Standard Operating Procedures

for

Salmon and Steelhead Production Programs

in the

Salmon and Snake River Basins

Prepared by
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Table of Contents

0. Preamble

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

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

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

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

This SOP document is intended to capture operational procedures that are consistent through time. Unless SOPs are changing permanently, little editing of this document will be necessary. If there are things that are changing that are specific to the current year, those changes will be captured in the AOP document but not in the SOP.

1. Summer Steelhead

- *Definition of species* - All steelhead *Oncorhynchus mykiss* in Idaho are classified as summer steelhead, determined by time of entry into the Columbia River. Idaho steelhead enter fresh water in one year and spawn the following spring. Idaho has A and B strains of steelhead that are classified based on life history characteristics. Generally A-strain steelhead spend one year in the ocean and return to freshwater during the summer. The B-strain steelhead commonly spend two years in the ocean before returning to freshwater in late summer or autumn.
- *Rearing locations* - Hatchery steelhead released into the Salmon River are reared at three hatcheries located in the Hagerman Valley in southern Idaho: Niagara Springs Fish Hatchery (NSFH), Hagerman National Fish Hatchery (HNFH), and Magic Valley Fish Hatchery (MVFH).
- *Broodstock collection and spawning locations* - Broodstock collection and spawning activities for the steelhead program in the Salmon River are conducted at the following locations: Oxbow Fish Hatchery (OFH)/Hells Canyon Trap (HC trap), Pahsimeroi Fish Hatchery (PFH), Sawtooth Fish Hatchery (SFH), East Fork Salmon River trap (EF trap), and Dworshak National Fish Hatchery (DNFH).
- *Calculation of Broodstock need* - Appendix 7.9 shows the brood calculator used to determine brood need to reach production goal for the program releases. The number of eggs collected is based on 5-yr running historical average of adult survival, eye-up percentage, disease rates and smolt survival rates to meet smolt release targets. Suppose the production goal is to trap and spawn enough adults to produce (x) number of smolts for release. Applying a production cushion (c) and eyed egg-to-smolt survival (ess) to total smolt goal, gives the eyed eggs needed (e=(x/(1-c))/(ess)). After accounting for green-to-eyed egg and culling survival (ges and cs, respectively), the green egg goal before culling can be determined (g=e/(ges)/(cs)). Using an average fecundity of green eggs per female (fec) gives the number females needed (F=g/fec). Sometimes the F:M ratio is not 50%:50% in the collected broodstock. Historical average % of females in the broodstock (fb) can be used to determine the number of Males that will be collected while reaching the required number of Females (M=(F/fb) – F). If the F:M ratio in collected broodstock is 50%:50%, then number of Males will equal the number of Females. The total number of fish to spawn is the sum of Males and Females (TotSp=F+M). Total fish needed when accounting for % pond mortality (pm) can be calculated (TotPM=TotSp/(1-pm)).
- *Smolt releases* - All steelhead smolts from HNFH, MVFH, and NSFH are released as yearling smolts and are transported to the release sites from late March through early May. Transportation protocols follow Integrated Hatchery Operations Team (IHOT) guidelines and releases are coordinated between hatcheries to minimize highway traffic and safety concerns.

1.1. Overview of facilities and Egg Box Programs

1.1.1. Niagara Springs Fish Hatchery (NSFH)

- *Hatchery description and location* - Niagara Springs Fish Hatchery (NSFH) is located in southern Idaho along the middle Snake River approximately 16 kilometers south of Wendell, Idaho.
- *Owner and operator* – NSFH is operated by Idaho Department of Fish and Game (IDFG) and is owned and funded by the Idaho Power Company (IPC).
- *Programs at facility* - NSFH is the rearing facility for OxbA and PahA steelhead stocks that are part of the IPC hatchery mitigation program.
- *Stocks reared and release locations* - Steelhead at NSFH are reared from OxbA and PahA eyed eggs received from OFH and PFH, respectively. PahA yearling smolts are released into the Pahsimeroi River below the PFH weir, into the Snake River below Hells Canyon Dam when OxbA smolts are not available to meet the stocking request, and into the Little Salmon

River. OxbA smolts are released into the Snake River below Hells Canyon Dam and into the Little Salmon River at Stinky Springs or Hazard Creek.

- *Production Goals (smolts, fpp)* - The Hells Canyon Settlement Agreement (HCSA) calls for the production of 400,000 pounds of summer steelhead smolts (approx. 1.8 million smolts at 4.5 fish per pound). This represents the combined production from Pahsimeroi and Oxbow fish hatcheries.
- *Adult mitigation goal (if applicable)* - There is no adult mitigation goal stipulated for IPC funded steelhead production from Niagara Springs hatchery however, managers expect the 1,800,000 Oxbow A-run (OxbA) and Pahsimeroi A-run (PahA)smolts released from NSFH to produce approximately 14,400 returning adults above Lower Granite Dam based on assumptions similar to those used to develop the LSRCP mitigation program.
- *Facility changes (if applicable)* = NA

1.1.2. Hells Canyon Trap (HC Trap) and Oxbow Fish Hatchery (OFH)

- *Hatchery description and location* - The Oxbow Fish Hatchery (OFH) is located in eastern Oregon immediately upstream of the confluence of Pine Creek and the Snake River at the IPC village known as Oxbow, Oregon. The hydrologic unit code for OFH is 17050201. The Hells Canyon Trap, the adult trapping facility for Oxbow Fish Hatchery steelhead, is located on the Oregon side of the Snake River approximately 35 kilometers downstream from Oxbow. The Hells Canyon Trap is located immediately below IPC's Hells Canyon Dam.
- *Owner and operator* –OFH is operated by IDFG and is owned and funded by the IPC. HC Trap is a satellite facility of OFH and is owned and operated by the IPC.
- *Programs at facility -* HC Trap is the broodstock collection site and OFH is the spawning facility for OxbA steelhead and is part of the IPC mitigation program. The HC Trap is operated as a cooperative effort by IPC and OFH staffs.
- *Stocks reared and release locations –* OxbA broodstock are collected at HC Trap and transported to OFH for spawning. Eyed eggs are transported to NSFH for final rearing. Steelhead spawning occurs in the spring and the resulting eggs are transferred to NSFH April and early May. All progeny are released in the Snake River below Hells Canyon Dam and the Little Salmon River at Stinky Springs or Hazard Creek.
- *Production Goals (smolts, fpp)* - The production goal for the OxbA stock is to produce 800,000 yearling smolts at 4.5 fpp at release.
- *Facility changes (if applicable)* -

1.1.3. Pahsimeroi Fish Hatchery (PFH)

- *Hatchery description and location* - Pahsimeroi Fish Hatchery (PFH) is comprised of two separate facilities – the lower Pahsimeroi Fish Hatchery (lower PFH) and the upper Pahsimeroi Fish Hatchery (upper PFH). The lower PFH is on the Pahsimeroi River approximately 1.6 kilometers above its confluence with the main Salmon River near Ellis, Idaho. The Upper PFH is approximately 11.3 kilometers further upstream from the lower facility on the Pahsimeroi River. The river kilometer codes for the upper and lower facilities are 522.303.489.011 and 522.303.489.002 respectively.
- *Owner and operator* –PFH is operated by IDFG and is owned and funded by the IPC.
- *Programs at facility -* PFH is the broodstock collection facility for PahA summer steelhead for IPC and LSRCP smolt programs and SBT steelhead streamside program. PFH also traps hatchery-origin B-run steelhead (USRB) that are part of the LSRCP smolt program and SBT streamside incubator program.
- *Stocks reared and release locations* –
    - IPC (PahA): PFH traps, spawns and incubates PahA broodstock to eyed-egg stage before being transported to NSFH for final rearing and release of smolts in Pahsimeroi and Little Salmon Rivers.
    - LSCRP and SBT (PahA): PFH traps and spawns PahA broodstock for LSRCP smolt program. Green eggs are transported to SFH (via SFH staff), incubated to eyed stage

before being transported to MVFH for final rearing and release of smolts in Salmon and Little Salmon River. PFH traps and spawns PahA broodstock and ships green eggs to SFH for incubation to be used in SBT egg boxes at Panther and Indian Creeks.

- LSRCP and SBT (USRB): PFH traps, spawns and incubates USRB broodstock for LSRCP smolt program. Eyed eggs are transported to MVFH for final rearing and release of smolts in Pahsimeroi, Yankee Fork, Salmon and Little Salmon Rivers. PFH traps and spawns USRB broodstock for SBT Streamside incubator program. See Appendix 7.3 for a description of activities related to these USRB programs.

- *Production Goals (smolts, fpp)* - The production goal for the PahA stock is to spawn enough adults to produce 1,000,000 yearling smolts for the IPC program and 186,000 smolts for the LSRCP program at 4.5 fpp at release. The production goal for the USRB stock is to spawn enough adults to produce 992,000 yearling smolts for the LSRCP program (with 93,000 DworB smolts). The production goal for the SBT steelhead streamside incubator program is to spawn enough adults to produce 500,000 PahA and 500,000 USRB eggs.
- *Facility or stock changes (if applicable)* - NA

1.1.4. Hagerman National Fish Hatchery (HNFH)

- *Hatchery description and location* -The Hagerman National Fish Hatchery is located in the Hagerman Valley, Idaho along the Snake River approximately 4.8 kilometers south and 3.2 kilometers east of Hagerman, Idaho.
- *Owner and operator* –HNFH is owned by the U. S. Fish and Wildlife Service (USFWS), is operated by IDFG, and is funded through the Lower Snake River Compensation Plan (LSRCP).
- *Programs at facility* - HNFH is the rearing facility for LSRCP steelhead mitigation program for SawA and East Fork Naturals (EFNat) steelhead stocks for release into the upper Salmon River drainage.
- *Stocks reared and release locations* - Steelhead at HNFH are reared from SawA and EFNat eyed eggs received from SFH. SawA smolts are released into the mainstem Salmon River at SFH. All EF Natural smolts are released into the EF Salmon River at the EF satellite facility (approx. 18 miles upstream of the mouth).
- *Production Goals (smolts, fpp)* - The original smolt production target deemed necessary to meet the adult mitigation goal is 1.7 million yearling smolts at 4.5 fish per pound (fpp) and an SAR of 0.8%. Reduction in spring flows in the Hagerman Valley since the program was initiated currently limits smolt production. Current production at HNFH is at 1,410,000 SawA, 60,000 EFNat smolts and 90,000 smolts being produced in the partial reuse aquaculture system (PRAS).
- *Adult mitigation goal (if applicable)* - The Adult mitigation goal for the HNFH production is to return 40,800 steelhead annually.
- *Facility or stock changes (if applicable)* - Constructed a Partial Reuse Aquaculture System capable of rearing an additional 90,000 steelhead smolts.

1.1.5. Magic Valley Fish Hatchery (MVFH)

- *Hatchery description and location* -The Magic Valley Fish Hatchery is located in the Hagerman Valley adjacent to the Snake River approximately 11.2 kilometers northwest of Filer, Idaho.
- *Owner and operator* – MVFH is operated by IDFG and is funded through the LSRCP program.
- *Programs at facility* - MVFH is the rearing facility for LSRCP steelhead mitigation program for PahA, USRB, Sawtooth A, and DworB steelhead stocks
- *Stocks reared and release locations (stage, broodstocks)* – Four stocks of summer steelhead are reared at MVFH and are released primarily in the upper Salmon River with some releases occurring in the Little Salmon River: PahA, SawA, USRB, and DworB. Managers have prioritized phasing out the release of DworB steelhead in the Salmon River and replacing them with a locally adapted group of Salmon River B-run steelhead.

- *Production Goals (smolts, fpp)* - The original smolt production target deemed necessary to meet the adult mitigation goal is 1.75 million yearling smolts at 4.5fpp and an SAR of 0.67%. Reduction in spring flows in the Hagerman Valley since the program was initiated currently limits smolt production to 1.55 million yearling smolts.
- *Adult mitigation goal (if applicable)* - The Adult mitigation goal for the MVFH production is to return 34,980 steelhead annually.
- *Facility or stock changes (if applicable) -* NA

1.1.6. Sawtooth Fish Hatchery (SFH)

- *Hatchery description and location* - The Sawtooth Fish Hatchery is located on the upper Salmon River approximately 8.0 kilometers south of Stanley, Idaho. The river kilometer code for the facility is 503.303.617.
- *Owner and operator* – SFH is operated by IDFG and is funded through the LSRCP program.
- *Programs at facility -* SFH is the broodstock collection facility for SawA summer steelhead for LSRCP smolt program. SFH incubates EFNat and PahA as part of the LSRCP smolt program. SFH also incubates PahA eggs for the SBT steelhead streamside incubator and LSRCP smolt program.
- *Stocks reared and release locations* –
    - SawA: SFH traps, spawns and incubates SawA broodstock to eyed-egg stage before being transported to HNFH and MVFH for final rearing and release of smolts in Salmon River.
    - EFNat: SFH receives EFNat green eggs from EF Weir and incubates to eyed egg stage before being transported to HNFH for final rearing and release of smolts in East Fork Salmon River.
    - PahA: SFH receives PahA green eggs from PFH and incubates to eyed egg stage before being transported to MVFH for final rearing and release of smolts in Salmon River and Little Salmon River. SFH also incubates PahA eggs to the eyed stage before being transported to SBT streamside incubators in Panther and Indian creeks.
- *Production Goals (smolts, fpp)* - The production goal for the SawA stock is to spawn enough adults to produce 1,500,000 smolts for HNFH and 279,000 smolts for MVFH at 4.5 fpp at release.
- *Adult mitigation goal (if applicable)* – NA
- *Facility or stock changes (if applicable) -* NA

1.1.7. East Fork Salmon River Satellite Facility (EF Trap)

- *Description and location -* East Fork Salmon River Weir (EF weir) is a satellite facility of SFH. It is located on East Fork Salmon River road on the East Fork Salmon River approximately 29 kilometers upstream of the confluence of the East Fork with the mainstem Salmon River. The river kilometer code for the facility is 522.303.552.029.
- *Owner and operator* – EF Trap is operated by IDFG and is funded through the LSRCP program.
- *Programs at facility –* EF Trap is the broodstock collection facility for EFNat steelhead supplementation for LSRCP smolt program. The goal of this hatchery program is to aid in the recovery of the natural steelhead population in the East Fork Salmon River by supplementing the natural spawning population.
- *Stocks reared and release locations - :* EF Trap traps and spawns EFNat broodstock for LSCRP smolt program. Green eggs are transported to SFH, incubated to eyed stage before being transported to HNFH for final rearing and release of smolts in East Fork Salmon River.
- *Production Goals (smolts, fpp)* - The production goal for the EFNat stock is to spawn enough adults to produce 60,000 smolts at 4.5 fpp at release.
- *Adult mitigation goal (if applicable)* – NA
- *Facility or stock changes (if applicable) -* NA

1.1.8. Dworshak National Fish Hatchery Ladder (DNFH Ladder)

- *Hatchery description and location* - The DNFH is located on the North Fork Clearwater River approximately one kilometer upstream from the confluence of the mainstem Clearwater and the North Fork Clearwater River.
- *Owner and operator* – DNFH is owned by the US Army Corps of Engineers and is operated by the USFWS and the Nez Perce Tribe (NPT).
- *Programs at facility -* DNFH Ladder is the broodstock collection facility for DworB steelhead for the USRB hatchery steelhead program.
- *Stocks reared and release locations - :* DNFH Ladder traps and spawns DworB broodstock. Green eggs are transported to Clearwater Fish Hatchery, incubated to eyed stage before being transported to MVFH for final rearing and release of smolts in Pahsimeroi River. Smolts also may be released in the Salmon River and Little Salmon River to supplement the USRB smolts program on an as needed basis.
- *Production Goals (smolts, fpp)* – Approximately 93,000 DworB steelhead yearling smolts are released into the Pahsimeroi River. DworB smolts are also released on an as needed basis to Yankee Fork, Squaw Creek and Little Salmon River to augment USRB releases. Managers are in the process of phasing out the releases of DworB steelhead into the Salmon River and replacing them with a locally adapted stock of USRB.
- *Adult mitigation goal (if applicable)* – NA
- *Facility or stock changes (if applicable) -* In an effort to transition the B-run hatchery program to a locally adapted stock of B-run steelhead in the Salmon River, IDFG in cooperation with IPC, has made several programmatic changes to expedite this transition with the intention to phase out the use of DworB steelhead in the Salmon River in the future.

1.1.9. Yankee Fork Trap

- *Hatchery description and location* - Construction of a satellite facility on the Yankee Fork Salmon River is planned in support of the SBT's Crystal Springs Fish Hatchery. It will be located on the Yankee Fork Salmon River approximately 5.22 kilometers upstream of the river's confluence with the Salmon River. As an interim plan, the SBT plans to use angling and temporary picket weirs to capture adult steelhead. Temporary weirs will be placed near the outlet of Pond Series 1 and 3.
- *Operator* – The satellite facility will be operated by the SBT and funded by the LSRCP.
- *Programs* – USRB summer steelhead broodstock will be collected at the facility for the LSRCP smolt program and SBT steelhead eggbox program in Yankee Fork.
- *Stocks reared and release locations* – For spawn year 2018, USRB adults will consist of 1 and 2-ocean AD-clipped and AD-intact fish. The SBT will use dorsal fin erosion to distinguish between a naturally produced steelhead and a hatchery USRB AD-intact fish.
- *Production goals (smolts, fpp)* – USRB broodstock needs from the Yankee Fork Salmon River will be determined in-season as part of the Snake Basin Coordination Meetings.
- *Adult mitigation goal (if applicable)* – Hatchery adults that return to the Yankee Fork Trap, which are produced by the LSRCP smolt program will count towards the MVFH adult mitigation goal of 34,980. Unmarked hatchery adults produced by the SBT steelhead eggbox program should also count towards LSRCP adult return goals.
- Shoshone Bannock Tribes Steelhead Streamside Incubation Program
- *Operator* – The Shoshone-Bannock Tribes initiated the Steelhead Streamside Incubation (SSI) Program in 1995 to help maintain, rehabilitate, and enhance steelhead populations in the upper Salmon River.
- *Programs* – The primary goal of the SSI Program is to seed vacant and/or underutilized tributary habitats with juvenile summer steelhead fry. This is accomplished by outplanting eyed-eggs, received from local hatcheries, in SSIs located in Yankee Fork (USRB), Panther Creek (PahA), and Indian Creek (PahA). Eyed summer steelhead eggs are outplanted into

SSIs in the spring, incubated in stream water, and fry allowed to volitionally emigrate in early summer.

- *Production Goals (smolts, fpp) -* Production objectives for the project are consistent with the *US v Oregon* Agreement, which are to incubate one million eyed-eggs. The production objectives are as follows: 1) 500,000 eyed-eggs are incubated in Yankee Fork; 2) 400,000 eyed-eggs are incubated in Panther Creek; and 3) 100,000 eyed-eggs are incubated in Indian Creek.

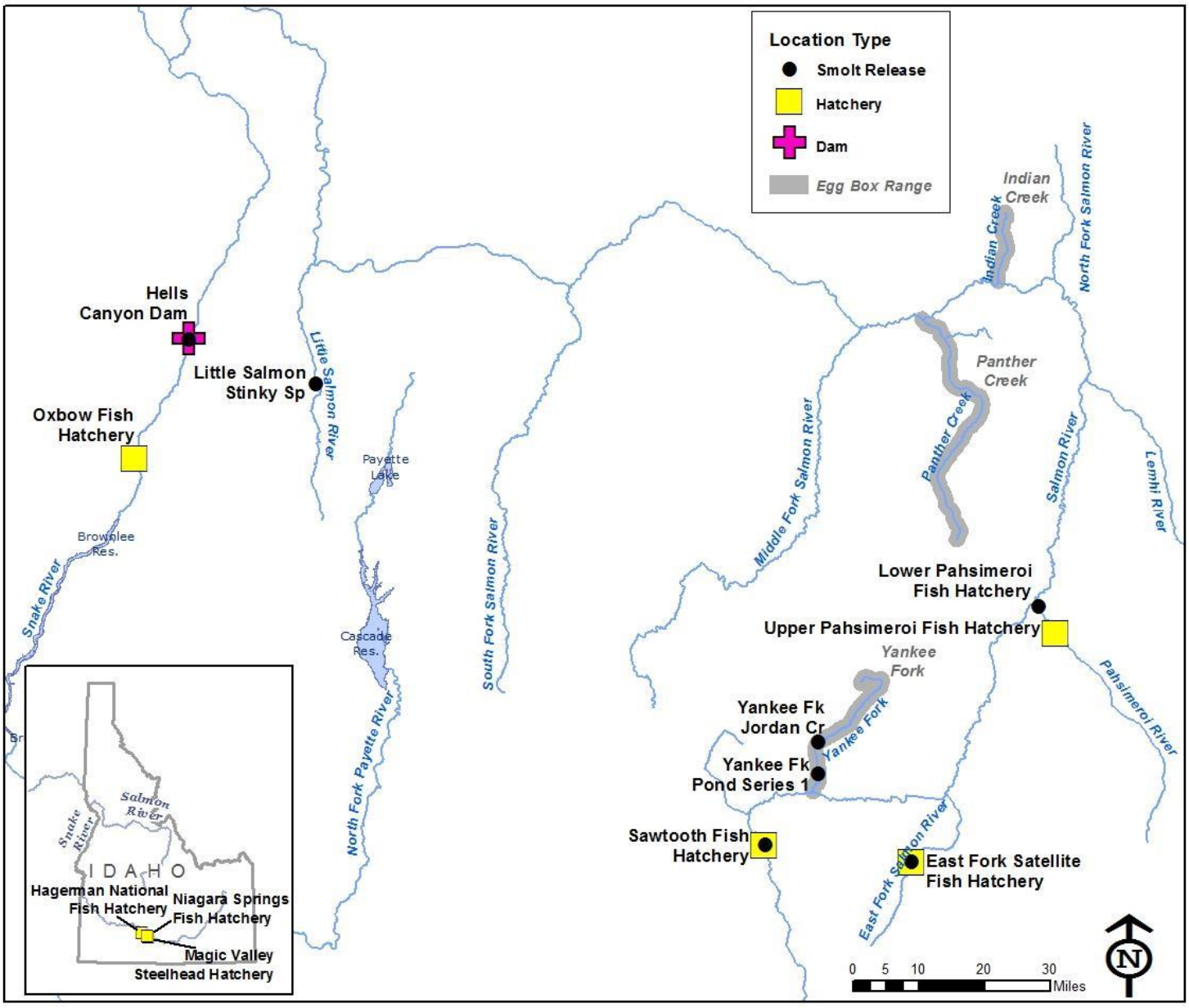

Figure 1.1. Steelhead facilities, smolt releases and egg box locations.

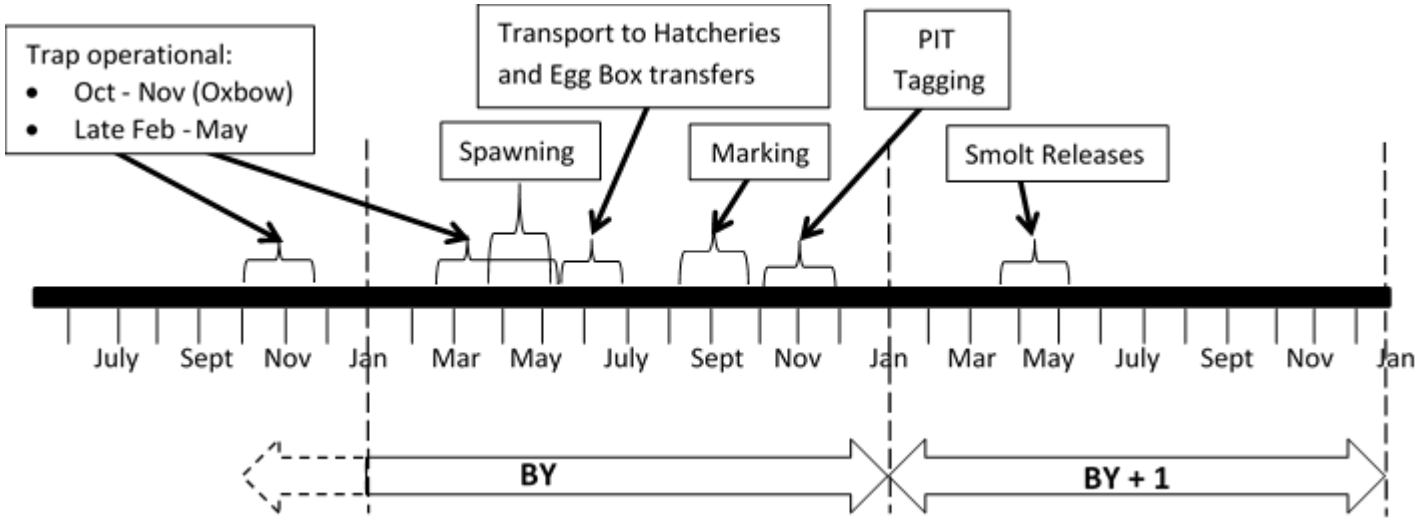

Figure 1.2. Timeline for Steelhead Production. Date ranges are shown to include all facilities' operations.

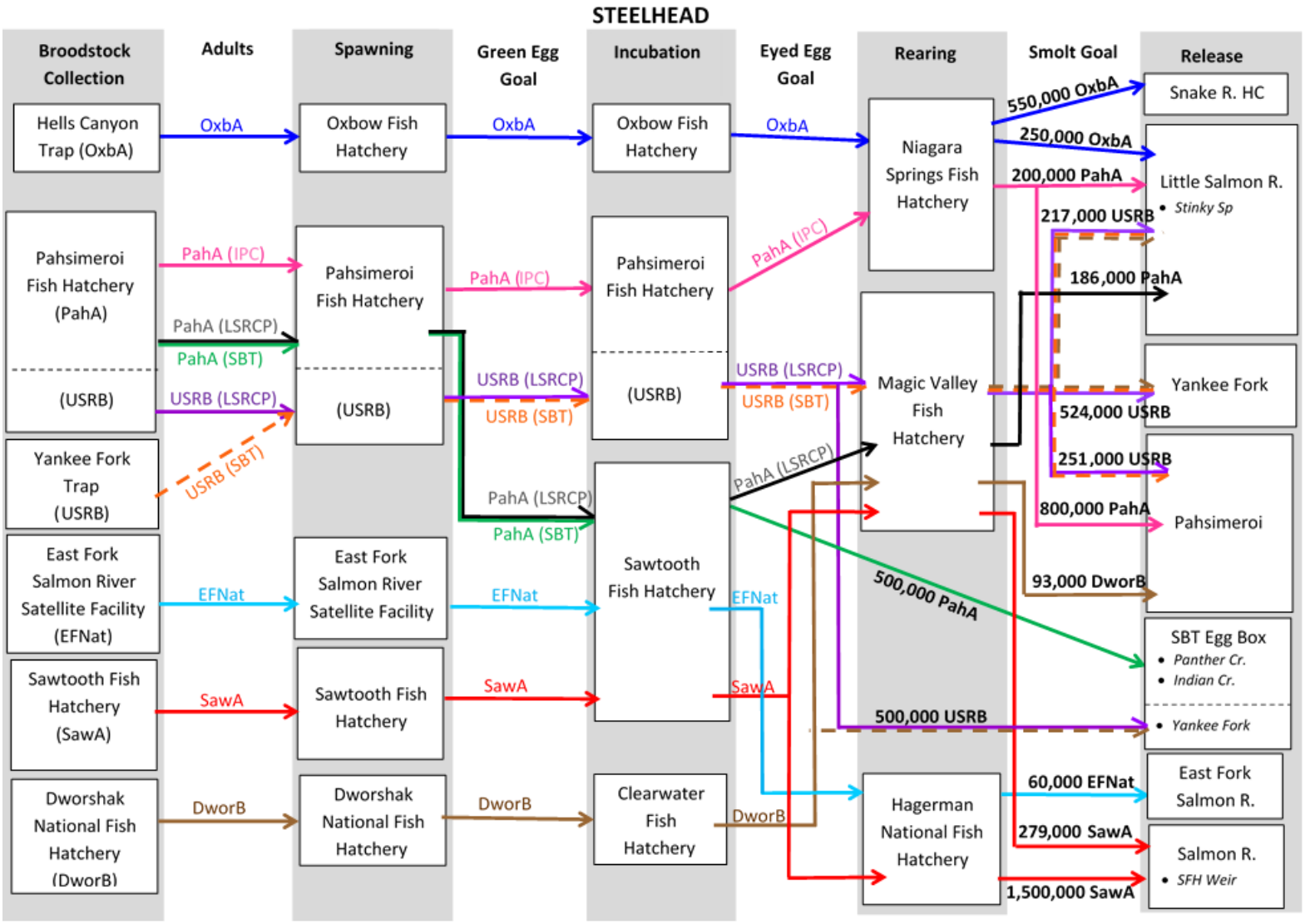

Figure 1.3. Fish and egg movements for Steelhead. Numbers reflect 2020 releases.

1.2. Niagara Springs

1.2.1. Egg incubation

- *Eggs received* - Eggs are incubated on chilled well water at the egg-taking stations to slow their development. Eyed eggs from both OFH (OxbA) and PFH (PahA) are shipped to NSFH in April and May (at approximately 400 TUs) and placed in upwelling incubators inside the hatchery building.
- *Treatment, loading density, flow rate* - Upon arrival at NSFH, eyed eggs are disinfected with Iodine at 100-ppm for at least 30 minutes prior to tempering and placing in 2 upwelling incubators per vat. Loading densities in the incubators range from 20,000 to 50,000 eggs. Incubator flows range between 20 to 25 gpm.
- PBT tracking - Niagara Springs uses tracking spread sheets and FINS to track PBT groups from egg trays at spawning station to NSFH release sites.
- *Method into rearing tanks* - After hatching, fry exit upwelling incubators directly into nursery rearing vats.

1.2.2. Early rearing

- *Environmental protocols (flow indices, density indices)* - Flows in vats will approach 250 gpm. Maximum flow indices should not exceed 1.12lbs/gpm/in, while density indices will peak at 0.35 lbs/ft^3/in.
- *Feeding protocol* - Fry will be hand-fed Rangen dry feed in the indoor nursery areas. Hand-feeding occurs at least once per hour and will be supplemented by Zeigler belt feeders.
- *Marking and tagging (AD, CWT; date range, size at application)* - M&E staff meet annually to develop representative marking and loading plans for CWT and PIT at each hatchery facility to evaluate harvest and survival. Adipose Fin clipping occurs the second week of August. Fish are pumped from indoor vats to the MATS clipping trailers and then ponded directly to the raceways from the marking trailers. CWT are not currently used at NSFH. Pit tagging is accomplished in November following IDFG research recommendations.
- *Fish movement/facility configuration* - Fish hatched at NSFH from OxbA eyed eggs are transferred from indoor vats to outdoor raceways 1 through 9 via the clipping trailer when they reach approximately 80 fpp. Fish hatched from PahA eyed eggs are ponded in the remaining ten raceways, 10 through 19, at similar sizes after being sent through the clipping trailer. Rearing space is increased as fish grow and their density index approaches 0.30 lbs/ft^3/in.

1.2.3. Final rearing

- *Target environmental protocols (flow indices, density indices)* – The maximum density and flow indices allowed are 0.35 lbs/ft^3/in and 0.9 lbs/gpm/in, respectively.
- *Feeding protocols*- Steelhead are fed Rangen Trout and Skretting Pro-Tech starter feeds throughout the early rearing period at NSFH. Feed is dispensed by hand initially in the outdoor raceways until the fish are 60 fpp. When fish reach 60 fpp, they are switched to Skretting Steelhead slow-sinking 450 extruded diet to allow staff to utilize two bulk tanks, a feed conveyor system, a fines separator and bridge feeders.
- *Mortality counting* - Mortalities will be recorded on all the raceways each month until stocking, and mortality results summarized in the NSFH annual report.
- *Water monitoring* - Dissolved oxygen is monitored monthly. Water temperature remains a constant 59°F.
- *Fish movement/facility configuration* - Fish are reared in 19 - 300 ft raceways. The raceways have keyways at 50 ft intervals. As rearing densities increase, tail screens are moved to the next 100 ft keyway and fish are allowed to move down to the next section.

- *Marking and tagging (PIT) -* PIT tagging typically occurs in November and a representative number of fin-clip quality checks are performed in all raceways prior to fish release.
- *Quality monitoring (counts, growth, length, marks quality, tag retention) -* A length at release standard of 180 to 250 mm is established under the NOAA Fisheries 1999 Biological Opinion. Sample counts are performed monthly on all raceways until release. Length frequencies are checked periodically during outside rearing.

1.2.4. Fish Health

- *Service provider -* Fish health inspection and diagnostic services are provided by personnel at the Eagle Fish Health Laboratory (EFHL).
- *Sampling protocols (what is sampled, sampling schedule) –*
    - Juveniles: Diagnostic services are provided as needed at the request of hatchery personnel. Quarterly on-site inspections include tests for the presence of viral replicating agents and other parasitic and bacterial pathogens. A pre-liberation inspection of 60 fish from each stock (PahA and OxbA) is done on all lots approximately 30-45 days prior to transportation. Specific pathogens tested for at pre-liberation will include infectious hematopoietic necrosis virus (IHNV), infectious pancreatic necrosis virus (IPNV), viral hemorrhagic septicemia virus (VHSV), *Renibacterium salmoninarum*, *Flavobacterium psychrophilum*, *Aeromonas salmonicida*, *Yersinia ruckeri* and *Myxobolus cerebralis.*
- *Vaccination methods -* Juvenile fish are administered a vaccination for *Aeromonas salmonicida* while in the hatch house. Initial treatment is administered at 150-200 fpp. Vaccinations are to be done following consultation with our Fish Health Manager.

1.2.5. Fish release/transportation

- *Truck specifications -* All NSFH steelhead smolts are trucked to release sites using three IPC 5,000-gallon fish tankers. IPC currently contracts with Neil Ring Trucking, Inc. to haul fish to release locations.
- *Hauling/Release schedule -* Hauling begins around March 18 and concludes May 1. Shipping occurs five days per week until all fish are stocked, with one day off in early April to complete a mid-season service on the tankers' generators.
- *Hauling/Release guidelines -* All fish are hauled in chilled spring water with the temperature adjusted to be within 3 degrees F of the receiving water. Tankers are loaded with approximately 5,000 lbs. of steelhead smolts each, not to exceed 5,500 lbs.

