

Infrastructure and Operations Audit of the Tucannon Hatchery 2023



Tucannon Hatchery
Lower Snake River Compensation Plan

Ace Trump
Washington Department of Fish and Wildlife

Chris Starr
U.S. Fish and Wildlife Service

Contacts

Tucannon Fish Hatchery

Washington Department of Fish and Wildlife

Doug Maxey

Hatchery Manager

2303 Tucannon Road

Pomeroy WA, 99347

Phone: 509-843-1430

E-mail: douglas.maxey@dfw.wa.gov

Washington Department of Fish and Wildlife

Ace Trump

Hatchery Operations Manager

13780 Hwy 261

Starbuck WA, 99359

Phone: 509-646-9201

E-mail: ace.trump@dfw.wa.gov

Washington Department of Fish and Wildlife

Chris Donley

Region 1 Fish Program Manager

2315 N Discovery Place

Spokane Valley WA, 99216

Phone: 509-892-7861

E-mail: christopher.donely@dfw.wa.gov

U.S. Fish and Wildlife Service

Chris Starr

Facility Coordinator

Lower Snake River Compensation Plan Office

1387 S Vinnell Way, Suite 343

Boise, ID 83709

Phone: 208-514-5644

E-mail: chris_starr@fws.gov

U.S. Fish and Wildlife Service

Nathan Wiese

Program Coordinator

Lower Snake River Compensation Plan Office

1387 S Vinnell Way, Suite 343

Boise, ID 83709

nathan_wiese@fws.gov

Executive Summary

On February 23, 2023, Chris Starr, Facility Coordinator LSRCP, Nathan Wiese, Program Coordinator LSRCP, Doug Maxey, Tucannon Hatchery Manager, Ace Trump, Lyons Ferry Hatchery (LFH) Complex Operations Manager, conducted a high-level half-day infrastructure and operations assessment of the Tucannon Fish Hatchery (TFH).

The purpose of this document is to provide the Lower Snake River Compensation Plan (LSRCP) and other stakeholders ample conceptual-level information of the current infrastructure challenges. The goal is to incorporate audit findings into a 10-year strategic plan for LSRCP that will maximize in-house and external improvement opportunities by developing solutions that fit resources, budgets, and supportive programs in a logical sequence. These efforts are intended to significantly improve water quality, program capacity, efficiency, and flexibility at the facility and ultimately increase opportunities for LSRCP to meet adult mitigation targets.

This audit is a kick-off effort to assess all spring/summer Chinook rearing facilities within the LSRCP program following to the 10-year spring/summer Chinook Program Review for the Independent Scientific Review Panel (ISRP) in December 2022. With this review, the LSRCP intends to identify strategies toward improving performance of achieving project area goals of 58,700 spring/summer Chinook salmon adult returns. From 2004-2017, the LSRCP averaged 29,115 spring/summer Chinook salmon adult returns and failed to achieve the project area goal on any year during the period.

The Tucannon audit resulted in a couple of options for increasing spring Chinook capacity.

Move the reduced jumbo trout program from TFH to LFH. The program was 4,000 fish at .67fpp and is now 2,500 fish at .67fpp. They were moved to the same raceway at LFH as the jumbo trout program there. This opened up four round ponds for the acclimation/over winter at TFH of the Tucannon spring Chinook. This is a zero-cost move.

Move the catchable rainbow trout program off-site and rear Tucannon spring Chinook in the earthen pond. There are a few issues with this idea. A new production well would be needed at TFH to provide water to the earthen pond during the summer. Raceways needed at LFH are potentially slated to be filled with spring Chinook. Estimated cost for a new production well is \$100,000 and rearing the rainbow at a private facility is estimated to cost \$200,000.

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1 Scope

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2 Background

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

TFH includes a combined incubation and office building, back-up power generation building, feed storage shed, shop, domestic water building, two well houses and a spring water collection building. There is also a river intake and adult trapping facility located upstream of Rainbow Lake along the Tucannon River (Rainbow Lake Intake). There are two residences for staff on site to fulfill security and emergency response needs.

