Infrastructure and Operations Audit of The Upper Salmon Basin 2022

East Fork Satellite Facility – Shoshone-Bannock Tribe
Lower Snake River Compensation Plan

Lytle Denny
Shoshone-Bannock Tribe

Nathan Wiese
U.S. Fish and Wildlife Service

Contacts

East Fork Satellite Facility
Shoshone-Bannock Tribe
Lytle Denny
Program Manager
Shoshone-Bannock Tribes Fish & Wildlife Department
29 Shoshone Drive
Ft Hall, ID 83203
Phone: 208-252-2007
E-mail: ldenny@sbtribes.com

Shoshone-Bannock Tribe
Danny Stone
Policy Analyst
Shoshone-Bannock Tribes Fish & Wildlife Department
29 Shoshone Drive
Ft Hall, ID 83203
Phone: 208-478-3700
E-mail: dstone@sbtribes.com

U.S. Fish and Wildlife Service
Rod Engle
Fish Biologist - Science Coordinator
Lower Snake River Compensation Plan Office
1387 S Vinnell Way, Suite 343
Boise, ID 83709
Phone: 208-514-5390
E-mail: rod_engle@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
Phone: 208-296-8759
E-mail: Nathan_wiese@fws.gov

Executive Summary

On September 13, 2022, Nathan Wiese, Program Coordinator LSRCP, Rod Engle, Science Coordinator, and Lytle Denny, Shoshone-Bannock Tribe Program Manager, conducted a high-level one-day infrastructure and operations assessment of the East Fork Satellite Facility and the Upper Salmon Basin acclimation locations.

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.

The LSRCP plans to assess all spring/summer Chinook rearing facilities within the program prior 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. Results of Infrastructure summary to achieve 19,445 to project area for Upper Salmon River (and additional 4,000 adults for BPA's Crystal Springs project)

Upper Salmon River Infrastructure and smolt summary

Location	Smolts	Female Brood Need	SAR	Adult Goal	Infrastructure Cost	Annual Cost	Full Implementation Smolt Release
Sawtooth FH	3,400,000	1,000	0.33%	11,310	$	$ 280,000	2025
East Fork	1,850,000	544	0.33%	6,090	$ 10,000	$ 470,000	2034
Valley Creek	620,000	182	0.33%	2,045		$ 174,000	2030
Yankee Fork	600,000	176	0.33%	2,000	$ 800,000	$ 195,000	2025
Panther Creek	400,000	129	0.50%	2,000	$ 600,000	$ 155,000	2025
Total/Avg	**6,870,000**	**2,032**	**0.36%**	**23,445**	**$ 1,410,000**	**$ 1,274,000**	

Table of Contents

1 Scope

On September 13, 2022, Nathan Wiese, Program Coordinator LSRCP, Rod Engle, Science Coordinator, and Lytle Denny, Shoshone-Bannock Tribe Program Manager, conducted a high-level one-day infrastructure and operations assessment of the East Fork Satellite Facility and Upper Salmon Basin acclimation locations.

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.

The LSRCP plans to assess all spring/summer Chinook rearing facilities within the program prior 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.

2 Background

2.1.1 Adult Production Goals

The goal of the Lower Snake River Compensation Plan is to return approximately 19,445 adult spring Chinook salmon to the project area above Lower Granite Dam for survival reductions resulting from construction and operation of the four lower Snake Dams (HGMP 2002). Initial plans included these targets:

Location	Smolts	Adults
Salmon River at Sawtooth FH	1,300,000	11,310
East Fork Salmon River	700,000	6,090
Valley Creek	300,000	2,045
Total	**2,000,000**	**19,445**

Targets were based on assumed smolt-to-adult return rates of 0.87%. Actual Sawtooth Fish Hatchery smolt-to-adult return rates have average 0.33% from 1992 to 2018. A SAR of 0.33% would require 5.9M smolts to achieve an average adult return of 19,445.

The most recent Biological Opinion (BIOP 2017) includes the following production targets for the Upper Salmon based on implementation of Crystal Springs Fish Hatchery and associated acclimation facilities:

Location	Smolts	Adults
Salmon River at Sawtooth FH	2,000,000 (150,000 integrated and 1,850,000 Segregated)	6,600 (based on 0.33 SAR)
Yankee Fork	600,000 (Sawtooth Stock)	2,000 (based on 0.33 SAR)
Panther Creek	400,000 (Pahsimeroi Stock)	2,000 (based on 0.5 SAR)

It is important to note that the Yankee Fork and Panther Creek smolt production from Crystal Springs hatchery was an agreement between the Shoshone-Bannock Tribe and Bonneville Power Administration. This production is not associated with meeting LSRCP adult mitigation targets, but could provide a temporary boost while options to meet original in-place goals are developed.