1.2.6. Communication

- *Written reports (e.g., Monthly summaries, annual reports) -* NSFH distributes monthly hatchery production summaries, monthly hatchery narratives and annual reports. These are currently not sent to the Contact list, but are maintained at the hatchery and IDFG headquarters and are available by request.
- *FINS and IDFG release databases -* NSFH enters yearly release numbers into IDFG database.
- *Meetings (e.g., AOP, Anad, HET, etc.) -* NSFH program objectives are discussed at the Salmon River AOP, IDFG anadromous meetings, hatchery manager meetings and additional meetings to discuss and resolve any issues.
- *Direct consultation -* The IPC hatchery evaluation biologist and IDFG hatchery supervisors maintain close contact with the hatchery manager and staff for consultation if problems arise during rearing. In addition, smolt releases at the Little Salmon River are coordinated with MFH, Hagerman National Hatchery, and MVFH, and Bruce McLeod of the NPT to reduce potential traffic and safety issues. Releases at the Pahsimeroi River and Snake River sites are coordinated with the PFH and OFH managers.

1.2.7. Monitoring and evaluation

- *Marking and loading plans* - M&E staff annually develop representative marking and loading plans for CWT and PIT at each hatchery facility to evaluate harvest and survival. For a more detailed description of the intended use of these tags see Appendix 7.2.
- *Mark providers* - Marks and tags are applied by the Pacific States Marine Fisheries Commission marking crew.

1.3. Hell's Canyon Trap (HC Trap)/Oxbow Fish Hatchery (OFH)

1.3.1. Ladder Operation

- *Dates operated* - Fall trapping at the HC Trap takes place in October and November when water temperatures fall below 60ºF. Trapping in the spring is influenced by flow in the Snake River and the resulting water releases from Hells Canyon Dam. Flow in excess of 40,000 ft^3/s at Hells Canyon Dam requires cessation of trapping because the trap is inundated with water. Trapping resumes in March or April and continues until the broodstock target of 150 fish is reached.
- *Trap configuration* - The HC trap sits directly below Hells Canyon Dam. It consists of an entrance area about 10-ft. wide and a horseshoe shaped ladder approximately 250-ft. long. Fish jump from the ladder over one of two finger weirs into a holding area. Two ladder pumps, four 75-hp. attraction pumps, and a shaft pump draws water from the Snake River to supply water for the trap. Fish are manually crowded from the holding area to a 500 gallon hopper that is hoisted by a crane 80-ft. up and placed into a 1000 gallon IPC tanker truck.
- *Trapping protocol (frequency, movement of fish* - Approximately 600 adult steelhead are trapped in the fall and held over winter; an additional 150 adults are trapped the following spring. Equal numbers of males and females are collected and fish with visible injuries are not used. Age class structure and run timing is maintained in the broodstock by collecting fish throughout the trapping period. Collecting 750 total broodstock (375 females) gives about a 100 female buffer above egg take needs to allow for prespawning mortality and culling for disease management. A detailed description of trapping protocols is provided in Appendix 7.5.

1.3.2. Adult handling

- *Measurements (marks, tags, sex, etc.)* - All returning adult steelhead and fall Chinook are scanned for PIT tags and examined for other marks, tags, and injuries. Coded Wire Tags are checked on all returning fall Chinook and steelhead that have been killed at spawning as well as prespawn mortalities.
- *Tissue sampling protocol* - Natural steelhead will have a tissue sample collected for Genetic Stock Identification (GSI) and a scale sample collected for age analysis before being released below HCD the same day. Genetic samples are collected from all spawned adults to develop the Parentage Based Tagging (PBT) baseline with a target tagging rate of 100% (see Appendix 7.1 for detail).
- *Dispositions (holding, releases)* - Natural steelhead are transported in a 125-gallon or 300-gallon tank driven by OFH personnel and released below HCD the same day. Adults to be held for broodstock are maintained in holding ponds at OFH until spawning occurs in the spring. Incidental catches including wild trout, Bull Trout, suckers, and fall Chinook will also be transported and released below HCD. If incidental catches of fall Chinook are numerous and it's not feasible to haul them all back the same day, up to 25 hatchery origin fall Chinook may be kept in the pink elephant holding through the night and released the next day.
- *Surplus distribution* - Depending on run strength, surplus adults may be trapped at HC Trap and distributed to IDFG, ODFW and the Nez Perce Tribe in equal proportions. The IDFG and

ODFW shares are released to supplement sport fisheries. The Nez Perce Tribe distributes their share for subsistence. Additional releases may take place at agreed upon locations if excess fish are trapped.

- *Carcass dispositions* - Carcasses from prespawning mortality are placed into a garbage dumpster and picked up weekly by the local sanitation company. Carcasses during spawn operations are placed in a freezer trailer and sent to a rendering plant.

1.3.3. Spawning/Egg take

- *Calculation of broodstock need (fecundity, eyeup, eye to smolt)* - The production goal is to trap and spawn enough adults to produce 800,000 yearling smolts at NSFH. See Section 1 ("Calculation of Broodstock Need") for details on broodstock calculation. Trapping adult steelhead in the fall and spring allows for prespawn mortality, possible culling of adults or eggs, and a little buffer in case spring trapping is not possible.
- *Spawning protocol (schedule, method, M/F ratio)* - Spawning occurs twice each week beginning about March 10 and continuing until early-May. Fish are euthanized using a Zephyr-F manufactured by Bock Industries followed by exanguination. Eggs from one female are drained of ovarian fluid and fertilized with milt from one male (1:1 ratio). Females with poor egg quality or bloody ovarian fluid and males with bloody or watery milt are not used for production.

1.3.4. Egg incubation/egg and fry shipping

- *Egg incubation method (egg distribution, treatments, picking)* - Fertilized eggs are water-hardened in 100 ppm Argentyne for 30 minutes and put away at one female's eggs per tray. Eggs are incubated at regulated well water temperatures ranging from 53ºF to 42ºF to consolidate egg shipments to NSFH. All eggs receive a 500 ml iodophore flush Tuesdays, Thursdays, and Saturdays and formalin treatments at 1,667 ppm Mondays, Wednesdays, and Fridays. Shocking occurs about 350 Daily Temperature Units (DTU's) and eggs are picked and counted 24-48 hours later using a Jensorter Model JM4 counter and picker. Eggs in excess of the egg request or eggs from disease concerns will be culled at the direction of the Fisheries Bureau. Culled eggs are disposed of in the local landfill.
- *Egg transfers* - All progeny are transferred as eyed eggs to NSFH in ten gallon coolers with 50ºF well water at approximately 400 DTU's. Normally four equal shipments of 220,000 eyed eggs apiece and 27,500 eyed eggs per cooler are hauled by truck to NSFH. In order to accomplish this, careful manipulation of DTU's between egg lots and trouble free operation of the chiller unit is imperative. Often OFH personnel and NSFH personnel meet halfway at an agreed upon location.
- *Surplus egg distribution (if applicable)* - Surplus eggs or fry may be used for other anadromous programs or resident Fish Management actions. Stocking resident sites will involve IDFG personnel driving IDFG owned vehicles. Stocking sites and coordination is done through the Fisheries Bureau.

1.3.5. Fish health

- *Service provider* - Fish health diagnostics are provided by personnel with the EFHL
- *Sampling protocols (what is sampled, sampling schedule) –*
    - Adults: All spawned females will have ovarian fluid and/or kidney/spleen samples collected to assay for viral replicating agents. Eggs will not be culled for IHNV, but may be culled for other viral replicating agents such as IPNV, VHSV, or infectious salmon anemia virus (ISAV). Sixty kidney samples are collected for enzyme-linked immunosorbent assay (ELISA) testing for *RS* and 60 head wedges are collected and examined for *Myxobolus cerebralis.*
- *Vaccination methods* - NA

- *Treatment methods* -On occasion secondary fungal infections have occurred on the adult steelhead broodstock. Under those conditions, EFHL has recommended a 170 ppm formalin treatment for one hour three to five times a week until the water temperature drops below 40 degrees F.

1.3.6. Communication

- *Written reports (e.g., Monthly summaries, annual reports)* - OFH distributes monthly and annual reports to the IDFG Bureau and IPC hatchery biologist.
- *FINS and IDFG release databases* - During steelhead trapping, HC trap data is uploaded to the Fish Inventory System (FINS) database for each day the trap is operated. Distributions and mortality is entered into the Holding Module at least weekly, and spawn data and incubation data will be entered weekly into the spawning and incubation modules in FINS .
- *Meetings (e.g., AOP, Anad, HET, etc.)* - The OFH program objectives are discussed at the Salmon River AOP, IDFG anadromous meeting, coordination meetings, and any additional meetings to resolve issues.
- *Direct consultation for egg/smolt transport* - Shipments of eyed eggs and installation of a barricade at the HCD parking area during smolt shipments is coordinated with NSFH personnel.

1.4. Pahsimeroi

1.4.1. Ladder Operation

- *Dates operated* - Trapping begins approximately February 20 and continues until a period when no fish are trapped for 10 days (typically mid-May).
- *Trap configuration* - The adult trap and holding ponds at the lower adult facility are supplied with water from the Pahsimeroi River through a 0.25 mile earthen intake canal. Once the water passes through the holding ponds, it reenters the Pahsimeroi River below a removable adult weir. The intake structure is equipped with four NOAA Fisheries approved rotating drum screens to prevent wild Chinook salmon and steelhead from entering the hatchery facilities. A water right for 70 cfs held by IPC allows hatchery personnel to divert water from the Pahsimeroi River for operations at the lower hatchery. This intake is equipped with a broad crested weir measuring device. The adult trap and holding ponds each measure 70' x 16' x 6'. The outer ponds are for adult holding and the center pond is considered the trap. The carrying capacity is approximately 2,000 adult summer Chinook salmon or 5,000 adult A-run steelhead per pond. The USRB steelhead are ponded into four small raceways which are also located at the lower facility and supplied with river water from the earthen intake canal. Each raceway can hold 150 adult steelhead.
- *Trapping protocol (frequency, movement of fish)* - The trap will be checked weekdays during the dates operated. The trap will be checked one to two times per week during the first month of trapping. As the run progresses, the trap will be checked up to five times per week and as the run declines, so will the frequency of checking the trap (one to two times per week). PahA and USRB stocks can be discerned during trapping because USRB adults are 100% CWT tagged with intact adipose fins, which allows them to be distinguished from the PahA stock.

1.4.2. Adult handling

- *Measurements (marks, tags, sex, etc.)* - All A and B run steelhead are measured for length, scanned for PIT tags, examined for gender, checked for various clips, tags, injuries, and readiness to spawn.
- *Tissue sampling protocol* - Tissue samples for genetic stock identification (GSI) are collected from all unmarked steelhead and wild adult trout that enter the trap. Scales are collected from unmarked steelhead. Genetic samples are collected from all spawned adults to

develop the Parentage Based Tagging (PBT) baseline with a target tagging rate of 100% (see Appendix 7.1 for detail).

- *Dispositions (holding, releases) -* A-run adult steelhead that are held for spawning are ponded into the outer holding ponds. Males are ponded into pond 1 and females are ponded into pond 2. All USRB broodstock are transferred to the small raceways for holding. All unmarked steelhead and trout are released upstream of the weir the day of trapping.
- *Surplus distribution -* Surplus hatchery adults are either planted into the Blue Mountain Pond in Challis, ID or the Kid's Pond in Salmon, ID. All steelhead out-planted from the PFH will either receive an operculum punch or caudal punch to identify recaptures.
- *Carcass dispositions -* Each day during spawning operations, carcasses are given to the SBT, the Shoshone Paiute Tribe, the public, and to charitable organizations in accordance with IDFG policy. Current charitable organizations on file at PFH include: American Legion in Challis, Eastern Idaho Community Action Partnership (Idaho Falls and Salmon), the Idaho Food Bank, Montana Food Bank, and the Northwest Food Bank. Due to whirling disease amplification issues, carcasses are not used for nutrification of local waters. Fish not suitable for public or charitable distribution are placed in a refrigeration unit and hauled to a rendering plant in Kuna, ID for disposal

1.4.3. Spawning/Egg take

- *Calculation of broodstock need (fecundity, eyeup, eye to smolt)* – See Section 1 ("Calculation of Broodstock Need") for details on broodstock calculation.
    - IPC (PahA): The IPC production goal is to trap and spawn enough adults to produce 1,000,000 yearling smolts at NSFH.
    - LSRCP and SBT (PahA): PFH traps and spawns additional PahA adult steelhead to provide 186,000 smolts for the LSRCP programs at MVFH. PFH also traps and spawns additional females to provide 500,000 eyed eggs for the SBT egg box program. These eggs are shipped green to SFH for incubation and distribution.
    - LSRCP and SBT (USRB): The LSRCP goal is to trap and spawn enough USRB adults to produce 992,000 yearling smolts at MVFH. In addition, PFH traps and spawns USRB adult steelhead to provide 500,000 eyed eggs for the SBT Egg Box program in the Yankee Fork Salmon River.
- *Spawning protocol (schedule, method, M/F ratio) -* On spawn days, steelhead in the trap and adult holding pens are sorted and checked for readiness to spawn. Broodstock preference is given to ripe fish in the holding pens in order to avoid over-ripe eggs. Over-ripe females are culled during sorting. During sorting, males and females are collected in equal numbers. The ripe females are euthanized in groups of ten using the SI-5 stunner. Each female is individually incised and eggs are collected in a colander, allowing excess ovarian fluid to drain off. The drained eggs are placed in a bucket and fertilized with milt from one male (1:1 spawn cross); milt is expressed directly into the bucket of eggs. Females with poor eggs or bloody ovarian fluid and males that expel bloody or watery milt are not used for spawning. Length data are recorded at spawning to evaluate age structure of the broodstock. Tissue samples are taken from spawned males and females and sent to the Eagle Fish Genetics Lab for Parental Based Tracking (PBT) with a target tagging rate of 100%.

1.4.4. Egg incubation/egg and fry shipping

- *Egg incubation method (egg distribution, treatments, picking) -* Eggs are watered hardened in a 100 ppm solution of buffered iodine at the lower PFH site (approximately 60 minutes), placed in aquaseed tubes, then into coolers of well water and transferred to the upper PFH site. Upon arrival to the upper hatchery, the egg coolers and the eggs are disinfected externally with a 100 ppm solution of buffered iodine for 10 minutes prior to entering the

incubation room. Eggs are then tempered for up to 30 minutes as needed, then placed into incubation trays. Incubator trays will be loaded at the rate of 1 to 3 females per tray. Eggs are incubated on a range of water temperatures varying from 40F to 50F. This is dependent upon when each entity wants eyed-egg shipments. Forty-eight hours after collection and proceeding until eye-up, all eggs incubated at upper PFH receive formalin treatments (1,667 ppm; 15 minutes) administered Mondays, Wednesdays and Fridays. A 500 ml iodine flush is also administered on Tuesdays, Thursdays, and Saturdays. At eye up, eggs are shocked by pouring them into a bucket of water from a height of approximately 30 inches. Dead eggs are picked and enumerated with a Jensorter electronic counter/picker. Surplus eggs are euthanized by pouring the eggs into a bucket of chlorine and transferred to a landfill.

- *Egg transfers* - To minimize risks associated with horizontal pathogen transfer, eggs are shipped to MVFH in coolers provided by the respective facility.
    - IPC (PahA): PFH traps, spawns and incubates PahA broodstock to eyed-egg stage before being transported to NSFH for final rearing.
    - LSCRP and SBT (PahA): PFH traps and spawns PahA broodstock for LSRCP smolt program. Green eggs are transported to SFH (via SFH staff), incubated to eyed stage before being transported to MVFH for final rearing. PFH traps and spawns PahA broodstock and transports the green eggs to SFH for incubation to the eyed stage before being transported to SBT egg boxes (see SBT Egg box section for details).
    - LSRCP and SBT (USRB): PFH traps, spawns and incubates USRB broodstock to the eyed stage for the LSRCP smolt program and the SBT steelhead streamside incubator program. Eyed eggs for the LSRCP smolt program are transported to MVFH for final rearing. All USRB eggs collected at the Pahsimeroi Hatchery are incubated to the eyed stage at Pahsimeroi Hatchery.
- *Surplus egg distribution (if applicable)* - Surplus USRB eggs will be distributed to the SBT for their streamside incubator program on the Yankee Fork.

1.4.5. Fish health

- *Service provider* - Fish health diagnostics are provided by EFHL personnel.
- *Sampling protocols (what is sampled, sampling schedule) –*
    - Adults: All spawned females will be tested for viral replicating agents by ovarian fluid or tissue (kidney/spleen) samples. Eggs will not be culled for IHNV, but may be culled for other viral replicating agents such as IPNV, VHSV, or infectious salmon anemia virus (ISAV). Sixty kidney samples are collected for ELISA testing for *RS.* Sixty head wedges are collected and examined for *Myxobolus cerebralis*.
- *Vaccination methods* - NA
- *Treatment methods* - NA

1.4.6. Communication

- *Written reports (e.g., Monthly summaries, annual reports)* - Monthly and annual reports are provided to the IDFG Fisheries Bureau and to IPC personnel.
- *FINS and IDFG release databases* - Steelhead trapping and spawning updates are entered on the FINS Database daily throughout the run and are available online at www.finsnet.org. Records of adult out-plants are uploaded to the Department's fish release database as they occur.
- *Meetings (e.g., AOP, Anad, HET, etc.)* - Pahsimeroi Hatchery personnel attended the annually IDFG anadromous meeting, the annual SOP meeting, the annual regional work plan meeting, AFS, NWFCC etc.

- *Direct consultation for egg/smolt transport -* Pahsimeroi Hatchery personnel coordinate with the SBT, NSFH, SFH and MVFH to determine a schedule to obtain and transfer green and eyed eggs.

1.5. Hagerman

1.5.1. Egg incubation

- *Eggs received -* HNFH receives eyed eggs from SFH that have between 370 and 450 TUs. Shipments occur in May and June.
- *Treatment, loading density, flow rate -* Upon arrival from SFH, eyed eggs are disinfected with Iodine at 100-ppm for 10 minutes then placed into upwelling incubators at 20,000 to 30,000 eggs per jar with a flow rate of 6 to 8 gallons per minute (gpm).
- *PBT if applicable -* Parental based tagging (PBT) data is recorded for tracking throughout the facility until distribution.
- *Method into rearing tanks -* After hatching, sac fry swim from incubators directly into indoor rearing tanks

1.5.2. Early rearing

- *Environmental protocol (flow indices, density indices) -* Flows in Nursery rearing tanks are ramped up to, and then maintained at 100 gpm. Fish are reared inside to a density index of 0.70 and a flow index of 1.00.
- *Feeding protocol -* Feeding typically begins 15 to 17 days post-hatch when 80% of the fry achieve swim-up. During rearing in the hatchery buildings fish are fed Rangen Fry food 8 hours per day at a minimum frequency of once per hour.
- *Marking and tagging (AD, CWT; date range, size at application)-*Fish are adipose fin clipped from the hatchery buildings in late August at approximately 100 fpp.
- *Fish movement/facility configuration -* In late August, fish are moved utilizing marking crew fish pumps from the Nursery to the marking trailer. From the marking trailer, pipeline is used to distribute fish to their final rearing raceways after marking. Fish are reared in three flow-through banks of raceways, 22 raceways per bank. Water is serially reused in the second and third bank.

1.5.3. Final rearing

- *Target environmental protocols (flow indices, density indices) -* Fish are reared in three flow-through banks of raceways at a maximum density index of 0.30 and a maximum flow index of 1.20.
- *Feeding protocol –* All fish are hand fed daily with Skretting floating steelhead feed with 2x vitamin pack up through 3.5mm. Starting with 2.5mm, feed is placed into demand feeders according to the current feed schedule.
- *Mortality counting -* Mortalities are removed, enumerated and recorded daily.
- *Water monitoring -* Dissolved oxygen levels are monitored monthly, with more frequent monitoring as needed in the final two months of rearing. Ammonia is monitored during periods of peak loading. Water temperature remains a constant 59^0F.
- *Marking and tagging (PIT) -* In early November PIT tagging is accomplished following IDFG research recommendations.
- *Quality monitoring (counts, growth, length, marks quality, tag retention) -* Marking trailer fish counts for each raceway are used for initial raceway inventory. Daily mortality is subtracted from each raceway to obtain a running tally on total fish numbers. Fish observations are performed daily checking for flashing and abnormal behavior while feeding and mort picking. Marks and tags are verified by IDFG prior to release. Length-at-release standard of 180 to 250 mm is used to guide culture practices. Steelhead are projected for an average size of 215 mm at release. Sample counts are performed monthly on representative

raceways. Length-frequency measurements are taken prior to transport, as well as precocial checks.

1.5.4. Fish Health

- *Service provider -* Fish health inspection and diagnostic services will be provided by the Eagle Fish Health Lab.
- *Sampling protocols (what is sampled, sampling schedule) –*
    - Juveniles*:* Diagnostic services will be provided as needed at the request of hatchery personnel. Quarterly on-site inspections will include tests for the presence of viral replicating agents and general bacterial pathogens. A pre-liberation inspection will be done on all stocks 30-45 days prior to transportation. Specific pathogens tested for at pre-liberation will include IHNV, IPNV, VHSV, *RS, Aeromonas salmonicida, Yersinia ruckerii,* and *Myxobolus cerebralis*.
- *Vaccination methods -* All steelhead are administered a vaccination for *Aeromonas salmonicida.* Initial treatment is administered at 350 fpp.

1.5.5. Fish release/transportation

- *Truck specifications -* All of the HNFH steelhead smolt releases are trucked utilizing four 5,000 gallon, 40 foot stainless steel tankers, each tanker comprised of five 1,000 gallon compartments. Each compartment has fish life support (LS) systems consisting of a water agitator and oxygen stones to help sustain fish life during transport. Tankers are equipped with a liquid oxygen bottle, 2 back up compressed oxygen bottles and an 8 kW generator to operate life support system. An alarm system on the trailer will notify the driver of any LS problems. A maximum of 1,000 lbs of steelhead per compartment at roughly 5,000 lbs of fish per tanker delivered in one truckload.
- *Hauling/Release schedule -* Hauling occurs Monday through Friday during April. Hauling is coordinated with several hatcheries to minimize traffic and safety concerns.
- *Hauling/Release guidelines -* IHOT fish transportation guidelines and NZMS HACCP plans are followed.

1.5.6. Communication

- *Written reports (e.g., Monthly summaries, annual reports) -* HNFH distributes a monthly hatchery production summary, a monthly narrative, and an annual report.
- *FINS and IDFG release databases -* The final release numbers are provided and entered into the IDFG release database upon completion of transport.
- *Meetings (e.g., AOP, Anad, HET, etc.) -* HNFH objectives are discussed at the Salmon River AOP, IDFG anadromous meetings, hatchery manager meetings, LSRCP yearly meeting, and additional meetings to discuss and resolve any issues.
- *Direct consultation for egg/smolt transport -* Coordination of eyed egg shipments are discussed weekly. Communication takes place between SFH, IDFG research, and HNFH, as well as MVFH hatchery personnel.

1.5.7. Monitoring and evaluation

- *Marking and loading plans -* M&E staff meet annually to develop representative marking and loading plans for CWT and PIT at each hatchery facility to evaluate harvest and survival. For a more detailed description of the intended use of these tags see the tagging information section in Appendix 7.2.
- *Mark providers -* Marks and tags are applied by the Pacific States Marine Fisheries Commission marking crew.
- *PRAS Evaluation* - The evaluation of the PRAS system ended with BY19 releases. Future evaluations will need discussion and coordination between USFWS-LSRCP and IDFG.

1.6. Magic Valley

1.6.1. Egg incubation

- *Eggs received* - Eyed eggs are received from SFH, PFH, and CFH when they have accrued between 370 and 450 TUs. Requests for the number and stocks of eggs are based on available rearing space. Raceways have a carrying capacity of 30,000 smolts. Vats have a carrying capacity of 90,000 fry. All fry in a vat must be of the same stock. Putting less than 90,000 fry in a vat will restrict production due to limited rearing space. To maximize efficiency, all vats should be filled to capacity. Depending on egg availability, that is not always possible, so smaller groups in vats are required. Incubating smaller groups in vats that were spawned at different times results in fish at vastly different sizes, which makes marking impractical. To circumvent this, eggs from later egg takes are raised on heated water to adjust TU's to levels of eggs from previous egg takes to allow for simultaneous hatching and less size discrepancy. This is coordinated with Sawtooth hatchery, and an explanation of temperature synchronization can be found there.
- *Treatment, loading density, flow rate* - Disinfected eyed eggs are loaded into upwelling incubators at 50,000 eggs per jar with a flow rate of 6 to 8 gpm. All stocks are reared in the incubation building.
- *PBT if applicable* - Record of spawning pairs loaded into indoor nursery incubators are maintained to facilitate the tracking of parental based tagging (7.27.2).
- *Method into rearing tanks* - Sac fry volitionally swim from incubators into indoor rearing tanks.

1.6.2. Early rearing

- *Environmental protocol (flow indices, density indices)* - Starting flows in rearing tanks are set at 100 gpm, and then increased up to 250 gpm prior to transfer to outside raceways. Fish are reared inside to a maximum density index of 0.60 and a maximum flow index of 1.20.
- *Feeding protocol* - Feeding typically begins 18 to 21 days post-hatch when approximately 90% of the fry achieve button-up. Steelhead fry are started on a Rangen semi-moist starter salmon diet that is fed at a minimum frequency of once per hour during rearing in the hatchery building. After feed size zero, all early rearing diets are changed to extruded dry feed diets appropriate to the size of the fry.
- *Marking and tagging (AD, CWT; date range, size at application)* - Fish are marked by AD clipping and CWT. They are marked during the transfer (via fish pump), to outside raceways to avoid the stress of a double handling event.
- *Fish movement/facility configuration* - Fish are transferred in groups of approximately 32,000 fish per outside section for a total of 50 sections. The upper sections are used for initial outside rearing. Screens are placed at the 50 foot keyway and the upper 100 foot section is divided into two rearing sections. Transfer to outside raceways begins in late July and is completed by early September. Fish will range in size from 115 to 250 fpp.

1.6.3. Final rearing

- *Target environmental protocols (flow indices, density indices)* - Density typically reaches an index of 0.30 and a maximum flow index of 1.30.
- *Feeding protocol* – Once outside, fish are hand-fed a Rangen #3 crumble and 2.0mm extruded pellets then graduate to larger feed sizes as growth continues. Currently, for the last seven months of growth steelhead are fed an appropriate 450 extruded slow-sink diet. Feeding duration varies by fish and feed size from as high as six times per day, to as low as three times per day. Fish are fed on a five-day-on and two-day-off schedule to control growth as needed during the fall. Seven-day-a-week feeding resumes as soon as possible in the spring.

- *Mortality counting* - Mortality is collected and enumerated on a daily basis.
- *Water monitoring* - Dissolved oxygen and total gas saturation are monitored intermittently throughout the rearing cycle. Water temperature remains a constant 58^0F.
- *Fish movement/facility configuration* - Upon being moved outside, the fish are placed into the first, or "A" section of the raceways. These "A" sections are divided in half by a screen. When fish approach density indexes of 0.30, inventory in the lower 50 feet of the A section, they will be moved to the lower 100 feet (B section) and the inventory in the upper 50 feet will have the entire A section for the final rearing period.
- *Marking and tagging (PIT)* - PSFMC crew marks fish over a two day period.
- *Quality monitoring (counts, growth, length, marks quality, tag retention)* - Steelhead are projected for an average size of 215 mm at release. Sample counts are performed monthly on representative raceway sections, and length frequencies are measured prior to transport.

1.6.4. Fish Health

- *Service provider* - Fish health inspection and diagnostic services will be provided by the EFHL.
- *Sampling protocols (what is sampled, sampling schedule) –*
    - Juveniles*:* Diagnostic services will be provided as needed at the request of hatchery personnel. Quarterly on-site inspections will include tests for the presence of viral replicating agents and general bacterial pathogens. A pre-liberation inspection will be done on all stocks 30-45 days prior to transportation. Specific pathogens tested for at pre-liberation will include IHNV, IPNV, VHSV, *RS, Aeromonas salmonicida, Yersinia ruckerii,* and *Myxobolus cerebralis*.
- *Vaccination methods* - NA

1.6.5. Fish release/transportation

- *Truck specifications* -Beginning in April, semi-trucks are used to transport smolts from Magic Valley Hatchery to their final destination. Up to five trucks are loaded with smolts daily. These trucks are then driven to the appropriate release sites, where the smolts are then released.
- *Hauling/Release schedule* - Hauling occurs Monday through Friday during April. Hauling is coordinated with several hatcheries to minimize traffic and safety concerns
- *Hauling/Release guidelines* - IHOT fish transportation guidelines and NZMS risk assessment guidelines are followed.

1.6.6. Communication

- *Written reports (e.g., Monthly summaries, annual reports)* - MVFH distributes monthly hatchery production summaries and annual reports. These are sent to IDFG Fisheries Bureau personnel, David Burbank (EFHL Pathologist), and the LSRCP office coordinator. Monthly summaries and annual reports are available upon request.
- *FINS and IDFG release databases* - The final release numbers are entered into the IDFG release database upon completion of transport.
- *Meetings (e.g., AOP, Anad, HET, etc.)* - An Annual Operating Plan addressing the year's production is developed by Nampa Research and Magic Valley Hatchery personnel.
- *Direct consultation for egg/smolt transport* - Coordination of eyed egg shipments are discussed weekly. Communication takes place between IDFG research and hatchery, as well as USFWS hatchery personnel.

1.6.7. Monitoring and evaluation

- *Marking and loading plans* - M&E staff meet annually to develop representative marking and loading plans for CWT and PIT at each hatchery facility to evaluate harvest and survival. For a more detailed description of the intended use of these tags see Appendix 7.2.

- *Mark providers -* All marks and tags are applied by the Pacific States Marine Fisheries Commission marking crew.

1.7. Sawtooth

1.7.1. Ladder Operation

- *Dates operated -* Ladder and trap operations begin in March and continue until late April or early May.
- *Trap configuration -* Steelhead swim into fish ladder attraction water, then into a single adult holding pond. A PIT tag array system into the ladder of the Sawtooth trap that consists of four antennas (two top water and two floor orifice) that are designed to detect all fish with PIT tags is operated throughout the trapping period.
- *Trapping protocol (frequency, movement of fish)* - The center holding pond that acts as the trap is emptied every Monday and Thursday throughout the trapping/spawning season. Fish are either immediately spawned or placed in one of the other two holding ponds for a later spawn day or distribution to local foodbanks and tribal ceremonial and subsistence. All natural fish are released upstream of the weir.

1.7.2. Adult handling

- *Measurements (marks, tags, sex, etc.) -* At sorting, fish are examined for gender, fork length measured, checked for various marks, radios, CWT, injuries, and readiness to spawn.
- *Tissue sampling protocol -* Genetic material and scale samples are collected from all unmarked steelhead. Genetic samples are also collected from all spawned adults to develop the Parentage Based Tagging (PBT) baseline with a target tagging rate of 100% (see Appendix 7.1 for detail).
- *Dispositions (holding, releases) -* Unmarked steelhead and other trapped species are released upstream of the hatchery weir. Fish are sorted on Mondays and Thursdays. The designated number of fish needed are spawned on sort days, all others are placed into the other two holding ponds to use on a later spawn day or for distribution to local food banks and tribal ceremonial and subsistence. All spawned carcasses are distributed to the general public.
- *Surplus distribution - Surplus steelhead are distributed to local food banks and tribal ceremonial and subsistence programs.*
- *Carcass dispositions -* First priority for spawned out carcasses is to Tribal ceremonial and subsistence programs and charitable organizations. Second priority for spawned-out carcasses is to the general public on a first-come-first-served basis. Due to whirling disease amplification issues, carcasses are not used for nutrification of local waters. Any remaining carcasses or unspawned adults are frozen and disposed of through rendering plant operation.

1.7.3. Spawning/Egg take

- *Calculation of broodstock need (fecundity, eye-up, eye to smolt)* - See Section 1 ("Calculation of Broodstock Need") for details on broodstock calculation. The production goal is to trap and spawn enough adults to produce 279,000 yearling smolts at MVFH and 1,500,000 yearling smolts at HNFH.
- *Spawning protocol (schedule, method, M/F ratio) -* Spawning occurs every Monday and Thursday from early to mid-March through late April to early May. Spawning protocol is random 1: 1 with two female's eggs combined prior to water hardening of the eggs.

1.7.4. Egg incubation/egg and fry shipping

- *Egg incubation method (egg distribution, treatments, picking) -* All eggs are water hardened and disinfected with PVP iodine per product label. Beginning two days after spawning until eye up, eggs will receive a formalin treatment (1,667 ppm for 15 minutes) three times a

week. After the eggs have developed to the eyed stage, the eggs are physically shocked before passing through an electronic egg machine for sorting and enumerating dead from live eggs. Eggs are culled according to Fish Health Pathologist recommendations. An inline heater system can be used to temperature sync up to 160 trays (see MVFH section for purpose of synching). Typically the East Fork Natural steelhead eggs are placed into this system and are temperature synched according to the needs of the receiving hatchery.

- *Egg transfers* - Only eyed eggs (no live fish) are transferred to HNFH and MVFH due to concerns with transfer of fish pathogens between stations. Eyed egg transfers are coordinated with HNFH and MVFH staff. PFH traps and spawns PahA broodstock and transports the green eggs to SFH for incubation to the eyed stage before being transported to SBT egg boxes (see SBT Egg box section for details) and MVFH.
- *Surplus egg distribution (if applicable)* - Surplus egg distribution will be coordinated with cooperators and the Fisheries Bureau.

1.7.5. Fish health

- *Service provider* - Eagle Fish Health Lab, Idaho Fish and Game
- *Sampling protocols (what is sampled, sampling schedule) –*
    - Adults: All spawned females will be tested for viral replicating agents by ovarian fluid or tissue (kidney/spleen) samples. Eggs will not be culled for IHNV, but may be culled for other viral replicating agents such as IPNV, VHSV, or infectious salmon anemia virus (ISAV). Sixty kidney samples are collected for ELISA testing for *RS.* Sixty head wedges are collected and examined for *Myxobolus cerebralis*.
- *Vaccination methods* - NA
- *Treatment methods* - NA

1.7.6. Communication

- *Written reports (e.g., Monthly summaries, annual reports)* - Weekly and monthly summaries are provided to interested parties via email. Annual Run Reports and Brood Year Reports are submitted to the Fisheries Bureau for distribution.
- *FINS and IDFG release databases* - FINS data is entered twice weekly after the trap is emptied. Twice weekly, run status is updated on the IDFG Webpage.
- *Meetings (e.g., AOP, Anad, HET, etc.)* - Eyed egg requests are finalized at the annual AOP meeting.
- *Direct consultation for egg/smolt transport* - Coordination of eyed egg shipments among the hatcheries is discussed weekly. Weekly communication for egg delivery status is undertaken with SBT Biologists.