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

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

Spring Chinook

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

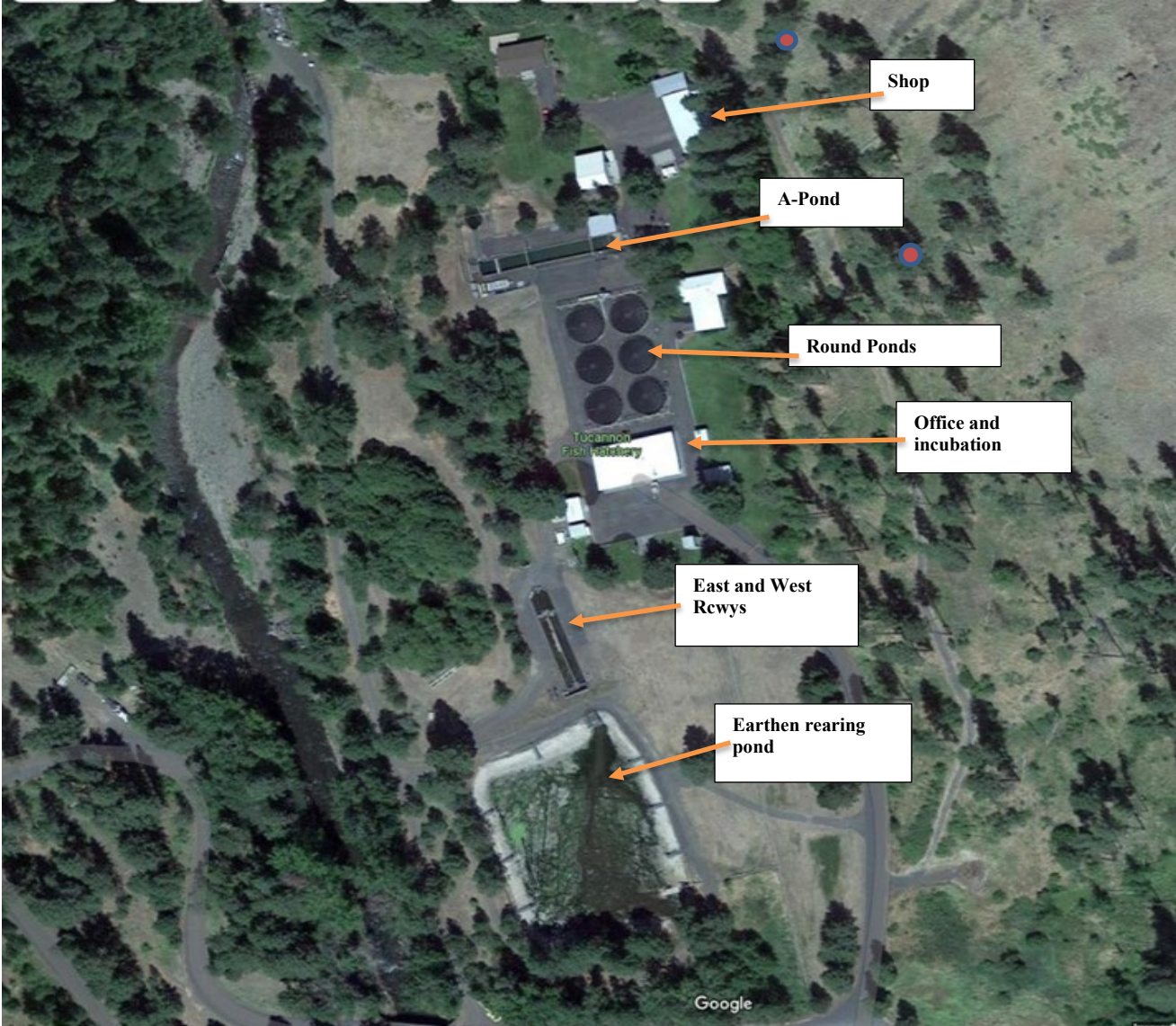
rearing/release strategies within and outside the Snake River basin, along with a potential to reinitiate a captive broodstock program in the near future to help preserve this stock.

The Tucannon River spring Chinook Salmon is in the Snake River Spring/Summer Chinook Salmon ESU, which was listed as threatened under the Endangered Species Act in 1992 (57 FR 14,653; April 22, 1992) – NOAA Fisheries 2017b.