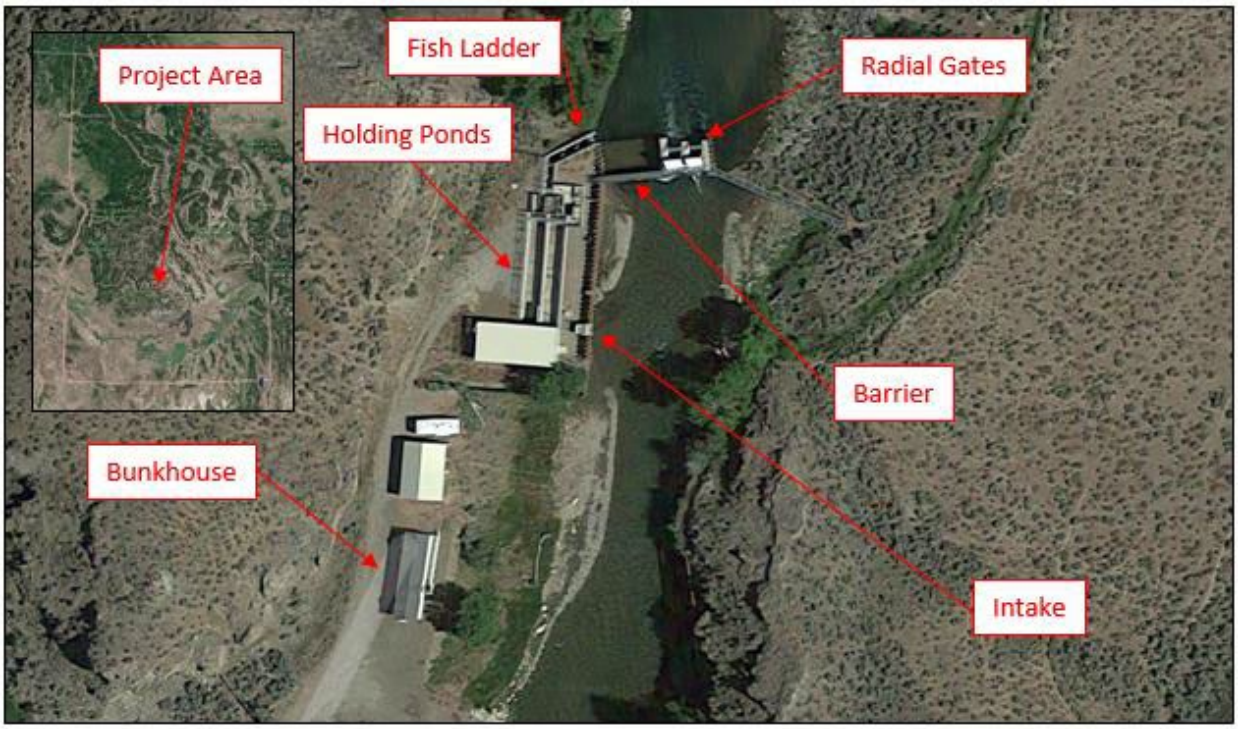
2.1.2 East Fork Satellite

The East Fork Salmon Satellite Facility is located approximately 56 miles east of Stanley, in the Sawtooth Mountains. Access to the Facility is as follows: from Stanley, Idaho, head North on Idaho State Highway 75 for 37.5 miles. Turn Right onto E Fork Rd. After 17.6 miles, turn left and travel through the locked gate onto unnamed road. Continue for 0.4 miles and the site is on the right.

The East Fork Salmon River Satellite Facility is operated as part of the Lower Snake River Compensation Plan (LSRCP), to help mitigate for fish losses due to the construction and operation of the four lower Snake River dams. The Facility is located in central Idaho on the East Fork of the Salmon River, approximately 20 miles upstream with the confluence of the Salmon River. The Facility was constructed by the U.S. Army Corp of Engineers (USACE) and became operational in 1984. Ownership of the Facility was transferred to U.S. Fish and Wildlife Service in 1990. The facility is owned by the Service, however normal operations are currently managed by the Idaho Department of Fish and Game (IDFG) thru a co-operative agreement with the Service. Operations were turned over to the Shoshone-Bannock Tribe in 2020.