1.8. East Fork

1.8.1. Ladder Operation

- *Dates operated* - Ladder and trap operations begin in late March and continue until mid-May.
- *Trap configuration* - Once the velocity barrier is in place, fish swim into attraction water and into a trapping and holding area.
- *Trapping protocol (frequency, movement of fish* - The trap is emptied daily. According to the trap protocol, fish are either immediately ponded, released upstream to spawn naturally or killed as in the case of strays.

1.8.2. Adult handling

- *Measurements (marks, tags, sex, etc.)* - All steelhead are examined for gender, fork length measured, checked for various marks, radios, CWT, injuries, and readiness to spawn.
- *Tissue sampling protocol* - Genetic material and scale samples are collected from all unmarked steelhead. Genetic samples are also collected from all spawned adults to

develop the Parentage Based Tagging (PBT) baseline with a target tagging rate of 100% (see Appendix 7.1 for detail).

- *Dispositions (holding, releases) -* Ripe fish are spawned when ripe males and females meeting program protocols are available. Program steelhead in excess of broodstock and other trapped species are released upstream of the velocity barrier. Any ad-clipped adult steelhead that are trapped are considered strays and are subsequently euthanized and checked for CWT.
- *Surplus distribution -* N/A
- *Carcass dispositions -* Carcasses are placed downstream of the velocity barrier and used for nutrification of local waters.

1.8.3. Spawning/Egg take

- *Calculation of broodstock need (fecundity, eyeup, eye to smolt) -* See Section 1 ("Calculation of Broodstock Need") for details on broodstock calculation. The production goal is to trap and spawn enough adults to produce 60,000 integrated steelhead smolts at HNFH.
- *Spawning protocol (schedule, method, M/F ratio) -* Spawning occurs every Tuesday and Friday throughout the spawning season. Naturally produced adults will be prioritized for inclusion into the broodstock but if insufficient natural adults are available, hatchery-origin adults will be included in the broodstock. Target is 14 pairs for integrated broodstock of natural origin adult fish. Spawning protocol is random 2 males: 1 female with half individual female's eggs fertilized by single male. Each natural origin male may be used with half the eggs of two separate females, but any hatchery origin males used for spawning will be crossed with half the eggs of only one female.

1.8.4. Egg incubation/egg and fry shipping

- *Egg incubation method (egg distribution, treatments, picking)* - All eggs are transferred to SFH as green eggs. Eggs receive three formalin treatments per week (1,667 ppm for 15 minutes) until eye-up. Eggs are sorted (live/dead) and counted using a Jensorter egg picker. Eggs are culled according to Fish Health Pathologist recommendations. Eyed eggs are shipped to HNFH.
- *Egg transfers -* Green eggs are transported to Sawtooth FH for eye-up, and then to HNFH for final incubation and rearing.
- *Surplus egg distribution (if applicable)* - N/A

1.8.5. Fish health

- *Service provider -* Eagle Fish Health Lab, Idaho Fish and Game
- *Sampling protocols (what is sampled, sampling schedule) –*
    - Adults: All spawned females will be tested for viral replicating agents by ovarian fluid or tissue (kidney/spleen) samples. Eggs will not be culled for IHNV, but may be culled for other viral replicating agents such as IPNV, VHSV, or infectious salmon anemia virus (ISAV). Up to 60 kidney samples are collected for ELISA testing for *RS.* Up to 60 head wedges are collected and examined for *Myxobolus cerebralis*.
- *Vaccination methods -* NA
- *Treatment methods* - NA

1.8.6. Communication

- *Written reports (e.g., Monthly summaries, annual reports) -* Weekly and monthly reports are distributed to interested parties via email. Annual Run Reports are submitted to the Fisheries Bureau for distribution.
- *FINS and IDFG release databases -* Trapping and spawning data is entered into FINS daily.
- *Meetings (e.g., AOP, Anad, HET, etc.) -* An Annual Operating Plan summarizing the current year's broodstock and spawning protocols is jointly developed pre-season by Nampa

Research staff and by Sawtooth FH staff. Eyed egg requests are finalized at the annual AOP meeting.

- *Direct consultation for egg/smolt transport -* Coordination of eyed egg shipments among the hatcheries is discussed weekly. Weekly communications occurs with IDFG research, hatchery, and Salmon Region personnel, and SBT.

1.9. Dworshak

1.9.1. Ladder Operation

- *Dates operated -* Adults are collected during two time periods. The ladder is opened in the fall with collection targets by month (Oct. – Dec.). Intermittent trapping in the spring (late Jan-late April).
- *Trap configuration -* A fish ladder in the N.F. Clearwater River traps returning adults at the hatchery. The holding pond at the top of the ladder is 15'x 75'x 8'. Broodstock are collected passively using a ladder that enters the hatchery from the North Fork Clearwater River.
- *Trapping protocol (frequency, movement of fish)* - The ladder is opened in the fall with collection targets by month (October 300 adults, November 150 adults, December 150 adults) for collection of early-return steelhead. This provides representation from October through December rather than collecting all of the fish in October as was previously done to represent the "early return" steelhead. Intermittent trapping in the spring (late Jan-late April) as needed to meet broodstock needs; this allows more fish to stay in the river for harvest and allows the spawning of fresh fish that are not held in the hatchery for more than a few days.

1.9.2. Adult handling

- *Measurements (marks, tags, sex, etc.) -*
- *Tissue sampling protocol -*
- *Dispositions (holding, releases) -* Broodstock are held in three 15' x 75' x 8' concrete ponds. Adults in these ponds are crowded into a 370 gallon anesthetic tank. From here the fish are lifted to an examining table and are checked for ripeness and either spawned or returned to the holding pond for later examination or outplanting.
- *Surplus distribution -* Adult returns in excess of broodstock needs are handled in several ways, depending on the level of excess. Any fish surplus to the broodstock needs are returned to the Clearwater River or the North Fork Clearwater River depending on river temperatures and conditions and made available to the fishery. When fish have to be culled, it is normally done by selecting those fish that are coded-wire tagged. This ensures recovery of the tags for evaluation purposes
- *Carcass dispositions -* Adult fish that are euthanized for the CWT mark, or dead fish, not treated with MS-222 are utilized for Tribal subsistence, public or local food banks. Fish not utilized through subsistence, public, or food bank, will be returned to the Clearwater River or North Fork River for nutrient enhancement. Any fish that have been exposed to hormone treatments (GnRHa) will be disposed at the transfer station. In the spring, some males may be spawned that have been held over from early returns to better achieve the 1:1 M:F spawning ratio; these males have been treated with formalin and their carcasses will be included in the group of fish to be disposed of in the Clearwater River.

1.9.3. Spawning/Egg take

- *Calculation of broodstock need (fecundity, eyeup, eye to smolt) -* See Section 1 ("Calculation of Broodstock Need") for details on broodstock calculation. The total number of females needed will produce eggs for LSRCP programs at CHF and MVFH. The production goal is to trap and spawn enough adults to produce 93,000 steelhead smolts at MVFH. The Dworshak steelhead program seldom observes a 1:1 sex ratio in adult returns. The typical sex ratio is

about 2.3F:1M. Due to high incidence of the IHN virus in late spawn takes, additional broodstock has been necessary to meet CFH and MVFH egg requests. Unfortunately, during the early and late portions of the run, it is not uncommon to be limited in the number of ripe males. During the middle portion of the run, the ratio is usually closer to one on one

- *Spawning protocol (schedule, method, M/F ratio) -* Approximately 600 adults are kept from the early return group for spawning in January. Beyond the "early return" steelhead, spawning starts in late January and continues through mid-late April for all programs. In the spring, spawning efforts are with fresh fish collected via the Dworshak ladder with the exception of some males that have been held over from previous collections to better achieve the 1:1 M:F spawning ratio. Spawning generally occurs weekly or every other week. Generally, Magic Valley Hatchery program adults are collected in the final two- three spawn takes in April. The late timing is more conducive to water rearing conditions at Magic Valley Hatchery, especially water temperatures (59 F).

  Fish ready to spawn from the past week are picked randomly to spawn and then if more are needed, ripe fish from previous weeks are selected. Jacks are used as they are randomly taken on the spawning rack. Repeat spawners are used as needed when the number of males returning during steelhead spawning is extremely low.

  Adults are crowded from a fish trap at the end of the fish ladder into a crowding channel, moved into a channel basket, and placed into an anesthetic bin. Steelhead adults are anesthetized with carbon dioxide at a rate of 400 to 1000 mg/l solution buffered with 8 to 10 pounds of sodium bicarbonate. Although carbon dioxide is more stressful on the fish than MS-222, carcasses anesthetized with CO^2 can be used for human consumption. Spinal columns of ripe females are severed using a pneumatic knife. The females are then placed on a table for 1-2 minutes for blood drainage. The ventral side is then cut open using a spawning knife and eggs are collected in disinfected colanders. After ovarian fluid is drained, the eggs are poured into a clean bucket. Milt from ripe males is stripped into Styrofoam cups and a one-percent saline solution is added to assist in milt motility. The milt solution is poured onto the eggs and swirled for more complete fertilization. After sufficient time has elapsed for fertilization to take place (one to two minutes), the eggs are rinsed of sperm, blood, and other organic matter

1.9.4. Egg incubation/egg and fry shipping

- *Egg incubation method (egg distribution, treatments, picking) -* Dworshak NFH provides green eggs to the Idaho Department of Fish and Game for the Salmon River B-run steelhead program and does not provide incubation for that program.
- *Egg transfers -* After fertilization, green eggs are transferred from Dworshak NFH by the Idaho Department of Fish and Game to Clearwater Hatchery and then to Magic Valley Hatchery. See appropriate sections for those hatcheries for details on egg and fry shipping.
- *Surplus egg distribution (if applicable) -*

1.9.5. Fish health

- *Service provider -* Testing of adults is performed by the Pacific Region Fish Health Program (USFWS).
- *Sampling protocols (what is sampled, sampling schedule) –*
    - Adults: Testing of adults is performed by the Pacific Region Fish Health Program (USFWS) including 100% testing for virus for eggs transferred to Magic Valley. Ovarian fluids are collected and tested individually for virus at 30% of each take for the rest of the steelhead spawned. Sixty female adults are also sampled for

Renibacterium salmoninarum (Bacterial Kidney Disease) testing by the ELISA assay. In addition, fish are sampled and tested at the 60 fish sample size for virus by kidney/spleen, for bacteria, and for parasites including *Myxobolus cerebralis* (Whirling Disease) and *Ceratonova shasta*.

- *Vaccination methods* - NA
- *Treatment methods* - To ensure ripeness of males, about 80 adult males of the early return fish are injected with GnRHa two weeks prior to spawning under an INAD. Milt from the 80 injected fish and 10 control fish is then measured for quantity and observed microscopically for motility.

1.9.6. Communication

- *Written reports (e.g., Monthly summaries, annual reports)* - During the spawning season, information on broodstock collection numbers, biological information, spawning numbers, and other information is reported in weekly updated reports. A summary of spawning operations and all data are provided in annual spawning reports available from Dworshak NFH.
- *FINS and IDFG release databases* - During the spawning season, information on broodstock collection numbers, biological information, spawning numbers, and other information is recorded in established databases.
- *Meetings (e.g., AOP, Anad, HET, etc.)* -
- *Direct consultation for egg/smolt transport* –

1.10. Shoshone-Bannock Tribes streamside incubator program

1.10.1. Egg incubation

- *Egg source* - Gametes to accomplish the steelhead streamside incubator (SSI) Program are acquired from Pahsimeroi Fish Hatchery (PahA and USRB). Green eggs are transported from PFH to SFH for incubation to the eyed stage.
- *Remote Site Incubators protocol* - Egg incubation procedures prior to transfer to the SSI Program are described within the specific hatchery section (PFH and DNFH). Egg incubation procedures described in this section pertain to the period between when eyed-eggs are acquired by the SSI Program to when fry vacate the SSI.

  SSIs consist of a 50-gallon polyurethane cylinder which is connected to natural river water using PVC piping. The SSI includes an inflow and outflow system primarily configured from 2" PVC pipes. The inflow system includes several segments of 2" PVC pipe extended to a point upstream generally 3' higher than the outlet of the RSI. Water upwelling through the SSI is controlled from the inlet system by a valve. The outflow system includes a 2" PVC pipe, located at the top of the SSI, connected to a 30-gallon Rubbermaid polyurethane tub with a custom fit cover, known as a catch tank. The catch tanks provide a secondary catchment, where emergence can be enumerated and/or monitored.

  The system is designed to incubate eggs, rear alevins, and volitionally release swim-up fry. Eggs are incubated on one of five unique trays. Each egg tray is loaded with an average of 20,000 eyed-eggs for a total of ~100,000 eyed-eggs per SSI. Upon hatching alevins drop through the incubation trays, into bio-saddles, which mimic substrate and provide interstitial spaces for alevin development. Eyed-eggs are typically outplanted into each SSI on a weekly basis, but contingent upon egg development at the local hatchery. Each SSI receives a similar number of eggs during the outplanting events.

Incubators are monitored twice weekly from initial construction through complete fry emigration. SSI staff adjust water levels as necessary and record water conditions, temperature, dissolved oxygen, conductivity, pH, and embryo development during each visit. In addition, the headbox is cleaned and debris removed. When fry emigration ceases, dead eggs and dead fry remaining in the SSI are enumerated to determine hatch success and fry seeding

1.10.2. Fish release/transportation

- *Egg transfers* - Eggs are transferred in bags within iced coolers to constructed incubators within each tributary.
- *RSI loading protocol* - Eyed-egg outplants are not to exceed 100,000 per upweller unit. Once on site, eggs are proportionately loaded onto six trays within the upweller. Family identity is preserved during egg outplant by recording which broodstock pairs are represented in each streamside incubator

1.10.3. Communication

- *Written reports (e.g., Monthly summaries, annual reports)* - Monthly reports are completed.
- *Meetings (e.g., AOP, Anad, HET, etc.)* -
- *Direct consultation for egg/smolt transport* - PFH, SFH, and SBT personnel coordinate to determine a schedule to obtain and transfer eyed eggs.

2. Spring/Summer Chinook Salmon

- *Definition of species* - Chinook salmon *Oncorhynchus tshawytscha* are native to the Columbia River drainage and spawn in freshwater during summer and fall. Idaho's Chinook enter the fresh water system the same year they spawn, usually beginning in the spring. Spawning begins in August and continues as late as November. Spring, Summer and Fall Chinook are designated by the time of entry into the Columbia River system.
- *Rearing locations* - Spring/summer hatchery Chinook salmon released into the Salmon River drainage are reared at four hatcheries: Rapid River Fish Hatchery (RRFH), Pahsimeroi Fish Hatchery (PFH), McCall Fish Hatchery (MFH), and Sawtooth Fish Hatchery (SFH). All four hatcheries are located within the Salmon River Basin.
- *Broodstock collection and spawning locations* - Broodstock collection and spawning activities for the spring/summer Chinook salmon program in the Salmon River are conducted at the following locations: Oxbow Fish Hatchery (OFH), Hells Canyon Trap (HC trap), Pahsimeroi Fish Hatchery (PFH), South Fork Salmon River trapping satellite (SF Trap), Johnson Cr weir, Yankee Fork weir, and Sawtooth Fish Hatchery (SFH).
- *Calculation of Broodstock need* - Appendix 7.9 shows the brood calculator used to determine brood need to reach production goal for the program releases. The number of eggs collected is based on 5-yr running historical average of adult survival, eye-up percentage, disease rates and smolt survival rates to meet smolt release targets. Suppose the production goal is to trap and spawn enough adults to produce (x) number of smolts for release. Applying a production cushion (c) and eyed egg-to-smolt survival (ess) to total smolt goal, gives the eyed eggs needed (e=(x/(1-c))/(ess)). After accounting for green-to-eyed egg and culling survival (ges and cs, respectively), the green egg goal before culling can be determined (g=e/(ges)/(cs)). Using an average fecundity of green eggs per female (fec) gives the number females needed (F=g/fec). The total number of fish to spawn is the sum of Males and Females (TotSp=F+M). Total fish needed when accounting for % pond mortality (pm) can be calculated (TotPM=TotSp/(1-pm)).
- *Smolt releases* –

2.1. Overview of facilities and Egg Box Programs

2.1.1. Rapid River Fish Hatchery (RRFH)

- *Hatchery description and location –* The Rapid River Fish Hatchery (RRFH) is located on Rapid River, a tributary to the Little Salmon River approximately 11.3 kilometers from the community of Riggins, Idaho. The adult trap is located approximately 2.4 kilometers downstream of the main hatchery.
- *Owner and operator* – RRFH is operated by IDFG and is owned and funded by the IPC**.**
- *Programs at facility –* RRFH is the broodstock collection, spawning, incubation and rearing facility for the IPC spring Chinook salmon mitigation program. A portion of the brood for this program is collected at the Hells Canyon Trap. Broodstock collected at the HC Trap and at RRFH are managed as a single broodstock.
- *Stocks reared and release locations-* Broodstock collected at the HC Trap and at RRFH are managed as a single broodstock for the Rapid River spring Chinook salmon program. All spring Chinook salmon are reared at the Rapid River Hatchery and released volitionally into Rapid River (2.5 million smolts) or transported for release to the Snake River below Hells Canyon Dam (350,000 smolts) and the Little Salmon River (150,000 smolts).
- *Production Goals (smolts, fpp)* - The mitigation goal for the RRFH is to release 3,000,000 yearling Chinook salmon (2,500,000 on site; 350,000 in the Snake River below Hells Canyon Dam; 150,000 in the Little Salmon River).
- *Adult mitigation goal (if applicable)* –
- *Facility or stock changes (if applicable) -*This should not change aspects of SOP.

2.1.2. Hells Canyon Trap (HC Trap) and Oxbow Fish Hatchery (OFH)

- *Hatchery description and location* - OFH: Oxbow Fish Hatchery is located in Baker County, Oregon, at the confluence of Pine Creek and the Snake River near the Hells Canyon National Recreation Area. HC Trap: located on the Oregon side of the Snake River approximately 35 kilometers downstream from Oxbow Fish Hatchery (OFH), immediately below Hells Canyon (HC) Dam.
- *Owner and operator* – HC Trap is owned and operated by the IPC. OFH is operated by IDFG and is owned and funded by the IPC.
- *Programs at facility* - HC trap and OFH operate as part of the RRFH program. HC Trap is a satellite facility of OFH and is used to collect a portion of the brood for the RRFH program. Chinook are temporarily held at OFH prior to transfer to RRFH for spawning. OFH is also utilized to incubate a portion of the eggs spawned at RRFH. These eggs are incubated until the eyed stage at which point they are transported back to RRFH for final incubation and rearing. Broodstock collected at the HC Trap and at RRFH are managed as a single broodstock.
- *Stocks reared and release locations-* Broodstock collected at the HC Trap and at RRFH are managed as a single broodstock for the Rapid River spring Chinook salmon program. All spring Chinook salmon are reared at the Rapid River Hatchery and released volitionally into Rapid River or transported for release to the Snake River below Hells Canyon and the Little Salmon River.
- *Production Goals (smolts, fpp)* – All spring Chinook salmon are reared at the RRFH and released volitionally into Rapid River. The mitigation goal for the RRFH is to release 3,000,000 yearling Chinook salmon (2,500,000 on site; 350,000 in the Snake River below Hells Canyon Dam; 150,000 in the Little Salmon River).
- *Adult mitigation goal (if applicable)* –
- *Facility or stock changes (if applicable) -*

2.1.3. South Fork Salmon River Trapping Satellite (SFSR Trap) and McCall Fish Hatchery (McFH)

- *Hatchery description and location* – McFH: The McCall Fish Hatchery is located within the city limits of McCall, Idaho - approximately 1/4 mile south of Highway 55 at Lardo Bridge along the east bank of the North Fork Payette River. SFSR Trap: The hatchery also operates the SFSR Trap satellite facility located on the west bank of the South Fork of the Salmon River approximately one mile downstream of Knox Bridge on Warm Lake Highway, in the area of Warm Lake.
- *Owner and operator* –McFH is operated by IDFG and is funded through the LSRCP. SFSR Trap is a satellite facility of McFH that is operated by IDFG and funded through the LSRCP.
- *Programs at facility* –McFH is the incubation and rearing facility for the SFSR summer Chinook Salmon stock. Adult summer SFSR Chinook Salmon are trapped and spawned at SFSR Trap for the SFSR Segregated and Integrated hatchery programs at McFH. Green eggs are transported to McFH for incubation and subsequent rearing for the segregated (SFSRSeg) and integrated (SFSRInt) programs. Additional SFSR Segregated broodstock may be collected to continue developing a summer run of Chinook salmon in the Clearwater River basin. Green eggs for this program are transported to Clearwater Fish Hatchery for incubation and rearing. In addition, summer Chinook collected at the Johnson Creek Weir by NPT staff are transported to SFSR Trap satellite where they are held and spawned. Green eggs from these adults are transported to McFH for incubation and rearing.
- *Stocks reared and release locations* – The hatchery program for summer-run Chinook salmon in the South Fork Salmon River is managed as an integrated “stepping stone”

program in which both SFSRInt and SFSRSeg components of the broodstock are maintained at McFH. Progeny will be released in the following locations: SFSRSeg eggs used in SBT Egg Boxes in Curtis/Cabin Creek (300,000 eyed eggs); SFSRSeg green eggs transported to Clearwater FH for rearing and release of smolts at the Powell satellite facility on the Lochsa River (up to 600,000 green eggs, when available); and 1.0 million yearling smolts released at Knox Bridge on the SFSR (850,000 Segregated, 150,000 Integrated). Additionally, MCFH rears up to 150,000 Johnson Creek origin summer Chinook salmon yearling smolts annually.

- *Production Goals (smolts, fpp)* - The production goal for the combined SFSR Segregated and Integrated programs is to release 1.0M yearling smolts (850,000 segregated and 150,000 integrated) into the SFSR. SFSR Segregated broodstock is also collected to provide 300,000 eyed eggs for the SBT egg box program. If needed, the SFSR Segregated broodstock also provides up to 600,000 green eggs to Clearwater Fish Hatchery for the Clearwater River basin's summer Chinook smolt program. The McFH also has the capacity to rear up to 150,000 summer-run Chinook salmon that are part of the Johnson Creek supplementation program run by the Nez Perce Tribe for release into Johnson Creek.
- *Adult mitigation goal (if applicable)* - The adult mitigation goal for McFH is to return 40,000 adults (8,000 upstream of LGD and 32,000 downstream of LGD)
- *Facility or stock changes (if applicable)* -NA

2.1.4. Shoshone Bannock Tribal Egg Box Program

- *Description and location* –Egg boxes are located in Curtis and Cabin creeks, tributaries to the main stem of the South Fork Salmon River.
- *Programs* - The Shoshone-Bannock Tribes initiated an egg box program to utilize excess or surplus summer Chinook salmon production from McFH to maintain, rehabilitate, and enhance summer Chinook salmon in the South Fork Salmon River. The primary goal of the program is to seed vacant and/or underutilized tributary habitats with juvenile summer Chinook salmon eggs and fry.
- *Stocks and release locations* –South Fork Salmon River Segregated (SFSRSeg) eggs are used for the SBT egg box program in Curtis/Cabin Creek.
- *Production Goals* - Production objectives for 2018 – 2027 are consistent with the *US v Oregon* Agreement, which include incubating 300,000 eyed-eggs in the SBT egg boxes.
- *General egg box method* – Adult SFSR Chinook are trapped and spawned at SFSR Trap and the green eggs are transported to McFH for incubation. SFSRSeg eggs destined for the SBT egg boxes are reared to the eyed stage at McFH before being placed in remote site incubators (RSIs) in Curtis/Cabin Creek. The eggs are incubated in stream water and the resulting fry volitionally emigrate the following spring.

2.1.5. Johnson Creek Weir (JC Weir)

- *Description and location* – The Johnson Creek Weir (JC Weir) is located approximately 4.5 miles above the confluence of the EFSF Salmon River. The weir is located on privately owned property of the Bryant Ranch and the site is used in agreement with the owners of the property.
- *Owner and operator* – JC Weir is operated by the NPT.
- *Programs at facility* – The JC Weir is the broodstock collection site for the Johnson Creek Artificial Propagation Enhancement program (JCAPE). The primary goal is to reduce the demographic risk of extirpation of the ESA listed Johnson Creek summer Chinook salmon and begin its recovery through supplementation. A secondary goal is to maintain genetic diversity of the artificially propagated summer Chinook salmon population and the natural population. The intent is to increase adult returns through increased juvenile survival and improved homing in order to preserve and recover the Johnson Creek salmon population.

Broodstock trapped at the JC Weir are transported to the SFSR Satellite Trap and are ponded and held until spawning. Eggs from this program are incubated and reared at the McFH. Only natural origin Chinook are utilized for broodstock and all other Johnson Creek adults are passed above the weir to spawn naturally.

The JCAPE project is integrated with a comprehensive M&E program that follows a detailed M&E Plan. The monitoring and evaluation program quantifies 41 regionally standardized performance measures to evaluate the supplementation program. These standard performance measures help inform decisions on Abundance, Survival-Productivity, Distribution, Genetic, Life History, and Habitat. The evaluation plan utilizes comparative performance tests at multiple life stages and involves treatment vs. natural experiments and repeated measures testing (treatment vs. reference).

- *Production Goals (smolts, fpp)* - The historic production goal of 100,000 yearling smolt has recently been increased to 150,000 smolt to be released annually into Johnson Creek. The monitoring and evaluation goal is to establish baseline information on the Johnson Creek summer Chinook Salmon population and determine the effectiveness of supplementation in aiding the recovery of the natural population.
- *Adult mitigation goal (if applicable)*- NA

2.1.6. Pahsimeroi Fish Hatchery (PFH)

- *Hatchery description and location* - Pahsimeroi Fish Hatchery (PFH) is comprised of two separate facilities – the lower Pahsimeroi Fish Hatchery (lower PFH) and the upper Pahsimeroi Fish Hatchery (upper PFH). The lower PFH is on the Pahsimeroi River approximately 1.6 kilometers above its confluence with the main Salmon River near Ellis, Idaho. The Upper PFH is approximately 11.3 kilometers further upstream from the lower facility on the Pahsimeroi River. The river kilometer codes for the upper and lower facilities are 522.303.489.011 and 522.303.489.002 respectively. Adults are trapped at the Lower PFH. Eggs are incubated and fish are reared at the Upper PFH.
- *Owner and operator* – PFH is operated by IDFG and is owned and funded by the IPC.
- *Programs at facility –* PFH is the broodstock collection, spawning, incubation and rearing facility for Segregated and Integrated Pahsimeroi summer Chinook salmon (PahSeg and PahInt, respectively).
- *Stocks reared and release locations –* The hatchery program for summer-run Chinook salmon in the Pahsimeroi River is managed utilizing both integrated (PahInt) and segregated (PahSeg) components of the broodstock. These summer Chinook smolts will be released into the Pahsimeroi River at the Pahsimeroi Weir (65,000 PahInt; 935,000 PahSeg).
- *Production Goals (smolts, fpp)* - The production goal for the combined Pahsimeroi Segregated and Integrated programs is to release 1.0M yearling Chinook salmon smolts into the Pahsimeroi River annually (65,000 PahInt; 935,000 PahSeg). The target release size is approximately 15 fpp.
- *Adult mitigation goal (if applicable)*-
- *Facility or stock changes (if applicable)* -NA

2.1.7. Sawtooth Fish Hatchery (SFH)

- *Hatchery description and location* -The Sawtooth Fish Hatchery is located on the upper Salmon River approximately 8.0 kilometers south of Stanley, Idaho. The river kilometer code for the facility is 503.303.617. The hydrologic unit code for the facility is 17060201.
- *Owner and operator* – SFH is operated by IDFG and is funded through the LSRCP.
- *Programs at facility –* SFH is the broodstock collection, spawning, incubation and rearing facility for the upper Salmon River spring Chinook salmon mitigation program. SFH is the

trapping, incubation and rearing facility for Upper Salmon River Segregated (USRSeg) and Upper Salmon River Integrated (USRInt) programs. SFH also provides broodstock for the Yankee Fork Chinook Supplementation (YFCSS) program operated by the Shoshone-Bannock Tribe. The YFCSS program was established to increase the number of threatened Snake River spring/summer Chinook salmon through development of a locally adapted salmon run in the Yankee Fork Salmon River using Upper Salmon River stock. Prior to the completion of the Crystal Springs Fish Hatchery, most broodstock for this program will be from the SFH trap due to limited returns to the Yankee Fork and smolt production will be at SFH (See Yankee Fork section for details).

- *Stocks reared and release locations –* The hatchery program for spring-run Chinook salmon in the upper Salmon River is managed as an integrated "stepping stone" program in which both USRInt and USRSeg components of the broodstock are maintained at SFH. Smolts will be released at the following locations: 1.45 million USRSeg in Salmon River (at weir); 250,000 USRInt in Salmon River (at the county line bridge, approximately 12 miles upstream of the SFH weir); 300,000 USRSeg in Yankee Fork of the Salmon River.
- *Production Goals (smolts, fpp)* - The current production goal for the combined Sawtooth Segregated and Integrated programs is to release 2.0 million yearling smolts annually (1,450,000 USRSeg in the mainstem Salmon River at SFH; 250,000 USRInt in the mainstem Salmon River; 300,000 USRSeg in the Yankee Fork Salmon River). The original smolt production target deemed necessary to meet the adult mitigation goal at LGD is 2.24 million yearling smolts at 20 fpp and an SAR of 0.87%. Currently, the rearing capacity at SFH is limited to 2.0M yearling smolts.
- *Adult mitigation goal (if applicable)* - The adult return mitigation goal is to provide 97,225 adults (77,780 below LGD, 19,445 above LGD).
- *Facility or stock changes (if applicable) -* NA

2.1.8. Yankee Fork Trap

- *Description and location –* The Yankee Fork Salmon River trap (YF trap) is a planned satellite facility constructed as part of Crystal Springs Fish Hatchery (CSFH). It will be located on the Yankee Fork Salmon River road approximately 5.22 river kilometers upstream of the confluence of the Yankee Fork with the mainstem Salmon River. As an interim plan, the SBT plans to use a temporary picket weir and instream fish trap to capture adult Chinook salmon. Until the YF satellite facility is completed, broodstock collected in YF will be transported to an agreed to holding and spawning location.
- *Owner and operator* – The YF trap (temporary weir) is operated by the SBT and funded by the LSRCP.
- *Programs -* YF trap is a Chinook salmon broodstock collection facility for the Yankee Fork Chinook Salmon Project.
- *Stocks and release locations –* The Tribes plan to collect broodstock for the Yankee Fork Chinook Salmon Project from the locally adapted Chinook salmon returning to the Yankee Fork Salmon River (YFInt). Upper Salmon River Segregated (USRSeg) broodstock may be used if returns to Yankee Fork are limited.
- *Production Goals (smolts, fpp) -* The goal is to release 300,000 YFInt/USRSeg in Yankee Fork of the Salmon River.
- *Stock changes (if applicable) -* In 2018, the Tribes plan to initiate broodstock collection of the locally adapted Chinook salmon returning to Yankee Fork.

2.1.9. East Fork Salmon River Satellite Facility (EF Trap)

- *Description and location -* The EFSR weir is a satellite facility of SFH

- *Owner and operator* – EF Trap is operated by IDFG and is funded through the LSRCP. The EF trap is a satellite facility of SFH.
- *Programs at facility* – Currently no Chinook salmon artificial production programs are conducted in the EF Salmon River. Beginning in 2014, the EF trap was no longer be used to trap Chinook salmon. In past years it was operated to trap, enumerate, sample and release all natural-origin Chinook salmon above the weir in an effort to monitor natural productivity above the weir. Genetic samples from natural/wild adult Chinook salmon collected at the EFSR adult trap were used to assess the relative reproductive success of captive-reared adults previously released to spawn naturally in the EFSR.
- *Stocks and release locations* – NA
- *Production Goals (smolts, fpp)* - NA
- *Adult mitigation goal (if applicable)* - NA
- *Facility or stock changes (if applicable) -* No longer operated for Chinook salmon.

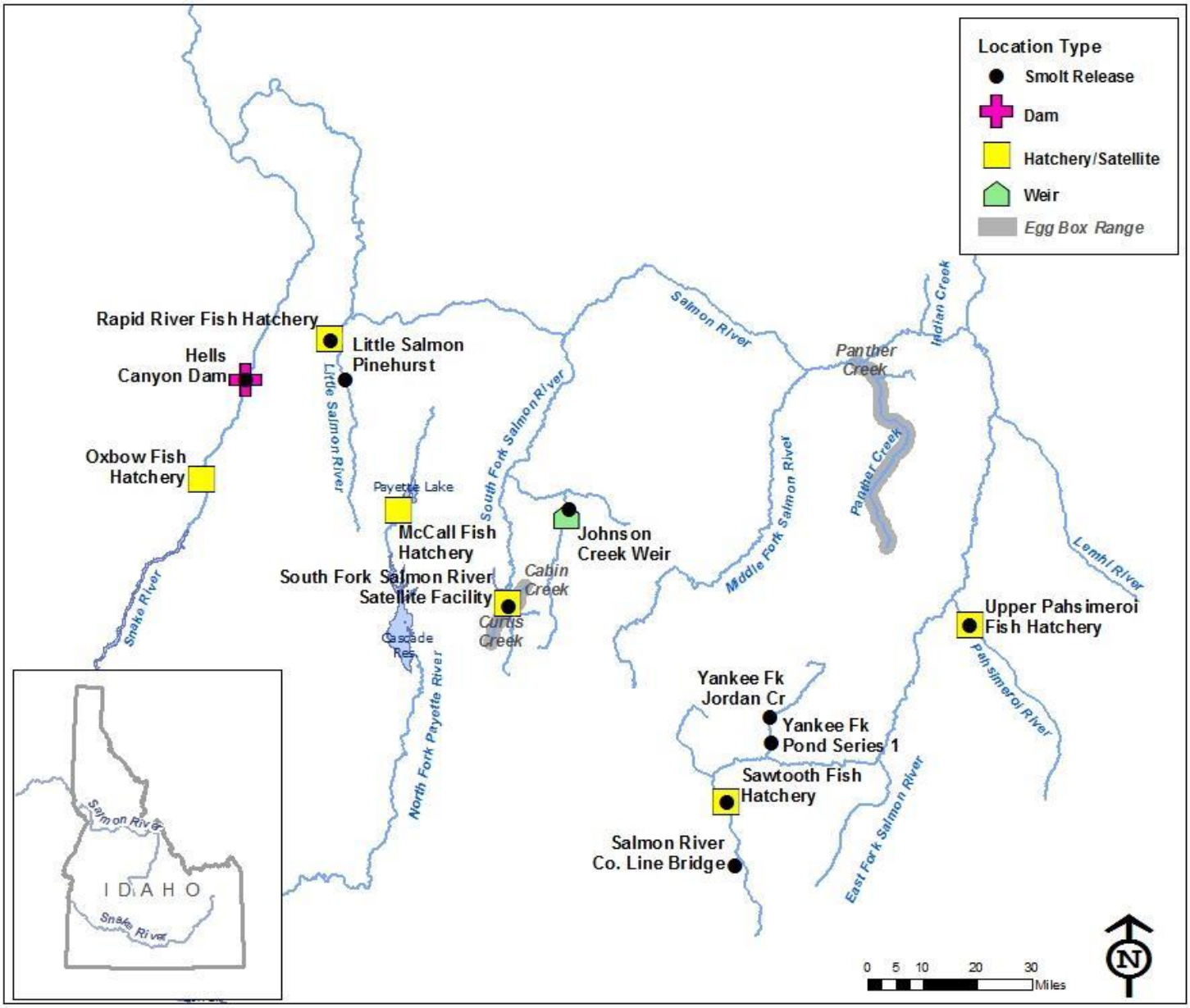

Figure 2.1. Spring/Summer Chinook salmon hatchery facilities and smolt release and egg box locations.