Rainbow Trout

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

Tucannon Fish Hatchery



Two on-site residences ●

Table 1. Hatchery SAS adjusted for recoveries from outside the Tucannon River subbasin as reported in the RMIS database, 1985-2016 brood years. (Data downloaded from RMIS database on 12/02/21).

Brood Year	Estimated Number of Smolts	Expanded Return to Tucannon	Expanded Other Returns^a	Grand Total of CWT Hatchery Origin Recoveries	Original Hatchery SAR (%)	Adjusted Hatchery SAS (%)
1985	12,922	45	1	46	0.35	0.36
1986	152,725	319	15	334	0.21	0.22
1987	152,165	178	2	180	0.12	0.12
1988	145,146	385	25	410	0.27	0.28
1989	99,057	209	12	221	0.21	0.22
1990	85,737	28	0	28	0.03	0.03
1991	74,064	25	4	29	0.03	0.04
1992	87,752	76	17	93	0.09	0.11
1993	138,848	138	11	149	0.10	0.11
1994	130,069	32	0	32	0.02	0.02
1995	62,144	177	2	179	0.28	0.29
1996	76,219	265	4	269	0.35	0.35
1997	24,186	176	41	217	0.73	0.90
1998	127,939	793	216	1,009	0.62	0.79
1999	97,600	33	3	36	0.03	0.04
2000	102,099	157	1	158	0.15	0.15
2001	146,922	127	5	132	0.09	0.09
2002	123,586	121	0	121	0.10	0.10
2003	71,154	71	0	71	0.10	0.10
2004	67,542	120	1	121	0.18	0.18
2005	149,466	690	2	692	0.46	0.46
2006	106,530	1,122	36	1,158	1.05	1.09
2007	114,681	261	5	266	0.23	0.23
2008	172,897	643	4	647	0.37	0.37
2009	231,437	300	7	307	0.13	0.13
2010	201,585	194	1	195	0.10	0.10
2011	259,964	711	24	735	0.27	0.28
2012	203,510	514	3	517	0.25	0.25
2013	207,859	362	11	373	0.17	0.18
2014	221,099	458	2	460	0.21	0.21
2015	199,686	165	1	166	0.08	0.08
2016	209,031	50	0	50	0.02	0.02
Mean					0.23	0.25
Geometric Mean					0.15	0.16

^a Includes expanded RMIS CWT recoveries from sources outside the Tucannon River Subbasin (i.e., sport and commercial fisheries, Tucannon strays in other river systems, etc.).

2.1 Infrastructure

2.1.1 Hatchery Water Supply

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

2.1.2 Broodstock Collection

Tucannon spring Chinook and Tucannon summer steelhead are collected at the adult trap at the Rainbow Lake Intake. The trap is checked daily and if any adults are present to be utilized for broodstock, they are hauled to LFH. Up to 170 spring Chinook adults and 80 summer steelhead adults are collected for broodstock. All adults collected for broodstock are given a PIT tag prior to transfer to LFH for spawning purposes and tracking. There is no collection of rainbow trout for broodstock.



2.1.3 Incubation

TFH has 40 concrete 1 ft x 15 ft x 0.5 ft shallow troughs. The only incubation that takes place is for eyed rainbow trout eggs received from the WDFW Spokane Hatchery. The eggs are disinfected with iodine at 1:100 for 15 minutes when they arrive. The eggs are incubated and hatched in shallow troughs. At swim up the fish are fed in the shallow troughs and then moved outside approximately three months later.

2.1.4 Nursery Rearing

TFH does not have any nursery rearing.

2.1.5 Outdoor Rearing

TFH has six concrete round ponds approximately 40 ft in diameter with a maximum of 2,660 ft³ of rearing area each, two concrete 10 ft x 80 ft x 3 ft raceways, one concrete 15 ft x 136 ft x 5 ft raceway (A-pond) and one earthen rearing pond with a maximum of 136,221 ft³ of rearing space (170 ft x 200 ft x 6.5 ft).

