

Steelhead Annual Operation Plan

For

Lower Snake River Fish and Wildlife Compensation Plan

Grande Ronde and Imnaha Basin

For the Period of

January 1 – December 31, 2018

Prepared by:

Oregon Department of Fish and Wildlife

Confederated Tribes of the Umatilla Indian Reservation

Nez Perce Tribe

For

Lower Snake River Compensation Plan

USFWS

and

Bonneville Power Administration

Final

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Figure 1. Steelhead hatchery facilities and release locations in Northeast Oregon.

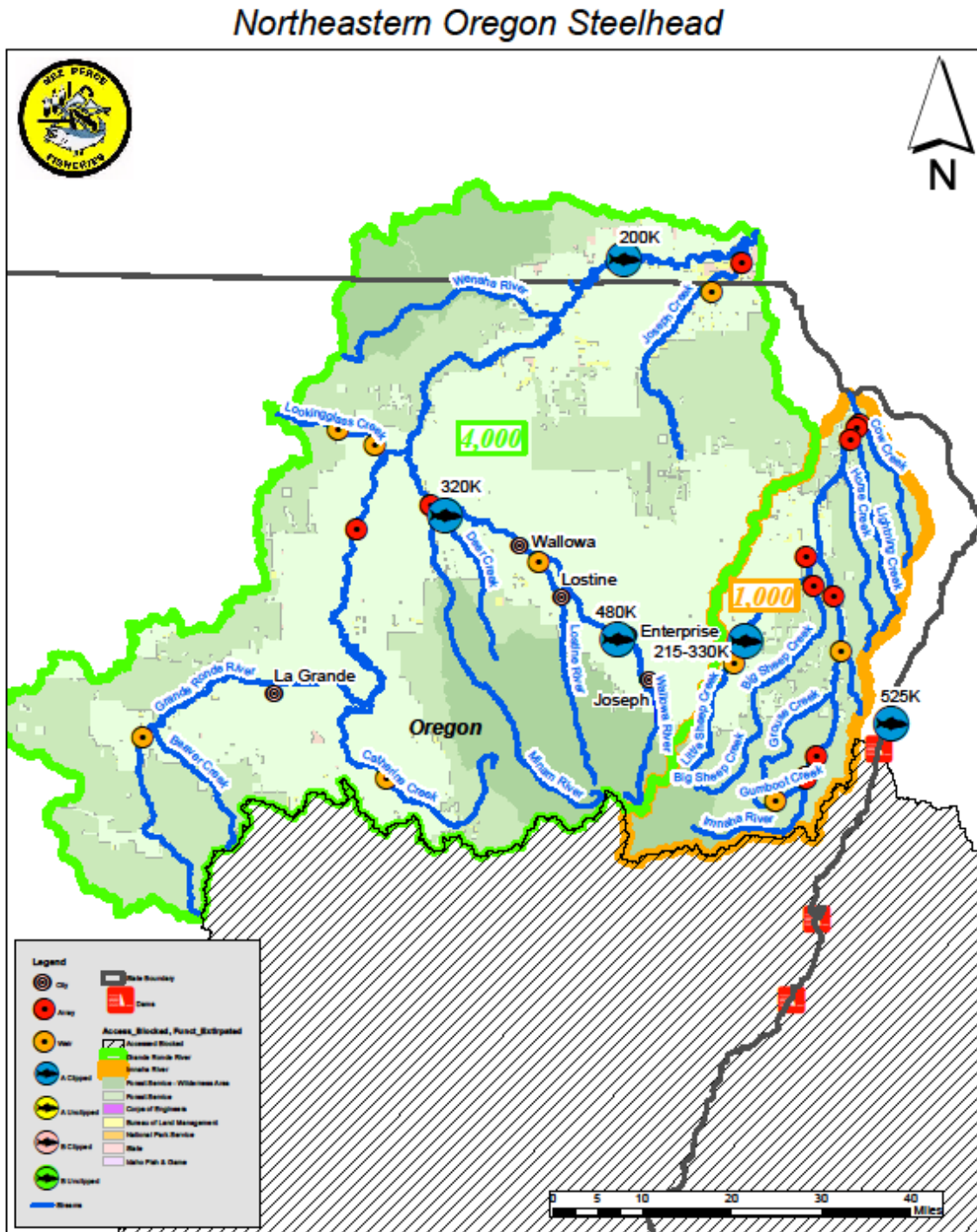


Table 1. Steelhead Smolt Release Goals by Release Site.

Smolt Release Program	Rearing Facility	Release Site	Parent Stock	Annual Smolt Release Goal
LSRCP / ODFW	WAL/IRR	Wallowa Acclimation Pond Early	Wallowa	320,000
	WAL/IRR	Wallowa Acclimation Pond Late	Wallowa	160,000
	Total			480,000
	WAL/IRR	Big Canyon Acclimation Early	Wallowa	160,000
	WAL/IRR	Big Canyon Acclimation Late	Wallowa	160,000
	Total			320,000
	WAL/IRR	Little Sheep Acclimation	Imnaha	215,000
	Total			215,000
	1,015,000			