The Facility was designed to be operated in conjunction with the Sawtooth Fish Hatchery, to help meet the chinook salmon adult return targets for the upper Salmon River. The Facility has infrastructure to trap returning adult chinook salmon, and hold them until spawning can occur, at the Facility. The East Fork HGMP indicated a release goal of 700,000 smolts (20 fpp); with an estimated 6,090 adults returning. Adult, spring chinook salmon collections were discontinued at the East Fork Salmon River satellite facility in 1998. Approximately 170 females were needed to meet the original management objectives for this facility. Unfortunately, these return numbers were never realized. Stocking chinook salmon smolts into the East Fork Salmon River was discontinued after 1998. In addition to poor adult returns, two other issues influenced the decision to halt chinook stocking. As stated previously, the Facility is located about 20 miles upstream of the confluence with the Salmon River. Nearly all of this stretch of the East Fork Salmon River is bordered by private land, making access by anglers nearly impossible. Also, that portion of the river contains very high quality spawning gravels, as many returning hatchery adults would “short stop” and spawn, never returning to the weir.

An agreement with BLM allows the Service to locate and operate the Facility at this location, owned by BLM. An easement with an adjacent land owner provides a corridor for the Facility’s entrance road (Real Estate Map Attached). The Facility is serviced by a 15 cfs water right (Jan 1 thru Dec 31), owned by the BLM. The Facility consists of a fish barrier, fish ladder, and holding ponds among other items (Site Map Below). The current replacement value (2018) for the Facility’s real property assets is slightly over $4.0 Million dollars.



East Fork Satellite Facility

After the Snake River Spring Chinook Salmon were listed as Threatened under the Endangered Species Act, the remaining population of naturally produced chinook salmon in the East Fork Salmon River were included in a region wide captive broodstock program. This program ended around 2010. Since then IDFG has done intermittent monitoring of the chinook salmon population. No hatchery produced chinook salmon have been stocked into the East Fork Salmon River since 1995. Detailed historical data for chinook salmon trapping, spawning and releases at the Facility is attached. East Fork Salmon River chinook salmon run report summaries from 2004 thru 2014 are also attached.

Currently the Facility is operated to collect East Fork Natural Steelhead broodstock; enough adults to produce approximately 60,000 smolts. East Fork Natural Steelhead are listed as Threatened under the Endangered Species Act. This program is approved production under U.S. vs Oregon. The manager of the Sawtooth Fish Hatchery oversees operations at this Facility. The Facility is staffed by two, full time, seasonal technicians from mid-March to mid-May. An employee bunkhouse provides on-site housing for the workers. Total operating costs for this program at this facility is estimated to be less than $20,000, with salary costs around $12,000 annually, and travel, phone, utilities, and limited routine maintenance costing $5,000 to $7,000.

The Facility is considered to be in good shape. The only significant maintenance project at this Facility in the last 15 years has been to replace the employee bunkhouse so as to meet Service safety standards. Two valves within the water conveyance infrastructure are not fully operational, and have not been since the Challis Earthquake of 1983, when they were stuck in the open position. Obviously this has not caused any operational issues.

Infrastructure at the Facility was evaluated for compliance with NOAA Fisheries standards in the Fall of 2016 (Table 2)

ITEM	CRITERIA	95% FLOW VALUE	5% FLOW VALUE
FISHWAY			
Head Drop Across Entrance Orofice	0.5 to 2.0 ft	0.26 ft	-
Minimum Attraction Flow	13.58 ft3/sec	3 ft3/sec	3 ft3/sec
Minimum Pool Width	6 ft	5 ft	5 ft
Minimum Pool Depth	5 ft	3.74 – 6.70 ft	-
EXCLUSION BARRIER			
Barrier – Min Height of Downstream End of Apron	0.1 ft	N/A	-4.75 ft