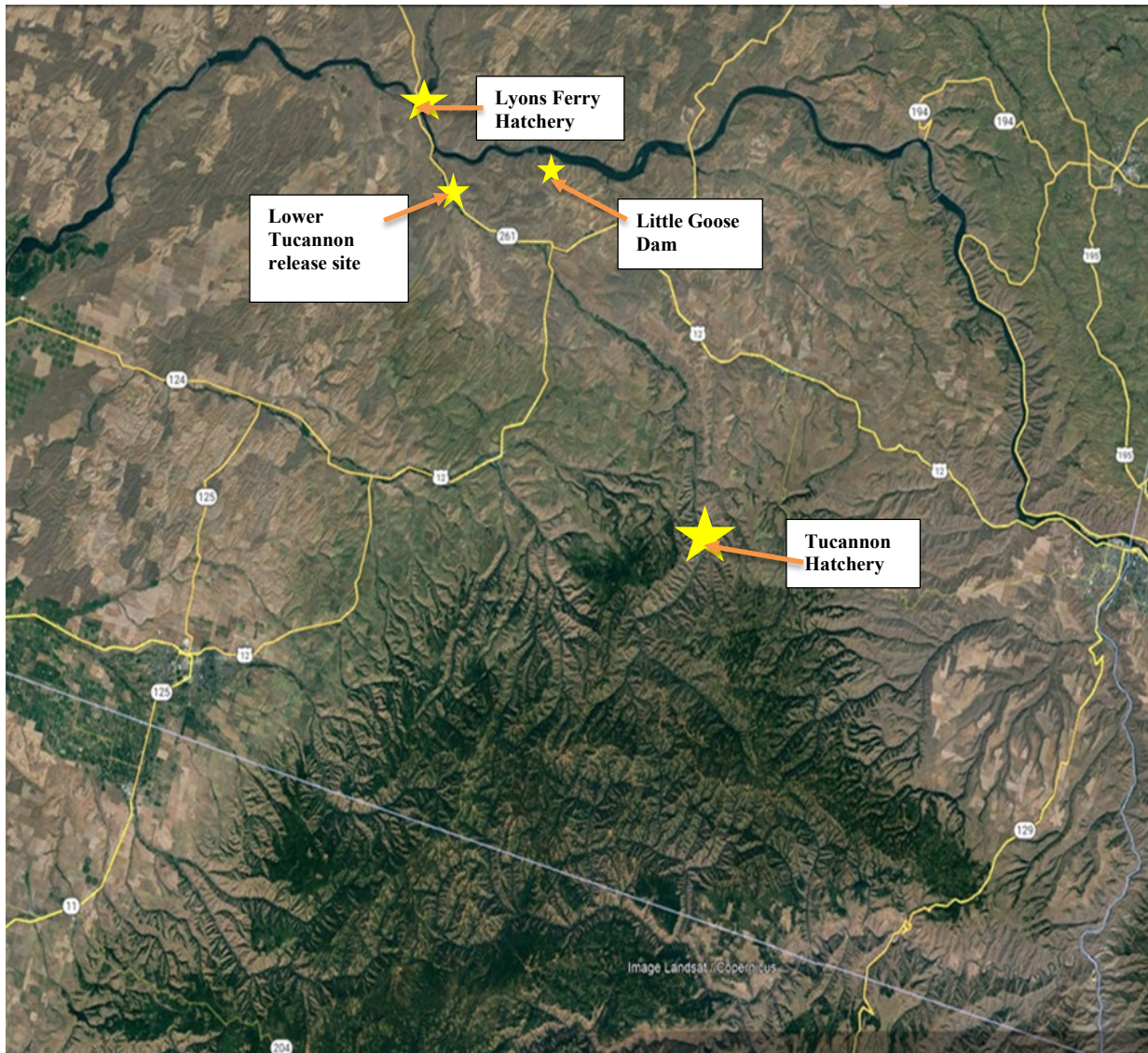
Rainbow trout are moved outside directly from the shallow troughs into the two round ponds after some of the jumbos are planted into lowland lakes. They are then split out into all six round ponds and the A-pond to finish out summer rearing. Sometime in October when the river water gets down to 50° F and remains there for a week, they are transferred to the earthen rearing pond. Waiting for the 50° F water is to reduce the risk of an *Ichthyophthirius multifiliis* (Ich) outbreak. Final rearing takes place in the rearing pond until April/May when they are planted into lowland lakes.

Tucannon spring Chinook are received from LFH after the rainbow are moved from the round ponds and A-pond to the earthen rearing pond sometime in October. Juveniles have been

received at 25fpp in the past, but LFH will start shipping them at ~15fpp in an attempt to get a longer, leaner smolt at release with a lower K factor in an attempt to improve overall post-release survival.