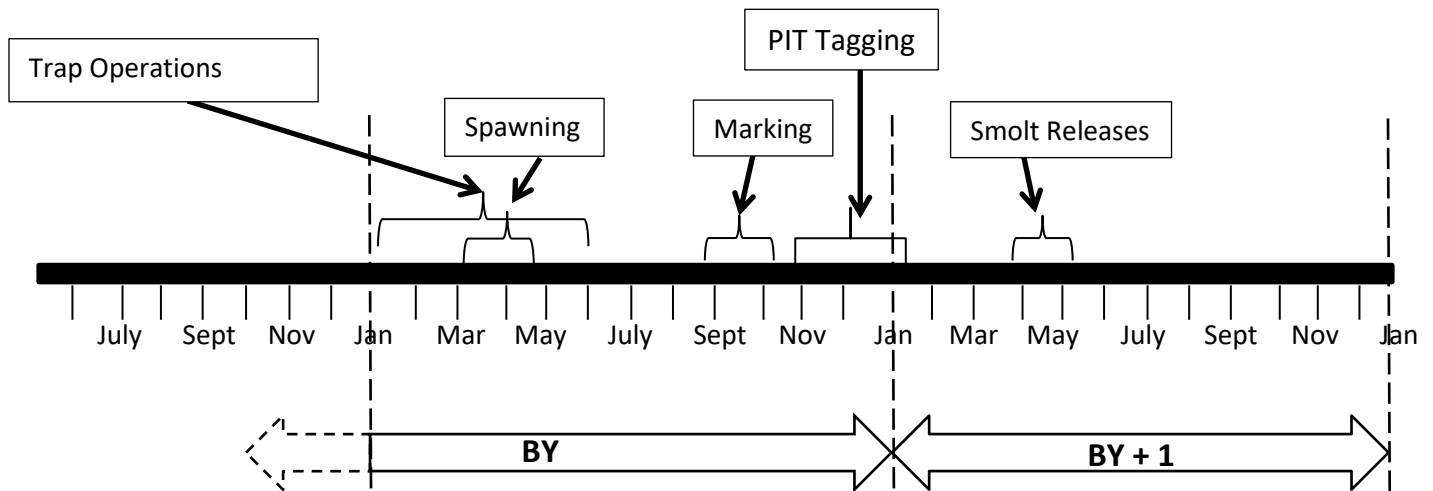


Figure 2. Steelhead Production Timeline

Table 2. BY2017 Steelhead Rearing Goals by Mark Type

Hatchery	Release Site	Stock	Rearing Goals by Mark Type							PIT Tags				
			Date	Total ⁴					Total # Tags ^{1,3}	Funding Source ²				
					AD	AD CWT	ADRV	ADRV CWT		ADLV CWT	CSS	LSRCP	IPC	USFWS
Irrigon	Wallowa Acc. 1st Release	Wallowa	11/15/17	280,000	45,000	50,000	135,000	25,000	25,000	10,500	3,500	7,000	-	-
Irrigon	Wallowa Acc. 2nd Release	Wallowa	11/15/17	160,000	55,000	25,000	55,000	25,000	-	1,700	700	1,000	-	-
Irrigon	Big Canyon Acc. 1st Release	Wallowa	11/15/17	160,000	110,000	50,000	-	-	-	3,400	1,400	2,000	-	-
Irrigon	Big Canyon Acc. 2nd Release	Wallowa	11/15/17	160,000	135,000	25,000	-	-	-	3,400	1,400	2,000	-	-
Irrigon	Cottonwood	Wallowa	11/15/17	40,000	15,000	25,000	-	-	-	4,000		4,000	-	-
Totals				800,000	360,000	175,000	190,000	50,000	25,000	23,000	7,000	16,000	-	-
Lyons Ferry	Wallowa Acc. 1st Release	Wallowa		40,000	40,00	-	-	-	-	0		4,000		
Irrigon	Little Sheep Accl. Pond	L. Sheep	11/15/17	215,000	190,000	25,000	-	-	-	15,000	7,000	8,000	-	-
Totals				215,000	190,000	25,000	-	-	-	15,000	7,000	8,000	-	-
Grand Total				1,015,000	550,000	200,000	190,000	50,000	25,000	38,000	14,000	24,000	-	-

¹ Represents actual number PIT tagged if tags have already been inserted at the time of this report

² Represents number of tags supplied by each agency. Sum total may not equal "Total # Tags" for locations where tagging has already occurred

³ Actual tag release numbers by release group will be available at: http://www.cbr.washington.edu/dart/query/pit_releases

⁴ Numbers in the "Total" column may not equal the current inventory shown in Table 3.

Table 3. BY2017 Steelhead Rearing and Releases

Hatchery	Release Site	Stock	Inventory AFTER Marking			Release Goals ¹		Projected Smolt Releases			% of goal
			Date	Number	Size (FPP)	Number	Size (FPP)	Start Date	Number	Size (FPP)	
Irr/Wal	Wallowa Accl. Pond - 1st Release	Wallowa	10/30/2017	295,416	27.0	280,000	4.0	4/1/2018	294,000	5.0	105%
Irr/Wal	Wallowa Accl. Pond - 2nd Release	Wallowa	10/30/2017	168,551	27.0	160,000	4.0	4/18/2018	167,500	4.5	105%
Irr/Wal.	Cottonwood Accl. Pond	Wallowa	10/30/2017	43,005	27.0	40,000	4.0	4/10/2018	42,900	4.5	107%
Lyons Ferry	Wallowa Accl. Pond - 1st Release	Wallowa	N/A	N/A	N/A	40,000	4.5	4/1/2018			
Irr/Wal	Big Canyon Accl. Pond - 1st Release	Wallowa	10/30/2017	169,206	27.0	160,000	4.0	4/11/2018	168,000	4.5	105%
Irr/Wal	Big Canyon Accl. Pond - 2nd Release	Wallowa	10/30/2017	168,269	27.0	160,000	4.0	5/1/2018	167,000	4.5	104%
Totals				844,447		800,000					
Irr/Wal	Little Sheep Accl. Pond	L. Sheep	10/30/2017	252,781	5.0	215,000	4.5	4/1/2018	251,000	5.0	117% ²
Grand Total				1,097,228		1,015,000			1,090,400		

¹ Release goal does not include 40,000 smolts reared at Lyons Ferry Hatchery in Washington that are released at Wallowa Acclimation Ponds for the ODFW-WDFW reciprocal study.

² Current permit limits smolt releases to 110% of release goal. Co-managers are seeking an exception from NOAA Fisheries to release the full production (~251,000 or 117%) in 2018, and is pending approval at the time this document was finalized.