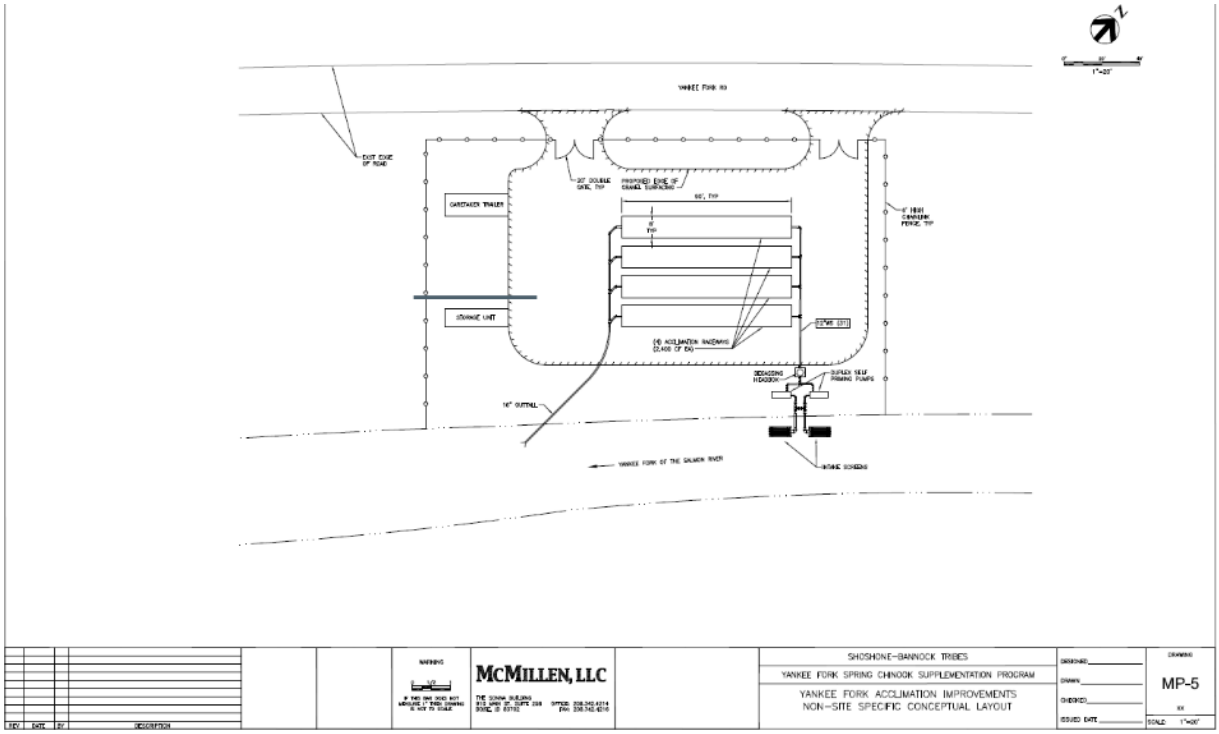
Table 2: Areas of Non-Compliance for the Infrastructure at the East Fork Salmon River Satellite Facility.

2.1.3 Yankee Fork Satellite below Jordan Creek

Work by the Shoshone-Bannock Tribe along with McMillen, LLC in 2012 identified a location above Jordan Creek on the Yankee Fork for acclimating Chinook smolts. This project was in conjunction with the adult trapping and acclimation site at the Pole Flat Weir connected to the Crystal Springs Fish Hatchery project.

The acclimation design is relatively simple requiring 4 tanks (2400 ft3 each), an in-water pump station, gravel pad for tanks, onsite crew quarters (RV), and some storage. Sizing appears a bit small for 600,000 Chinook smolts (20 fpp), but could be doubled (8 tanks) to provide a rearing environment of 0.3 DI (same as Sawtooth facility).

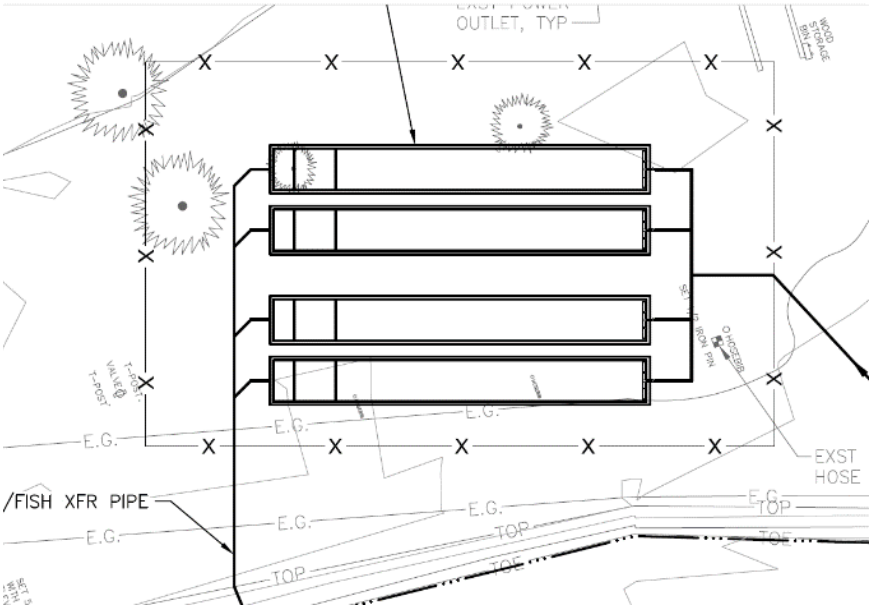
Estimated cost is $800,000 (Lytle Denny, pers. comm.).