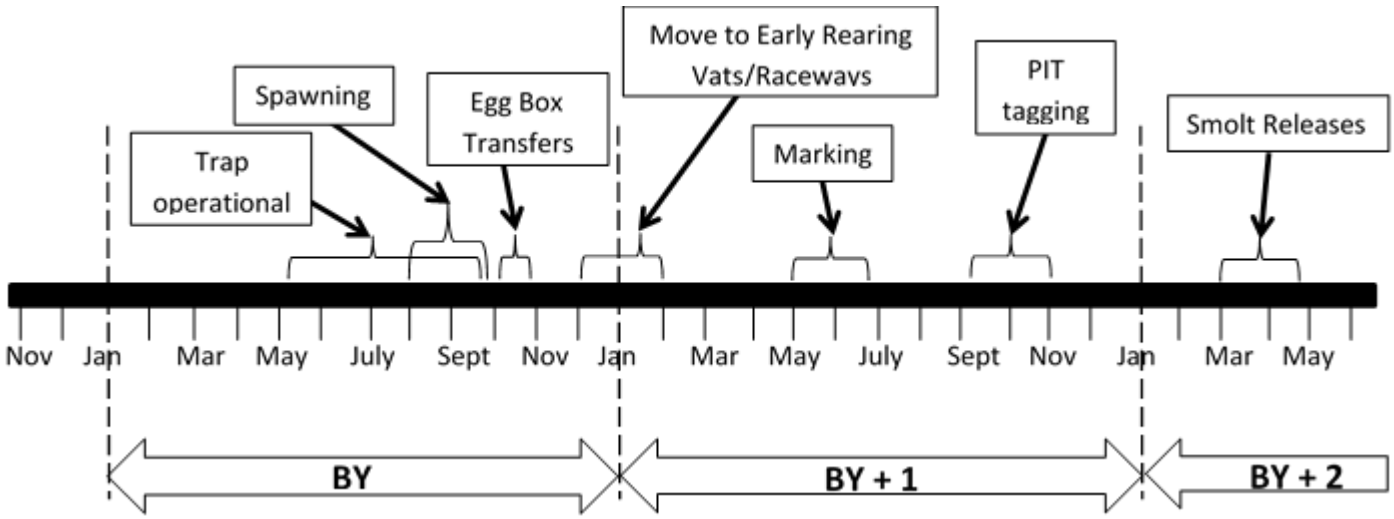

Figure 2.2. Timeline for Spring/Summer Chinook Production. Date ranges are shown to include all facilities' operations.

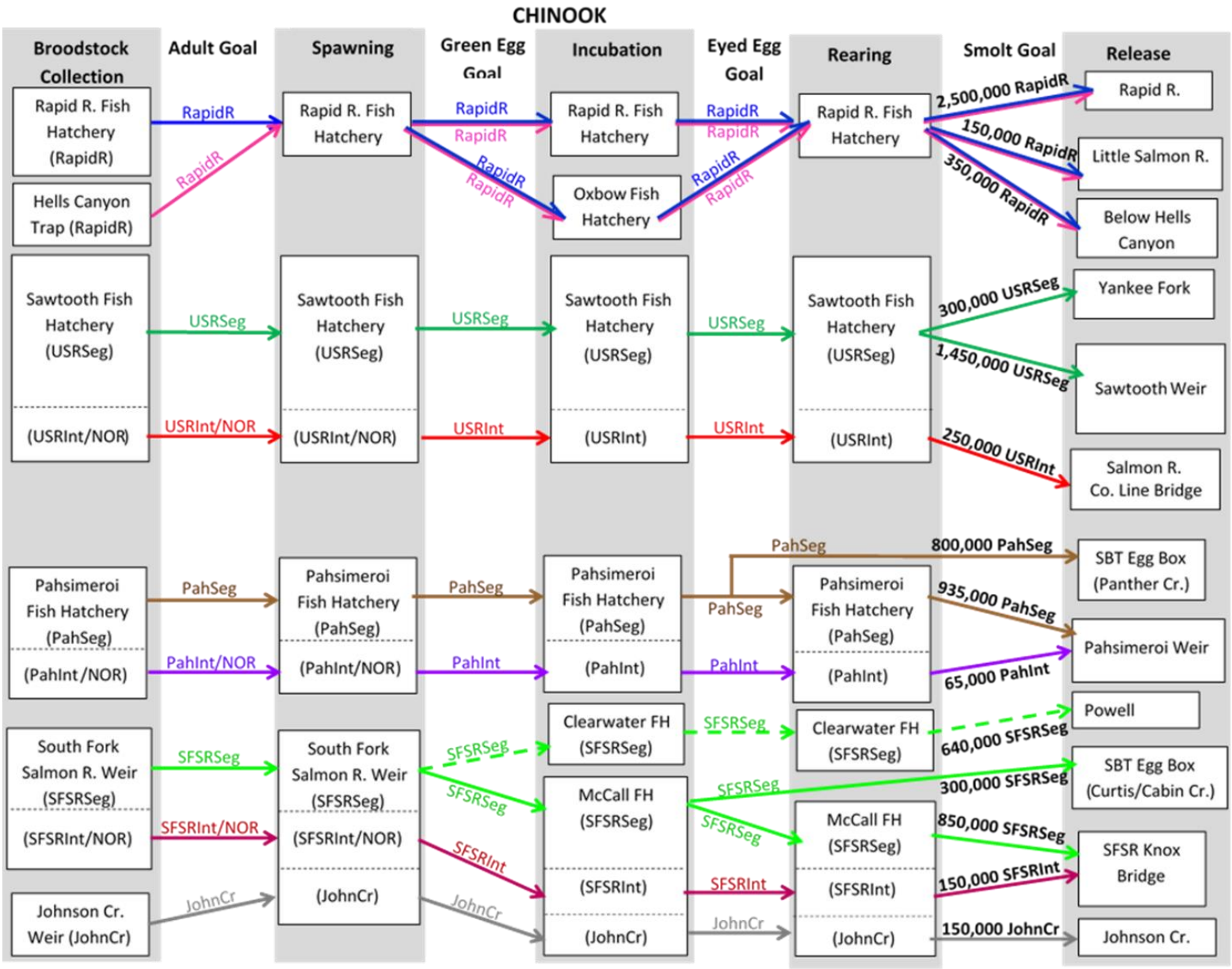

Figure 2.3. Fish and Egg movements for Sp and Su Chinook. Numbers reflect 2020 releases.

2.2. Rapid River Fish Hatchery (RRFH), Oxbow Fish Hatchery (OFH), Hells Canyon Trap (HC Trap)

2.2.1. Trap/Weir operation

- *Dates operated* – RRFH: The adult trapping facility is put into operation approximately mid-March. Spring Chinook arrive at the trap beginning in May. Trapping continues through the first week of September. HC Trap: Trapping for spring Chinook salmon begins in May and continues into July. Trapping ceases when holding pond temperatures exceed 70ºF--usually about the first or second week in July.
- *Trap configuration* – RRFH: The RRFH obtains adult salmon for broodstock from a fish trap located 1.5 miles downstream from the hatchery on Rapid River. It is designed to trap and hold adult fish migrating upstream. The fish trap consists of a permanent concrete velocity barrier, a seven-step fish ladder, and a two-stage trap. Adult salmon are transferred from the trap to a 1,000-gallon tanker-truck using an Alaska Steeppass Ladder, which allows fish to move from the trap to a 500-gallon bucket that is lifted by a crane with a 2-ton electric hoist and discharged into the truck. The fish trap is designed to provide unimpeded migration around the velocity barrier when trapping is not in progress. In addition to fish trapped in Rapid River, RRFH receives fish from Oxbow Fish Hatchery (OFH) that are trapped in the Snake River below Hells Canyon Dam. HC Trap: See Appendix 7.5 for a detailed summary of HC Trap.
- *Trapping protocol (frequency, movement of fish)* – RRFH: RRFH trap operation begins in March and continues through early September, thus encompassing the entire Chinook salmon migration period. In years of low abundance all trapped hatchery-origin fish may be retained for broodstock required to meet smolt production goals. When the number of returning adults exceeds the broodstock needs, fish are retained and spawned in a manner that represents the average annual temporal abundance and age structure of adult returns to the trap. The trap is worked up daily during the weekdays and on an as-needed basis during the weekends. During periods of heavy fish movement, access into the trap can be blocked by means of bar racks inserted at the end of the ladder once a maximum of 400 fish have entered the trap to prevent potential smothering. During trapping, extreme conditions may occur and the trap may be closed until trapping can resume. HC Trap: The HC Trap operates three days/week Monday – Wednesday as flows permit (less than 40k ft^3/s) (See Appendix 7.5 for a detailed summary of HC Trap – trapping protocols). HC Trap operation is affected by projected return to RRFH. If fish do not return in sufficient numbers to HC to meet brood needs, the brood balance will be shifted to RR upon agreement of the cooperators. The trap is operated by IPC and OFH personnel and adults are transported to OFH for holding or distribution.

2.2.2. Adult handling

- *Measurements (marks, tags, sex, etc.)* –RRFH: Upon arrival into the trap, all fish are counted, measured, scanned for PIT tags and CWT, and scrutinized for other tags e.g., jaw tags. All marked hatchery fish to be added to broodstock are transported to the hatchery holding ponds. Arriving ad-clipped spring Chinook salmon are not sexed at this time because dimorphism is not expressed when they arrive at the trap. HC Trap: All fish entering the trap are electronically scanned for PIT tags and scrutinized for jaw tags, radio transmitters, and fin clips. Arriving ad-clipped Chinook salmon are not sexed.
- *Tissue sampling protocol* – RRFH: During spawning at RRFH, genetic samples are collected from all spawned adults to develop the Parentage Based Tagging (PBT) baseline. Samples are taken from males and females spawned and recorded in a manner to allow for parental genetic analysis (Appendix 7.1). Samples also will be collected from reused (second spawn)

males for genetics. Because of the current pond configurations and multiple release sites, PBT tracking at RRFH can only be identified to the hatchery level.

- *Dispositions (holding, releases) and adult marking (if applicable)*- RRFH: Unmarked Chinook salmon will be counted, sexed, measured, given a right operculum punch, sampled for DNA, and released above the weir. Ad-clipped spring Chinook salmon are held for broodstock to fill RRFH mitigation needs and to supply eggs to other programs. The broodstock includes a cross section of the run. Fish that scan positive for CWT or PIT tags or have jaw tags will be selectively held for broodstock. HC Trap/OFH: Natural Chinook will have a tissue sample collected for Genetic Stock Identification (GSI) and transported and released below HCD the same day trapped. Spring Chinook salmon to be held for spawning will be held at OFH for transport to RRFH weekly or more often depending on water temperatures. Fish to be transported to RRFH are loaded into a 1,000-gallon tanker containing 52^{o} F well water and transported by IPC personnel. Adult broodstock are not injected with antibiotics and receive a left operculum punch prior to transport to RRFH.
- *Surplus distribution* – RRFH: Adult returns that are surplus to broodstock needs will be distributed or disposed of according to priorities outlined in IDFG policy and by agreement among cooperators. These hatchery fish will generally be loaded directly from the fish trap. The decision to release hatchery fish will be made based on the number of rack returns, run size as projected by IDFG, and on the overall condition of fish trapped earlier in the run. All fish released will be given an operculum punch. HC Trap/OFH: Adult hatchery origin returns that are surplus to broodstock needs may be transported back into the Snake River below HCD to re-enter fisheries, transported to other drainages to provide fishing opportunity or for supplementation, or provided to tribal and humanitarian organizations. These hatchery fish will be sequestered at the hatchery, and will not be anesthetized or injected. The decision to release hatchery fish will be made by cooperators based on the number of rack returns, run size as projected by IDFG, and on the overall condition of fish trapped earlier in the run.
- *Carcass dispositions* – RRFH: Hatchery personnel perform cursory necropsies of all pre-spawning mortalities. Causal factors for pre-spawning mortality are recorded. As fish are removed from the ponds they are scanned for CWT, and snouts were collected from fish in which a CWT is detected. The snouts are placed in numbered plastic bags, cataloged, and held until the end of the spawning season when they were delivered to the Department's Fish Marking Laboratory at the Nampa Research Office in Nampa, Idaho. Carcasses are frozen in a diesel-powered freezer trailer and taken to a rendering plant in Caldwell, Idaho at the end of the spawning season. At the end of the spawning season remaining senescent fish are distributed to tributaries within the Little Salmon River Drainage for nutrient enrichment. HC Trap/OFH: Carcasses from holding and trapping mortality are placed into a garbage dumpster and picked up weekly by the local sanitation company to approved ODEQ landfill.
- *Ancillary species (if applicable)* – RRFH: Ancillary species will enter the fish trap. All steelhead entering the trap will be sexed, measured, scanned for CWT and PIT tags, and given a right operculum punch to identify recaptures. Wild steelhead will be sampled for DNA and scales, and released into Rapid River above the weir. Hatchery steelhead including unmarked hatchery fish (determined by morphology) will be released into the Little Salmon River about a mile above the confluence of Rapid River unless they scan positive for CWT. When a CWT is detected, hatchery steelhead will be sacrificed and the snout collected. Released steelhead will be given a right operculum punch to identify recaptures. Bull trout entering the trap will be measured, scanned for tags, and given caudal punch to identify recaptures. HC Trap: Ancillary species will enter the fish trap including Rainbow Trout, Bull

Trout, suckers, and steelhead. Wild steelhead will be checked for tags and marks, receive a left operculum punch to identify recaptures, get a DNA and scale sample, and be released the same day below Hells Canyon Dam. See Appendix 7.5 for a detailed summary of HC Trap.

2.2.3. Spawning/Egg take

- *Calculation of broodstock need (fecundity, eye-up, eye-to-smolt) –* See Section 2 ("Calculation of Broodstock Need") for details on broodstock calculation. The production goal is to trap and spawn enough adults to produce 3,000,000 Chinook smolts at RRFH. The target brood level has been calculated under AHOP contract with IPC.
- *Spawning protocol (schedule, method, M/F ratio)* - Beginning approximately August 10, all adults are collected, and sorted by sex. All ripe females are spawned each spawn-day. Spawning takes place twice each week for each holding pond and continues through mid-September. The RRFH employs a random cross of one male/female, as recommended in the Integrated Hatchery Operations Team (IHOT) guidelines for genetic management. All eggs from females exhibiting gross signs of pathology are discarded after consultation with staff from the Eagle Fish Health Laboratory (EFHL) on-site. Carcasses are measured, scanned for PIT tags and CWT. Females are scanned for PIT tags before spawning to ensure that any PIT tags that are deposited in egg containers are not missed. Each spawn-day's egg-take is designated as an individual numerical egg-Lot (Lot) beginning with Lot-1 on the first spawn day and continuing consecutively throughout the spawning season. Eggs are incubated to eye-up then shocked at 500 daily temperature units (DTU) by pouring them from the trays into water. Individual trays are picked and counted two days later using a Jensorter™ Model JM4 picker/counter.

2.2.4. Egg incubation/Egg and fry shipping

- *Egg incubation method (egg distribution, treatments, picking) -* RRFH: After fertilization, the eggs are transported to the incubation building for water hardening. Eggs are water hardened/disinfected with a 100-mg/L solution of buffered iodine in well water. Single female/tray incubation is the standard however it is necessary to load two females/tray and/or transfer green eggs to OFH for initial incubation to achieve a goal of 3.6 million green eggs. Upon receiving ELISA results, eggs are segregated or culled based on titers >0.249. These culled eggs are not enumerated. Beginning on the fourth day of incubation, all Lots are treated with formalin three times each week at 1,667 mg/L for 15 minutes. This continues until each Lot accumulates 800 daily thermal units (DTU). After eggs have accumulated 300 DTU incubator trays are rodded weekly or more often if necessary throughout the incubation period to remove silt. At eye-up (approximately 500 DTU), all Lots are shocked and picked using a Jensorter model BM-4 picker/counter then returned to the cleaned incubator trays. A second pick-off is performed at 750 DTU. Hatch occurs about 800 DTU. At 1,000 DTU, all Lots undergo another pick off to remove dead eggs or fry and eggshells. At 1,500 DTU, fry undergo a fourth pick-off and swim-up fry are ponded at 1,750 DTU. The number of eggs removed during secondary and subsequent pick-offs are recorded and subtracted from tray totals before ponding. Depending on the number of females spawned in the first Lot, the first Lot is generally ponded in indoor vats pending subsequent development of later Lots. As the subsequent Lots reach 1,750 DTU the fry in the vats are moved to outdoor raceways along with remaining swim-up fry
- OFH: Due to space limitations at RRFH, it is routinely necessary to transport green eggs from RRFH to OFH for initial incubation. When the green eggs arrive at OFH they are disinfected in 100-mg/L buffered iodophor in well water then placed in vertical incubation stacks at a rate of one female/tray. Green eggs are incubated to eye-up, enumerated, picked, and

returned to RRFH. When they arrive at RRFH they are disinfected in 100-mg/L buffered iodophor in well water for at least 20 minutes and placed in vertical stack incubators. The EFHL will notify OFH with the results ELISA BKD analysis and culling will take place at OFH. After returning to RRFH, eggs are treated the same as eggs retained at RRFH.

- *Egg transfers* - Due to space limitations at RRFH it is routinely necessary to transport green eggs from RRFH to OFH for initial incubation. Eggs for transport will be placed in egg-tubes and water hardened in coolers filled with 100-mg/L buffered iodophor in well water for one hour. After one hour the iodophor is displaced from the coolers with well water. About one gallon of ice is added, and the coolers are sealed for transport. After enumeration at OFH, eyed eggs are transferred back to RRFH in the same coolers and egg-tubes filled with 50-degree well water. When they arrive at RRFH they are disinfected in 100-mg/L buffered iodophor in well water for at least 20 minutes and placed in vertical stack incubators. The EFHL will notify OFH with the results ELISA BKD analysis and culling will take place at OFH. After returning, eggs are disinfected and placed in incubators. They are treated the same as eggs retained at RRFH.
- *Surplus egg distribution (if applicable)* -Generally egg-take numbers are targeted to provide swim-up numbers sufficient to yield a release of three million smolts. In some years broodstock are held beyond target numbers based on the IDFG Fisheries Bureau request, run-profile, anticipated need at other facilities, or agreement and excess females may be ponded. If ponded, excess females may be spawned or distributed based on agreement to provide the best possible use of that surplus. Surplus eggs at RRFH and at OFH after egg transfers back to RRFH will be culled or available to other anadromous programs as directed by the IDFG Fisheries Bureau.

2.2.5. Early Rearing

- *Environmental protocols (flow indices, density indices)* - Fry are moved from vertical stack incubators to eleven outside raceways. Density and flow indices do not exceed 0.49 lb/ft^3/in and 1.11 lb/gal/min/in, respectively.
- *Feeding protocol* - After ponding, alevins are fed continuously via automatic feeders during daylight hours and hourly by hand during the workday until they reach 570 fpp As development proceeds, hand feeding is reduced to six times/day at 570 fpp, and four times/day at 150 fpp Feed size is increased as the fingerlings grow. From swim-up to 570 fpp they are fed #0 feed then feed size changes to #1 at 570 fpp, #2 at 300 fpp, 1.2 mm at 150 fpp, and 1.5 mm at 90 fpp During the transition between feed sizes the different feeds are mixed for three weeks at consecutive weekly ratios of 3:1, 1:1, and 1:3. Feed amounts fed are adjusted daily based on water temperature, fish size, water quality, and feeding behavior.
- *Marking and tagging (AD, CWT; date range, size at application)* - Fish released will be 100% AD clipped and receive approximately 120,000 CWTs. The AD clips and CWTs are applied beginning in mid-June. The timing of the marking event is dictated by rearing density in the raceways and water quality. Marking is concurrent with transferring fingerlings from the eleven early rearing raceways to the six final rearing pond sections. Marking and transfer takes from two to three weeks. The AD clips and CWTs are applied electromechanically by fish marking specialists. Mark allocation and distribution of fish from the eleven raceways to the six rearing pond sections is determined by IDFG M&E specialists. The fingerling are generally between 150 fpp and 100 fpp when marking commences
- *Fish movement/facility configuration* - As alevins reach 1,750 DTU they are moved from the hatchery building to outdoor raceways via four-inch aluminum pipe. In mid-June, when the fingerlings are marked, they are moved to the final rearing ponds. Marking is concurrent

with transferring fingerlings from the early rearing raceways to the final rearing ponds, which takes from two to three weeks. Distribution for fish from the eleven raceways to the six rearing pond sections is determined by IDFG M&E specialists. The fingerlings are generally between 150 fpp and 100 fpp when marking commences. During marking, the fingerlings are pumped into the marking units via four-inch plastic pipe using an electric suction pump, then moved to the rearing ponds via gravity flow through four-inch aluminum pipe.

2.2.6. Final rearing

- *Target environmental protocols (flow indices, density indices)* - Final rearing continues in the rearing ponds until mid-March of the year following transfer from the raceways. Volitional release into Rapid River begins in mid-March and continues until late April. Final rearing density and flow indices do not exceed 0.22 lb/ft^3/in and 2.25 lb/gal/min/in respectively at the beginning of release.
- *Feeding protocol* – After moving to the final rearing ponds, fingerlings are fed via a truck-mounted Harrington Model 500-50G pneumatic fish feeder during the workday. As development proceeds feeding takes place three to four times/day depending on the volume fed and feeding response. As the fingerlings grow, feed size changes from 1.2 mm at 150 fpp to 1.5 mm at 90 fpp, 2.0 at 60 fpp, and 2.5 mm at 25 fpp. During the transition between feed sizes they are mixed for three weeks at weekly consecutive ratios of 3:1, 1:1, and 1:3. Feed amounts are adjusted daily based on water temperature, fish size, water quality, and feeding behavior. Feeding is discontinued when ice covers the ponds in winter, which is usually from a couple days to a couple weeks at a time.
- *Mortality counting – All mortalities are collected and recorded daily from each rearing unit.*
- *Water monitoring* – Water flows are monitored daily, rechecked each night, and measured as needed and monthly. Relying on surface water, it is necessary to monitor turbidity, flow, screen cleaning and feeding accordingly. A comprehensive water quality analysis is performed every five years or as needed. Effluent is monitored pursuant to NPDES Permit.
- *Fish movement/facility configuration* - The fingerlings remain in the six final rearing pond sections until release. During release, fish are seined and loaded from rearing ponds onto IPC tanker trucks for transport to off-site release locations pursuant to US v. Oregon. Loading is performed utilizing a 1985 Aqua-Life model 860-P fish pump. Transport occurs in mid-March. The remaining fish are released volitionally directly into Rapid River.
- *Marking and tagging (PIT) -* Approximately 52,000 fish are PIT tagged as part of the CSS study. IPC provides 20,000 PIT tags and CSS provides approximately 32,000 tags. The PIT tags are applied in September by IDFG marking specialists in cooperation with PSMFC. The PIT tags are applied by hand using reusable applicators (for more specific information regarding application and procedures see PSMFC marking protocol and IPC AHOP § 3) FISH MARKING). Fish are marked from Rearing Pond (RP)-2A into RP-2B. The fish in RP-2A are held off feed at least three days before marking begins and feed is reintroduced a day after marking is complete. The fish in the receiving pond RP-2B are held off feed from the commencement of the marking operation until a week after marking is complete. This process requires feed to be withheld from a million smolting fish (one third of annual production) for at least a week three weeks before release. After both rearing pond sections are returned to feeding the screens separating the two pond sections are removed and the populations allowed to mix. At RRRH the exit weir for the RP-2A/B system contains a PIT tag array that reads fish emigrating during volitional release. Seventy percent of PIT-tagged fish within the release are treated as run-at-large (monitor mode) at each Snake and Columbia River hydro-system collection facility. The balance of the PIT tagged fish are diverted back

to the river (default bypass mode) for reach survival estimates. A background and summary of the CSS study (10 year retrospective report) can be found at http://www.fpc.org/documents/CSS/FINAL (Appendix 7.2).

- *Quality monitoring (counts, growth, length, marks quality, tag retention) -* Starting immediately after ponding the fish are sampled bimonthly for weight. This occurs at mid-month and again at the end of the month. Samples are comprised of at least 300 fish/rearing unit. At the end of each month, 60-fish sub-samples are measured to determine average total length and condition factor. Starting the month marking is completed and continuing until release, a quality check of AD clips is performed on the sub-samples and fish are categorized as full clip, partial clip, or no clip.

2.2.7. Fish health

- *Service provider -* Eagle Fish Health Lab, Idaho Fish and Game
- *Sampling protocols (what is sampled, sampling schedule) –*
    - Adults: All RRFH and OFH brood females are sampled for BKD and the samples are analyzed by ELISA technology at EFHL. Spawned female carcasses are marked with a numbered tag, matched with an egg bucket number, and a tray number to facilitate tracking for ELISA BKD analysis. At least 90 fish are sampled by a combination of 30 tissue samples (kidney/spleen) and 60 ovarian fluid samples for viral replicating agents. Twenty head wedges are taken and examined for *Myxobolus cerebralis* the causative agent of whirling disease. The Animal and Plant Health Inspection Service (APHIS) veterinarian-in-charge is notified of any reportable pathogens detected while sampling adults or juveniles. Egg inventory numbers are made available to EFHL. A 60-fish disease sample (20 lethal and 40 non-lethal) of the earliest Chinook salmon trapped at the HC trap will be conducted by EFHL to test for virus and whirling disease when out of basin transfers like the Boise River are planned.
    - Juveniles: Spring Chinook juvenile salmon reared at RRFH are inspected by EFHL personnel on a quarterly basis for *RS*, viral replicating agents, parasites, and bacterial pathogens such as *Aeromonas*, and *Flavobacterium psychrophilum*. Diagnostic services are provided upon request. A pre-liberation sample consisting of 60 randomly collected fish is examined for *RS, Myxobolus cerebralis*, and viral replicating agents. Goede's organosomatic index is also performed. The pre-liberation sample is performed within 30 to 45 days of release.
- *Vaccination methods -* None.
- *Treatment methods -* Once adult fish are ponded for broodstock, daily formalin treatments will be applied to control pre-spawning mortality from external mycosis. The target treatment rate is 167 ppm for one hour.

2.2.8. Fish release/transportation

- *Truck specifications -* Adult fish are transported from the fish trap to the hatchery facility in river water in a truck mounted 1,000-gallon tank at a rate not to exceed 70 fish/load. Smolt release at off-site locations takes place via IPC's 5,000-gallon tank-trailers at a rate of approximately 0.6 pounds/gallon. Water for transport is pumped onto IPC's tankers directly from the final rearing ponds immediately before loading fish. Transport trucks will continuously supply oxygenation during transport and water will be treated via fresh-flows.
- *Hauling/Release schedule* - Volitional release at Rapid River begins about March 15 and ends about April 24. In most years about 99% of the smolts emigrate volitionally. The remaining smolts are seined from the ponds.

- *Hauling/Release guidelines* - IPC tanker trucks transport smolts for release at the USFS boat ramp below Hells Canyon Dam and Pinehurst Bridge on Little Salmon River. Transport takes place in oxygenated Rapid River water at a loading density of 0.6 lbs/gallon.

2.2.9. Communication

- *Written reports (e.g., Monthly summaries, annual reports)* - Trapping information is updated daily and reported to IPC weekly via email. As incubation and rearing progresses, Monthly Production Summaries and a Monthly Narrative Report are submitted to the IDFG Anadromous Fish Hatchery Complex Supervisor and IPC.
- *FINS and IDFG release databases* - Trapping information is updated on site and uploaded to the IDFG Fisheries Bureau via the hatchery database (FINS) daily. The Fisheries Release Database is updated and uploaded at the end of smolt release. Release groups are reported to the IDFG Research Bureau via the Release Data Entry Form. PIT tag files for returning adults are uploaded to PTAGIS at the end of the trapping season.
- *Meetings (e.g., AOP, Anad, HET, etc.)* - Necessary meetings will take place throughout the year. This will include but is not limited to: Annual Anadromous Fishery Section Meeting, Salmon River Basin Annual Operation Plan Meeting, Mark/Tag Coordination Meeting, Regional Work Plan Meetings, Regional Preseason Public Meetings, Fish Hatchery Managers Meeting, Preseason State and Tribal Salmon Fisheries Meeting, and Postseason State and Tribal Fisheries Meeting,
- *Direct consultation* - Hatchery personnel are in regular communication with staff from the EFHL for guidance on culling and segregation.

2.2.10. Adult outplants (if applicable)

- *Trigger for outplanting* - HC Trap: At the direction of the IDFG Fisheries Bureau and salmon cooperators, adult Chinook in excess of brood needs (2,500 for RRFH) and subsistence needs, may go for adult releases. The numbers deemed in excess of broodstock goals and subsistence is a balancing act based on harvest shares and effects to the sport fishery below HCD.
- *Purpose* -HC Trap: When excess Chinook trapped at the HC Trap are present, IDFG typically releases fish into the Boise River for sports fisheries and ODFW releases their share in the Powder River in Oregon for sports fisheries. Adult tanker trucks owned and operated by IDFG and ODFW haul these fish respectively.
- *Outplant protocol (sex ratio, timing, marking, sampling)* –HC Trap: Adult Chinook that are released from OFH are not injected and do not receive any identifying mark before release. A 60-fish disease sample (20 lethal and 40 non-lethal) is preferred by EFHL on the earliest trapped adults. Transport permits and a current Invasive Species Permit issued by the Idaho Department of Agriculture stay are maintained on file at the hatchery.

2.3. South Fork Salmon River Trapping Satellite (SFSR Trap) and McCall Fish Hatchery (McFH)

2.3.1. Trap/Weir operation

- *Dates operated* - The SFSR weir is installed after high water when river flows begin to subside. The bridge/weir design allows for placement when the F.S. USGS Krassel Gauging Station staff reading reaches 4.0 to 4.2; typically the second or third week of June. Hatchery personnel monitor flows physically at the SFSR and on-line to determine the appropriate river stage to lower weir panels. Trapping operations will continue through the end of spawning until no fish have been trapped for one week, at which point water to the ladder will be shut off and weir panels preventing upstream fish passage will be removed.
- *Trap configuration* - Upstream migration of returning salmon will be stopped by the SFSR weir allowing for adult diversion and interception through the fish ladder and adjoining trap. A PIT tag array system in the ladder of the South Fork trap consisting of four antennas (two

top water and two floor orifice) is designed to detect all fish with PIT tags entering the ladder. The array is operated throughout the trapping period.

- *Trapping protocol (frequency, movement of fish)* - The trap is worked up daily during the weekdays and on an as-needed basis during the weekends. During periods of heavy fish movement, access into the trap will be blocked by means of pickets inserted at the end of the ladder once approximately 400 fish have entered the trap to prevent potential overcrowding.

2.3.2. Adult handling

- *Measurements (marks, tags, sex, etc.)* - All Chinook salmon are processed through the trap where they are identified by mark type and gender, measured and scanned for PIT tags and CWTs, and any injuries are noted. CWT snouts from 30 jacks and 10 adults from each age class are collected and sent to the Nampa Research office for tag extraction and processing. No salmon processed through the SFSR trap will be injected with erythromycin due to environmental concerns and logistics needed to ensure a 30-day withdrawal period is reached prior to in-stream disposal of broodstock carcasses.
- *Tissue sampling protocol* - Tissue samples are collected from all natural-origin and integrated-origin fish released above the weir during trapping, for the genetics baseline. During spawning, genetic samples are collected from all spawned adults to develop the Parentage Based Tagging (PBT) baseline. Samples are taken from all males each time they are used and all females spawned and are recorded in a manner to allow for parental genetic analysis with a goal of 100% tracking to release site (Appendix 7.1).
- *Dispositions (holding, releases) and adult marking (if applicable)* - Salmon intended as brood stock are placed into holding ponds one and 2. The third adult holding pond is used to hold untreated returning HORint and HORseg adults and jacks that may be released back into open fisheries or to C&S and food banks. Broodstock collected for the integrated program will be a combination of returning-adult progeny of the integrated program and natural origin adults. The origin of adult returns can be determined by differential marking/tagging: Hatchery Origin Segregated fish (HORseg) are AD clipped, Hatchery Origin Integrated fish (HORint) are unmarked with CWT, and Natural Origin fish (NOR) are unmarked and have no tags. Parties have agreed to the importance of identifying alternate locations for holding broodstock in the event of potentially lethal water quality conditions such as what happened in 2014. Discussion of alternatives were outlined in 2016 and are found in Appendix 7.7.
    - SFSRSeg Broodstock Collection: HORseg by HORseg will be used to create eggs for the segregated component for the SFSR, SBT Egg box program, and the Clearwater summer Chinook program. Eggs for the Clearwater program will come from fish trapped in excess of brood needs for onsite smolt and egg box programs. Prioritization of excess fish between recycling to fisheries, Tribal C&S, foodbank and outplants will occur in-season between State and Tribal managers. If the returns of HORint adults exceed the numbers required for natural spawning and integrated broodstock, HORint fish may be used for up to 30% of the segregated broodstock.
    - SFSRInt Broodstock Collection: The number of NOR adults incorporated into the brood stock is based on a sliding scale of abundance for NOR adults (Table 2.1). Returning adults will be used in the integrated broodstock and passed above the weir in proportions outlined in the sliding scale. The spawn crosses used to create integrated offspring will be a mix of NOR by HORint, NOR by NOR, and HORint by HORint adult crosses. HORint by HORint crosses are performed only when escapement of NORs to SFSR weir are low. The number of adults needed for the

integrated broodstock program is calculated annually based on the forecasted natural-origin return and accounts for average pre-spawn mortality, fecundity, BKD cull rates and green-egg to smolt survival at MCFH. The goal is to utilize equal numbers of male and female NORs in the brood stock for integrated offspring production.