Table 4. BY2017 Steelhead Transport, M&E Sampling and Release Schedule

Transfer Date	M&E Sampling^a	Release Date	Stock	From Ponds	To	Number	Est. Pounds
Jan. 22-23	Mar. 30	April 1-3	5617	7*,9,11,12	Wallowa Lower Acc	168,000	33,600
Jan. 23-24	Jan. 26 Feb. 20 ^b Mar. 30	April 2-3	5617	8*,10*	Wallowa Upper Acc	83,800	16,760
Jan. 31	Mar. 30	April 2-3	5617	Lyons Ferry	Wallowa Upper Acc	42,000	9,333
Jan. 30	Nov. 15 ^c Dec. 13 ^c Jan. 26 ^c Jan. 30	April 10	5617	14*	Cottonwood	42,900	9,533
Feb. 20	Feb. 20 ^b Mar. 30	April 2-3	5617	16*	Wallowa Upper Acc	43,100	9,577
Feb. 20-21	Apr. 10	April 11-13	5617	13,15*	Big Cany. Lower Acc	83,700	18,600
Feb. 21-22	Apr. 10	April 12-13	5617	17,18*	Big Cany. Upper Acc	84,900	18,667
Feb. 22-24	Mar. 29 Apr. 30 ^d	April 1-30	2917	27, 28*, 29, 30, 31,32	Little Sheep Acc	251,800	50,360
Apr. 3-4	Apr. 17	April 18-30	5617	19 ,20*, 21*, 22	Wallowa Lower Acc	168,000	37,333
Apr. 16	May 1 May 11 ^d	May 1-11	5617	23*,25	Big Cany. Lower Acc	83,700	18,600
Apr. 17	May 1 May 11 ^d	May 2-11	5617	24,26	Big Cany. Upper Acc	84,000	18,667
Total						1,135,900	241,030

* Denotes Coded Wire Tag (CWT) Pond

^a Sampling is for pre-release unless otherwise footnoted.

^b This group cannot be identified by external marks once they are in acclimation ponds, so samples are collected just prior to acclimation.

^c Smolt physiological assessments for the reciprocal study.

^d Sex ratio determination.

Table 5. BY 2018 Steelhead Spawning

Trap Site	Egg Destination	Stock	Spawning Dates	Predicted Return Natural	Predicted Return Hatchery	Wild Fish Needed for Spawning		Hatchery Fish Needed for Spawning		
				Total	Total	Males	Females	Males	Females	Total
Wallowa	Irrigon	Wallowa - Production	February 28 -RV's only (Wednesdays) March 7 - 25 Females; RV's as needed March 14 - 14 Females; RV's as needed March 21 - 17 Females; RV's as needed March 28 -16 Females; RV's as needed April 4 - 15 Females; RV's as needed April 11 - 27 Females; RV's as needed	N/A	1,764*	None – Hatchery Only		114	114	228
Wallowa	Irrigon	Wallowa - Fall Brood		None – Hatchery Only	122	122	244			
Big Canyon	Irrigon	Wallowa-Production	N/A	13	1,052	Broodstock not collected at Big Canyon				
Little Sheep	Irrigon	Little Sheep	Estimated first spawn (Tues) March 20. Spawn each Tuesday for six weeks or until goals is met.	37	944	2	2	68	64	136

*This estimate includes Wallowa Fall Brood

Trap Site	Egg Destination	Stock	Fecundity	Egg Take Goal	Egg Transfer Goal
				Green Eggs	Eyed Eggs
Wallowa	Irrigon	Wallowa - Production	5,000	570,000	500,000
Wallowa	Irrigon	Wallowa - Fall Brood	4,800	585,000	500,000
Big Canyon	n/a	Wallowa-Production	Broodstock not collected at Big Canyon		
Little Sheep	Irrigon	Little Sheep	4,800	317,000	282,000

Table 6. BY 2018 Little Sheep Steelhead Broodstock Collection Targets

Week Ending (Fri)	Natural				Hatchery			
	Average % by Week	Males	Females	Total	Average % by Week	Males	Females	Total
16-Mar	5.4%	0	0	0	6.9%	4	4	10
23-Mar	9.7%	0	0	0	8.6%	5	5	6
30-Mar	8.6%	0	0	0	12.6%	8	8	13
6-Apr	16.0%	1	1	2	18.8%	13	12	18
13-Apr	16.5%	1	1	2	19.2%	14	13	17
20-Apr	15.2%	0	0	0	13.9%	10	9	18
27-Apr	14.8%	0	0	0	11.6%	8	7	21
4-May	9.2%	0	0	0	5.7%	4	4	16
11-May	2.6%	0	0	0	1.8%	1	1	4
18-May	1.3%	0	0	0	0.7%	1	1	2
25-May	0.7%	0	0	0	0.2%	0	0	1
Total		2	2	4		68	64	132

*No management of the proportion of hatchery/natural fraction at natural adult run sizes <100. Assuming a predicted natural return of 37 fish, pass six hatchery fish for every one natural, resulting in approx. 231 total adults of the 250 adult target above the weir to spawn naturally in Little Sheep Creek.