Yankee Fork near Jordan Creek confluence

2.1.4 Panther Creek Satellite at Cobalt Work Station

Work by the Shoshone-Bannock Tribe along with McMillen, LLC in 2012 identified an additional acclimation location at the Cobalt Work Station on Panther Creek. This site was designed for acclimation of up to 400,000 smolts.



The acclimation design utilizes additional infrastructure for adult holding/trapping/spawning facilities. However, a start-up facility could likely use a similar Jordan Creek of Yankee Fork design with a pump station. Costs may be lower because the worksite already has significant leveling, etc.

Estimated cost is $600,000 (Lytle Denny, pers. comm.).

Panther Creek near Cobalt Work Center

2.1.5 Valley Creek

Valley Creek had an original smolt production target (HGMP 2002) of 300,000 smolts for 2,045 adults.

2.2 Past Releases - HGMP

East Fork Salmon River Releases (HGMP 2002)

Brood Year	Number Released	Year Released	1-Ocean	2-Ocean	3-Ocean	Total	SAR
1984	108,700	1986	1	23	51	75	0.069
1985	195,100	1987	6	55	27	88	0.045
1986	249,200	1988	22	106	32	160	0.064
1987	305,300	1989	12	23	23	58	0.019
1988	514,600	1990	7	27	65	99	0.019
1989	98,300	1991	15	18	13	46	0.046
1990	79,300	1992	6	2	0	8	0.01
1991	35,172	1993	0	0	0	0	0
1992	12,368	1994	0	7	0	7	0.056
1993	48,845	1995	3	7	n/a	10	0.02
						AVG	0.035%

Sawtooth Fish Hatchery Releases (HGMP 2002)

Brood Year	Number Released	Year Released	1-Ocean	2-Ocean	3-Ocean	Total	SAR
1986	1,705,500	1987-88	428	1,410	326	2,164	0.127
1987	2,092,595	1988-89	41	199	109	349	0.017
1988	2,217,600	1989-90	41	263	481	785	0.035
1989	650,600	1991	15	77	26	118	0.018
1990	1,263,864	1992	29	64	6	99	0.007
1991	774,583	1993	6	15	25	46	0.006
1992	213,830	1994	16	74	26	116	0.054
1993	334,313	1994-95	0	79	10	69	0.022
						AVG	0.036%

Yankee Fork Releases (SSCPR 2010)

Brood Year	Number Released	Year Released	Stock
1984	386,348	1986	Pahsmieroi
1985	157,877	1987	Sawtooth
1986	883,500	1987-88	Sawtooth
1987	248,300	1988-89	Sawtooth
1988	325,800	1989-90	Sawtooth
1989	591,300	1990	Sawtooth
1990	50,000	1991	Sawtooth

We don't have adult survival data for Valley Creek, Yankee Fork, or Panther Creek or smolt releases for Panther Creek and Valley Creek. Significant smolt releases have occurred in the Yankee Fork and at the Sawtooth Weir in the past decade. That data suggests significant straying from Yankee Fork to the Sawtooth weir.

Data from the Hatchery Genetic Management Plan (HGMP 2002) suggest similar Smolt to Adult Returns (SARs) from Chinook smolts reared at Sawtooth Fish Hatchery and released at the Sawtooth Weir compared to smolts released at the East Fork facility.

2.3 Infrastructure

2.3.1 East Fork Fish Ladder

The vertical slot ladder consists of a rectangular channel divided into five pools=. Each step of the ladder is created by the placement of stop log boards to ensure a minimum pool depth. Of the five pools, four pools measure 9 feet long (Pools 1, 2, 4, and 5), while the fifth pool (Pool 3) is an angled pool, the angle is less than 90 degrees and it therefore does not qualify as a turning pool. All pools are 5 feet wide. The height of the ladder pools varies from 7.5 to 12.5 feet when measured from top of floor slab to top of wall. The ladder measures approximately 50 feet long and the floor slopes continuously at 10.0%. Passive Integrated Transponder (PIT) tag detector arrays are not present at this site.
The maximum fish ladder flow at the Facility is 3 cubic feet per second (cfs) based on the data questionnaire provided by the USFWS.