The procedure for implementing the sliding scale starts with the preseason forecast for the number of NORs that will return to the SFSR trap. This forecast provides a starting point for the hatchery staff to develop broodstock acquisition plans. Approximately 10 days after the first NOR is trapped, M&E staff will reassess the projected return of NORs and adjust the projection if needed. NORs will be collected for integrated broodstock throughout the duration of the run and historic run timing data will be used to calculate the number of NORs to retain each week to avoid holding excess fish. The number and types of crosses (HORint x NOR, NOR x NOR, and HORint x HORint) will be determined based on the number of returning NOR adults. Depending on run timing or an updated run projection, the number of NORs retained each week for integrated broodstock may be adjusted from the preseason planning numbers.

- Releases: All adults that get passed upstream to spawn naturally receive a right operculum hole punch prior to being released. This is done to help management efforts in evaluating weir efficiency. Returning adults (NOR, HORint) will be passed above the weir in proportions outlined in the sliding scales (Table 2.1).

Table 2.1. SFSR Summer Chinook stepping stone scale

NOR Return to Weir		Integrated Program Size	NORs Released Above Weir		Max. Number of NORs Held for Brood		Max. % of NORs Retained for Brood	Max. pHOS
50	124	150,000	30	74	20	50	40.0%	NA
125	424	150,000	75	331	50	93	40.0%	NA
425	699	150,000	332	606	93	93	25.0%	0.45
700	999	250,000	544	843	156	156	25.0%	0.45
1,000	1,299	500,000	687	988	311	311	35.0%	0.35
1,300	1,999	1,000,000	674	1,377	622	622	50.0%	0.35

- *Surplus distribution* – A prioritization distribution schedule is determined by the cooperators. Priority use of hatchery-origin Chinook, in excess of broodstock needs, is to provide additional harvest opportunity during sport and tribal seasons. For details on outplanting, see Adult Outplant section below. The left operculum of excess reserve Chinook not intended for use as broodstock are hole punched, double punched if the presence of a CWT is detected, and placed into a subdivided section of HP3A holding pond until they are either loaded onto a truck for transport to in-basin release sites, primarily

downstream near Roaring Creek (during fisheries), or are dispatched for subsistence purposes to support Tribal and non-Tribal charitable relief organizations. These fish are not injected with erythromycin or treated with formalin.

- *Carcass dispositions* -Pre-spawn mortalities are returned to the SFSR for nutrient supplementation at a specified location immediately downstream from the trap water intake or are redistributed to upstream sites coordinated through the IDFG Regional Anadromous Fishery Biologist. Prior to disposal, external tags are removed and the tail is completely severed from the body to identify these fish for those conducting spawning ground surveys. All female spawning carcasses exhibiting gross internal signs consistent for BKD, as determined by fish pathologists, are frozen and disposed of in a public landfill.
- *Ancillary species (if applicable)* - Ancillary species do enter the adult trap on the SFSR. These include bull trout, whitefish, brook trout and steelhead. Bull trout and steelhead are measured at fork length and operculum punched for recapture identification and returned to the river. In addition, a genetic sample may be collected from steelhead prior to release. All other non-target species are immediately returned to the river.

2.3.3. Spawning/Egg take

- *Calculation of broodstock need (fecundity, eyeup, eye to smolt)* – See Section 2 ("Calculation of Broodstock Need") for details on broodstock calculation. The production goal is to trap and spawn enough adults to produce 1,000,000 smolts for the release at Knox Bridge, and 300,000 eyed eggs for SBT Curtis/Cabin Creek egg boxes at MFH. If available and if needed, additional fish may be spawned to provide green eggs for CFH's summer Chinook salmon program (600,000 smolts) funded by LSRCP (SFSR-SUM). Brood for the Clearwater eggs are not included in stated brood goals and will come from fish trapped in excess of brood needs for onsite smolt and egg box programs. Prioritization of excess fish between recycling to fisheries, Tribal C&S, foodbank and outplants will occur in-season between State and Tribal managers.
- *Spawning protocol (schedule, method, M/F ratio)* - Spawning protocols initiated with BY2009 SFSR summer Chinook production will be continued in response to enhanced egg requests, continued direction to provide genetic samples that will allow for parental genetic analysis and the need to reduce the number of males being held for spawn-taking activities. Spawning activities take place on Tuesdays and Fridays and may begin at primary sort, typically the 2nd week of August. Adults spawned for both the integrated and segregated broodstocks are spawned at a 1:1 (Male to Female) ratio. At the time of spawning, tissue samples will be collected from all adults that contribute to the broodstock. If it is determined that there is a shortage of viable males, they may be used and not killed. When this occurs, these males are marked with a caudal punch which is collected and used for PBT. Prior to spawning, all males are checked for an existing caudal punch and killed and re-sampled after being used the second time. All eggs collected are linked to an individual egg tray and genetic sample, based on the ELISA BKD disease sample collected. All fish killed for spawning or distribution will be done so by strict adherence to the IDFG best management practice protocol for humane euthanasia.

2.3.4. Egg incubation/Egg and fry shipping

- *Egg incubation method (egg distribution, treatments, picking)* - Hatchery production eggs for smolt production and eggs spawned for SBT egg boxes are returned to MCFH for incubation in Heath style incubator trays following water hardening at SFSR trap. Segregated eggs are loaded into trays at two females per tray and integrated eggs will be incubated at 1-female per tray. Formalin is added to each incubation stack to retard fungus development daily at a rate of 1,667 ppm (15-min drip). Formalin treatments are initiated 2 days following

spawning and continue until immediately prior to hatch. Silt removal from incubator trays through rodding will begin once the eggs are eyed. At 550-600 FTU's eggs are shocked and picked (enumerated) the following day. Eggs generated from females demonstrating ELISA optical densities greater than 0.250 will be culled prior to eye-up and egg enumeration; individual Lot averages will be assigned to these eggs for fecundity and % eye-up. Once eggs have been enumerated additional eggs may be culled, based on ELISA results, to reduce inventory to achieve a "full capacity" hatchery level. A secondary "pick" is performed following complete egg hatch (1,000 – 1,050 FTU's). Fry are transferred to indoor vats for early rearing at swim-up (1,700 – 1,750 FTU's).

- *Egg transfers* - Green eggs collected for Clearwater Hatchery's summer Chinook program are transported to Clearwater FH for incubation by IDFG personnel following water-hardening and disinfection at the SFSR trap.
- *Surplus egg distribution (if applicable)* - NA

2.3.5. Early Rearing

- *Environmental protocols (flow indices, density indices)* - At swim-up MCFH program summer Chinook fry are transferred into 12 indoor vats with screens initially placed at ½ vat length. Fry are set out in a manner to allow for spawn timing proportionality representation for CWT and individual pond marking. Approximately 90,000 fry are set out in each vat. Flows are set at 80 gpm then increased to 140 gpm (maximum) when fry are well on feed and vats are extended to full length. Individual vats are extended to full length when the density index reaches 0.50 to 0.60.
- *Feeding protocol* - Initial feeding is delayed up to 14 days post set out due to the potential occurrence of a fungal infection of the underdeveloped air bladder and/or digestive tract. Hourly hand feeding during the day commences after this extended period of morphological growth expires. Extruded starter feed in the BioVita formula, produced by Skretting/BioOregon, is used during early rearing. Feed size transitions occur consistent with Skretting/BioOregon guidelines.
- *Marking and tagging (AD, CWT; date range, size at application)* - Parr are marked into outdoor rearing ponds during June and July mark sessions. Currently, all segregated SFSR summer Chinook are AD-clipped, and approximately 120,000 of these are also CWT. All integrated parr are given CWT's only (no AD clip). Segregated fish that receive a CWT are distributed equally between the outdoor ponds. The majority of fish are MATS marked and moved (AD clip and AD/CWT segregated; CWT only for integrated) into outdoor ponds during marking events in June and July at < 150 fpp.
- *Fish movement/facility configuration* - Following the first round of marking in mid-June (see Marking above), remaining fry are subdivided into 5 of the emptied vats to provide space for continued rearing (40,000 to 55,000 in 11 vats). Remaining indoor fry are moved to the outdoor ponds via the MATS Automated Marking Trailer during the 3rd week of July.

2.3.6. Final rearing

- *Target environmental protocols (flow indices, density indices)* - Final rearing takes place in one of two outdoor rearing ponds which are partially covered to allow for natural light penetration. At time of release density and flow indices do not exceed 0.25 and 2.00, respectively
- *Feeding protocol* – Summer Chinook in the ponds are hand fed a commercially produced dry pellet diet. Feed size transitions occur consistent with the feed manufacture recommendations.
- *Mortality counting* – Hatchery staff remove PIT tags from pre-release mortalities and sweep raceways with a magnet post release to recover any shed PIT tags.

- *Water monitoring –* Water temperature, dissolved oxygen and flow are monitored and recorded appropriately. In accordance with NPDES monitoring, total suspended solids and total phosphorus are calculated from water samples collected under NPDES guidelines twice yearly for analysis by an independent lab. Results from the biannual samples along with monthly discharge monitoring reports are sent to the EPA and Idaho Dept. of Environmental Quality.
- *Fish movement/facility configuration -* Ponds are connected to a collection basin where fish are crowded for loading onto transport trucks for release.
- *Marking and tagging (PIT) -* PIT tags will be inserted into 52,000 pre-smolts in October. Of this total, 26,000 are segregated and 26,000 are integrated production smolts.
- *Quality monitoring (counts, growth, length, marks quality, tag retention) -* Sample counts are conducted monthly to monitor growth. In the two weeks prior to release a sample of 300 summer Chinook (crowded with a seine to make selection more random) from each pond will be checked by MCFH staff to provide a baseline for mark quality, release size and fish condition.

2.3.7. Fish health

- *Service provider -* Eagle Fish Health Lab, Idaho Fish and Game
- *Sampling protocols (what is sampled, sampling schedule) –*
    - Adults: All brood females are sampled for *Renibacterium salmoninarum* by the ELISA technique. Eggs from females with optical densities of 0.250 and above are culled from production. Ovarian fluids or kidney/spleen tissues are collected from at least 90 females for viral replicating agent examination, while head wedges are collected from 20 fish for *Myxobolus cerebralis* examination.
    - Juveniles: Chinook salmon reared at this facility are inspected by the EFHL on a quarterly basis for *R. salmoninarum*, viral replicating agents, parasites, and bacterial pathogens. Diagnostic services are provided upon request. A pre liberation sample consisting of 60 randomly selected fish is examined for *R. salmoninarum*, bacterial, viral replicating agents, and whirling disease *M. cerebralis*. Goede's organosomatic index is performed as a part of this pre liberation examination. The pre liberation examination is performed between 30 and 45 days prior to release.
- *Vaccination methods -* None
- *Treatment methods -* Once adult fish are ponded for broodstock, daily formalin treatments will be applied to control pre-spawning mortality from external mycosis. The target treatment rate is 167 ppm for one hour.

2.3.8. Fish release/transportation

- *Truck specifications -* The MCFH LSRCP transport truck, MCFH adult transport truck, MFH resident 2-Ton transport truck and two resident transport trucks (from Nampa FH) are utilized to move salmon smolts to the SFSR release site at Knox Bridge.
- *Hauling/Release schedule -* Prior to release, pre-liberation length and weight data will be collected from 300 fish. The same 300 fish will also be visually graded for precocity or early maturation. Approximately 8,500 pounds of fish are transported during each release trip and 2 release trips are scheduled each day. Three to four days of transportation are needed to complete the release process. Johnson Creek fish, which are reared in the collection basin at the MCFH, are transported out for release prior to the release of the SF stock. The timing for the Johnson Creek releases are the end of March/early April with the SF stock releases beginning immediately afterwards.

- *Hauling/Release guidelines -* At Knox Bridge, water from the SFSR is pumped onto the trucks to provide tempering and water chemistry introductions prior to release. Release takes place using a transfer tube stretching from the roadway to the river.

2.3.9. Communication

- *Written reports (e.g., Monthly summaries, annual reports) -* Monthly production narratives are provided to representatives from each organization. Spawning summaries will be included in the annual run report. A monthly hatchery production summary is completed and distributed accordingly.
- *FINS and IDFG release databases -* All SFSR adult trap data will be recorded and reported using the FINS program. All juvenile and adult summer Chinook salmon outplants will be recorded in the IDFG release database. When available, all SFSR spawning data will also be recorded in the FINS database spawning module.
- *Meetings (e.g., AOP, Anad, HET, etc.)* Hatchery staff participate in various meetings throughout the year to include; AOP, Marking and Tagging, Anadromous, LSRCP, Preseason Trapping, Postseason Trapping, Pre Fishing season SFSR, FINs database and others.
- *Direct consultation -* Hatchery staff maintains communication with LSRCP coordinators, IDFG Fishery Bureau Staff, IDFG Fish Health Pathologists, IDFG Fish Marking Coordinators, NPT Fishery Staff and SBT fishery staff through rearing cycle as needed. As eggs are enumerated MCFH will coordinate with SBT fishery personnel to determine a schedule to transfer eyed eggs. Prior to initiation of transportation activities the MCFH hatchery manager contacts the Valley County Road Department to notify them of the hatcheries hauling schedule to ensure the Warm Lake road plowing crews are aware of our presence. The MCFH hatchery manager also contacts McCall field offices of the IDFG and NPT, prior to releases, so they are aware of the hatchery's release schedule and operation of juvenile fish sampling screw-traps can be suspended.

2.3.10. Adult outplants (if applicable)

- *Trigger for outplanting -* Adults returning to the SFSR vary in terms of numbers, origin, sex ratios, and age class. Outplanting will occur after the Nez Perce Tribe's minimum viable number of 2,000 spawners (natural and hatchery combined) is met in the upper mainstem SFSR (below and above the weir combined). Once 2,000 anticipated spawners is met then outplants to outside systems will be considered.
- *Purpose –* The purpose of outplanting is to help boost natural spawning below the weir, above weir spawning will be managed with the sliding scale.
- *Outplant protocol (sex ratio, timing, marking, sampling) -*Fish that are out-planted need to be sexed to ensure an equal sex ratio if possible. The timing of out-plants should occur late enough to (1) encourage fish to remain in outplant sites for intended spawning (i.e., after July 25), and (2) ensure that fish are sufficiently mature to decrease chances of fish straying into other tributaries. A maximum of 1,000 Chinook will be outplanted in the EF SFSR and a maximum of 500 will be outplanted in the SFSR.

2.4. Johnson Creek Weir (JC Weir)

2.4.1. Trap/Weir operation

- *Dates operated -* The Johnson Creek weir is installed mid-June to early-July when water flows subside to 700 cfs or below. The weir is removed when no fish have been captured for seven consecutive days, usually in mid-September.
- *Trap configuration -* The Johnson Creek weir consists of two directional wings or fences that funnel fish into an instream trap box. Chinook salmon encountering the Johnson Creek weir are directed towards the trap box.

- *Trapping protocol (frequency, movement of fish) -* The weir is monitored daily and fish are processed out of the trap box each day.

2.4.2. Adult handling

- *Measurements (marks, tags, sex, etc.) -* Each fish trapped is examined for marks, tags, and clips. The sex and length information is recorded as well as disposition and any tag, mark or clip information. A tissue sample is collected at this time, as well as a secondary mark (opercle punch) to indicate that the fish was trapped at the weir.
- *Tissue sampling protocol* - All salmon trapped at the JC Weir will have a tissue sample collected at the time the fish is processed. The samples are approximately 6 mm in diameter and are collected from the caudal fin using a standard hole punch mechanism. Samples are placed on Whatman Paper for storage until being sent to the genetics lab for analysis.
- *Dispositions (holding, releases) and adult marking (if applicable) -* Up to 104 natural origin Johnson Creek adults may be retained for broodstock. Upon being trapped at the Johnson Creek Weir, broodstock adults are transferred to the SFSR Satellite facility where they are held until spawning. Johnson Creek and SFSR adults are treated similarly at the Satellite facility (see McFH Adult Handling). All other natural origin fish trapped at the JC weir are released upstream of the weir for natural spawning. All hatchery origin fish captured at Johnson Creek weir are either (1) released upstream for natural spawning (supplementation fish only) or (2) euthanized and placed into Johnson Creek for nutrient enhancement. Only Ad-clipped strays are euthanized at the weir. All fish released above the weir are marked in a manner that identifies them as having been trapped at the weir (either an operculum punch or tag). Broodstock transported to the SFSR Trap Satellite are both operculum and floy tagged to differentiate them from SFSR broodstock.
- *Surplus distribution –* There are no surplus fish from the JC Weir. All natural origin fish not selected as broodstock and all supplementation adults trapped at the weir are released above the weir for natural spawning. AD clipped strays are removed at the weir and euthanized.
- *Carcass dispositions -* Stray AD-clipped fish are euthanized and placed into Johnson Creek for nutrient enhancement. All trap/weir, pre-spawning mortalities and spawned-out carcasses are transported back to Johnson Creek and placed in the stream by NPT fishery personnel for nutrient enhancement.
- *Ancillary species (if applicable) -* Other species handled at the JC Weir may include Bull Trout, Mountain Whitefish, Rainbow Trout, and Westslope Cutthroat Trout. All non-target species caught in the trap box are released upstream of the weir. On occasion, Steelhead Kelts are found on the upstream side of the weir. These fish are captured and released downstream of the weir.

2.4.3. Spawning/Egg take

- *Calculation of broodstock need (fecundity, eyeup, eye to smolt) –* See Section 2 ("Calculation of Broodstock Need") for details on broodstock calculation. The production goal is to trap and spawn enough adults to produce 150,000 JohnCr smolts at MFH.
- *Spawning protocol (schedule, method, M/F ratio) -* Johnson Creek broodstock are spawned at the SFSR trap on the same days as the SFSR broodstock. Spawn pairing is one male to one female (1:1). An additional male is used when sperm quantity or quality is questionable. During spawning, all brood females are sampled for *RS* by ELISA technology. The JCAPE project has cryopreserved semen available for use in spawning (Appendix 0). The use of these samples would follow the guidelines established by the NPT Cryopreservation project and with approval from NOAA Fisheries.

2.4.4. Egg incubation/Egg and fry shipping

- *Egg incubation method (egg distribution, treatments, picking, culling) –* Johnson Creek-origin green eggs are transported in individual egg bags from SFSR Satellite Trap to McFH for incubation in Heath-style incubator trays. Eggs will for the most part be loaded into trays at one female per tray. If incubation space becomes limited at MCFH, IDFG staff will coordinate with NPT staff to resolve those issues when they arise. Incubation procedures are the same as those used for SFSR production eggs at McFH. Eggs from females with optical densities of 0.25 and above are culled from production. Eggs from parents with serious pathogens are culled. Egg shocking, picking and enumeration follow the procedures set for the McFH.
- *Egg transfers -* Johnson Creek origin green eggs are transported in individual egg bags from SFSR Trap Satellite to McFH for incubation in Heath style incubators trays.
- *Surplus egg distribution (if applicable) -* N/A

2.4.5. Early Rearing

- *Environmental protocols (flow indices, density indices) -* After hatch at MCFH Chinook fry are transferred into two indoor rearing vats with screens initially placed at ½ lengths. Fry are initially reared in two indoor rearing tanks. Flows are initially set at 80 gpm then increased to 130 gpm (maximum) when fry are well on feed. Individual vats are extended to full length when the density index reaches 0.5. Following June reserve, SFSR salmon ad fin clip marking, the Johnson Creek Chinook are divided into additional vats to reduce rearing densities. As density indices approach 0.5 Chinook parr are subdivided into additional vats.
- *Feeding protocol -* Hourly hand feeding during the day commences when 80% of fry achieve swim-up. Feeding protocols follow those set for the McFH.
- *Marking and tagging (AD, CWT; date range, size at application)-*All Johnson Creek Chinook receive a CWT in mid-July (by MATS marking trailers operated by PSMFC) and are moved back into the indoor vats for continued rearing. None of the Johnson Creek fish receive any type of fin clip.
- *Fish movement/facility configuration -* Johnson Creek Chinook parr are moved into the outdoor collection basin in late October to early November.

2.4.6. Final rearing

- *Target environmental protocols (flow indices, density indices)* - Final rearing takes place in the outdoor collection basin. This pond is not covered so the fish are exposed to natural photoperiod. At time of release density and flow indices do not exceed 0.15 and 0.2, respectively.
- *Feeding protocol –* Summer Chinook in the ponds are hand fed a commercially produced dry pellet diet. Feed size transitions occur consistent with manufacturer recommendations.
- *Mortality counting –* Hatchery Staff collect and tally mortalities on a daily basis from the ponds. PIT tags are collected through scanning and excision of pre-release mortalities and and/or may be collected as 'shed tags' following the release and a subsequent sweep of the bottom of the vat with a magnet.
- *Water monitoring –* Water temperature, dissolved oxygen and flow are monitored and recorded appropriately. In accordance with NPDES monitoring, total suspended solids and total phosphorus are calculated from water samples collected under NPDES guidelines twice yearly for analysis by an independent lab. Results from the biannual samples along with monthly discharge monitoring reports are sent to the EPA and Idaho Dept. of Environmental Quality.
- *Fish movement/facility configuration -* Once in the final rearing pond, the fish in the collection basin are crowded for loading onto transport trucks for release.

- *Marking and tagging (PIT) -* All JC smolts receive CWT in July of each year. This is done using the PSMFC automated tagging trailers at the same time the SFSR fish are getting CWT and fin clipped at the McFH. Approximately 2,100 of the CWT fish are also PIT tagged by NPT personnel. PIT tagging occurs in September to October, just prior to the fish being transferred to outdoor rearing.
- *Quality monitoring (counts, growth, length, marks quality, tag retention) -* Sample counts are conducted monthly to monitor growth. Mark retention of CWT is assessed by NPT fishery personnel as they PIT tag the smolts. This assessment evaluates CWT retention among the smolts prior to release.

2.4.7. Fish health

- *Service provider -* Eagle Fish Health Lab, Idaho Fish and Game.
- *Sampling protocols (what is sampled, sampling schedule) –*
    - Adults: During spawning, all brood females are sampled for *RS* by ELISA technology. Brood fish are also examined for viral replicating agents and *Myxobolus cerebralis.*
    - Juveniles: Johnson Creek Chinook are reared at McFH and follow their fish health protocols. A pre-liberation sample consisting of 60 randomly collected fish is examined for *Renibacterium salmoninarum (RS),* parasites, and viral replicating agents. Goede's organosomatic index is also performed on these fish. The preliberation sample is performed within 30 to 45 days of release.
- *Vaccination methods -* None
- *Treatment methods -* Once adult fish are ponded for broodstock, daily formalin treatments will be applied to control pre-spawning mortality from external mycosis. The target treatment rate is 167 ppm for one hour

2.4.8. Fish release/transportation

- *Truck specifications -* Up to six 1-ton 4x4 trucks with 400 – 500 gallon tanks are used for transporting smolts to Johnson Creek.
- *Hauling/Release schedule -* One scheduled release trip (4 to 6 trucks per trip) is planned for each day. Release of smolts is scheduled for late March to early April.
- *Hauling/Release guidelines -* Johnson Creek summer Chinook are transported to release site by NPT fisheries personnel. The NPT provide personnel and up to four 1-ton 4x4 trucks with 400 – 500 gallon tanks for transporting smolts to Johnson Creek near Wapiti Ranch for release. Fish are released directly into Johnson Creek using a release tube stretching to the river.

2.4.9. Communication

- *Written reports (e.g., Monthly summaries, annual reports) -* The JCAPE project provides weekly updates during the adult trapping and spawning season. These updates are distributed via e-mail. The JCAPE project is responsible for preparing annual brood year reports that are submitted to both NOAA Fisheries and BPA. These reports are not currently sent to the contact list, but are available upon request or through BPA's website or from the JCAPE project staff. The JCAPE project is required to prepare and submit as a condition of ESA Section 10 permitting an Annual Operation Plan (AOP) for the JCAPE project to NOAA Fisheries. Once the AOP is approved by NOAA Fisheries, it will be available for upon request.
- *FINS and IDFG release databases -* The JCAPE project utilizes the FINS database for JC Weir data entry.
- *Meetings (e.g., AOP, Anad, HET, etc.)* - The JCAPE project fully participates in all applicable meetings as they pertain to the project and local and regional affairs.

- *Direct consultation -* The JCAPE project consults with NOAA Fisheries for the operation of the project.

2.4.10. Adult outplants (if applicable)

- *Trigger for outplanting -* N/A
- *Purpose –* N/A
- *Outplant protocol (sex ratio, timing, marking, sampling) –* N/A

2.5. Pahsimeroi Fish Hatchery (PFH)

2.5.1. Trap/Weir operation

- *Dates operated -* The PFH weir and trap operates to collect summer Chinook from mid-June through early-October.
- *Trap configuration -* The adult trap and holding ponds at the lower adult facility are supplied with water from the Pahsimeroi River through a 0.25 mile earthen intake canal. Once the water passes through the holding ponds, it reenters the Pahsimeroi River below a removable adult weir. The intake structure is equipped with four NOAA Fisheries approved rotating drum screens to prevent wild Chinook salmon and steelhead from entering the hatchery facilities. A water right for 70 cfs held by IPC allows hatchery personnel to divert water from the Pahsimeroi River for operations at the lower hatchery. This intake is equipped with a broad crested weir measuring device. The adult trap and holding ponds each measure 70' x 16' x 6'. The outer ponds are for adult holding and the center pond is considered the trap. The carrying capacity is approximately 2,000 adult summer Chinook salmon or 5,000 adult A-run steelhead per pond.
- *Trapping protocol (frequency, movement of fish) -*The trap is checked weekdays and usually is not checked on weekends. Additionally, the ladder is shut off during heavy weekend fish periods to avoid overloading the adult fish trap. The trap will be checked as needed, generally one to three times per week and up to five times per week during the peak of the run which is mid-July.

2.5.2. Adult handling

- *Measurements (marks, tags, sex, etc.) -* At trapping, fish are measured for length, scanned for PIT tags, wanded for CWTs, examined for gender, checked for various external clips, tags, and injuries. Snouts are removed from 30 jacks and 10 fish from each adult age class containing CWT's and are sent to the Nampa Research office for CWT extraction and processing. Chinook from the integrated broodstock are unmarked and 100% CWT.
- *Tissue sampling protocol -* Tissue samples for genetic analysis are collected from all Chinook used for broodstock and all unmarked Chinook that enter the trap. Genetic samples are collected from all spawned adults to develop the Parentage Based Tagging (PBT) baseline with a target of tracking 100% of smolts to release site (Appendix 7.1). Genetic samples are collected from all Chinook released above the weir.
- *Dispositions (holding, releases) and adult marking (if applicable) -* The decision process for ponding broodstock is determined by historical hatchery run timing records. The run timing is broken into weekly increments on a percentage basis and a corresponding percentage of broodstock are ponded each week based on these records. Fish in excess of these weekly broodstock needs are recycled if a fishery in the adjacent upper Salmon River is ongoing, distributed to Treaty Tribes for subsistence, or distributed to registered food banks in that order of priority. Broodstock collected for the segregated program will only be returning-adult progeny of the segregated program. Broodstock collected for the integrated program will be a combination of returning-adult progeny of the integrated program and natural origin adults. The origin of adult returns can be determined by differential marking/tagging: Hatchery Origin Segregated fish (HORseg) are AD clipped, Hatchery Origin Integrated fish

(HORint) are unmarked with CWT, and Natural Origin fish (NOR) are unmarked and have no tags.

- o PahSeg Broodstock Collection: HORseg by HORseg crosses will be used to create eggs for the segregated component for the PFH programs.
- o PahInt Broodstock Collection: The number of NOR adults incorporated into the brood stock is based on a sliding scale of abundance for NOR adults (Table 2.2). Returning adults will be used in the integrated broodstock and passed above the weir in proportions outlined in the sliding scales. The spawn crosses used to create integrated offspring will be a mix of NOR by HORint, NOR by NOR, and HORint by HORint adult crosses. HORint by HORint crosses are performed only when escapement of NORs to PFH weir are low. The number of adults needed for the integrated broodstock program is calculated based on the smolt release goal of 65,000 and accounts for average prespawn mortality, fecundity, and green-egg to smolt survival at each facility. The goal is to utilize equal numbers of male and female NORs in the broodstock.

  The procedure for implementing the sliding scale starts with the preseason forecast for the number of NORs that will return to the Pahsimeroi trap. This forecast provides a starting point for the hatchery staff to develop broodstock acquisition plans. Approximately 10 days after the first NOR is trapped, M&E staff will reassess the projected return of NORs and adjust the projection if needed. NORs will be collected for integrated broodstock throughout the duration of the run, and historic run timing data will be used to calculate the number of NORs to retain each week to avoid holding excess fish, and avoid holding fish for an extended period of time prior to spawning. The number and types of crosses (HORint x NOR, NOR x NOR, and HORint x HORint) will be determined based on the number of returning NOR adults. Depending on run timing or an updated run projection, the number of fish retained each week for integrated broodstock may be adjusted from the preseason planning numbers.

Table 2.2. Pahsimeroi Fish Hatchery Summer Chinook stepping stone scale

NOR Return to Weir		Integrated Program Size	NORs Released Above Weir		Max. Number of NORs Held for Brood		Max % of NORs Retained for Brood	Max. pHOS
50	124	65,000	35	87	15	37	0.3	0.99
125	249	65,000	88	208	38	41	0.3	0.30
250	499	65,000	209	458	41	41	0.3	0.30
500	999	65,000	459	958	41	41	0.2	0.25
1,000	1,499	65,000	959	1,458	41	41	0.2	0.25
1,500	1,999	65,000	1,459	1,958	41	41	0.2	0.25
2,000	3,000	65,000	1,959	2,959	41	41	0.2	0.25

- *Surplus distribution –* Fish in excess of weekly broodstock needs are recycled if a fishery in the adjacent upper Salmon River is ongoing, distributed to Treaty Tribes for subsistence, or distributes to registered food banks in that order of priority. If enough Chinook return to provide a fishery, out-plant sites will be determined by the IDFG Fisheries Bureau and Salmon Region biologists. Additional surplus jacks will be outplanted to the Salmon Kid's Creek pond, Blue Mountain Meadow pond, or selected for charitable/tribal fish giveaways.

- *Carcass dispositions* - Once the fish reach a point where they can no longer be used for food and fisheries are closed, surplus fish are euthanized and stored in a refrigerated trailer unit until they are transferred to a rendering plant in Kuna, ID. Neither excess adult fish nor carcasses are transferred out of the upper Salmon River Basin due to whirling disease concerns.
- *Ancillary species (if applicable)* - Ancillary species are accounted for and released above the weir the same day they are trapped and entered onto the FINS Database Management System. The numbers of ancillary species trapped are also documented in PFH annual brood year report.

2.5.3. Spawning/Egg take

- *Calculation of broodstock need (fecundity, eyeup, eye to smolt) –* See Section 2 ("Calculation of Broodstock Need") for details on broodstock calculation. The production goal is to trap and spawn enough adults to produce 935,000 segregated smolts and 65,000 integrated smolts. Upon availability, eggs will be collected for the SBT egg box program in Panther Creek (up to 800,000 segregated eyed eggs) and will come from fish trapped in excess of brood needs for onsite smolt programs. Prioritization of excess fish between recycling to fisheries, Tribal C&S, foodbank and out-plants will occur in-season between State and Tribal managers.
- *Spawning protocol (schedule, method, M/F ratio)* - The first sort and spawn generally occurs around September 1 each year. Spawning occurs twice per week, usually on Monday and Thursday. A spawning ratio of 1:1 is used. Jacks are limited to 10% of the total males used for broodstock.

2.5.4. Egg incubation/Egg and fry shipping

- *Egg incubation method (egg distribution, treatments, picking)* - All eggs are collected at Lower PFH. Following water hardening, eggs are transferred to Upper PFH in Aqua Seed tubes for incubation and early rearing on well water and secondary rearing on river water. Upon arrival to the Upper PFH, the egg coolers and the eggs are disinfected externally with a 100 ppm solution of Argentyne for 10 minutes prior to entering the incubation room. All eggs are incubated to eye-up at PFH using well water chilled from 50ºF to 40ºF. The incubator trays are loaded at the rate of one female per tray. From 48 hours after spawning until eye-up, eggs at Pahsimeroi FH are treated three times a week with a 1,667-ppm formalin treatment to prevent fungal growth on the eggs. A 500 ml iodine California Flush is also administered on Tuesdays, Thursdays, and Saturdays. At eye up, the eggs are shocked twice by dropping them into a bucket of water from a height of approximately 30 inches. Dead eggs are picked and enumerated with a Jensorter electronic counter/picker. Eggs from females with ELISA optical densities of 0.25 and above are culled from production. Surplus eggs may be disposed of by dumping the eggs into a bucket of chlorine and transferred to a landfill.
- *Egg outplants* - Upon availability, eggs will be collected for the SBT egg box program in Panther Creek and will come from fish trapped in excess of brood needs for onsite smolt programs. Prioritization of excess fish between recycling to fisheries, Tribal C&S, foodbank and out-plants will occur in-season between State and Tribal managers.
- *Surplus egg distribution (if applicable)* - To be determined by IDFG fisheries bureau and the SBT.