Table 7. BY2018 Production Planning

Stock	HAT¹	Pond	# Fish	LBS	F/LB²	Transfer Location	Approx Transfer Date	Approx Release Date³	Marks
5618-FB	IR	7	42,000	8,400	5.0	WA Lower Pond	January 20th	Early April	25K ADRVCWT, 17K ADRV, 1300 PIT LSRCP, 700 PIT CSS
5618-Prod	IR	8	42,000	8,400	5.0	WA Upper Pond	January 20th	Early April	25K ADLVCWT, 17K AD, 1300 PIT LSRCP, 700 PIT CSS
5618-FB	IR	9	42,000	8,400	5.0	WA Lower Pond	January 20th	Early April	42K ADRV
5618-Prod	IR	10	42,000	8,400	5.0	WA Upper Pond	January 20th	Early April	25K ADCWT, 17K AD, 1000 PIT LSRCP, 700 PIT CSS
5618-FB	IR	11	42,000	8,400	5.0	WA Lower Pond	January 20th	Early April	42K ADRV
5618-FB	IR	12	42,000	8,400	5.0	WA Lower Pond	January 20th	Early April	42K ADRV
5618-FB	IR	13	42,000	9,333	4.5	Big Canyon Lower	February 15th	April 15th	42K AD
5618-Prod	IR	14	42,000	9,333	4.5	WA Upper Pond	January 20th	Early April	42K AD
5618-FB	IR	15	42,000	9,333	4.5	Big Canyon Lower	February 15th	Mid April	25K ADCWT 17K AD, 1000 PIT LSRCP, 700 PIT CSS
56-18-Prod	IR	16	42,000	9,333	4.5	WA Upper Pond	February 20	Early April	25K ADCWT, 17K AD, 1000 PIT LSRCP, 700 PIT CSS
5618-Prod	IR	17	42,000	9,333	4.5	Big Canyon Upper	April 5th	April 15th	42K AD
5618-Prod	IR	18	42,000	9,333	4.5	Big Canyon Upper	April 5th	April 15th	25K ADCWT 17K AD, 1000 PIT LSRCP, 700 PIT CSS
5618-FB	IR	19	42,000	9,333	4.5	WA Lower Pond	April 5th	April 15th	42K ADRV
5618-Prod	IR	20	42,000	9,333	4.5	WA Lower Pond	April 5th	April 15th	42K AD
5618-FB	IR	21	42,000	9,333	4.5	WA Lower Pond	April 5th	April 15th	25K ADRVCWT, 17K ADRV, 1000 PIT LSRCP, 700 PIT CSS
5618-Prod	IR	22	42,000	9,333	4.5	WA Lower Pond	April 5th	April 15th	25K ADCWT, 17K AD, 1000 PIT LSRCP, 700 PIT CSS
5618-FB	IR	23	42,000	9,333	4.5	Big Canyon Lower	April 15th	Early May	25K ADCWT, 17K AD, 1000 PIT LSRCP, 700 PIT CSS
5618-Prod	IR	24	42,000	9,333	4.5	Big Canyon Upper	April 15th	Early May	25K ADCWT, 17K AD, 1000 PIT LSRCP, 700 PIT CSS
5618-FB	IR	25	42,000	9,333	4.5	Big Canyon Lower	April 15th	Early May	42K AD
5618-Prod	IR	26	42,000	9,333	4.5	Big Canyon Upper	April 15 th	Early May	42 AD

¹ Hatchery abbreviations: IR – Irrigon Hatchery

² F/LB is the number of fish per pound at time of transfer.

³ Release date is the approximate date of the first release.

Table 7 Continued. BY2018 Production Planning

Stock	HAT¹	Pond	# Fish	LBS	F/LB²	Transfer Location	Approx Transfer Date	Approx Release Date³	Marks
2917-IM	IR	27	36,000	7,200	5.0	Little Sheep Acc. Pond	Late Feb./Early March	Early April	36K AD
2917-IM	IR	28	36,000	7,200	5.0	Little Sheep Acc. Pond	Late Feb./Early March	Early April	25K ADCWT, 17K AD, 2700 PIT LSRCP, 2300 PIT CSS
2917-IM	IR	29	36,000	7,200	5.0	Little Sheep Acc. Pond	Late Feb./Early March	Early April	36K AD
2917-IM	IR	30	36,000	7,200	5.0	Little Sheep Acc. Pond	Late Feb./Early March	Early April	36K AD, 2700 PIT LSRCP, 2300 PIT CSS
2917-IM	IR	31	36,000	7,200	5.0	Little Sheep Acc. Pond	Late Feb./Early March	Early April	36 K AD
2917-IM	IR	32	36,000	7,200	5.0	Little Sheep Acc. Pond	Late Feb./Early March	Early April	36K AD, 2600 PIT LSRCP, 2400 PIT CSS

¹ Hatchery abbreviations: IR – Irrigon Hatchery

² F/LB is the number of fish per pound at time of transfer.

³ Release date is the approximate date of the first release.

Standard Operating Procedures

Steelhead (*Oncorhynchus mykiss*)

I. Summer Steelhead - Grande Ronde- Wallowa Stock

A. Production goals

Wallowa stock smolt release is 800,000 fish at 4.0 fpp consisting of 400,000 Fall brood and 400,000 Production.

B. Allocations –Wallowa fish will be acclimated at the Wallowa, Big Canyon, and Cottonwood Creek facilities. Wallowa and Big Canyon releases will occur in two acclimation periods.

C. Liberations

1. **Wallowa Acclimation:** Smolts will be transferred from Irrigon Hatchery and Lyons Ferry Hatchery to Wallowa Hatchery and Cottonwood Creek acclimation ponds.

a. **Early Group** – released after a 10 -13 week acclimation

- i. **Lower Acclimation Pond** – The screens will be pulled on the release date. Remaining fish will be forced out after 2 days.
- ii. **Upper Acclimation Pond** – The screen will be pulled on the release date. Remaining fish will be forced out after 1 day.
- iii. In February 40,000 smolts will be transferred to Cottonwood and 40,000 will be transferred from Lyons Ferry Hatchery to Wallowa Hatchery acclimation as part of a reciprocal study.
- iv. One raceway (~ 40,000 smolts) will be transferred to Wallowa Hatchery in February from Irrigon to compare the effect of a long and short acclimation on survival and straying.

b. **Late Group** – released after 1-3 weeks of acclimation

- i. **Lower Acclimation Pond** – The screens will be pulled on the release date. Remaining fish will be forced out after 10 days.

2. **Big Canyon Acclimation:** Smolts will be transferred from Irrigon Hatchery to the Big Canyon acclimation ponds.

a. **Early Group** – released after 5-7 weeks of acclimation

- i. **Lower Acclimation Pond** – The screens will be pulled on the release date. Remaining fish will be forced out after 2 days.
- ii. **Upper Acclimation Pond** – The screen will be pulled on the release date. Remaining fish will be forced out after 1 day.

b. **Late Group** – released after 1-3 weeks of acclimation

- i. **Lower Acclimation Pond** – The screens will be pulled on the release date. Remaining fish will be forced out after 12 days.

- ii. **Upper Acclimation Pond** – The screen will be pulled on the release date. Remaining fish will be forced out after 11 days.
 - iii. **Residual removal** – On the force out date, ODFW Fish Research will sample smolts in the acclimation pond. If >70% of the sample contains *males*, fish will be enumerated and released into area ponds at the District Biologist’s discretion. Fish Research will scan for PIT tags.
- 3. Liberation Notifications:** ODFW (Harrod) will notify Yanke, Garner, Sedell and Keniry (ODFW), Harbeck and Tenant (NPT), and Putnam (IDFG) of steelhead releases.