The ladder has one entrance below the first pool. The entrance is orientated roughly perpendicular to the East Fork Salmon River flow. The entrance measures 1 foot wide. Because the ladder is a vertical slot configuration, the entrance height varies with the water surface elevation in the both the ladder and river. A staff gage is located outside the ladder entrance pool, and stop log guide slots are present at the entrance allowing the ladder to be completely closed from the river.

2.3.2 Exclusion Barrier

The exclusion barrier consists of a velocity barrier fitted with radial gates to prevent upstream passage beyond the Facility during collection seasons. Sheet pile extends along the entire perimeter of the Facility on both sides of the river, as well as upstream and downstream of the barrier itself. During the collection seasons, the radial gates are lowered and closed. This creates a pool upstream of the gates. Pooling water flows over a vertical structure, onto a velocity barrier, and continues downstream. When not collecting fish, the radial gates are open and the river runs freely through the radial gate openings.

The radial gates are each 10 feet wide by 16.5 feet tall. A catwalk extends the entire width of the river at

the top of the radial gates. The gate actuators and operators are located on this catwalk.
The velocity barrier extends from the left bank for approximately 36 feet. A sheet pile perimeter serves as both a cutoff wall for the barrier and a weir upstream of the apron. The elevation of the left 4.5 feet of the upstream weir are adjustable by stop logs. The concrete apron extends downstream from the sheet pile weir approximately 21 feet at 10.0% for the length of the barrier.

2.3.3 East Fork Holding Ponds

Each holding pond measures 10 feet wide by 68 feet long. The average pool depth is 4.5 feet, which results in a total pond volume of 3,060 cubic feet per pond. Each holding pond could acclimate approximately 100,000 Chinook smolts each (200,000 total) at 20 fpp for a DI of 0.3.

2.3.4 East Fork Intake

The intake for the water supply to the Facility is located on the left bank approximately 90 feet upstream of the barrier. The intake only operates when the radial gates are closed and the upstream pool backed up. Once the operation pool is created by the backed up river, the intake valve is opened. Water is diverted from the pool through the intake, into the adult holding ponds, through the trap and down the ladder into the river downstream of the barrier.

The intake consists of a 14.5 feet tall, 4.33 square concrete shaft. The face of the shaft adjacent to the river is screened to prevent debris from entering the Facility. The bottom 3 feet
of the intake are screened by a bar mesh with openings 1/8-inch-tall by 2 inch wide. The next 4 feet of the intake are screened by 2-inch diameter aluminum tubes with 1-inch clear spacing. The top portion of the intake is screened by the same bar mesh as the bottom of the intake.
Opposite the screen face is a 3-foot diameter pipe which conveys water to the holding ponds. This pipe is operated by a slide gate. The intake does not have a flow meter.

Approximately 3 cfs are used between March and May at an average of 45F and peak temperature of 51 F. The intake can receive up to 12 cfs from the East Fork of the Salmon River. A well on site provides domestic water and pathogen free water for spawning.

3 Operations

3.1.1 East Fork Trap Operations

The Facility is only operated March through May. The remainder of the year the radial gates are raised and the Facility dewatered and closed. An operator is on-site 24/7 when the Facility is operating, and the intake is checked regularly. If debris is observed, the operators will manually clean the intake if needed. Debris does not typically accumulate at the barrier due to the velocity barrier's capability to pass miscellaneous items in the river. If large debris is observed at the barrier and has failed to pass downstream via the velocity barrier, operators will use equipment to manually remove the debris. Debris of this size is a rare occurrence. Ice accumulation has not been observed to be a problem at the site

during operation. The intake is checked daily for debris and manually cleaned if needed.

3.1.2 NOAA Compliance Costs

NOAA compliance costs are estimated below (McMillian Jacobs 2017).