2.5.5. Early Rearing

- *Environmental protocols (flow indices, density indices)* - Early rearing takes place in the Upper PFH vat room on 50ºF well water. Rearing is segregated according to lineage designation and BKD status as stated above. Fry are ponded directly into 1,280 cubic foot,

80' long indoor vats, with each vat having a mix of progeny by age class and run timing based on lot number. Approximately 60,000 fry are ponded into each vat. All 18 vats are used to rear approximately 1,050,000 fry. All vats are supplied with pathogen-free well water. Flow indices are kept below 1.0 lbs/gpm/in and density indices are kept below 0.3 lbs/ft^3/in.

- *Feeding protocol* - Fish food is distributed to all vats with Ziegler belt feeders and supplemented with hand feeding. Target size for ponding is 110 fpp to achieve a refractory WD size prior to exposure to river water containing the WD causative agent. Feeding regime is regulated to achieve this size by May 14 when ad clipping and CWT marking occurs.
- *Marking and tagging (AD, CWT; date range, size at application)* - AD clipping and CWT tagging always occurs in mid-May. Integrated smolts will receive CWT's only and no adipose clip. The segregated group receives an adipose fin clip and also approximately 120,000 receive an adipose clip and CWT's. In September, approximately 21,400 segregated fish receive PIT's. A total of 1,000 integrated fish receive PITs. Approximately 1,200 integrated group fish are placed back into a dedicated vat after receiving CWT's. These fish are reared in vats until PIT tagging size is reached, then, hatchery personnel PIT tag 1,000 fish from this group prior to transfer into a secondary rearing pond.
- *Fish movement/facility configuration* - Following marking, fish are moved outside into two covered rearing ponds.

2.5.6. Final rearing

- *Target environmental protocols (flow indices, density indices)* - Flow indices are kept below 1.0 lbs/gpm/in and density indices are kept below 0.3 lbs/ft^3/in.
- *Feeding protocol* – Feeding regimes vary based on size of fish and rearing water temperature. PFH summer Chinook are fed BioVita and BioPro 2 and the feed is distributed using automatic fish feeders.
- *Mortality counting* – Mortality is removed and accounted for daily.
- *Water monitoring* – River and well water samples are collected annually and are analyzed by National Testing Laboratories located in Ypsilanti, Michigan.
- *Fish movement/facility configuration* - Swim-up fry are initially ponded into 18 indoor rearing vats and once the fish reach 110 fish per pound in mid-May, they are marked by PSMFC and then transferred to two outdoor rearing ponds for final rearing. The smolts are released volitionally from the outdoor rearing ponds in late April the following year.
- *Marking and tagging (PIT)* - PIT tagging of Segregated fish usually occurs in September or October annually. See marking and tagging section for Integrated tagging protocol.
- *Quality monitoring (counts, growth, length, marks quality, tag retention)* - Pre-liberation condition factors and mark quality assessments are conducted prior to release. Final release numbers are determined using sample counts along with marking numbers minus mortality.

2.5.7. Fish health

- *Service provider* - Eagle Fish Health Lab, Idaho Fish and Game
- *Sampling protocols (what is sampled, sampling schedule)* –
    - Adults: All brood females are sampled for *RS* by ELISA technology. Sixty ovarian fluid samples and 30 tissue samples (kidney/spleen) are collected from 90 females and examined for viral replicating agents. Twenty head wedges are removed from returning adult salmon to ascertain *Myxobolus cerebralis* prevalence.
    - Juvenile: Pre-liberation condition factors and mark quality assessments are conducted prior to release. The preliberation sample is performed within 30 to 45 days of release. Chinook salmon reared at this facility are inspected by EFHL on a

quarterly basis for *RS*, viral replicating agents, parasites, and bacterial pathogens such as *Aeromonas*, and *Flavobacterium psychrophilum*. Diagnostic services are provided upon request. A pre-liberation sample consisting of 60 randomly collected fish are examined for *RS*, *Myxobolus cerebralis*, and viral replicating agents. Goede's organosomatic index is also performed.

- *Vaccination methods* - None.
- *Treatment methods* - Salmon ponded for broodstock are treated with 60 minute 167 ppm flow-through formalin treatments on an alternating day basis between July 1 and August 15. These formalin treatments are needed to control mycosis and to prevent outbreaks of ICH. Juvenile fish also receive prophylactic treatments of formalin, at a 167 ppm applied on an alternating day basis during July and August to limit mortalities from a perennial infestation of *Ichthyophthirius multifilis.*

2.5.8. Fish release/transportation

- *Truck specifications* - PFH has a two ton truck equipped with a 1,000 gallon tank capable of hauling 150 adult steelhead or 150 jacks.
- *Hauling/Release schedule* - All Chinook smolts are typically released volitionally from the rearing ponds at the upper facility from April 17 to April 24. To reduce the chance of large numbers of fish entering the intake canal at the lower facility, the release procedure is as follows: screens will be removed on both ponds; fish migration will then be monitored via the Salmon regional monitoring screw trap. Hatchery personnel will monitor and clean the lower hatchery intake canal smolt bypass system nightly to ensure fish don't get trapped in the canal. After two weeks of volitional release, remaining fish are forced out of the rearing ponds by hatchery personnel.
- *Hauling/Release guidelines* - Screens are removed and the fish are allowed to volitionally move out of the two rearing ponds and into the Pahsimeroi River.

2.5.9. Communication

- *Written reports (e.g., Monthly summaries, annual reports)* - Pahsimeroi FH distributes trapping and spawning updates three times per week during the summer Chinook run. These data summaries are provided electronically to a distribution list. Monthly inventory summaries are provided to an electronic distribution list which includes IDFG Fisheries Bureau, LSRCP, and IPC offices.
- *FINS and IDFG release databases* - Trapping information is uploaded to FINS Data Management System daily and is available online at www.finsnet.org.
- *Meetings (e.g., AOP, Anad, HET, etc.)* - PFH attends the annual anadromous meeting, the Salmon River AOP meeting, the regional work plan meeting, the hatchery managers meeting, AFS, NWFCC and the fisheries retreat.
- *Direct consultation* - Hatchery personnel are in regular communication with staff from the EFHL for guidance on culling and segregation.

2.5.10. Adult outplants (if applicable)

- *Trigger for outplanting* - Excess (beyond Shoshone Bannock C&S) jacks will be distributed to the Salmon Kids Pond in Salmon, ID and the Blue Mountain Pond in Challis, ID.
- *Purpose* – To provide additional fishing opportunity.
- *Outplant protocol (sex ratio, timing, marking, sampling)*–Adults and jacks in excess of broodstock needs will be outplanted to the surrounding waters and/or recycled to the fishery. All fish will be given an operculum punch.

2.6. Sawtooth Fish Hatchery (SFH)

2.6.1. Trap/Weir operation

- *Dates operated* - Depending on spring runoff conditions, ladder and trap operations will begin between mid-May and mid-June and continue through early-September. Generally, the weir can be fully placed into operation as a descending Salmon River USGS hydrograph located near the mouth of the Yankee Fork Salmon River discharge reading approaches 3,000 cfs.
- *Trap configuration* - A weir is installed across the Salmon River and directs fish into a fish ladder and trap area.
- *Trapping protocol (frequency, movement of fish)* - The adult trap is emptied daily. According to trap protocol, fish are either placed into a holding pond or released upstream of the weir.

2.6.2. Adult handling

- *Measurements (marks, tags, sex, etc.)* - The adult trap is worked up daily and all fish are measured for fork length and examined for marks, gender, injuries, and either placed into one of three adult holding ponds or released directly into the Salmon River above the hatchery, depending upon what mark or tag the fish may have. Unmarked Chinook not needed for Integrated broodstock are released above the hatchery intake after daily trap operations have ended.
- *Tissue sampling protocol*- During spawning, genetic samples are collected from all spawned adults to develop the Parentage Based Tagging (PBT) baseline. Samples are taken from males and females spawned and recorded in a manner to allow for parental genetic analysis with a goal of 100% tracking to release site (Appendix 7.1). Tissue samples are also collected from all fish released above the weir.
- *Dispositions (holding, releases) and adult marking (if applicable)* - Broodstock collected for the segregated program will be returning-adult progeny of the segregated program. Broodstock collected for the integrated program will be a combination of returning-adult progeny of the integrated program and natural origin adults with a pNOB target of 1.0. The origin of adult returns can be determined by differential marking/tagging: Hatchery Origin Segregated fish (HORseg) are AD clipped, Hatchery Origin Integrated fish (HORint) are unmarked with CWT, and Natural Origin fish (NOR) are unmarked and have no CWT. Broodstock for production of smolts for release in the Yankee Fork are AD clipped adults captured at the Sawtooth trap (see Yankee Fork section for details).
    - USRSeg Broodstock Collection: HORseg by HORseg crosses will be used to create eggs for the segregated component for the SFH programs. If the returns of HORint adults exceed the numbers required for natural spawning and integrated broodstock, HORint fish may be used for up to 30% of the segregated broodstock.
    - USRInt Broodstock Collection: The number of NOR adults incorporated into the broodstock is based on a sliding scale of abundance for NOR adults (Table 2.3). Returning adults will be used in the integrated broodstock and passed above the weir in proportions outlined in the sliding scale. The spawn crosses used to create integrated offspring will be a mix of NOR by HORint, NOR by NOR, and HORint by HORint adult crosses. HORint by HORint crosses are performed only when escapement of NORs to SFH weir are low. The number of adults needed for the integrated broodstock program is calculated based on the targeted program size and accounts for average prespawn mortality, fecundity, and green-egg to smolt survival at SFH. The goal is to utilize equal numbers of male and female NORs in the broodstock.

The procedure for implementing the sliding scale starts with the preseason forecast for the number of NORs that will return to the Sawtooth trap. This forecast provides a starting point for the hatchery staffs to develop broodstock acquisition plans. Approximately 10 days after the first NOR is trapped, M&E staff will reassess the projected return of NORs and adjust the projection if needed. NORs will be collected for integrated broodstock throughout the duration of the run, and historic run timing data will be used to calculate the number of NORs to retain each week to avoid holding excess fish. The number and types of crosses (HORint x NOR, NOR x NOR, and HORint x HORint) will be determined based on the number of returning NOR adults. Depending on run timing or an updated run projection, the number of NORs retained each week for integrated broodstock may be adjusted from the preseason planning numbers.

Table 2.3. Sawtooth Fish Hatchery Spring Chinook stepping stone scale

NOR Return to Weir		Integrated Program Size	NORs Released Above Weir		# of NORs Held for Brood		Max % of NORs Retained for Brood	Max. pHOS
50	124	250,000	30	74	20	50	40.0%	NA
125	349	250,000	75	215	50	134	40.0%	NA
350	699	250,000	263	565	88	134	25.0%	0.45
700	999	250,000	566	865	134	134	25.0%	0.45
1,000	1,299	500,000	750	1,031	250	268	25.0%	0.35
1,300	1,599	1,000,000	780	1,064	520	535	40.0%	0.35
1,600	2,000	1,700,000	768	1,090	832	910	52.0%	0.35

- *Surplus distribution* – Returning adults in excess of the broodstock needs will be handled according to a prioritized distribution schedule that will be determined by the cooperators. Adult and jack Chinook surplus to brood need are ponded separate from broodstock and made available for Tribal ceremonial and subsistence, charitable organizations, adult outplants to Yankee Fork Salmon River (see SFH Outplant section), and recycling into fisheries downstream of Sawtooth weir. Excess Chinook are not treated with injectable erythromycin, anesthetized with MS-222 or treated with formalin.
- *Carcass dispositions* - Neither excess adult Chinook, nor carcasses, will be transferred out of the upper Salmon River Basin due to whirling disease concerns except directly to approved rendering plants. Carcasses are made available to the SBT for carcass outplants into the Yankee Fork Salmon River.
- *Ancillary species (if applicable)* - NA

2.6.3. Spawning/Egg take

- *Calculation of broodstock need (fecundity, eye-up, eye to smolt)* – See Section 2 ("Calculation of Broodstock Need") for details on broodstock calculation. The production goal is to trap

and spawn enough adults to produce 2,000,000 smolts at SFH. The number of segregated and integrated smolts will vary annually based on the natural origin returns and the production targets outlined in the sliding scale (Table 2.3).

- *Spawning protocol (schedule, method, M/F ratio) -* Spawning occurs every Monday and Thursday from early August through the first week of September. Segregated crosses (HORseg x HORseg) occur across brood years where possible using the following spawning protocol; if > 100 pairs then 1M:1F random cross, if 50-100 pairs then 2M:1F split random cross , if 25-50 pairs then 3M:1F split random cross, if < 25 pairs then 4M:1F split random cross. The split random cross includes eggs from one female being split in equal groups of one, two, three to four then each group fertilized by one male. After fertilization the eggs are recombined into a single group for incubation and water hardening. The integrated program spawn crosses are 1M: 1F. The eggs/progeny from the integrated crosses are kept separate from any segregated progeny until smolt release. If cryopreserved sperm is needed fill out request form (Appendix 0). Assistance will be provided to NPT cryopreservation program.

2.6.4. Egg incubation/Egg and fry shipping

- *Egg incubation method (egg distribution, treatments, picking) -* Incubation and fish rearing practices are the same for both integrated and segregated smolts. All eggs are incubated at SFH. Eggs are water hardened following label directions of buffered PVP iodine. Formalin is added three times per week to each incubation stack to retard fungus development at a rate of 1,667 ppm (15-min drip). Formalin treatments are initiated 2 days following spawning and continue until eye up. After the eggs have developed to the eyed stage, the eggs are physically shocked before passing through an electronic egg machine for sorting and enumerating dead from live eggs. Typically, a single female's eggs are incubated in a single incubation tray. Eggs are culled according to Fish Health Pathologist recommendations.
- *Egg transfers -*All Sawtooth stock eggs are incubated and reared at SFH.
- *Surplus egg distribution (if applicable) -* Surplus egg distribution will be coordinated with the Bureau.

2.6.5. Early Rearing

- *Environmental protocols (flow indices, density indices) -* At swim-up Chinook fry are transferred into 15 indoor vats and 6 small outside raceways with screens initially placed at half length. Approximately 65,000 fry are set out in each vat. The remaining Chinook fry are transferred evenly into one of six outside small raceways supplied with well water. Flows are set at 50 gpm then increased to 110 gpm (maximum) when fry are on feed well.
- *Feeding protocol -* Hourly hand feeding during the day commenced when 90% of set out fry achieved swim-up. After the transition to #2 starter feed automatic clock belt feeders will present the feed to the fry. Extruded starter feeds will be used during early rearing.
- *Marking and tagging (AD, CWT; date range, size at application)-*All fry (100 – 150 fpp) will be marked with an adipose clip and/or CWT (MATS Automated Trailer) into outside raceways beginning the third week of May. Integrated smolts will be marked differentially (100% CWT, no-fin clip) from the segregated smolts (100% AD clip).
- *Fish movement/facility configuration -*The fry are moved by hand from the egg trays directly into either a vat or a small outside raceway for early rearing. From their early rearing container they are pumped into the MATS trailer for marking and moved to their outside large final rearing raceway.

2.6.6. Final rearing

- *Target environmental protocols (flow indices, density indices) -* Final rearing takes place in one of fourteen outside raceways. These raceways are supplied with raw, river water. The target density index and flow index at release are 0.30 and 1.0 – 1.6 respectively.
- *Feeding protocol –* Fish are fed daily by hand as water temperatures and ice allow.
- *Mortality counting –* Mortalities are collected daily as ice conditions allow.
- *Water monitoring –*Water quality monitoring is completed monthly according to our NPDES guidelines. Flows are checked weekly. Dissolved oxygen and total gas pressure levels are checked as needed.
- *Fish movement/facility configuration -*Fish are placed into their final rearing raceway by the MATS trailer.
- *Marking and tagging (PIT) -* PSMFC tagging crews PIT tag fish in September. PIT tags are provided by LSRCP and the Comparative Survival Study (CSS). The contribution of in-river tags from CSS is expected to continue into the future. A background and summary of the CSS study (10 year retrospective report) can be found at http://www.fpc.org/documents/CSS/FINAL. Hatchery staff scan all fish mortalities from tagged raceways and sweeps raceways with a magnet post release to recover any shed PIT tags.
- *Quality monitoring (counts, growth, length, marks quality, tag retention) -* Standard protocol is to sample count at twice monthly intervals for growth monitoring during their rearing cycle, and approximately one week before release. Length frequencies and condition factors will be collected from each release group prior to release. A fin clip quality check and CWT retention check will be completed before release.

2.6.7. Fish health

- *Service provider -* Eagle Fish Health Lab, Idaho Fish and Game.
- *Sampling protocols (what is sampled, sampling schedule) –*
    - Adults: All brood females are sampled for *RS* by ELISA technology. Eggs from females with optical densities of 0.25 and above are culled from production, except when adult return fails to provide adequate number of eggs for full hatchery production. Ninety brood Chinook salmon are examined for viral replicating agents (by ovarian fluid sample or kidney/spleen sample taken for viral assay). Head wedges from 20 fish are collected to monitor *Myxobolus cerebralis* prevalence. Pre-spawning mortality of adult spring Chinook salmon will be categorized by suspected cause.
    - Juveniles: Chinook salmon reared at this facility are inspected by EFHL personnel on a quarterly basis for *RS*, viral replicating agents, parasites, and bacterial pathogens. Diagnostic services will be provided upon request. A preliberation sample consisting of 60 randomly collected fish is examined for *RS, Myxobolus cerebralis*, and viral replicating agents. Goede's organosomatic index is also performed on these fish. This sample is taken within 30 to 45 days of release.
- *Vaccination methods -* None.
- *Treatment methods -* Adults are treated with formalin three to seven days per week depending on river water temperatures and fish health. To reduce prespawning mortality due to *Ichthyophthirius multifilis,* broodstock holding water will be treated with 167 mg/l formalin for up to 7 days per week. Once water temperatures exceed 65ºF, an extended formalin treatment of 40 mg/l for 6 hours will be implemented if *I. multifilis* is detected (under veterinary extra-label prescription).

2.6.8. Fish release/transportation

- *Truck specifications* -Neil Ring Trucking is contracted through the USFWS to transport and release the Yankee Fork release group and the SFH integrated broodstock release group.
- *Hauling/Release schedule* – See YFCSS section for details on Yankee Fork smolt releases. Integrated broodstock smolts will be transported and released in March or April using contract drivers.
- *Hauling/Release guidelines* – For releases into the Salmon River at the weir, the hatchery mitigation smolts are flushed into the connected raceway tailrace then crowded from the tailrace to the Salmon River via a buried 24 inch pipeline. See YFCSS section for details on Yankee Fork smolt releases. Smolts from the integrated broodstock program will be loaded with a fish pump into transport tanker truck and transported according to IHOT guidelines. Trucks will release smolts into a pipeline with outflow positioned in the Salmon River at the Highway 75 bridge just upstream of the mouth of Alturas Lake Creek.

2.6.9. Communication

- *Written reports (e.g., Monthly summaries, annual reports)* - Monthly hatchery narrative reports are available to all requesting to be included on the distribution list. Summary run report, Annual Operation and Maintenance report and final Brood Year report are available after completion and upon request.
- *FINS and IDFG release databases* - FINS trapping and spawning data is entered daily. A weekly summary is provided to interested parties via email. Weekly adult trapping information is available on the IDFG website.
- *Meetings (e.g., AOP, Anad, HET, etc.)*
- *Direct consultation* - Final plans are determined when fish run projection is clear. Discussion with IDFG, SBT, NPT and LSRCP is ongoing. Planning coordination occurs with NPT for cryopreservation program.

2.6.10. Adult outplants (if applicable)

- *Trigger for outplanting* - . For adult returns in excess of broodstock needs, outplants may occur in the Yankee Fork Salmon River.
- *Purpose* –To supplement the natural run.
- *Outplant protocol (sex ratio, timing, marking, sampling)* – Tribal staff will operculum punch, record length, sex, and marks, and collect tissue samples from all adult hatchery-origin Chinook salmon outplanted into the Yankee Fork. Outplanted adults are transported using a 20 ton truck with two 900 gallon tanks with oxygen, diffuser, and circulating pump. The tank is filled with water acquired at the SFH. Normal hauling guidelines are followed for adult fish, which is approximately one pound of fish per gallon of water.

2.7. East Fork Salmon River Satellite Facility (EF Trap)

2.7.1. Trap/Weir operation

- *Dates operated* - NA.
- *Trap configuration* -NA
- *Trapping protocol (frequency, movement of fish)* -NA

2.7.2. Adult handling

- *Measurements (marks, tags, sex, etc.)* - NA
- *Tissue sampling protocol*- NA
- *Dispositions (holding, releases) and adult marking (if applicable)* - NA
- *Surplus distribution* –NA
- *Carcass dispositions* –NA

2.7.3. Communication

- *Written reports(e.g., Monthly summaries, annual reports)* -

- *FINS and IDFG release databases -*
- *Meetings (e.g., AOP, Anad, HET, etc.)-* Chinook Salmon Captive Propagation Technical Oversight Committee (CSCPTOC) meets quarterly providing program updates to participating agencies.
- *Direct consultation -*

2.8. Yankee Fork Weir

2.8.1. Trap/Weir operation

- *Dates operated -* Operation of a temporary picket weir, near Pole Flat campground, occurs from mid to late June when flow drops to a level for safe installation through mid-September, annually.
- *Trap configuration -* A portable picket weir is installed on the Yankee Fork Salmon River annually. The weir is located just below Pole Flat Campground (approximately 3.5 miles upstream of confluence) to trap returning natural-origin and hatchery-origin adults.
- *Trapping protocol (frequency, movement of fish) -* Trap boxes will be checked every day by trap tenders.

2.8.2. Adult handling

- *Measurements (marks, tags, sex, etc.) -* All fish are measured for length and right operculum punched at the lower weir for tissue (DNA) and mark-recapture analysis to estimate total adult Chinook salmon escapement above the weir.
- *Tissue sampling protocol-* All fish are right operculum punched at the weir for tissue (DNA). Tissue samples will be collected and placed in 95% ethanol or on Whatman paper.
- *Dispositions (holding, releases) and adult marking (if applicable) -* Broodstock collected for the integrated program will be a combination of returning-adult progeny of the segregated program and natural origin adults.
- *Surplus distribution –*Currently, there are no surplus returning adults to Yankee Fork.
- *Carcass dispositions -* Mortalities are placed in the mainstem Yankee Fork to replenish depleted marine-derived nutrients in the system.
- *Ancillary species (if applicable) -*

2.8.3. Spawning/Egg take

- *Calculation of broodstock need (fecundity, eye-up, eye-to-smolt) –* TBD
- *Spawning protocol (schedule, method, M/F ratio)-* TBD

2.8.4. Egg incubation/Egg and fry shipping

- *Egg incubation method (egg distribution, treatments, picking) –* See SFH section for details.
- *Egg transfers -*See SFH section for details.
- *Surplus egg distribution (if applicable) -* Surplus eggs will be outplanted in Yankee Fork.

2.8.5. Early Rearing

- *Environmental protocols (flow indices, density indices) -* See SFH section for details.
- *Feeding protocol -* See SFH section for details.
- *Marking and tagging (AD, CWT; date range, size at application)-* TBD
- *Fish movement/facility configuration -* See SFH section for details.

2.8.6. Final rearing

- *Target environmental protocols (flow indices, density indices) -* See SFH section for details.
- *Feeding protocol –* See SFH section for details.
- *Mortality counting –* See SFH section for details.
- *Water monitoring –* See SFH section for details.
- *Fish movement/facility configuration -* See SFH section for details.
- *Marking and tagging -* TBD

- *Quality monitoring (counts, growth, length, marks quality, tag retention) -* See SFH section for details.

2.8.7. Fish health

- *Service provider -* See SFH section for details.
- *Sampling protocols (what is sampled, sampling schedule) –* See SFH section for details.
- *Vaccination methods -* See SFH section for details.
- *Treatment methods* - See SFH section for details.

2.8.8. Fish release/transportation

- *Truck specifications -*
- *Hauling/Release schedule -* Yankee Fork smolt release and transportation is currently being determined and will be finalized in a Memorandum of Agreement between the SBT, IDFG, and LSRCP. Yankee Fork smolts will be transported and released in April using contract drivers. Smolt releases in the Yankee Fork will be representative of adults from across the run.
- *Hauling/Release guidelines -* Smolts destined for the SBT program in the Yankee Fork Salmon River will be loaded with a fish pump into transport tanker truck transported according to IHOT guidelines. Trucks will release smolts into a pipeline with outflow positioned over the YFSR near the mouth of Jordan Creek (direct stream) and Pond Series 1 (acclimation).

2.8.9. Communication

- *Written reports (e.g., Monthly summaries, annual reports) -* Annual reports are completed and published on LSRCP website.
- *FINS and IDFG release databases -*Adult trapping data uploaded to FINS weekly
- *Meetings (e.g., AOP, Anad, HET, etc.)*
- *Direct consultation -* The Tribes will coordinate with IDFG and SFH personnel as necessary.

2.8.10. Adult outplants (if applicable)

- *Trigger for outplanting –* Currently, there are no surplus returning adults to Yankee Fork, so only fish trapped at SFH weir are outplanted to Yankee Fork Salmon River (see SFH Adult Outplant section for details).
- *Purpose –* Currently, there are no surplus returning adults to Yankee Fork, so only fish trapped at SFH weir are outplanted to Yankee Fork Salmon River (see SFH Adult Outplant section for details).
- *Outplant protocol (sex ratio, timing, marking, sampling) –* Currently, there are no surplus returning adults to Yankee Fork, so only fish trapped at SFH weir are outplanted to Yankee Fork Salmon River (see SFH Adult Outplant section for details).

2.9. Shoshone Bannock Tribal Egg Box Program

2.9.1. Egg incubation/Egg and fry shipping

- *Egg source and transfers –*
- *Curtis/Cabin Creek -* Eyed-eggs used in the eggbox program at Curtis/Cabin Creek are progeny of Chinook salmon trapped at the SFSR Trap, operated by McCall Fish Hatchery. Egg incubation procedures prior to transfer to the SBT (i.e. before the eyed stage) are described in the SFSR Trap and McFH sections.
- *Panther Creek -* Eyed-eggs used in the Panther Creek eggbox program are progeny of Chinook salmon trapped at Pahsimeroi Fish Hatchery. Prior to their transfer to the SBT, eggs are incubated at either Sawtooth or Pahsimeroi fish hatcheries. As such, incubation procedures prior to the eyed-stage are as outlined in the Pahsimeroi and Sawtooth hatchery sections.
- *Physical description of eggboxes* – In-stream eggboxes are constructed from 10 gallon Rubbermaid storage containers (23.9" L x 15.9" W x 8.7" H). Each side of the container (6

total) is modified to allow water to filtrate through the incubator, i.e. by cutting out sections and replacing them with 1/8" Vexar screen mesh. A section of the top of the incubator is also modified and replaced with 1/4" Vexar screen mesh, which will allow swim-up fry to volitionally exit the eggbox. Substrate (Amiracle Bio balls) is added to fill each box to within 2 inches of the top to provide interstitial space for developing embryos and alevin. Eggs are poured directly on top of the Bio balls. An eggbox can typically accommodate four females' worth of eggs, to a maximum of ~20,000 eggs.

- *Eggbox protocol* - The system is designed to incubate eyed-eggs, rear alevins, and volitionally release swim-up fry. Upon hatching, alevins develop in the interstitial spaces provided by the bio-saddles. At Curtis/Cabin Creek, eyed-eggs are typically outplanted on one to three occasions. Due to the larger quantity of eggs outplanted at Panther Creek, and the desire to supplement the population with brood collected throughout the spawning migration, boxes are outplanted throughout the month of October and into early November. Once a box is loaded with eggs, it is placed in the stream and anchored to the streambed via tie wire and rebar.
- *Monitoring and enumerating success* - Eggboxes will be monitored prior to hatch and/or emergence on a monthly basis to assess the condition of the boxes and monitor hatch success and timing. When fry emigration is complete, dead eggs and fry remaining in the box will be enumerated to determine hatch success. The SBT is also implementing parentage-based tagging efforts to monitor production deriving from the eggbox program at Panther Creek. In South Fork, SBT will estimate Chinook density in treatment streams (Curtis/Cabin) relative to a control stream (upper South Fork).

2.9.2. Communication

- *Written reports (e.g., Monthly summaries, annual reports)* - Results and conclusions from the egg box program will be presented in an annual report to the appropriate funding agency.
- *FINS and IDFG release databases* - Egg transfers and release locations will be updated in FINS
- *Meetings (e.g., AOP, Anad, HET, etc.)*
- *Direct consultation* - McCall, Sawtooth, and Pahsimeroi Fish Hatchery and the Shoshone-Bannock Tribes will coordinate to determine a schedule to spawn, obtain, and transfer eyed-eggs.

3. Fall Chinook Salmon

- *Definition of species* - Fall Chinook Salmon *Oncorhynchus tshawytscha* are native to the Columbia River drainage and spawn in freshwater during the fall months. Idaho's fall Chinook enter the fresh water system the same year they spawn, usually beginning in the late summer each year. Spawning begins in October and continues into November.
- *Rearing locations* - Fall hatchery Chinook salmon released into the Salmon River have in the past been reared primarily at two hatcheries: Oxbow Fish Hatchery (OFH), and Irrigon Fish Hatchery (IFH). Due to changing programs and shifted priorities, OFH sub-yearling program has been transferred to the Irrigon Fish Hatchery (see Lyons Ferry AOP for details).
- *Broodstock collection and spawning locations* - Broodstock is collected at Lower Granite Dam and transported to Lyons Ferry Hatchery for spawning (see Lyons Ferry Fish Hatchery AOP for details).
- *Juvenile releases* – Sub-yearlings will be released into the Salmon River at Hammer Creek boat launch.
- *Production Goals (lifestage, fpp)* - The Idaho Power Company's (IPC) mitigation goal is to release 1,000,000 Fall Chinook salmon sub-yearlings annually into the Salmon River.
- *Adult mitigation goal (if applicable)* - NA

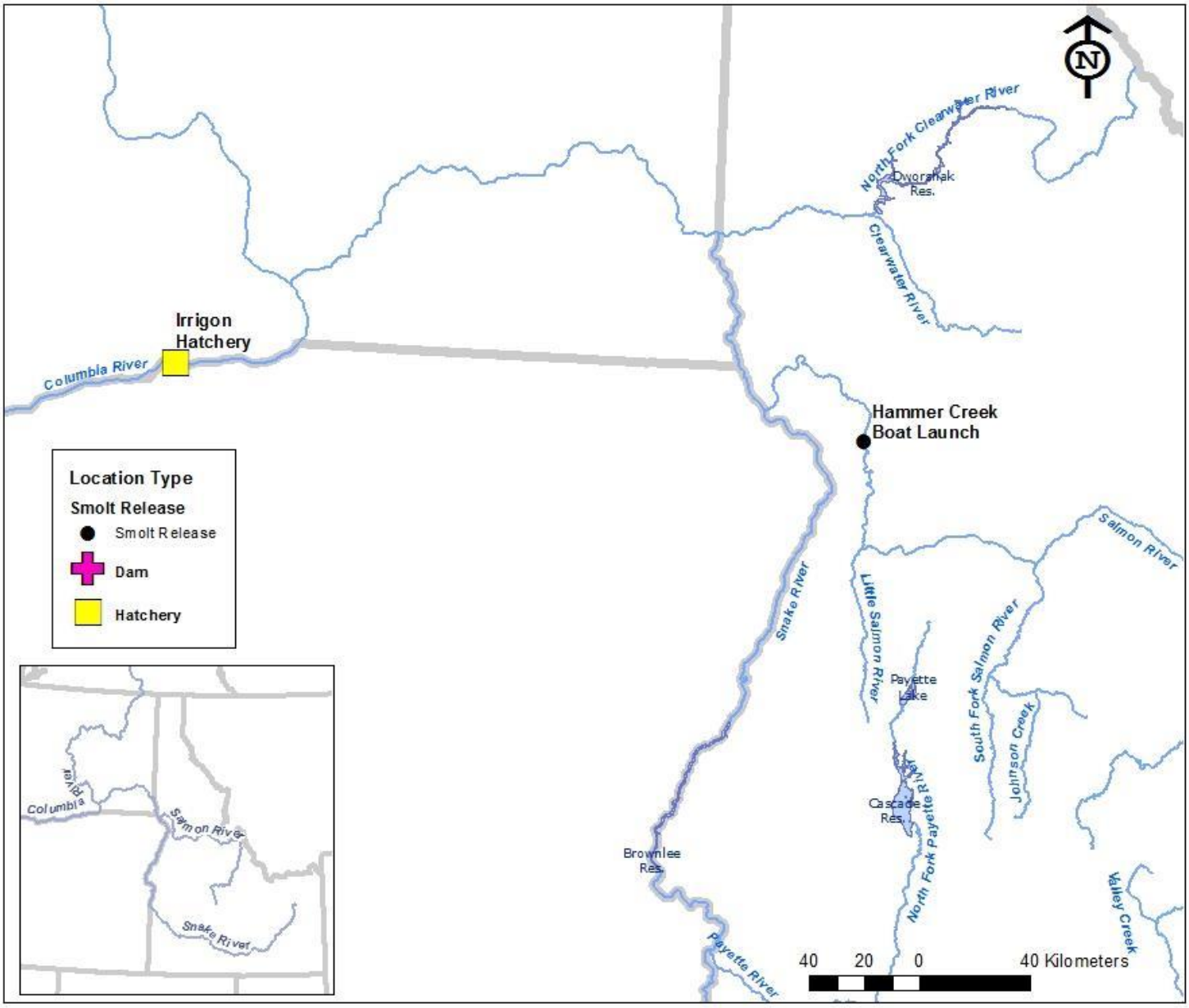

Figure 3.1. Fall Chinook Salmon facilities and smolt release locations.