D. Trap Operations

1. Wallowa Trap

- a. **Period of Trap Operation** - Wallowa trap will be installed in late January. Collections will continue until no fish are caught for 10 consecutive days.
- b. **Trap/sorting Frequency** - Work trap Wednesdays with ODFW staff.
- c. **Disposition of Trapped Fish**
 - i. **Marked** - Brood collection. Surplus fish will be distributed to food banks, buried at Wallowa Hatchery and outplanted to Roulet Pond (50), Marr Pond (100) and Wallowa Wildlife Pond (70). Stocked fish will be marked with 2-left opercle punches.
 - ii. **Unmarked**—Transport unmarked fish to the Wallowa River and release. Sampling shall include genetic punch, sex, and length.
 - iii. **Residual Steelhead** – Count and sample all residuals, take snouts from all CWT fish, and euthanize all marked fish. After smolts have been released from acclimation pond, discontinue residual sampling.

2. Big Canyon Trap

- a. **Period of Trap Operation** - The Big Canyon trap will be installed in early-February or as winter conditions allow. Collections will continue until no fish are caught for 10 consecutive days. From initial start-up through April 30, the ladder will be operated from Monday afternoon through Friday morning. After sorting on Fridays, the ladder will remain closed through Monday afternoon to increase hatchery fish availability to anglers. Beginning May 1, the ladder will remain open throughout the trapping operation.
- b. **Trap/sorting/ Frequency** - Work trap weekly with a preference for Fridays.
- c. **Disposition of Trapped Fish**
 - i. **Marked** – Possible brood collection. Surplus fish will be distributed to food banks, buried at Wallowa Hatchery and outplanted to Roulet Pond, Marr Pond, or Wallowa Wildlife Pond. Stocked fish will be marked with 2-left opercle punches.
 - ii. **Unmarked** - Pass all fish above the weir in Deer Creek. Measure all released fish and mark with 1-LOP.
 - iii. **Residual Steelhead** - Count and sample weekly until first smolt release, take snouts from all CWT fish, and euthanize all marked fish. After smolts have been released from acclimation pond, discontinue residual sampling.
 - iv. **Disposition of Fallback Fish** - Staff will collect heads and scales from dead fish on the Deer Creek weir and pass live fish downstream.

E. Brood Collection

1. **Wallowa Hatchery** – Approximately 450 adults are required to produce the base program of 800,000 smolts.
 - a. Wallowa steelhead are held and spawned at Wallowa Hatchery. Spawning 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. The first 200 + RV clipped fish trapped will be held at a 50:50 Male / Female ratio to meet spawning goals. In-season adult collection adjustments will be made depending on mortality and spawning success.
2. **Big Canyon** - Brood will be collected and spawned if production needs exist.

F. Spawning Guidelines

1. **Wallowa First Spawn** – Early March.
2. **Expected Spawning Frequency** – Weekly on Wednesdays.
3. **Spawning Strategies**
 - a. Fish are spawned at a 1:1 ratio and loaded into incubation trays up to 2 females per tray. Fall Brood and Production eggs are segregated during incubation.
 - b. Production eggs will be represented from 6 egg takes. ODFW Fish District staff develops a number of fish to spawn related to Fish Research run estimates.
 - c. Fall Brood spawning will occur weekly in March until the goal number of spawned fish is reached. Ripe fish will be spawned as needed from on-hand collected brood.

G. Incubation and Rearing

1. Green eggs will be incubated at Wallowa Hatchery. Eyed eggs will be transferred to Irrigon Hatchery and will represent all egg takes.
2. Eggs will be hatched and ponded at Irrigon Hatchery.
3. Fish will be reared at Irrigon Hatchery until time of transfer to acclimation sites.
4. Fall Brood and Production fish will be segregated at Irrigon Hatchery.
5. If excess occurs greater than expected eggs can be culled and used for resident trout production, or ODFW will propose release location such as Kinney Lake or Oxbow Reservoir. Excess smolts will not be marked.

II. Summer Steelhead - Imnaha Stock

In 2017 the National Marine Fisheries Service issued a permit which covers activities related to the production, monitoring, and evaluation of the Little Sheep Creek Summer Steelhead Hatchery Program. The permit has additional details on these activities, and can be found at:

https://www.fws.gov/lsnakecomplan/Reports/ESA%20Compliance/Permits/NMFS_Final%20Permit%2018032%20Little%20Sheep%20STH_07-25-2017.pdf

- A. **Production goals** - Little Sheep smolt release is 215,000 fish at 4.5 fpp.

- B. Allocations** –Little Sheep fish will be acclimated at the Little Sheep Creek satellite facility. The releases will occur in one acclimation period.
- C. Liberations - Little Sheep Acclimation:** Smolts will be transferred from Irrigon Hatchery to Little Sheep Creek acclimation pond.
1. Smolts are volitionally released after a 5-8 week acclimation. Beginning in the first part of April, the screens are pulled and the fish are allowed 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 release date.
 2. Fish Research will sample smolts in the acclimation pond. If >70% of the sample contains *males*, remaining fish will be estimated and up to 7,500 fish released in Kinney Lake. If outplanted, Fish Research will scan for PIT tags. Otherwise, the remaining fish will be forced out.
 3. Liberation Notifications: ODFW (Harrod) will notify Yanke, Garner, Sedell and Keniry (ODFW), Harbeck and Tenant (NPT), and Putnam (IDFG) of steelhead releases.