Table ES-2. Alternatives and Cost Estimates

Alternative	Description	Cost
1	Vertical Rotating Screen - Replace existing intake screen with vertical rotating screen - Extend power to intake - Install flowmeter	$136,000
2	Vertical Rotating Screen - Replace existing intake screen with vertical screen with air burst cleaning system - Extend power to intake - Install flowmeter	$46,000
3	Modified Picket Barrier at Velocity Barrier - Install hanging picket assembly over velocity barrier - Minor structural modifications to bridge - Minor structural modifications to sill	$524,000
4	Ladder Replacement - Remove existing ladder - Construct new NOAA compliant ladder	$687,000

4 Operational/Infrastructure Changes for Program Efficiency

4.1.1 East Fork Satellite Facility

The East Fork of the Salmon river was intended to return 6,090 adults (HGMP 2002). The facility never realized its goal, but returned an identical average to Sawtooth weir releases from 1986 until it was discontinued in 1993.

At current SAR rates from Sawtooth Fish Hatchery (0.33) a total of 1,850,000 smolts would need to be released in the East Fork to achieve an adult return of 6,090 fish.

To accomplish this goal the cooperators will need to work with NOAA to determine an appropriate PNI (proportion of natural influence) for the East Fork stock.

Once some broodstock is available, smolt rearing would occur offsite (preferably not Sawtooth Fish Hatchery) and acclimation would occur at the East Fork satellite facility for up to 200,000 smolts. Once that group was established, additional smolts would be directly released to compare acclimated versus non-acclimated releases. Data from the work would determine if additional acclimation facilities are needed. Not using Sawtooth Fish Hatchery as a rearing facility would reduce straying to that location.

For acclimation, the current adult ponds will need additional pond screens and slots installed. Head end screens installed here:

Tailbox screens installed here:

Eventually, the return would grow to the desired 6,090 on average adult returns:

East Fork Smolt releases and Adult returns, BY2024-BY2037

Brood Year	Available East Fork Brood Spawned Females	Smolt Release (3400/female)	Release Year	Return Year	Hatchery Adult Return (0.33 SAR)	Adult Hatchery Harvest
2024	50	170,000	2026	2028	0	0
2025	50	170,000	2027	2029	0	0
2026	50	170,000	2028	2030	0	0
2027	50	170,000	2029	2031	0	0
2028	331	1,123,700	2030	2032	561	0
2029	331	1,123,700	2031	2033	561	0
2030	331	1,123,700	2032	2034	561	0
2031	331	1,123,700	2033	2035	561	0
2032	544	1,850,000	2034	2036	3,708	2,620
2033	544	1,850,000	2035	2037	3,708	2,620
2034	544	1,850,000	2036	2038	3,708	2,620
2035	544	1,850,000	2037	2039	3,708	2,620
2036	544	1,850,000	2038	2040	6,105	5,017
2037	544	1,850,000	2039	2041	6,105	5,017

Total Cost Projection:

$10,000 for Screens at East Fork and installation of channels

$370,000 annually for smolt production costs at existing facility for feed, marking, transport, etc. (1,850,000 at 20 fpp and $0.20/smolt)

$100,000 annually from SBT M&E budget shifted towards fish production activities.

4.1.2 Salmon River at Sawtooth Fish Hatchery

The Sawtooth infrastructure audit identified some additional smolt production opportunities by efficiently using rearing space in each raceway at 180,000 smolts per raceway. Total Sawtooth production would maximize at 2.52M. Unfortunately, 3,400,000 smolts would be needed to achieve the adult program goal of 11,310 adults to that location. The LSRCP infrastructure audits have identified options for alternative rearing locations that could assist the Sawtooth release to 3.4M.

Current (2022)

Adult returns could support broodstock necessary for full implementation to 3.4M smolts (1000 females).

Total Costs

$280,00 annually for increased smolt costs (1.4M at $0.20/smolt)

4.1.3 Valley Creek

Valley creek was identified in the HGMP 2002 for 2,045 adults. To achieve this adult return from current SARs (0.33) releases would need to be 620,000. Other LSRCP facilities could be used produce thee smolts. Work with NOAA would need to determine if Sawtooth stock would be appropriate for this location.

An additional 182 females would be required for implantation from Sawtooth that would likely not be available until Brood Year 2028 and smolt releases would occur in 2030.

Total Costs = $174,000 at $0.20/smolt assuming infrastructure costs born by Sawtooth rearing lake expansion and $50,000 annually shifted from SBT M&E budget for production purposes.

4.1.4 Yankee Fork

The Yankee Fork was identified for 600,000 smolts to achieve 2,000 adults (0.33) SAR in the most recent BIOP. Current Sawtooth Fish Hatchery return rates should support broodstock collection of an additional 177 females. However, rearing should occur offsite of Sawtooth Fish Hatchery to avoid problems with straying back to that facility.