2.1.6 Release

Currently there are three strategies being used for the Tucannon spring Chinook. 20,000 smolts are being released into the lower Tucannon River, approximately 0.25 miles upstream of the mouth, 20,000 fish are being trucked to LFH where they are put on a barge and then released below Bonneville Dam, and the remainder are being direct released into the Tucannon River at TFH.



2.1.7 Settling Pond

TFH does not have a settling pond but is always within compliance of NPDES parameters.

2.1.8 NPDES

There have been no NPDES violations or problems.

3 Operations

3.1.1 Marking

No marking of fish occurs at TFH.

3.1.2 PIT Tagging

Tucannon spring Chinook are PIT tagged in February by staff from the Snake River Lab LSRCF M&E office. Currently 45,000 smolts (15,000/group) receive a PIT tag so the three different release strategies can be evaluated.

4 Operational/Infrastructure Changes for Program Efficiency

4.1.1 Jumbo Trout Program

The jumbo trout program has had funding reduced by the TSS. Due to this reduction, the program, was 4,000 fish at 0.67 fpp but is now 2,500 fish at 0.67 fpp and now fits nicely with the jumbo trout program at LFH and the fish will be reared and planted out of LFH from here on out. This will allow for more space (four round ponds) for the Tucannon spring Chinook program if needed and the possibility of moving the conservation part of the Tucannon steelhead program to TFH in the fall or late winter.

4.1.2 Move Rainbow Trout to off-station and rear Tucannon spring Chinook in the TFH rearing pond

Tucannon spring Chinook could be reared from just after tagging (May at 100 fpp) at LFH until release in the TFH rearing pond. Moving the fish to TFH after marking is due to the inability to hold adults due to pre-spawn mortality at TFH and the marking program does not have the time to move a trailer to TFH and mark the fish there. This would require moving the rainbow trout program off-site (100,000 trout at 2.5 fpp), possibly to LFH. A new production well would also be needed to supply water during late spring and summer until the river water cools off and could be used. Another downfall is that LFH would need to use five raceways through May that are needed for anadromous fish at the same time. LFH would not have the water or space for the trout program. If these two obstacles were overcome, the conservation piece of the Tucannon steelhead program could also be reared from just after tagging until release at TFH.

New production well costs are estimated at \$100,000.

Rearing 100,000 trout (2.5 fpp) at private facility would cost approximately \$200,000.

4.1.3 Summary

The Tucannon spring Chinook program is an important conservation program within the LSRCP. The ability to keep spring Chinook onsite at Tucannon for more of their rearing span could be beneficial to the program.

The rainbow trout component of Tucannon and Lyons Ferry has met its targets very consistently over the four decades of the LSRCP program. Changes to trout programs should be carefully weighed for pros/cons prior to implementation.