D. Trap Operations

1. Little Sheep Trap

a. Period of Trap Operation - The Little Sheep Creek trap will be installed in late February. Collections will continue until no fish are caught for 10 consecutive days.

b. Trap/sorting Frequency - Work trap Monday and Thursday with ODFW staff.

c. Disposition of Trapped Fish

- i. Marked** - Adults collected for broodstock, placed above the weir and marked with a 1 LOP, distributed to food banks, used for stream enrichment, or buried.
- ii. Unmarked** -Adults collected for broodstock or placed above the weir and marked with a 1-LOP.
- iii. Genetics tissue samples** - Tissue sample all wild and hatchery fish passed above the weir for genetic analysis by ODFW (for NOAA Fisheries).
- iv. Residual Steelhead** – Count weekly until first smolt release, take snouts from all CWT fish, and euthanize all marked fish. After smolts have been released from acclimation pond discontinue residual sampling.
- v. Surplus** – Steelhead in excess of production or natural production needs above the weir are considered surplus. These fish will be killed and: 1) distributed to tribes and/or local food banks, 2) placed in Little Sheep Creek for nutrient enrichment purposes, or 3) buried in a landfill. If IHNV prevalence $\geq 30\%$ then nutrient enrichment would have to stop. Contact Jim Harbeck (NPT) for carcass availability.
- vi. Disposition of fall back fish.** 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.
- vii. Carcass Disposal** - Spawned fish not suitable for distribution can be placed in the stream for nutrient enhancement or buried in a landfill.
- viii. Strays** - All unidentified marked fish (e.g. RV only, maxillary clip) will be sacrificed.
- ix. Scales** - Samples will be collected from all wild adults.

E. Brood Collection

1. Broodstock Management guidelines- Approximately 126-137 adults are required to produce the base program of 215,000 smolts.
2. The guideline for the proportion of natural fish in the broodstock is as follows:
 - a. At less than or equal to 100 natural returns, use 10% of natural run for broodstock
 - b. At greater than 100 natural returns, use 10 natural fish plus 40% of the natural run greater than 100 for broodstock.
3. Remaining broodstock needs are comprised of hatchery adults.
4. Wild and Hatchery adults are collected based upon weekly estimated run timing to the facility. ODFW Fish Staff (Yanke) will create a table to reflect all collections.
5. Little Sheep Creek – In season modification - The run size will be reviewed around April 1 and adjustment can be made for broodstock collections.

F. Spawning Guidelines

1. **Little Sheep Satellite First Spawn** – Mid March.
2. **Expected Spawning Frequency** – Weekly on Tuesdays.
3. **Spawning Strategies-**
 - c. A 2 x 2 or 3 x 3 spawning matrix will be utilized. A matrix will include at least one natural fish, whenever possible.
 - d. When eggs have been fertilized, the embryos will be combined into groups of three females. These groups will be tracked.
 - e. Note: Live spawn all wild males retained for broodstock, collect genetic tissue sample (1 LOP), and release above the weir.

G. Incubation and Rearing

1. Green eggs will be incubated at Wallowa Hatchery. Eyed eggs will be transferred to Irrigon Hatchery and will represent all egg takes.
2. Eggs will be hatched and ponded at Irrigon Hatchery.
3. Fish will be reared at Irrigon Hatchery until time of transfer to acclimation sites.
4. 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.

III. Monitoring and Evaluation

Summary: 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. PIT tags will 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 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.

A. Current Studies

1. Fallbrood versus standard production, began with 2004 cohort (funded by LSRCP)
2. Comparative Survival Study (for the Fish Passage Center, contact: Brandon Chockley), compares barging at Lower Granite vs. natural downstream migration (funded by BPA)
3. ODFW-WDFW reciprocal release study, began with 2015 release and ended with 2017 (funded by LSRCP)
4. Effect of no. of days of acclimation on survival, straying, began with 2015 release (funded by LSRCP)
5. Effect of vent clip, CWT, on survival and straying began with 2015 release (funded by LSRCP)
6. Pilot study assesses efficacy of trapping residuals from acclimation ponds (funded by LSRCP)
7. Relative Reproductive Success (RRS) of Imnaha stock – Reproductive success of hatchery and wild Imnaha adults passed above the weir to spawn naturally is evaluated using genetics run by NOAA Fisheries (contact: Ewann Bernston). All fish released above the weir and used for broodstock are sampled for genetics. (funded by BPA)

B. Work Conducted at Facilities

1. Irrigon Hatchery

- a. Physiological sampling of Wallowa stock (contact: Kyle Hanson, USFWS). Sample 30 fish from raceway going to Cottonwood Acclimation – measure FL, wt. (g), collect gill filaments for ATPase measurements, sacrifice fish for lipid analysis. This work is associated with the ODFW-WDFW reciprocal study.
- b. PIT tagging
 - i. November tagging – 16k LSRCP tags (8k Wallowa stock and 8k Imnaha stock), 13.3k CSS tags (6.3k Wallowa and 7k Imnaha stock).
 - ii. January tagging – 8,000 LSRCP tags (4k in pond 14 going to Cottonwood), and 4,000 in pond 10 (control for reciprocal study), 700 for CSS in pond 10.

2. Wallowa Hatchery

- a. Spawning
 - i. Wallowa stock - sample all adults. Measure FL, weight, record fin clip, opercle punch, collect snouts on CWT'd fish, collect genetic tissue samples from all brood used in production for Matt Campbell's (Eagle Genetics Lab, ID) parental based tagging study.
 - ii. Imnaha stock – sample adults that were spawned at Little Sheep Facility by hatchery staff the previous day - same sampling protocol as Wallowa stock except collect two genetic samples, one for the Eagle Genetics Lab and one for NOAA Fisheries (contact: Ewann Bernston).
- b. Pre-release sampling – For each unique release group, measure 100 FL (mm), 50 weights (g), and 300 Ad-clip quality in each acclimation pond.
- c. Install 2 PIT tag antennas in adult ladder for duration of trapping.
- d. Use 24 hr set of minnow-type trap in acclimation pond to assess whether residuals can be lured into trap by pheromones.

3. Big Canyon Facility

- a. Pre-release sampling – Same procedure as at Wallowa Hatchery, except collect 50 genetic tissue samples for NOAA Fisheries (contact: Ewann Bernston)

- b. Sex ratio at end of volitional release – estimate number left in pond, measure FL, sacrifice 100 fish and determine gender – note if ripe. If > 70% male, outplant to ponds.
- c. Trapping – assist hatchery staff with running adult trap (weekly), record number, fork length, fin clip of adults by sex, collect snouts on CWT adults and residuals, and save opercle punches (1LOP) on all wild fish passed above weir.
- d. Fallbacks at weir – Assist with capture of fallbacks. Record sex, fin clip, FL (mm), opercle punch, and collect scales on fallbacks. Pass live fish downstream, and collect heads (for otoliths) on all dead fish.
- e. Sampling to enumerate residuals in Deer Creek – Mid to late July, using block seines and a backpack electrofisher, do multiple pass/removal of all salmonids at two sites. Count and measure (FL) by species, record origin (hatchery or wild) keeping each pass separate. Estimate number of age zero *O. mykiss*, Chinook salmon, and other non-salmonids.
- f. Use 24 hr set of minnow-type trap in acclimation pond to assess whether residuals can be lured into trap by pheromones.