This program is part of Bonneville Power Administration's (BPA) Crystal Springs Hatchery project. LSRCP would work to stand this project up because of the long development times

needed for Valley Creek (2030) and East Fork (2034) projects. At that time, it is assumed that the project would either be transferred to BPA or negotiations to stay within the LSRCP program.

Total costs are:

$120,000 annual costs at $0.20/smolt for 600,000 smolts

$75,000 annual costs from SBT M&E budget to production

$800,000 infrastructure cost for acclimation location

4.1.5 Panther Creek

Panther Creek was identified for 400,000 smolts to achieve 2,000 adults (0.5 SAR) in the most recent BIOP. Current Pahsimeroi Fish Hatchery adult return rates should support broodstock collection of an additional 130 females for the program. These smolts should also be reared out of basin and returned to the Panther Creek acclimation location.

Total costs are:

$80,000 annual costs at $0.20/smolt for 400,000 smolts

$75,000 annual costs from SBT M&E budget to production

$600,000 infrastructure cost for acclimation location

4.1.6 Infrastructure Summary

Upper Salmon River Infrastructure and smolt summary

Location	Smolts	Female Brood Need	SAR	Adult Goal	Infrastructure Cost	Annual Cost	Full Implementation Smolt Release
Sawtooth FH	3,400,000	1,000	0.33%	11,310	$	$ 280,000	2025
East Fork	1,850,000	544	0.33%	6,090	$ 10,000	$ 470,000	2034
Valley Creek	620,000	182	0.33%	2,045		$ 174,000	2030
Yankee Fork	600,000	176	0.33%	2,000	$ 800,000	$ 195,000	2025
Panther Creek	400,000	129	0.50%	2,000	$ 600,000	$ 155,000	2025
Total/Avg	**6,870,000**	**2,032**	**0.36%**	**23,445**	**$ 1,410,000**	**$ 1,274,000**	

5 References

Annual Operation Plan (AOP). 2022. Annual Operation Plan for Salmon and Steelhead Production Programs in the Salmon and Snake River Basins. Prepared by Idaho Department of Fish and Game, Nez Perc Tribe, Shoshone-Bannock Tribes, U.S Fish and Wildlife Service, and Idaho Power Company. https://www.fws.gov/sites/default/files/documents/2022%20Salmon-Snake%20AOP.pdf

BIOP. 2017. Biological Opinion. Endangered Species Act (ESA) Section 7(a)(2) Biologica~ Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat (EFH) Consultation Four Salmon River Basin Spring/Summer Chinook Salmon Hatchery Programs in the Upper Salmon River Basin NMFS Consultation Number: WCR-2017-7042. Accessed August 23, 2022. https://www.fws.gov/sites/default/files/documents/NMFS%20Biological%20Opinion%20Upper%20Salmon%20Basin%20Chinook%20Hatchery%20Programs%2012-26-2017.pdf

Hatchery Genetic Management Plan (HGMP). 2002. Upper Salmon River Spring Chinook Salmon (Sawtooth Fish Hatchery) East Fork Salmon River Satellite.. Idaho Department of Fish and Game. Accessed August 17, 2022 file:///C:/Users/nwiese/Documents/LSRCP/ChinookReview/Hatchery/EastFork/Sawtooth%20East%20Fork%20HGMP.pdf

McMillen Jacobs. 2017. NOAA Compliance Evaluation of the Lower Snake River Compensation Plan Facilities. East Fork Salmon River Satellite Facility Evaluation Report. Final Revision No. 0.

NMFS. 1995. Proposed Recovery Plan for Snake River Salmon. U.S. Department of Commerce, National Oceanic and Atmospheric Administration. National Marine Fisheries Service, Portland, OR. March 1995.

Spring/Summer Chinook Program Review. 2010. Lower Snake River Compensation Plan. November 30-December 2, 2010, Boise, Idaho. Accessed September 26, 2022. https://www.fws.gov/media/spring-chinook-symposium-2010-program-narrative

U.S. Fish and Wildlife Service (USFWS). 2011. Review of Idaho Lower Snake River Compensation Plan State-Operated Hatcheries, Clearwater, Magic Valley, McCall, and Sawtooth Fish Hatcheries: Assessments and Recommendations. Final Report, March 2011. Hatchery Review Team, Pacific Region. U.S. Fish and Wildlife Service, Portland, Oregon.