5 Appendix A. Monthly Production Strategy – Tucannon Fish Hatchery

Facility	Location	Parameter	January	February	March	April	May	June	July	August	September	October	November	December
Tucannon	Incubation	Eggs	125000											
Tucannon	Incubation	Temp	48											
Tucannon	Batt 1-5 - Catch RBT	Smolts		115,000	112,000	110,000	-							
Tucannon	Batt 1-5 - Catch RBT	Fpp		2000	1000	500								
Tucannon	Batt 1-5 - Catch RBT	DI		0.02	0.04	0.06								
Tucannon	Batt 1-5 - Catch RBT	FI		0.22	0.26	0.32								
Tucannon	Batt 1-5 - Catch RBT	Flow (gpm)		240	320	400								
Tucannon	Batt 1-5 - Catch RBT	CuFt		2,240	2,240	2,240								
Tucannon	Batt 1-5 - Catch RBT	Temp		50	50	52								
Tucannon	Round Pond 1 - RBT	Smolts	1,000	1,000	750	500	21,000	21,000	21000	11000	10500	1,000	1,000	1,000
Tucannon	Round Pond 1 - RBT	Fpp	0.75	0.67	0.67	0.67	320	120	44	32	25	3.5	2.2	1.25
Tucannon	Round Pond 1 - RBT	DI	0.03	0.04	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02
Tucannon	Round Pond 1 - RBT	FI	0.56	0.60	0.45	0.30	0.01	0.01	0.01	0.01	0.01	0.20	0.27	0.40
Tucannon	Round Pond 1 - RBT	Flow (gpm)	160	160	160	160	2905	7140	14,280	14,280	15,680	160	160	160
Tucannon	Round Pond 1 - RBT	CuFt	2,660	2,660	2,660	2,660	13,300	13,300	85,680	85,680	85,680	2,660	2,660	2,660
Tucannon	Round Pond 1 - RBT	Temp	50	50	51	52	53	56	58	60	60	54	52	51
Tucannon	Round Ponds 2 - RBT	Smolts	1,000	1,000	750	500	21,000	21,000	21000	11000	10500	1,000	1,000	1,000
Tucannon	Round Ponds 2 - RBT	Fpp	0.75	0.67	0.67	0.67	320	120	44	32	25	3.5	2.2	1.25
Tucannon	Round Ponds 2 - RBT	DI	0.03	0.04	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02
Tucannon	Round Ponds 2 - RBT	FI	0.56	0.60	0.45	0.30	0.01	0.01	0.01	0.01	0.01	0.20	0.27	0.40
Tucannon	Round Ponds 2 - RBT	Flow (gpm)	160	160	160	160	2905	7140	14,280	14,280	15,680	160	160	160
Tucannon	Round Ponds 2 - RBT	CuFt	2,660	2,660	2,660	2,660	13,300	13,300	85,680	85,680	85,680	2,660	2,660	2,660
Tucannon	Round Ponds 2 - RBT	Temp	50	50	51	52	53	56	58	60	60	54	52	51
Tucannon	Round Pond 3 - RBT/SCS	Smolts	25,000	25,000	25,000		21,000	21,000	21000	11000	10500	25,000	25,000	25,000
Tucannon	Round Pond 3 - RBT/SCS	Fpp	16	14	12		320	120	44	32	25	16	14	12
Tucannon	Round Pond 3 - RBT/SCS	DI	0.10	0.11	0.13		0.00	0.00	0.00	0.00	0.00	0.10	0.11	0.13
Tucannon	Round Pond 3 - RBT/SCS	FI	0.93	1.01	1.12		0.01	0.01	0.01	0.01	0.01	0.93	1.01	1.12
Tucannon	Round Pond 3 - RBT/SCS	Flow (gpm)	300	300	300		2905	7140	14,280	14,280	15,680	300	300	300
Tucannon	Round Pond 3 - RBT/SCS	CuFt	2,660	2,660	2,660		13,300	13,300	85,680	85,680	85,680	2,660	2,660	2,660
Tucannon	Round Pond 3 - RBT/SCS	Temp	38	40	43		53	56	58	60	60	48	45	40
Tucannon	Round Pond 4 - RBT	Smolts	1,000	1,000	750	500	21,000	21,000	21000	11000	10500	1,000	1,000	1,000
Tucannon	Round Pond 4 - RBT	Fpp	0.75	0.67	0.67	0.67	320	120	44	32	25	3.5	2.2	1.25
Tucannon	Round Pond 4 - RBT	DI	0.03	0.04	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02
Tucannon	Round Pond 4 - RBT	FI	0.56	0.60	0.45	0.30	0.01	0.01	0.01	0.01	0.01	0.20	0.27	0.40
Tucannon	Round Pond 4 - RBT	Flow (gpm)	160	160	160	160	2905	7140	14,280	14,280	15,680	160	160	160
Tucannon	Round Pond 4 - RBT	CuFt	2,660	2,660	2,660	2,660	13,300	13,300	85,680	85,680	85,680	2,660	2,660	2,660
Tucannon	Round Pond 4 - RBT	Temp	50	50	51	52	53	56	58	60	60	54	52	51
Tucannon	Round Pond 5 - RBT	Smolts	1,000	1,000	750	500	21,000	21,000	21000	11000	10500	1,000	1,000	1,000
Tucannon	Round Pond 5 - RBT	Fpp	0.75	0.67	0.67	0.67	320	120	44	32	25	3.5	2.2	1.25
Tucannon	Round Pond 5 - RBT	DI	0.03	0.04	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02
Tucannon	Round Pond 5 - RBT	FI	0.56	0.60	0.45	0.30	0.01	0.01	0.01	0.01	0.01	0.20	0.27	0.40
Tucannon	Round Pond 5 - RBT	Flow (gpm)	160	160	160	160	2905	7140	14,280	14,280	15,680	160	160	160
Tucannon	Round Pond 5 - RBT	CuFt	2,660	2,660	2,660	2,660	13,300	13,300	85,680	85,680	85,680	2,660	2,660	2,660
Tucannon	Round Pond 5 - RBT	Temp	50	50	51	52	53	56	58	60	60	54	52	51