4. Little Sheep Creek Facility

- a. Trapping – Hatchery staff will scan all hatchery fish (Ad clip) for CWT and collect snouts on distribution days (Mondays).
- b. Pre-release sampling– same procedures as Wallowa Hatchery, except collect 50 genetic tissue samples for NOAA Fisheries (contact: Ewann Bernston)
- c. Sex ratio at end of volitional release – estimate number left in pond, measure FL, sacrifice 100 fish and determine gender – note if ripe. If > 70% male, outplant to farm ponds (up to 7,500), otherwise force out.
- d. Install 2 PIT tag antennas in adult ladder for duration of trapping.
- e. Take scales from all wild fish passed above weir (Little Sheep trap crew).
- f. Sampling to enumerate residuals in Little Sheep Creek – Procedures similar to Big Canyon.
- g. Genetic sampling for the Relative Reproductive Success study (contact: Ewann Bernston NOAA Fisheries) – In mid-August, collect fin clip samples from *O. mykiss* as follows: 20 age-0, 20 age 1+, all wild fish >150 mm FL (considered rainbow trout), and all hatchery (ad-clipped) residuals at 8 sites above the Little Sheep Creek facility. Sites on Little Sheep Creek include Devils Gulch, Lightning Creek, Hayden Creek, Threebuck Creek, Rail Canyon, Austin/Martin property, McCully Creek, and Ferguson Creek.

C. Creel Surveys

1. Lower Grande Ronde River (1 Sept to 30 March)– One creel surveyor conducts pressure counts, and interviews anglers between counts, recording angler hours fished, angler origin, number of steelhead adults kept, hatchery fish released, and wild fish released. Creeler samples harvested fish, scans for PIT tags and CWT, records fin clip, FL (mm), sex, and collects snouts on all CWT fish.
2. Wallowa River (1 Feb to 15 April) – same sampling protocol as Lower GR, except no pressure counts.
3. Imnaha River (1 Feb to 30 April) – One creel surveyor runs a check station at Fence Creek, interviewing all anglers leaving lower river. During scheduled times, the surveyor closes the check station and drives upriver to the town of Imnaha and up Big Sheep Creek to the mouth of Little Sheep Creek, count and interview all anglers then return to the check station, recording time away from the check station. During the second day of a two-day sampling block, surveyor drives downstream to Cow Creek, counting and

interviewing all anglers. Creeler collects the same sampling information as on the Lower GR and Wallowa surveys.

D. Adult Return and Juvenile Release Monitoring

1. CWT vs. PIT tag reconstruction of abundance, mortality, and life history traits throughout the run; Grande Ronde and Imnaha basin harvest.
2. Download PIT tag detections at dams and weirs for in-season run forecasts and run timing – detections at Bonneville and Lower Granite dams, Wallowa and Imnaha rivers, Wallowa Hatchery, Big Canyon and Little Sheep Creek acclimation facilities.
3. Little Sheep acclimation pond volitional release – download PIT tag detections at Lower Granite Dam to investigate whether timing of volitional departure from acclimation is related to juvenile arrival timing and survival at the dam.

E. Marking and Tagging

1. Ad-clip – October at Irrigon Hatchery in conjunction with CWT'ing.
2. CWT - October at Irrigon Hatchery. Eleven 25k tag groups are represented.
 - a. Production – Wallowa Hatchery upper acclimation pond - April release.
 - b. Fallbrood – Wallowa Hatchery lower acclimation pond -April release.
 - c. Production (LV clip) – Wallowa Hatchery upper acclimation pond – April release.
 - d. Production – Wallowa Hatchery lower acclimation pond - May release.
 - e. Fallbrood – Wallowa Hatchery lower acclimation pond -May release.
 - f. Production – Big Canyon upper acclimation pond –April release.
 - g. Fallbrood – Big Canyon lower acclimation pond – April release.
 - h. Fallbrood – Big Canyon lower acclimation pond – May volitional release.
 - i. Little Sheep production – Little Sheep acclimation pond – April volitional release.
3. CWT Recovery – Adult fish are scanned for CWTs using a tube detector or wand. If a tag is present, the snout is removed and placed in a bag with snout identification number. Snouts are sent to the ODFW Fish ID Lab in Clackamas for processing, typically in June.
4. PIT tag – November and January of 2018 at Irrigon Hatchery.

IV. Fish Health

Location	Sp.	Stock	Examination Category	Protocol	Comment
Irrigon Hatchery	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	StS	56 or 29	Annual Myxobolus cerebralis	60 smolts that have been on the water supply for at least 6 months >180 days	Prefer using saved mortalities
Steelhead acclimation sites – WA, BI & LI	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 n = 60 <i>O. mykiss</i> from each water supply to be sampled for Mc prior to release.	Must be on water supply >180 days
Wallowa & Little Sheep	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. Discontinue out-planting if IHNV prevalence \geq 30%.
Wallowa & Little Sheep	StS	56 & 29	Adult Mortality	-kidney smears on TYE-S agar - A maximum of 10 mortality (29 stock) examined and no more than 20 of 56 stock will be examined	
Lookingglass Creek	StS or Sp		Adults	-mortalities examined for culturable viruses, bacteria, <i>R. salmoninarum</i> by ELISA	The scope of what can be learned from these mortalities will depend on the degree of degradation.

**Disinfections and Sanitation Guidelines
Specific Operational Recommendations**

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 ^a .
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

Disinfection and Sanitation Guidelines
Summary of Recommended Disinfectants (Concentration and time) and for what Application

Disinfectant^b	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.

^a Within a stock, operations will start with 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.