4. Sockeye Salmon

- *Definition of species* - The Snake River Sockeye Captive Broodstock Program was founded in 1991 by IDFG and NOAA Fisheries to prevent extinction of the species. The program incorporates the use of hatchery facilities, captive broodstock technology, genetic support, and a comprehensive monitoring and evaluation plan to maintain the genetic resource and to continue rebuilding the number of Sockeye in the natural environment.
- *Rearing locations* - Sockeye salmon are currently reared at three facilities: Springfield Fish Hatchery (SpFH) rears juveniles to the full term smolt stage for release in late April and early May. SpFH was completed in the fall of 2013 and Sockeye salmon production began in December 2013.Eagle Fish Hatchery (EFH) and Burley Creek Fish Hatchery (BCFH) (with BCFH smolts reared to adult on sea water at Manchester Research Station (MRS)) rear Sockeye to full term adults for captive broodstock needs and releases.
- *Broodstock collection and spawning locations* - Broodstock collection and spawning activities for the Sockeye salmon program in the Salmon River are conducted at the following locations: Redfish Lake Creek Trap (RFLC Trap) and SFH Trap collect anadromous Sockeye for broodstock. All spawning activities occur at EFH and BCFH.
- *Calculation of Broodstock need* - Appendix 7.9 shows the brood calculator used to determine brood need to reach production goal for the program releases. The number of eggs collected is based on 5-yr running historical average of adult survival, eye-up percentage, disease rates and smolt survival rates to meet smolt release targets. Suppose the production goal is to trap and spawn enough adults to produce (x) number of smolts for release. Applying a production cushion (c) and eyed egg-to-smolt survival (ess) to total smolt goal, gives the eyed eggs needed (e=(x/(1-c))/(ess)). After accounting for green-to-eyed egg and culling survival (ges and cs, respectively), the green egg goal before culling can be determined (g=e/(ges)/(cs)). Using an average fecundity of green eggs per female (fec) gives the number females needed (F=g/fec). Sometimes the F:M ratio is not 50%:50% in the collected broodstock. Historical average % of females in the broodstock (fb) can be used to determine the number of Males that will be collected while reaching the required number of Females (M=(F/fb) – F). If the F:M ratio in collected broodstock is 50%:50%, then number of Males will equal the number of Females. The total number of fish to spawn is the sum of Males and Females (TotSp=F+M). Total fish needed when accounting for % pond mortality (pm) can be calculated (TotPM=TotSp/(1-pm)).
- *Smolt/Adult releases* – In the 2008 FCRPS Biological Opinion, NOAA Fisheries established a juvenile Sockeye production target for this hatchery program of up to 1 million smolts. Adult release goals have been set at 250 Sockeye Salmon adults released to Redfish Lake. This number can be a combination of anadromous returning Sockeye and captive reared Sockeye from EFH and BCFH. Adult Sockeye can also be released to Pettit Lake, but currently there is no release target.

4.1. Overview of facilities

4.1.1. Eagle Fish Hatchery (EFH)

- *Description and location* – EFH is operated by IDFG and funded through Bonneville Power Administration. It is located in Ada County, Idaho near the town of Eagle; latitude 43° 40' 40" N and longitude 116° 24' 11" W.
- *Owner and operator* – EFH is operated by IDFG and is funded by Bonneville Power Administration (BPA).
- *Programs at facility* – EFH is the spawning and incubating facility of anadromous and EFH captive adults for the smolt and captive-reared adult Sockeye programs (anadromous broodstock trapped at RFLC and SFH Trap). EFH (1) rears Sockeye Salmon from the eyed egg stage through maturation in captivity, (2) traps, transports, holds and releases anadromous

Sockeye Salmon, (3) spawns captive broodstock and anadromous Sockeye Salmon to provide eggs to smolt production programs and for replacement captive broodstock.

- *Stocks reared and release locations* - Smolt rearing: EFH spawns anadromous Sockeye collected at RFLC and SFH Traps and EFH captive broodstock (Snake R. Sockeye stock). Resulting eggs are incubated to the eyed stage for the smolt program. Starting with BY15, all eyed eggs for smolt production are transferred to SpFH for rearing to smolts and release into Redfish Lake Creek. Adults rearing: Anadromous broodstock collected at RFLC and SFH Trap and EFH captive broodstock are used to produce captive Sockeye adults (Snake R. Sockeye stock). Eyed eggs are reared at EFH and BCFH for adult captive broodstock and release. Sockeye Salmon adults (anadromous and captive reared) above what is needed for production of eggs (for smolt and captive broodstock programs) will be released to Salmon Basin lakes (Redfish Lake and Pettit Lake).
- *Production Goals (smolts/adults, fpp)* - The current broodstock goal is to produce 800 to 1,000 captive adults to spawn annually. Anadromous returns will be incorporated into the captive broodstock spawning designs. Smolt goals: In combination with NOAA Fisheries Burley Creek Hatchery, the EFH Sockeye Salmon Program will provide 1,250,000 eyed eggs to SpFH for smolt production. Starting with BY15, all smolt production from eyed eggs will be transferred to SpFH. Production goals may be adjusted annually based on recommendations provided by the Stanley Basin Sockeye Technical Oversight Committee (SBSTOC) to agency policy staff. Adult goals: Eyed eggs are sourced from EFH spawning operations for replacement captive broodstock at EFH and BCFH (1,500 eyed eggs for each program). Sockeye Salmon adults (anadromous and captive reared) above what is needed for production of eggs (for smolt and captive broodstock programs) will be released to Salmon Basin lakes.
- *Adult mitigation goal (if applicable)* - Adult release goals have been set at 250 Sockeye Salmon adults released to Redfish Lake. This number can be a combination of anadromous returning Sockeye and captive reared sockeye from EFH and BCFH. Adult Sockeye also can be released to Pettit Lake, but currently there is no release target.
- *Programs at facility* – EFH is the spawning and incubating facility of anadromous and EFH captive adults for the smolt and captive-reared adult Sockeye programs (anadromous broodstock trapped at RFLC and SFH Trap). Eggs for smolt production are transferred to SpFH at the eyed stage of development. Approximately 1,500 eyed eggs are selected for replacement captive broodstock at EFH and BCFH. Captive Broodstock eggs are hatched and reared through maturity at EFH.
- *Facility or stock changes (if applicable)* - NA

4.1.2. Redfish Lake Creek Trap (RFLC Trap) and Sawtooth Fish Hatchery Trap (SFH Trap)

- *Description and location* – Redfish Lake Creek trap is located approximately 1.4 km below the outlet of Redfish Lake. It is a temporary picket weir across Redfish Lake Creek directing fish into a V-trap and holding area. The original weir and trap has been replaced with a similarly designed weir and trap. The new trap site will include a temporary holding area capable of holding approximately 400 adults. Sawtooth FH trap is part of a weir across the Salmon River at Sawtooth FH, which directs fish into a fish ladder and trap box.
- *Owner and operator* – RFLC Trap is operated by IDFG and is funded through the BPA. The RFLC trap is a satellite weir of SFH. SFH Trap is operated by IDFG with personnel from the Sockeye program staff assisting with processing of the trap.
- *Programs at facility (stage, broodstocks)* – RFLC Trap: RFLC Trap is used to collect broodstock for the EFH Sockeye program. A new weir and trap will be completed in 2018, the trap holding area is designed to hold up to 400 adults. Trapped Sockeye will continue to

be transferred to Eagle FH or released upstream on a daily basis throughout the trapping season SFH Trap: SFH Trap is used to collect broodstock for the EFH Sockeye program. All Sockeye are loaded directly onto a transport vehicle and transferred to EFH or RFLC Trap site for processing. Sockeye processed at the RFLC Trap site will be released directly to Redfish Lake at the boat ramp.

- *Stocks reared and release locations* - See SpFH, EFH and BCFH for rearing and release information.
- *Production Goals (smolts/adults, fpp)* – See SpFH, EFH and BCFH for production goals.
- *Adult mitigation goal (if applicable)* – See SpFH, EFH and BCFH for mitigation goals.
- *Facility or stock changes (if applicable)* - NA

4.1.3. Burley Creek Fish Hatchery (BCFH) and Manchester Research Station (MRS)

- *Description and location* –The NOAA Fisheries Program operates two rearing stations: (1) BCFH is in Kitsap County, Washington near the City of Port Orchard; latitude 47° 26’ 36” N and longitude 122° 37’ 52” W and (2) MRS is in Kitsap County, Washington near the City of Port Orchard; latitude 47° 34’ 14” N and longitude 122° 33’ 11” W.
- *Owner and operator* – BCFH is operated by NOAA Fisheries and funded by BPA.
- *Programs at facility* – BCFH maintains a duplicate (safety net) Sockeye captive broodstock program to the EFH program. BCFH (1) rears Sockeye from eyed eggs to adults for the Captive Broodstock Program or to release for volitional spawning (eyed-eggs received from EFH), (2) maintains and spawns captive broodstock Sockeye, (3) incubates eggs from captive fish to the eyed-stage for transfer to smolt production programs. Captive broodstock smolt-to-adult rearing of BCFH smolts is conducted at the MRS facility on sea water.
- *Stocks reared and release locations* - Smolt rearing: BCFH spawns BCFH captive adults for the smolt program (Snake R. Sockeye stock). Resulting eggs are incubated to the eyed stage for the smolt program. Starting with BY15, all eyed eggs for smolt production are transferred to SpFH for rearing to smolts and release into Redfish Lake Creek. Adult rearing: Anadromous broodstock collected at RFLC and SFH Trap and EFH captive broodstock are used to produce eyed eggs for the captive Sockeye adults (Snake R. Sockeye stock). Eyed eggs are received from EFH for adult captive broodstock production at BCFH and adult release. Captive reared adults above what is needed for production of eggs will be released to Salmon Basin lakes (Redfish Lake and Pettit Lake).
- *Production Goals (smolts, fpp)* –The current broodstock goal is to produce 800 to 1,000 captive adults to spawn annually. Smolt goals: In combination with EFH, the BCFH Sockeye Salmon Program will provide 1,250,000 eyed eggs to SpFH for smolt production. Starting with BY15, all smolt production from eyed eggs will be transferred to SpFH. Production goals may be adjusted annually based on recommendations provided by the Stanley Basin Sockeye Technical Oversight Committee (SBSTOC) to agency policy staff. Adult goals: Eyed eggs are sourced from EFH spawning operations for replacement captive broodstock at EFH and BCFH (1,500 eyed eggs for each program). Sockeye Salmon adults (anadromous and captive reared) above what is needed for production of eggs (for smolt and captive broodstock programs) will be released to Salmon Basin lakes.
- *Adult mitigation goal (if applicable)* - Adult release goals have been set a 250 Sockeye Salmon adults released to Redfish Lake. This number can be a combination of anadromous returning Sockeye and captive reared Sockeye from EFH and BCFH. Adult Sockeye can also be released to Pettit Lake, but currently there is no release target.
- *Facility or stock changes (if applicable)* - NA

4.1.4. Springfield Fish Hatchery (SpFH)

- *Description and location –* SpFH was completed in the fall of 2013. SpFH is located in Bingham County near the town of Springfield, Idaho; latitude 43° 03’ 36.46” N and longitude 112° 39’ 29.69” W.
- *Owner and operator* – SpFH is operated by IDFG and is funded through the BPA as part of the Idaho Fish Accord Agreement.
- *Programs at facility* – SpFH rears smolts from eyed-eggs received from EFH and BCFH for release in Redfish lake Creek. SpFH was completed in the fall of 2013 and is the primary Sockeye smolt production facility, receiving eyed-eggs from EFH and BCFH.
- *Stocks reared and release locations-* SpFH rears Sockeye smolts from eyed-eggs received from EFH and BCFH (anadromous and captive broodstock; Snake R. Sockeye stock) for release in Redfish Lake Creek.
- *Production Goals (smolts, fpp)* – SpFH’s Sockeye smolt production goals are: 880,000 smolts at 10 fpp for BY16; 600,000 smolts at 10 fpp for BY17; and 1,000,000 smolts at 10 fpp for BY18.
- *Adult mitigation goal (if applicable)* - NA
- *Facility or stock changes (if applicable) –* NA

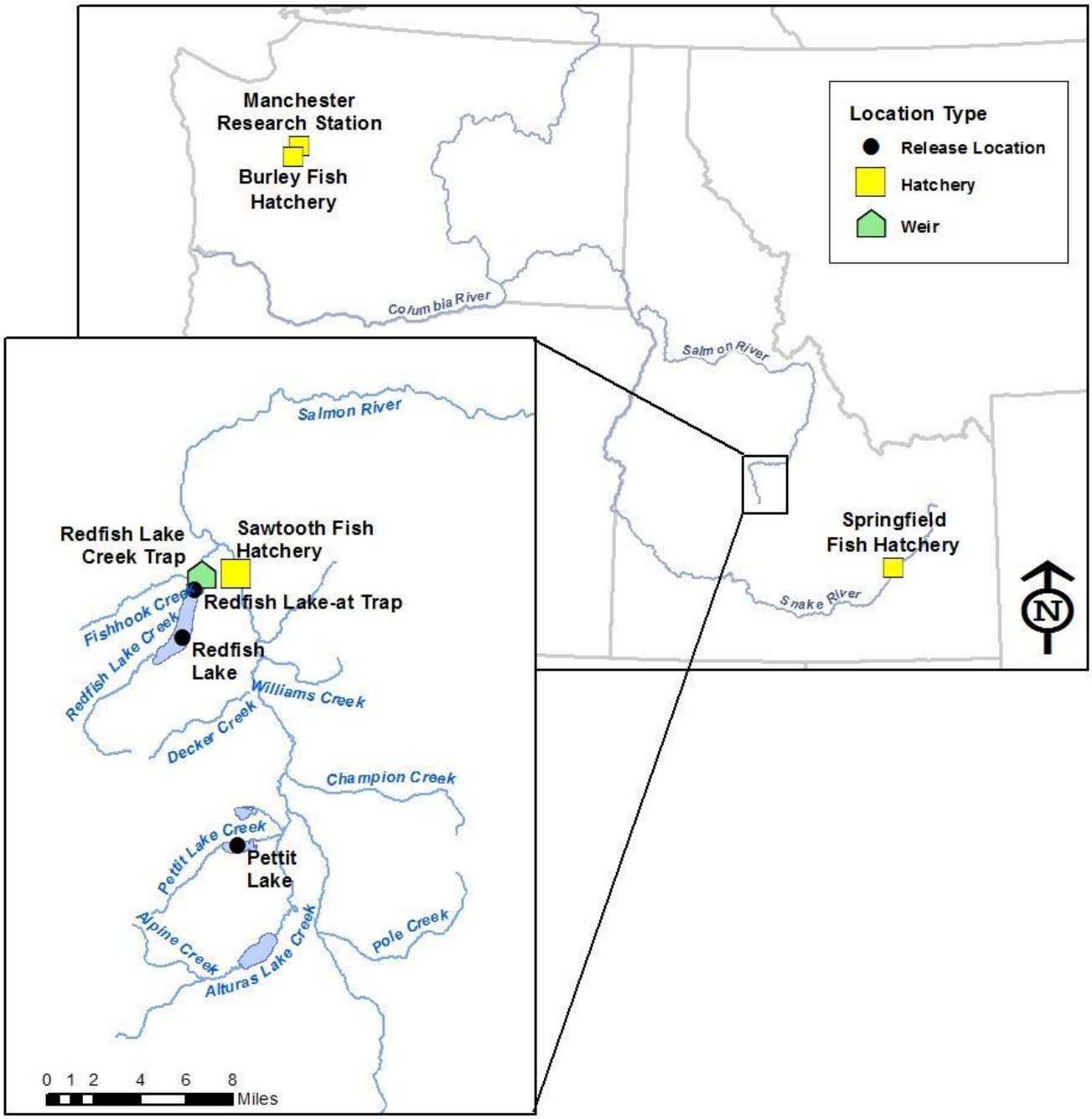

Figure 4.1. Sockeye salmon traps, hatchery facilities, and smolt and adult release locations.

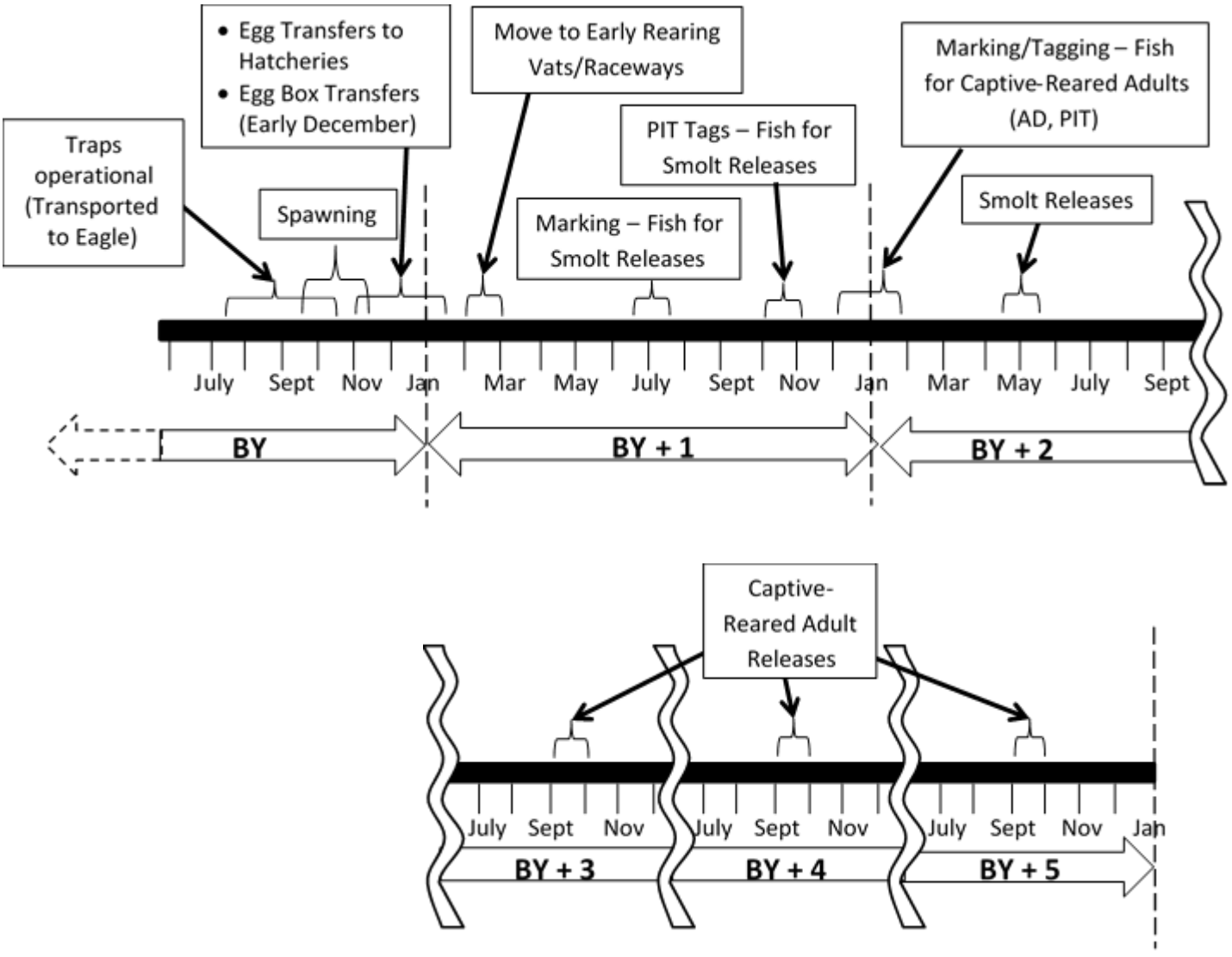

Figure 4.2. Timeline for Sockeye Salmon production. Date ranges are shown to include all facilities' operations.

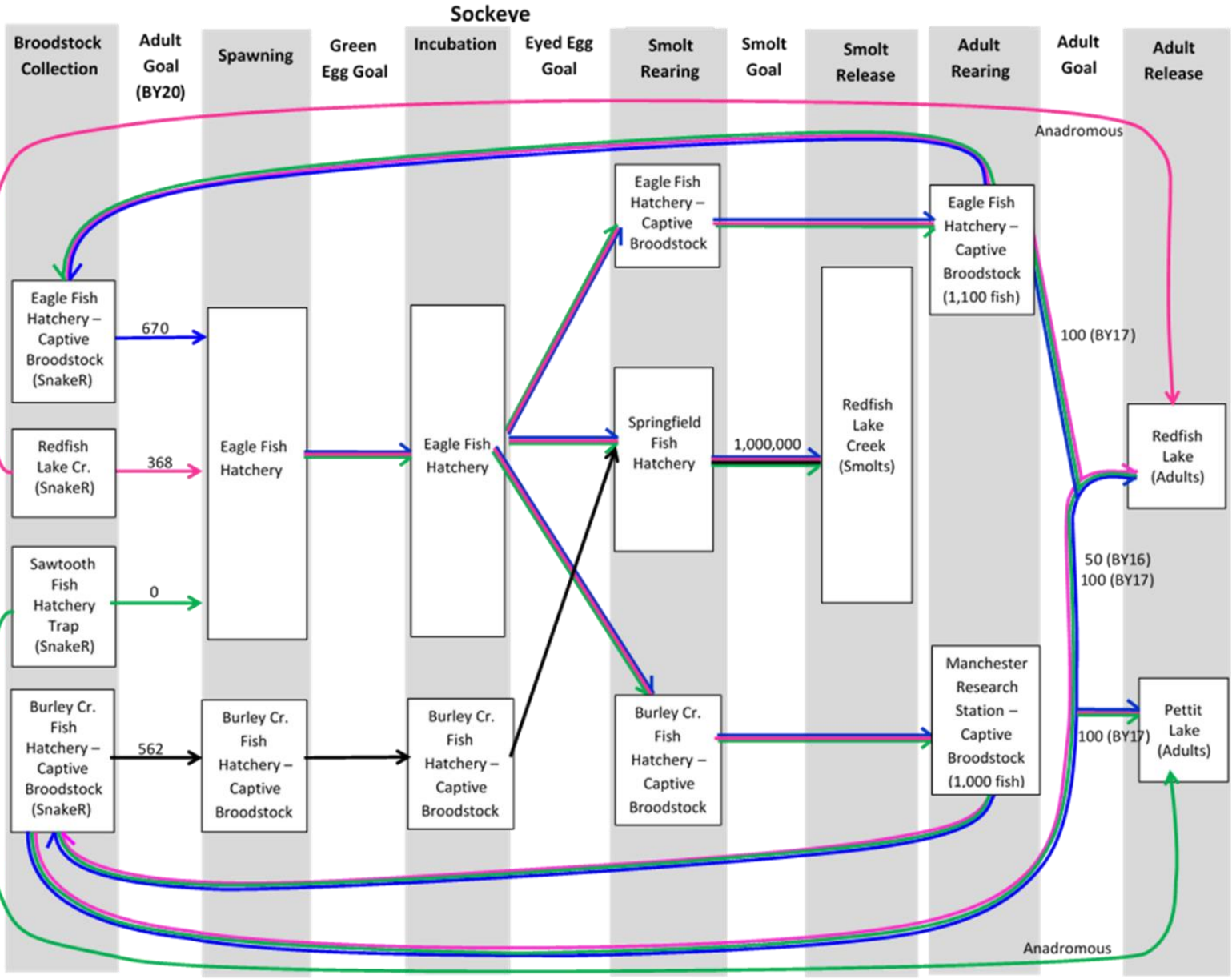

Figure 4.3. Fish and Egg movements for Sockeye. Numbers reflect 2020 releases.

4.2. Redfish Lake Creek Trap (RFLC Trap), Sawtooth Fish Hatchery Trap (SFH Trap)

4.2.1. Trap/Weir operation

- *Dates operated* – RFLC: Fish weirs on Salmon River at and Redfish Lake Creek are monitored daily from mid-July through mid-October. SFH: The trap is operated beginning in June for Chinook Salmon through mid-September for Sockeye.
- *Trap configuration* – RFLC weir/trap is a temporary picket weir with a V-trap leading to an upstream holding area. Beginning in 2018, the old Redfish Lake Creek weir and trap was replaced with a new weir and trap. The new weir and trap operates similarly to the old weir/trap with the exception of a larger holding area for trapped adults. The trap holding area is designed to hold up to 400 adults. SFH weir/trap is a weir installed across the Salmon River directing fish into a fish ladder and trap.
- *Trapping protocol (frequency, movement of fish)* – RFLC weir/trap is checked daily (multiple times if needed) during the anadromous run. Trapped sockeye are transported back to Eagle FH or released to Redfish Lake Creek above the weir. Sockeye are transported daily to EFH until broodstock needs are met. At this time Sockeye are directly released above the weir after trapping data has been collected. A subsample of Sockeye will continue to be transported to EFH to ensure the entire run is represented in the broodstock. EFH staff stationed at RFLC trap assist SFH personnel with working up fish from the SFH trap each morning. If Sockeye are collected at SFH they receive a lower caudal fin punch to identify them as trapped at SFH and placed on a transport truck. Trapped Sockeye are loaded directly onto a transport vehicle and transferred to Eagle FH or Redfish Lake Creek for release (after work-up).

4.2.2. Adult handling

- *Measurements (marks, tags, sex, etc.)* – Data collected at the trap before fish are released upstream includes: sex, length, exterior marks, check for PIT tags and CWT tags, scales taken, and injuries noted.
- *Tissue sampling protocol* – All released Sockeye will be genetically sampled for future Parental Based Tagging (PBT) analysis.
- *Dispositions (holding, releases) and adult marking (if applicable)* - Some returning adults will be incorporated into the spawning matrix at EFH. Anadromous Sockeye not transferred to EFH are released to Redfish Lake Creek (trapped at RFLC Trap). All adults released are monitored after release to determine spawning behavior information (spawn timing, spawning locations, number of redds developed, etc.). This information is collected using radio transmitters, visual observations and snorkeling over spawning areas.
- *Surplus distribution* – NA
- *Carcass dispositions* – All carcasses as a result of spawning or pre-spawn mortalities will be disposed of at the local rendering plant.
- *Ancillary species (if applicable)* – NA

4.2.3. Adult outplants (if applicable)

- *Trigger for outplanting* - After broodstock needs have been met, anadromous Sockeye Salmon can be direct released upstream of RFLC weir.
- *Purpose* - Adults are released to Redfish Lake to spawn naturally in the habitat.
- *Outplant protocol (sex ratio, timing, marking, sampling)* – All released adult Sockeye have been genetically sampled before release for PBT. Anadromous Sockeye returned to EFH that are not needed for broodstock, along with captive reared Sockeye not needed for broodstock are returned to Redfish Lake and released in mid-September.

4.3. Eagle Fish Hatchery (EFH), Burley Creek Fish Hatchery (BCFH), and Manchester Research Station (MRS)

4.3.1. Spawning/Egg take

- *Calculation of broodstock need (fecundity, eyeup, eye to smolt) –* See Section 4 ("Calculation of Broodstock Need") for details on broodstock calculation. The production goal is to trap and spawn enough adults to produce 1,000,000 smolts at SpFH.
- *Spawning protocol (schedule, method, M/F ratio)* - During final maturation the Age-3 captive broodstock Sockeye Salmon are ultrasounded to determine maturation status and sex. This information is provided to the Eagle Fish Genetics staff to be included with individual genetic analysis for this group. Real time genetic analysis is completed on anadromous Sockeye returned to EFH. This information is used to select broodstock based on genetic representation of the entire group. Males and females are represented equally during broodstock selection. Eggs from each female are divided into two equal subfamilies and fertilized with two different males (1 x 2 spawn matrix). Starting in 2014, males are randomly selected to cross with females. Every attempt is made to represent all males in the population equally. Biosecurity protocols are in place to maintain isolation between anadromous broodstock and captive broodstock at EFH. Eggs and milt are collected from both groups and spawn crosses are made between anadromous and captive broodstock, but the adult fish are kept isolated from each other on the facility.

4.3.2. Egg incubation/Egg and fry shipping

- *Egg incubation method (egg distribution, treatments, picking) -* Eggs will be incubated between 8 to 10 degrees Celsius until the eyed stage. Formalin treatments are administered three days per week during incubation. Eggs are shocked after reaching the eyed stage and dead eggs are counted and removed. Remaining live eggs are hand counted to determine survival to the eyed stage. All spawners (males and females) are sampled for pathogens. Current protocol is to cull eggs from females testing positive, with ELISA values in the high range (above optical density of .40) for Bacterial Kidney Disease. Eggs from females in the moderate range (O.D. values between 0.25 and 0.40) can be released as eyed eggs to Sawtooth Basin lakes. Only eggs from parents testing negative will be used in the replacement captive broodstock.
- *Egg transfers -* Currently eyed eggs are transferred to SpFH for smolt production and BCFH for replacement captive broodstock. Eyed egg transfers occur in November and December from EFH and BCFH.
- *Surplus egg distribution (if applicable) -* NA

4.3.3. Early Rearing – to Captive Adults

- *Environmental protocols (flow indices, density indices)* - Fish sample counts are conducted as needed to ensure that actual growth tracked with projected growth. In general, fish were handled as little as possible. Age-1 Sockeye salmon rearing densities are maintained at levels not exceeding 8.0 kg/m^3
- *Feeding protocol -*The Sockeye program currently uses commercial diets produced by Skretting (formerly Bio-Oregon, Inc) or EWOS® Canada LTD (EWOS). Based on previous experience and performance, Sockeye rearing facilities may use either feed manufacture for rearing Sockeye. Starter feeds are fed from swim-up through about five grams per fish. Rations are weighed daily and follow suggested feeding rates provided by the manufacturers. Fry are hand fed every ½ hour initially moving to every hour through around five grams per fish. After five grams per fish they are hand fed four times per day.
- *Marking and tagging (AD, CWT; date range, size at application)-*All captive reared adults will be PIT tagged and AD clipped.

- *Fish movement/facility configuration* - Feeding fry are ponded from isolation incubators to multiple (8 to 12) 24 gallon tanks, as fish grow groups are combined and moved to 80 gallon tanks.

4.3.4. Final Rearing –to Captive Adults

- *Target environmental protocols (flow indices, density indices)* - Fish sample counts were conducted as needed to ensure that actual growth tracked with projected growth. In general, fish were handled as little as possible. Sample counts are measured monthly to about Age-2 to monitor growth rates. Due to the size of the Sockeye at Age-2, Sockeye are handled as little as possible after this point to eliminate stress to the fish. Age-3 and age-4 rearing densities were maintained at levels not exceeding 14.0 kg/m^3.
- *Feeding protocol* – The Sockeye program currently uses commercial diets produced by Skretting (formerly Bio-Oregon, Inc) or EWOS® Canada LTD (EWOS). Based on previous experience and performance, Sockeye rearing facilities may use either feed manufacture for rearing Sockeye. Final rearing feeds are fed using 12-hour belt feeders to reduce disturbances around the groups. Maturing adults are taken off feed in June in preparation for spawning. Rations are weighed daily and follow suggested feeding rates provided by the manufacturers
- *Mortality counting* – Rearing tanks are monitored daily for mortalities. Mortalities are recorded on data sheets. If signs of disease are present, samples are collected for processing at EFHL.
- *Water monitoring* – Rearing water temperatures are monitored daily and maintained between 10 and 11 degrees Celsius. Dissolved Oxygen (D.O.) is checked every two weeks and flows are adjusted if needed to maintain D.O readings above 7ppm.
- *Fish movement/facility configuration* - Final rearing at EFH and BCFH occurs in tanks from 1,700 gallons to 9,000 gallons.
- *Marking and tagging (PIT)* - Adults are Ad-clipped and PIT tagged during early rearing. Additional external tags may be used during spawning for identification.
- *Quality monitoring (counts, growth, length, marks quality, tag retention)* - Monthly sample counts (lengths and weights) are collected through approximately Age-2. After Age-2, fish are handled as little as possible to reduce stress.

4.3.5. Fish health

- *Service provider* - Eagle Fish Health Lab processes samples collected at EFH and BCFH and reviews fish health results from NOAA Fisheries before issuing transport permits for the program. Upon detection of reportable pathogens, the APHIS-Veterinarian-in-Charge will be notified.
- *Sampling protocols (what is sampled, sampling schedule)* –
    - Adults: Anadromous adults returned to EFH to be incorporated into the spawning matrix are sampled for viral and bacterial pathogens. All captive brood female adults are sampled for *RS* using ELISA technology.
    - Juvenile: Due to the relatively low number of fish reared annually, pre-transfer fish health sampling does not occur prior to transporting adult Sockeye from Manchester back to Idaho. However, all fish that die in the program during the course of any rearing year are assayed for typical viral and bacterial pathogens.
- *Vaccination methods* - Beginning in 2019, anadromous Sockeye salmon transferred to Eagle FH will not be injected with a 20 mg/kg intra-peritoneal injection of erythromycin to control *Renibacterium salmoninarum* and will not be injected with 10 mg/kg IP injection of oxytetracycline to control *A. salmonicida*. To reduce prespawning mortality due to *Ichthyophthirius multifilis,* anadromous sockeye tanks will be treated with 167 mg/l formalin

(60 minute static bath) for up to three days per week. Sockeye captive broodstock at Eagle are reared on well water and do not receive vaccinations. BCFH vaccinates Sockeye smolts at the time they are transferred from fresh water to seawater rearing.

4.3.6. Fish release/transportation

- *Truck specifications -* A variety of trucks and transport tanks are used in the Sockeye program. Transport tanks for 250 gallons to 3,000 gallons are used. Loading densities for adults will not exceed 0.5 pounds/gallon. All tanks are equipped with supplemental oxygen and recirculating fresh-flos.
- *Hauling/Release schedule* - Current production goals are to release 250 adults (a combination of anadromous returns, EFH Captive Broodstock and BCFH Captive Broodstock) in September to Sawtooth Basin lakes.
- *Hauling/Release guidelines -* All adults released are monitored after release to determine spawning behavior information (spawn timing, spawning locations, number of redds developed, etc.). This information is collected using radio transmitters, visual observations and snorkeling over spawning areas.

4.3.7. Communication

- *Written reports (e.g., Monthly summaries, annual reports)* - EFH produces monthly updates provided to IDFG Fisheries Bureau. EFH and BCFH also provide annual reports internally and to BPA.
- *FINS and IDFG release databases* - EFH updates the FINS database daily during anadromous Sockeye trapping. The IDFG Plant1 database is updated after groups are released.
- *Meetings (e.g., AOP, Anad, HET, etc.)-* EFH and BCFH participate in the Stanley Basin Sockeye Technical Oversight Committee (SBSTOC) which meets quarterly providing program updates to participating agencies.
- *Direct consultation-* Cooperating management agencies in the basin conduct weekly teleconferences and internet data exchanges that include updates of PIT tag detections and radio tracking for Snake Basin Sockeye salmon.

4.3.8. Adult outplants (if applicable)

- *Trigger for outplanting -* The current goal for adult outplants is for a minimum of 250 adults released to Redfish Lake. This can be a combination of anadromous returning adults and captive reared adults from EFH and BCFH.
- *Purpose -* Providing adults to spawn naturally in the habitat.
- *Outplant protocol (sex ratio, timing, marking, sampling)* – Adult releases may occur from early August through mid-October. For captive reared releases, early to mid-September is targeted. All adults released will have been genetically sampled for use in parentage analysis.