Facility	Location	Parameter	January	February	March	April	May	June	July	August	September	October	November	December	
Tucannon	Round Pond 6 - RBT/SCS	Smolts	25,000	25,000	25,000			5,000	4,500	4,200	4,100	4,000	25,000	25,000	25,000
Tucannon	Round Pond 6 - RBT/SCS	Fpp	16	14	12			200	60	20	12	6	25	20	18
Tucannon	Round Pond 6 - RBT/SCS	DI	0.10	0.11	0.13			0.00	0.01	0.02	0.02	0.03	0.08	0.09	0.10
Tucannon	Round Pond 6 - RBT/SCS	FI	0.79	0.87	0.96			0.07	0.14	0.26	0.36	0.56	0.69	0.80	0.86
Tucannon	Round Pond 6 - RBT/SCS	Flow (gpm)	350	350	350			160	160	160	160	160	300	300	300
Tucannon	Round Pond 6 - RBT/SCS	CuFt	2,660	2,660	2,660			2,660	2,660	2,660	2,660	2,660	2,660	2,660	2,660
Tucannon	Round Pond 6 - RBT/SCS	Temp	38	40	43			53	56	58	60	60	48	45	40
Tucannon	Raceways E & W - SCS	Smolts	55,000	55,000	55,000								50,000	50,000	50,000
Tucannon	Raceways E & W - SCS	Fpp	16	14	12								25	20	18
Tucannon	Raceways E & W - SCS	DI	0.13	0.14	0.15								0.09	0.10	0.11
Tucannon	Raceways E & W - SCS	FI	0.61	0.67	0.74								0.41	0.48	0.51
Tucannon	Raceways E & W - SCS	Flow (gpm)	1,000	1,000	1,000								1,000	1,000	1,000
Tucannon	Raceways E & W - SCS	CuFt	4,780	4,780	4,780								4,780	4,780	4,780
Tucannon	Raceways E & W - SCS	Temp	38	40	43								48	45	40
Tucannon	Raceway A - SCS	Smolts	120,000	120,000	120,000					50,000	50,000	120,000	120,000	120,000	
Tucannon	Raceway A - SCS	Fpp	16	14	12					32	25	25	20	18	
Tucannon	Raceway A - SCS	DI	0.17	0.18	0.20					0.04	0.05	0.12	0.14	0.15	
Tucannon	Raceway A - SCS	FI	1.33	1.22	1.24					0.70	0.83	0.99	1.15	1.23	
Tucannon	Raceway A - SCS	Flow (gpm)	1,000	1,200	1,300					500	500	1,000	1,000	1,000	
Tucannon	Raceway A - SCS	CuFt	8,050	8,050	8,050					8,050	8,050	8,050	8,050	8,050	
Tucannon	Raceway A - SCS	Temp	38	40	43					60	60	48	45	40	
Tucannon	Rearing Pond - RBT	Smolts	100,000	100,000	100,000	55,000	18,000				100,000	100,000	100,000	100,000	
Tucannon	Rearing Pond - RBT	Fpp	20	20	2.5	2.5	2.5				18	23	21	20	
Tucannon	Rearing Pond - RBT	DI	0.00	0.00	0.01	0.01	0.00				0.00	0.00	0.00	0.00	
Tucannon	Rearing Pond - RBT	FI	0.53	0.48	1.74	1.17	0.38				0.69	0.48	0.52	0.53	
Tucannon	Rearing Pond - RBT	Flow (gpm)	1,800	2,000	2,200	1,800	1,800				1,500	1,800	1,800	1,800	
Tucannon	Rearing Pond - RBT	CuFt	318,920	318,920	318,920	318,920	318,920				318,920	318,920	318,920	318,920	
Tucannon	Rearing Pond - RBT	Temp	38	40	43	48	52				50	48	45	40	