V. Grande Ronde Natural Population Monitoring

Summer Steelhead Monitoring: Catherine Creek/Grande Ronde River/Lookingglass Creek/Lostine River/Joseph Creek

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

- a. 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.
- b. 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 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

- i. Live, unclipped, first-time captures** – Enumerate, fork length, maturity, migration status, scales, sex, marks/tags, condition, take ONE opercle punch 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.
 - ii. 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).
 - iii. 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 and collect snouts if CWT present. 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).
 - iv. 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 and take otolith. 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. 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.

- i. **Adult Escapement** – Population estimate using mark-recapture methodology.
 - ii. **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).
 - iii. **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.
 - iv. **Live clipped first time captures** – LR fin clipped steelhead will be treated the same as unclipped steelhead.
 - v. **Live, clipped, previously punched captures** – Recaptured LR fin clipped steelhead will be treated the same as unclipped steelhead.
 - vi. **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.
- i. **Adult Escapement** - Enumeration using floating weirs with standoff structures going to the bank and a PIT tag array.
 - ii. **Wild/Hatchery** – No broodstock collection. Trap, collect data, and release only.
 - iii. **Kelts** – No broodstock collection. Trap, collect data, and release only.
 - iv. **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.
 - v. **Trapping Strategies** - Traps checked every day.
 - vi. **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.
3. **Disposition of bull trout and other non-target species**
- i. **Disposition of Bull trout** – Record date, number trapped, and estimated fork length (minimizing handling effects and avoid anesthetics). Report take to as per the US Fish

and Wildlife Service 2016 Biological Opinion with copy of data to ODFW (Yanke) and LSRCP (Robertson).

- ii. **Disposition of other non-target species** – Enumerate, subsample for length and release.
- iii. **Adult Mortalities** – Natural mortalities will be sampled for biological information and their heads retained for otolith extraction.

B. Remote PIT Tag Array Monitoring

NPT and ODFW operate remote in-stream detection systems in the Grande Ronde basin year round as 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”. 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 (WR1) - Wallowa River at rkm 14 - N 45.633769, W 117.73369- installed 8/16/2013.*
4. *Site Code (UGS) - Upper Grande Ronde Weir - N 45.248966, W 118.388930- installed 11/05/17.*

C. Key Contacts

1. CTUIR (McLean, Naylor). Distribute bull trout and steelhead data collected to ODFW District offices (Bailey, Yanke).
2. NPT (Vogel, Vatland, Watry). Distribute bull trout and steelhead data collected to ODFW District offices.
3. ODFW (Sedell, Feldhaus, Faber). Distribute bull trout and steelhead data collected to ODFW District offices (Bailey)

VI. Imnaha Basin Natural Population Monitoring

Summer Steelhead - Imnaha River and Tributaries (Cow, Camp, Big Sheep, Freezeout, and)

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

A. Tributary 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 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 once daily.
 - e. *Disposition of Fish*

- i. 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 Creek. 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.
 - ii. Other non-target species – Enumerated, subsampled for length and released.
- f. **Adult Mortalities** – Natural mortalities will be sampled for biological information.

B. Imnaha Weir Monitoring

When the Imnaha weir is operating during the time that steelhead may be present, NPT staff are available to assist. The following protocols will be used:

1. **New Upstream Steelhead** – If adult steelhead are observed in the Imnaha trap box they will be handled, processed and passed upstream. ODFW staff will operate the crowder system and make the fish available for processing. NPT staff will provide all the tools, instruments, scale and genetic tissue envelopes PIT tags, etc. needed to process the fish. NPT staff will record data and handle the fish until recovery. ODFW staff will then place the fish into the operating return tube.

If Chinook salmon and/or bull trout and steelhead are present in the trap at the same time, then Chinook salmon and/or bull trout will take priority. ODFW will process the Chinook salmon and bull trout exclusively. NPT staff will either wait or leave and return at an agreed upon time when the steelhead can be processed without interfering with the Chinook operations.

Protocols to process upstream bound steelhead will be based upon those used at the tributary weirs. Steelhead removed from the trap will be placed in an anesthetic vessel provided by NPT containing a buffered solution of tricaine methanesulfonate (MS-222) at a concentration of 80 mg/L. After anesthetization, each fish will be examined for fin-clips, marks and/or tags, measured for fork length (cm), categorized by gender using secondary sexual characteristics, and origin determined (hatchery or natural). Scales will be collected from the preferred area of the fish and a 1ROP opercle punch given to each steelhead. The resulting tissue will be retained for future genetic analysis. Prior to release, steelhead without a preexisting PIT tag, will receive a tag for future detections on passover PIT tag arrays and downstream dams (kelts). These fish will be tagged in the cartilage of the pelvic girdle to facilitate tag retention during spawning. After tagging the steelhead will recover in a NPT provided vessel with fresh river water. ODFW staff will then release the recovered fish down the return tube.

2. **Live Kelts** – NPT staff will make daily kelt observations at the weir when turbidity levels allow. If kelts are present, every effort within reason will be made to safely pass kelts downstream. Panels will be raised temporarily in specific sections of the weir to accommodate their downstream movement. If flows allow, seine or dip nets may be used to encourage kelts to seek the temporary exit through the weir. If kelts are netted they will be immediately released below the weir. No live kelts will be examined or processed.

3. **Dead Kelts** – Steelhead kelts that have died on the weir or floated down as carcasses will be retained for processing (if flows allow for recovery). NPT will provide a steelhead carcass tote to hold carcasses until NPT staff can examine the fish. NPT will process the carcasses similar to methods used for live upstream steelhead. After examination carcasses will be passed downstream.
4. **Timeframe** – NPT staff will be at the Imnaha weir to assist on a daily basis until June 20 or until it can be determined that adult steelhead will no longer be present at the weir site.

B. Remote PIT Tag Array Monitoring

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.ptoccentral.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.*
8. *Site Code (IR4) – Imnaha Weir Downstream Array 45.19446, W 116.868774- installed 8/18/2016.*
9. *Site Code (IR5) – Imnaha Weir Upstream Array 45.193188, W 116.868593- installed 8/18/2016.*
10. *Site Code (IML) – Imnaha Weir Adult Ladder 45.19427639, W 116.8686635- installed 5/18/2015.*

C. Key Contacts

NPT (Vogel, Hesse, Young, Harbeck)