4.4. Springfield Fish Hatchery (SpFH)

4.4.1. Egg incubation/Egg and fry shipping

- *Egg incubation method (egg distribution, treatments, picking) -* Eyed eggs are shipped to Springfield hatchery from November through December. CTU's are used to track egg development. Eyed eggs are shipped to Springfield Hatchery when they reach 351-507 CTU's. Eyed eggs will be placed in 100 ppm iodophor bath for 10 minutes upon arrival on station. Eggs will then be tempered to match stack temperature. Eggs are placed into vertical flow-through incubator trays, at approximately 3,300-5,000 eggs per tray, with 384 available trays.
- *Egg transfers -* Eyed eggs are received from Eagle Fish Hatchery and NOAA's Burley Creek facility.

- *Environmental protocols (flow indices, density indices)* - Sockeye will be reared using a flow index of 1.0, and a density index of 0.3. These are maximum values decided during the preliminary design phase of the facility.
- *Feeding protocol* -All fry will be fed by hand at Springfield. EWOS feed will be used during the entire production cycle at Springfield. At swim-up, fry will be fed every hour. Feeding frequency will be reduced as the fry continue to grow, with actual frequency based on observation of the fish and length uniformity that is needed for AD clipping activities. Growth rates will be manipulated so that fry do not exceed an average size of 5 grams/fish prior to May 31 to prevent precocialism.
- *Marking and tagging (AD, CWT; date range, size at application)* - All smolts will be AD clipped with a representative number receiving PIT tags to determine downstream survival and travel time through the hydrosystem. Adipose clipping will occur during the months of June/July at a fish size of approximately 100-120 fpp. Fish will be transferred from early rearing vats to the MATS marking unit via electric fish pump and immediately ejected to the receiving raceways upon clipping. PIT tagging will occur in late Fall.
- *Fish movement/facility configuration* - Early rearing will occur in indoor linear fiberglass rearing tanks. A total of 22 units are available for early rearing. Each rearing tank has a maximum useable volume of 53' length x 41" width x 31" depth. Fish will be transferred from early rearing vats to the MATS marking unit via electric fish pump, and immediately discharged to the receiving raceways upon clipping.

4.4.2. Final Rearing

- *Target environmental protocols (flow indices, density indices)* - Final rearing indices will mirror those of early rearing, with maximum flow and density indices at 1.0 and 0.3, respectively.
- *Feeding protocol –* Fingerling in outdoor raceways will be fed 1-3 times per day by hand. Frequency will be reduced as the fish continue to grow with actual frequency determined by observation of feed consumption and size uniformity. In order to minimize jacking rates and not exceed fish size at release goals, feed rations will be reduced to minimize growth rates during the winter months. Feed rations will be gradually restored to full levels in the spring to ensure that smolts are in top condition when they are released.
- *Mortality counting –*Mortality will be collected and removed daily. Mortality is recorded on a daily log maintained by hatchery personnel.
- *Water monitoring –*Dissolved Oxygen, TDG pressure, CO2, ph, and conductivity will be sampled bi-monthly.
- *Fish movement/facility configuration* -Secondary rearing will occur in outdoor concrete linear raceways. A total of 22 raceways are available for final rearing. Each rearing raceway has a maximum useable volume of 80' length x 8' width x 4' depth.
- *Marking and tagging (PIT)* - All smolts will be AD clipped during transfer to the raceways. A representative number will receive PIT tags to determine downstream survival and travel time through the hydrosystem. Approximately 50,000 Sockeye smolts will be PIT tagged prior to release. PIT tagged smolts will be part of the CSS evaluation and as such, 70% will be randomly assigned to the run at large sort by code category and 30% will be randomly assigned to the return to river sort by code category.
- *Quality monitoring (counts, growth, length, marks quality, tag retention)* - , Hatchery personnel will collect individual length/weights from a subsample of 200 fish per brood year. This sampling will be conducted on a monthly basis. A hatchery specific condition factor will be obtained from this data. Wet weights (fish per pound) will also be collected monthly. PIT tags will be recovered from pre-release mortality.

4.4.3. Fish health

- *Service provider* - Fish health inspection and diagnostic services are provided by IDFG's Eagle Fish Health Lab personnel. Upon detection of reportable pathogens, the APHIS-Veterinarian-in-Charge will be notified.
- *Sampling protocols (what is sampled, sampling schedule)* –
    - Juvenile: Fish health inspections are conducted quarterly. Necropsied fish are sampled for bacterial and viral replicating agents. Fish health inspections are available upon request. A 60 fish pre-liberation sample will be tested before release for viral and bacterial pathogens as well as NZMS. All pathology guidelines will be met before smolts are released.
- *Vaccination methods* - NA

4.4.4. Fish release/transportation

- *Truck specifications* -Smolt transportation tanker trucks will be used for smolt hauling at Springfield. Smolts will be released into Redfish Lake Creek.
- *Hauling/Release schedule* - Smolts will be released in the Salmon River Basin into RFLC from late April through early May. Smolts will be transferred to Sawtooth Fish Hatchery for a 2-3 week acclimation period before release into Redfish Lake Creek. Smolts will be released from the Spur Road, located approximately 200 yards below the Redfish Lake Creek weir.
- *Hauling/Release guidelines* -Smolts will be crowded to the tail screens. An Aqualife BP-60 electric fish pump and tower will be used to load the smolts into the tankers. A combination of chilled and ambient water will be used to match hauling temperatures with release site temperatures. Hauling densities shall not exceed 1 lb of fish per gallon of water.

4.4.5. Communication

- *Written reports(e.g., Monthly summaries, annual reports)* - SpFH produces monthly updates provided to IDFG Fisheries Bureau, the Eastern Idaho Hatchery Complex Manager, the Eagle Fish Health Lab, and key Sockeye research personnel. Annual BPA contract completion reports are reviewed internally, then uploaded to BPA's PISCES web based reporting system. The final copy is subsequently posted on BPA's web site.
- *FINS and IDFG release database*- The FINS incubation module will be populated pending completion of egg receipt information from EFH/BCFH facilities. Final release numbers will be entered into the IDFG stocking database upon the conclusion of stocking activities for a given brood year.
- *Meetings (e.g., AOP, Anad, HET, etc.)*- Stanley Basin Sockeye Technical Oversight Committee (SBSTOC) meets quarterly providing program updates to participating agencies. Other program specific deliverables include attendance and participation in AOP, APR, and anadromous meetings as scheduled.
- *Direct consultation*-Hatchery personnel communicate directly with the Eastern Idaho Hatchery Complex Manager. Information is then forwarded to IDFG Fisheries Bureau personnel, Eagle Fish Health Lab, and Eagle Hatchery personnel as appropriate for review. Action items are addressed with follow-up correspondence to include the Eastern Idaho Hatchery Complex Manager.

5. Pacific Lamprey

- *Definition of species* -
- *Trapping, Holding, and Release locations* – Adult trapping occurs at Bonneville, The Dalles, and John Day Dams. Fish are transported to Nez Perce Tribal Hatchery for holding. Adults are released in the South Fork Salmon River.

5.1. Overview of Program

- *Operator* – Pacific Lamprey program is operated by the Nez Perce Tribe.

- *Purpose* – The purpose of this stop gap effort by Nez Perce Tribe Fisheries is to avoid local extirpation in the Snake River Basin and maintain a population of ammocoetes that serve as a source of pheromone attractants drawing adults upstream to spawn in the abundant habitat in this region.
- *Goals* – The goal is to continue the presence of adult Lamprey in the Snake River Basin until upstream adult and downstream juvenile passage problems are identified and corrected so healthy and harvestable populations can be restored. The Nez Perce Tribe believes it is imperative to restore this important component of the ecosystem and retain cultural values.

5.1.1. Trap/Weir operation

- *Dates operated* – Trapping occurs at locations listed below from June through August.
- *Trap configuration* – NPT Fisheries began a new phase of operations by actively trapping adult lamprey at Bonneville, The Dalles, and John Day Dams.
- *Trapping protocol (frequency, movement of fish)* –

5.1.2. Adult handling

- *Measurements (marks, tags, sex, etc.)* –
- *Tissue sampling protocol* – Genetic samples are collected by NPT staff at the Nez Perce Tribal Hatchery for later analysis.
- *Dispositions (holding, releases) and adult marking (if applicable)* - Adult fish are immediately transported to Nez Perce Tribal Hatchery after being trapped. The adult Lamprey are held at the Nez Perce Tribal Hatchery in holding tanks specifically set up for Lamprey. They remain in those tanks until April/May when they are loaded onto fish transport vehicles for release/outplanting to selected streams.
- *Carcass dispositions* –

5.1.3. Fish health

- *Service provider* - USFWS Pacific Region Fish Health Program
- *Sampling protocols (what is sampled, sampling schedule)* –Moribund or fresh dead adults are examined when necessary.
    - Adults:
- *Vaccination methods*- All adult Lamprey are injected with oxytetracycline by NPT and fish health staff as available for furunculosis.

5.1.4. Adult outplants

- *Truck specifications* -
- *Hauling/Release schedule* – NPT plans to outplant adult Lamprey during April/May annually.
- *Hauling/Release guidelines*- Releases in the Salmon Sub-basin are planned for the South Fork Salmon River, Johnson Creek and the Secesh River. The number of release sites per stream will depend on the number of adult Lamprey available each year.

6. Contact list

Agency	Name	Location-Position	Phone	Email
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7. Appendices

7.1. Parental Based Tagging (PBT)

A novel approach for mass marking hatchery broodstock is parentage-based tagging. Parentage-based tagging (PBT) involves the annual genotyping of all broodstock at each hatchery, creating a parental genotype database. Progeny from any of these parents (either collected as juveniles or returning adults), if genotyped, could be assigned back to their parents, thus identifying the hatchery they originated from and exact brood year they were produced in.

The exceptional advantage PBT has over mechanical tagging technologies is increased sample size. By genotyping all parental broodstock, every juvenile is "tagged" thereby vastly increasing the chances of encountering a tagged fish. The key for this technology to work is the ability to sample all (100%) of the hatchery broodstock and the goal for each hatchery program is to achieve PBT tagging rates at or near 100%.

Eagle Fish Genetics Lab (EFGL) provides Whatman sheets for sample preservation and sampling equipment to the spawning facilities, but relies largely on existing hatchery or other program personnel to take fin tissue samples, record sex and record spawn/sample date. A detailed protocol for genetic sampling is available on the BPA protocol website (https://www.monitoringresources.org/Document/Method/Details/4087), but general procedures are provided below.

- Obtaining tissue samples (fin clips) from every adult hatchery steelhead and Chinook salmon that contributes to spawning in the Snake River basin (~6000 adult hatchery steelhead and ~10,500 adult hatchery Chinook salmon). This includes sampling re-use males each time they are used
- Ensuring that all samples come from fresh, "live" tissue and that each sample is properly preserved until DNA extraction and free of contamination.
- Ensuring that every sample is properly labeled and inventoried.
- Ensuring that data/information from every fish sampled is recorded and tied to a field/hatchery sample number (sample/spawn date, take #, hatchery, sex, length, cross information, etc.) and that field/hatchery sample number is tied to a unique genetic (Progeny) number.

A specific sampling protocol includes:

- Use forceps and scissors or a scalpel, remove a small amount of tissue:
  - fin tissue – about the size of your little finger nail (any fin will work, just make sure that it is free of fungus and that you are sampling "live" tissue
- Carefully wipe clean instruments with a Kimwipe or paper towel and rinse the instrument in ethanol or clean water between each sample.
- Placing tissue samples onto a Whatman sheet for preservation and delivery of samples to EFGL.
- Providing an Excel data sheet with individual Whatman cell number, sex identification, and any other available data (length, PIT tag number, CWT status, adipose clip, etc.) to EFGL.
- If possible, record every individual cross by genetic sample number, sex and date.

7.2. Description and rationale for PIT and CWT tagging

7.2.1. Passive Integrated Transponder (PIT) Tags:

PIT tags are used to evaluate metrics associated with juvenile and adult migration. Detectors within juvenile bypass systems and adult ladders at Snake and Columbia River dams allow biologists to utilize information resulting from individual PIT tag detections.

PIT tag detectors in juvenile bypass systems are used to deflect migrating juveniles into barges or back to the river depending on the time of year or the specifics of a study design. For juveniles, PIT tags are most commonly used to evaluate travel time, passage timing, survival from release to a specific dam, and to compare survival rates for alternative routes of passage through the hydro-system. All PIT tagged hatchery fish outmigrating from Idaho facilities are subject to Separation by Code (SbyC) where the majority of a release group is treated as the unmarked run at large and a smaller portion is diverted back to the river by default.

PIT tag detectors in adult ladders are highly efficient at detecting PIT tags in returning adult fish. In addition to detectors at the dams, adults can also be detected at various in-river arrays that exist in locations like the South Fork Salmon River. Adults are also scanned for PIT tags at hatchery racks. For returning adults, PIT tags are generally used for hatchery- and age-specific run timing, stock composition, in-season harvest management, smolt to adult return rate estimates, estimating stray rates, and to provide a known-age component at hatchery racks. PIT tags can also be used to estimate stock- and age-specific rates of fallback/reascension and after counting hour passage at Snake and Columbia River dams. Due to differences in rearing conditions, sample sizes, release locations, etc., PIT tags are not typically used to make statistical comparisons between hatcheries or between raceways within a hatchery unless a specific study design exists.

7.2.2. Coded wire tags (CWT):

Coded wire tags are used to evaluate metrics associated with adult returns. Because CWT's are universally accepted and easy to detect and read, they are often used for evaluating recovery rates in ocean and freshwater systems, estimating stray rates, harvest rates in mixed stock fisheries, and stock and age composition in fisheries and at hatcheries. Although not a common practice, CWT's can also be used to identify hatchery origin fish in the absence of an adipose clip. Adult fish checked during creel censuses as well as returning to racks are all typically scanned for a CWT. Snouts recovered in Idaho fisheries and at IDFG and IPC hatcheries are processed in the CWT lab at IDFG's Nampa Research office. Though CWT tagging rates are relatively high when compared to other tag types, the recovery rate of CWT's is very low. Because of such low recovery rates and differences in rearing conditions, sample sizes, release locations, etc., CWT's are not used to make statistical comparisons between stocks, nor are they used to evaluate differences within a hatchery unless a specific study design exists.

7.3. Upper Salmon River B (USRB) Planning

7.3.1. Trapping, Spawning, Incubation and Rearing Plan

The Upper Salmon River B Steelhead (USRB) program was shifted from Squaw Creek to the Pahsimeroi River in 2010 with the release of 95,023 unmarked USRB smolts into the Pahsimeroi River below the weir. The eventual goal is to shift the broodstock collection facility to another suitable site in the near future. In order to move the Upper Salmon River B-Run (USRB) steelhead program forward to the planned release target of 960,000 smolts without having to make any infrastructure changes at Pahsimeroi Fish Hatchery (PFH), several alternatives were reviewed and evaluated. The preferred option is to incubate all of the USRB green eggs at Sawtooth Fish Hatchery (SFH) prior to transferring the eyed eggs to Magic Valley Fish Hatchery (MVFH).

- **Incubation Capacity at SFH**- with the newly developed well water, SFH has the capacity to incubate up to 6.0 million green eggs (assuming they get the 20–half stacks of heath incubators back from PFH). The current steelhead program at SFH requires approximately

2.5 million green eggs which leaves enough space for an additional 3.5 million green eggs. Brent indicated that utilizing the space for the 6.0M steelhead eggs would not impact water availability for the Chinook salmon program.
    - The full USRB program (960,000 smolts- including releases into the Little Salmon River) will require approximately 1.4 million green eggs.
    - In addition to the USRB eggs, SFH will also incubate the 633,600 PahA green eggs that are currently being incubated at PFH that are part of the Lower Snake River Compensation Plan (LSRCP) mitigation. These eggs will be shipped from PFH to SFH as green eggs and will come from two lots in late March.
- **Manipulating Water Temperature**- It was also agreed that SFH will need some ability to modulate incubation water temperatures in order to minimize the aggressive feed manipulation that would otherwise be required to synchronize fish size prior to marking at MVFH.
    - Brent brought up the idea of installing in-line heaters as a method to modulate water temperature. LSRCP would like to evaluate the cost and efficiency of the in-line heaters compared with other methods (moist air etc.) before moving forward but is supportive of the idea to install some form of temperature modulation at SFH.
- **Adult Trapping and Spawning**- Broodstock collection is going to continue at PFH until there are enough USRB adults returning to another facility to support the egg-take needs required to meet release goals. Until enough adults are returning to an alternate site, PFH will be scheduling extra time to spawn fish for the PahAs and the USRBs, which will require working out logistical issues between PFH and SFH to transport eggs. The long-term goal is to collect the adults at a facility on the Yankee Fork of the Salmon River operated by the SBT.

7.3.2. Changes made in 2012 and 2013

- 633,600 green PahA eggs (part of the LSRCP mitigation) were transferred from PFH to SFH. They were eyed up at SFH and then shipped to MVFH for final incubation and rearing. A total of 501,000 of those were released as smolts (219,000 in Little Salmon River, 94,000 at each of the Red Rock, Shoup, and Colston Corner sites in the upper Salmon River).
- In 2013 a total of 214,865 unclipped DWOR B smolts and 250,965 clipped DWOR B smolts were released in the Yankee Fork to establish an Upper Salmon B-Run stock in that system.
- Brood collection for the USRB broodstock continued at PFH in 2013 with 226 females spawned for 1,249,800 green eggs. USRB eggs were shipped green to SFH for incubation and distribution to MVFH.

7.3.3. Changes made in 2014

- 633,600 green PahA eggs (part of the LSRCP mitigation) will be transferred from PFH to SFH. They will be eyed up at SFH and then shipped to MVFH for final incubation and rearing (same as in 2012, 2013 and will continue into the future).
- All USRB green eggs will be transported to SFH for incubation to the eyed stage and will then be transported to MVFH for final incubation and rearing. This will be the protocol into the future. An inline water heater is expected to be installed prior to the 2014 steelhead spawning season. This heater will allow staff to manipulate the incubation temperatures for a maximum of 192 females loaded at two females per tray. The temperature manipulation will allow staff to synchronize later lots to earlier lots to provide eyed eggs to MVFH within the two to three week window of delivery time that they requested.
- DWOR B stock eggs will be transferred to Magic Valley Hatchery for release at PFH to meet B-stock release goals as unmarked fish.

7.3.4. Changes made in 2019

- Smolt release goals were changed with USRB brood year 2019 steelhead to increase future returns of USRB broodstock to the Pahsimeroi weir. A total of 96,000 adipose fin intact smolts, tagged with CWT, were moved from the Yankee Fork Salmon release site to the Pahsimeroi weir release site, beginning with the spring of 2020 smolt release. This change reduces the USRB smolt release at Yankee Fork from 217,000 to 121,000 adipose fin intact smolts, and increases the USRB smolt release at Pahsimeroi from 155,000 to 251,000 adipose fin intact smolts.

7.4. Cryopreserved Milt Request Form

NEZ PERCE TRIBE
Department of Fisheries Resources Management
Administration Enforcement Harvest Production Research Resident Fish Watershed

McCall Field Office
P.O. Box 1942 McCall, Idaho 83638
Phone: (208) 634-5290 Fax: (208) 634-4097

Cryopreserved Semen Request Form

Name:
Affiliation:
Phone number:
Email address:
Date needed by:
Species: Chinook salmon / steelhead
Stock requested: _____
Origin: Hatchery / wild/natural
Number of straws needed: _____0.5ml, _____5.0ml
Reason for request (clearly demonstrate need; attach additional pages if needed):

Please provide additional information as necessary (Annual Operating Plan, Management Plan, etc.). You will be contacted by phone or email to discuss the request and coordinate the transfer. Requests are review by a scientific panel from regional management agencies and reserve the right to refuse unjustified requests. The Nez Perce Tribe will assist in the fertilization of eggs and expects adequate monitoring of the results (percent of eggs fertilized, post-thaw sperm motility, etc.).

Signature: _____Date: _____

Contact William Young at the above address (or by email: billy@nezperce.org) if you would like additional information about the gene bank or the request process, or see the Annual Reports for additional information (www.nptfisheries.org/Research-Projects/199703800.aspx)

7.5. Hells Canyon Trapping Protocols

7.5.1. Introduction

The purpose of this document is to establish standard operating procedures and assign responsibilities for the operation of the Hells Canyon Fish Trap (HC Trap) and Oxbow Fish Hatchery. Idaho Power Company (IPC) and Idaho Department of Fish and Game (IDFG) employees directly involved with the coordination and daily operation of the HC Trap and Oxbow Fish Hatchery are encouraged to review this document prior to the onset of each trapping season and modify procedures as necessary.

7.5.2. FERC License Guidelines

The Hells Canyon Settlement Agreement clearly specifies the time frame in which the HC Trap may be operated. For purposes of collecting adult summer steelhead, the trap may be operated from September 1 through December 20 annually and again from March 1 through April 30 annually. Adult spring Chinook salmon may be collected from May 1 through July 15 annually.

7.5.3. Steelhead Trapping

Preparations and Planning

Within the referenced time frame, trap operation will commence at the request of IDFG provided that hatchery personnel communicate their desired startup date to IPC at least 2 weeks in advance of the actual date. Additionally, IDFG personnel are urged to schedule an inspection of the trap and hoist facilities with IPC at least 4 weeks prior to commencement of trapping operations. The purpose of this inspection is to identify and recommend corrections to any equipment which may pose a safety risk to IPC or IDFG personnel and to reduce the potential for injury to adult fish during the trapping process.

The trap will be operated by qualified IPC personnel only. Persons assigned to this task should have some prior experience with the trap or should be assisted by a qualified person. To ensure that the hoist, fish transfer hopper, and fish truck are in proper working order, IPC personnel will make at least one dry run with all equipment before making any attempt to remove fish from the trap. All pumps, valves, alarms and other mechanical equipment should also be serviced and tested by IPC personnel prior to trap operation.

Similar inspections of the transport vehicles should be done by IPC personnel to identify possible problems. Air lines should be checked for leaks, plugged or broken aeration stones should be replaced, mechanical aerators should be inspected for proper operation and all valves tested for proper operation. Aeration stones should be wet sanded prior to each season to ensure efficient operation.

Prior to trap operation all IDFG and IPC employees that will be involved with the trap will hold a safety tailboard and review meeting. All safety concerns and hazards shall be addressed as well as questions concerning trapping and hauling operations. This will be reviewed with any new personnel that assist with the trap operation during the season.

Trap Operation

Prior to initiation of trapping, IDFG will communicate its numeric trapping goals to IPC along with any other anticipated uses of adult steelhead such as outplants to the Boise River and Hells Canyon Reservoir as well as tribal Ceremonial and Subsistence (C&S) distributions. It is important to note that before any live fish can be transferred out of the basin a 60 fish sample is preferred for disease concerns. Historically, a 60 lethal fish disease sample was taken about 2 weeks prior to normal steelhead trapping. Starting in 2014, 20 lethal and 40 non-lethal samples

were collected for virus (IHNV and IPNV), some common fish bacterial pathogens, and whirling disease (head wedges on the 20 lethal samples) from the first fish caught at the start of normal trapping. Fall steelhead trapping generally commences in mid to late October when the river water temperature at Oxbow Hatchery drop to 60^{o} F. Trapping will occur 3 days per week (M-W) and will continue until sufficient numbers of fish are collected to meet established production and distribution goals or until freezing air temperatures interfere with safe trap operation (usually from December 5 to 15). Daily trapping at the HC Trap typically occurs from 8am to 4pm. Any deviation in scheduling to accommodate vacation, holidays, employee illness or other unique circumstance will be discussed and mutually agreed to by IDFG and IPC prior to the event whenever possible.

Collection of adult steelhead during the spring months is much less predictable and is constrained by river flows in excess of 40,000 cubic feet per second (cfs). During a normal water year river flows at Hells Canyon Dam can exceed 40,000 cfs for days or weeks at a time, thereby making trap operation unpredictable. During high water years the trap may not be operable at all during the March 1 through April 30 time frame. Under favorable flow conditions the trap will be operated 3 days per week (M-W) in the spring until a sufficient number of steelhead are trapped to provide 20% of the total broodstock goal. Once this goal is achieved trap operations may be reduced or terminated for the season.

IDFG will have someone on site at all times when the trap is in operation. The primary function of this individual will be to ensure the wellbeing of any threatened or endangered species which may be collected incidentally to target species. IPC will have no obligation to operate the trap when IDFG personnel are unavailable. The role of the IDFG trap tender is to:

- Tally the number of fish entering the trap by species.
- Monitor the welfare of fish in the trap.
- Shut down the weirs and alert IPC personnel when sufficient fish have been trapped to warrant removal and transport to Oxbow Hatchery.
- Monitor trap pumps and alert IPC personnel of any problems with the trap or the health of the fish and suggest remedial actions.
- Assist with or otherwise direct IPC personnel in the safe and proper disposition of threatened or endangered species.

Specific details of HC Trap operation are listed below. Normally IPC personnel will be the first to arrive at the trap and will always be responsible for the startup procedures listed here. Often the trap tender will ride down to the trap with the IPC truck driver. IDFG personnel are encouraged to become familiar with this procedure so that they can help monitor equipment operation.

a. Upon arrival at Hells Canyon Dam, telephone the power plant operator (#7442) to let him/her know you are there and your purpose for being there.
b. Use an IPC supplied ID badge or fob to open the gate to enter the Hell's Canyon Dam complex. The OFH manager is the only one that will be issued an IPC badge or fob. If you do not have an ID card issued to you, wait for the IPC driver to let you in or call the power plant with the phone provided outside the entrance gate. When the gate opens, drive into the complex and park near the head of the stairway which leads to the trap.
c. Using a LC2 key, unlock the gate at the head of the stairs that lead down to the trap.
d. Verify that there is the proper number of stop logs placed in the intake to allow fish to be counted into the ladder as they pass over the top by the IDFG trap tender and that

the aluminum grate is hanging in the slot ready to be installed once the ladder contains enough fish for the loads required that day.

e. Using the LC2 key, the IPC driver will unlock the large gray electrical cabinet (just to the right of the head of the stairs).
f. The IPC driver will start the #1 Shaft Water Pump by pushing the START button so labeled.
g. Visually check that the sprayers are wetting the PVC grader bars. If the sprayers are not functioning, **DO NOT** start the remaining pumps. If it is felt that more fish may enter the trap than will be transported that day, it is advisable to have the IDFG trap tender watch the trap inlet when the attraction pumps are turned on. An estimate can be made of the fish entering the ladder and the aluminum grate installed when needed to prevent overcrowding.
h. Once proper operation of the Shaft Water Pump/sprayers is confirmed and IDFG personnel are on site, Attraction Water Pumps #1 through #4 can be started by pushing the corresponding START buttons. If the Attraction Water Pumps are functioning properly water can be seen "boiling up" at the fish ladder entrance.
i. Start the #2 Ladder Pump by depressing the START button labeled #2. **NOTE: Startup of the ladder pump should not be done until IDFG personnel are on site and ready to begin fish counting.**
j. Check the oil level in each Attraction Water Pump Angle Drive (4) and Ladder Pump (1) by visually examining the sight glasses. The oil level should be in the middle of the sight glasses. If the oil level is low, notify IPC maintenance personnel.

With the HC Trap now in operation, the IDFG trap tender may be left alone to monitor trap operation and fish collection. Should the trap tender need assistance for any reason he is encouraged to contact the Hells Canyon Power Plant Operator via telephone at #7442 or the IPC maintenance shop at #7230. Procedures for the trap tender are as follows;

a. Descend the stairs to the trap tender's observation room.
b. Record the trap start time in the yellow data booklet.
c. Count fish at the trap inlet if needed and lower aluminum grate into inlet when there are enough fish in the ladder for the days transport.
d. Count fish (using hand-held counter) as they enter the trap at the finger weirs.
e. Make sure there is a steady flow of water coming from the trap (under the PVC grader bars). If water flow is not steady the pressure relief valve can be closed (a little at a time) until flow is stabilized.
f. Visually check that there is a steady flow of water into the fish crowding area. There is a valve that's normally not adjusted that controls water into the holding area. Get IPC maintenance to adjust the valve if there is no flow.
g. Monitor the water coming from the sprayers. A decrease in pressure may indicate a clogged water filter. Notify IPC personnel immediately if pressure loss occurs.
h. Two hours after start up, and every 2 hours thereafter, return to the mezzanine deck and check the oil level in each angle gear drive and fish ladder pumps (see step #10 above), and check for excess heat and noise.
i. Once 115 steelhead have entered the trap, the IDFG trap tender must open the pressure relief valve by turning the hand wheel to the left until the arrow on top points to OPEN. He must immediately close both up-well water valves by turning the hand wheels to the right until the arrows on top point to CLOSED. IPC and IDFG personnel should strive to load no more than 115 adult steelhead per truckload for transport to Oxbow Hatchery.

Understanding that it may be unrealistic to be this precise, 125 fish per truckload should be considered the absolute maximum capacity under any circumstance.

Fish Loading and Transport Procedures

Once the desired number of steelhead have been accumulated in the HC Trap, the IDFG trap tender will notify IPC personnel by calling the power plant (#7442) from the telephone located at the mezzanine level. **Adult steelhead and any non-target species will be removed from the trap and transported to Oxbow Fish Hatchery only by IPC personnel in IPC owned vehicles.** Thirty minutes before transport to the hatchery, the 1,000 gallon tank truck is to be filled with water at the power plant and then moved to the loading site. In warm weather, this step should be completed just before loading to reduce warming of the water. Oxygen tanks should be turned on to charge the aeration system prior to filling the transport tank with water. At least 5 minutes prior to loading fish onto the transport vehicle IPC personnel will confirm that oxygen is flowing to the air stones and that the regulator valve is set to a delivery rate of 3.5 liters per minute. Mechanical aerators should also be powered up at this time.

IPC personnel may now transfer adults from the trap to the fish truck by following these steps;

a. Turn spray water off.
b. Open the louvers on the crowder.
c. Run the crowder downstream to the trap entrance, and slowly close the crowder louvers being careful not to pinch or injure fish.
d. Net any fish that are trapped on the downstream side of the crowder and move them to the upstream side of the crowder.
e. Slowly run the crowder to the hopper entrance, “herding” fish into the hopper.
f. Push the rubber shield back inside of the crowder so it won’t hang up on the hopper.
g. Raise the hopper and set it on the fish truck using the crane.
h. Open the water valve and close the air valve on the hopper. The hopper plug should now float to the open position.
i. When the float stem is visible above the hopper, open the 3” valve located at the lower rear of the tanker and the ¾” gate valve located at the top rear of the fish truck. This will allow fish to move from the hopper to the truck. As a last resort, if there is a failure of the float system, a cable hoist is kept on the truck which allows the hopper to be opened manually.
j. When water stops draining from the hose on the ¾” valve, close the 3” and ¾” gate valves. All fish should now be in the fish tank.
k. Close the water valve and open the air valve on the hopper.
l. Lower the hopper back into position in the trap.
m. Turn the spray water back on.
n. Close the truck lid and double check oxygen levels before leaving the trap.

NOTE: Failure of the hopper plug or the water and air valves described in steps 8 through 11 to operate properly may result in incomplete transfer of fish from the hopper to the truck. If so, fish may become trapped under the hoist bucket when it is returned to its resting location in the trap where they can be crushed or suffocate from insufficient water flow. If there is any indication of equipment malfunction it is the responsibility of the IPC trap operator to investigate and resolve the situation immediately.

When the IPC transport operator leaves Hell's Canyon Dam with a load of fish, the IDFG trap tender will notify Oxbow Hatchery (541-785-3459) or cell (541-540-3459) using the telephone located on the mezzanine or the hatchery cell phone to let them know the time of departure and the number of fish in the load. This same information is to be recorded in the yellow data booklet.

Upon arrival of the fish truck at Oxbow Hatchery, the mechanical aerators may be shut off. The oxygen system should be allowed to run for an additional 10 minutes following off-loading of fish to purge any water from the aeration stones. This practice will improve the efficiency of the stones and prevent freeze damage in cold temperatures.

At certain times it may be desirable to trap and transport multiple truckloads of adult steelhead to Oxbow Hatchery per day. This issue will be discussed and agreed upon between IPC and IDFG personnel one week prior to implementation. IPC will provide a driver for a maximum of three loads per day. It should be noted that to achieve three loads in one day, everything has to run smooth, and the last load of fish will usually arrive back to the hatchery between 4:00 and 5:00 p.m. If multiple loads of fish are desired the following procedure is to be followed by the IDFG trap tender once the first load of fish are removed from the trap.

a. Open two up-well water valves by turning the hand wheels to the left until there is visually enough flow to attract fish. The valves are fully open when the arrow points to the OPEN mark on the dial.
b. Begin counting fish.
c. When the last load for the day is in the holding area the sorter may be lifted which will allow the remaining fish to pass over the weir and back to the river.

At the end of the day, it will be the responsibility of IPC personnel to ensure the security of the fish trap. All pumps are to be shut off following communication with IDFG personnel, ensuring that the ladder doesn't contain a significant number of fish. All gates and electrical cabinets must be securely locked. IPC personnel must exercise caution to ensure that no fish are stranded in the fish ladder when pumps are shut off.

Contingency Plans

There are several problems that may occur during the trapping/transport process which can ultimately result in fish mortality. Measures should be taken to monitor all conditions carefully and implement corrective actions as necessary to prevent or minimize problems. The purpose of this discussion is to encourage employees to think about what options are available to them in the event a problem arises which may compromise the life of the fish. The following contingency plans are meant to provide some guidance in the event of an emergency. However it is important to note that variable conditions such as truck loading density, water temperature and condition of the life support systems make it impossible to anticipate every situation. Ultimately the well-being of adult fish trapped at Hells Canyon Dam relies on sound judgment on the part of the IDFG trap tender and IPC trap operator. Considering the visibility of this program to the general public, and the fact that it involves animals listed as threatened or endangered under the federal Endangered Species Act, conservative judgment erring on the side of fish health is encouraged.

One basic concern is collecting too many fish in the HC Trap. This can occur early in the run when large numbers of fish are present in the river and move into the trap quickly, or under

turbid water conditions when it becomes difficult to see into the trap holding area. This condition can also occur if the trap tender has not accurately counted the number of fish passing the finger weirs. While large numbers of fish may not be in jeopardy in the trap, once they are transferred to the transport vehicle they rapidly exceed the life support capabilities of the oxygen and aeration systems and may die in route to Oxbow Hatchery. In the event that IPC or IDFG personnel believe that more than 125 steelhead are present in the trap or transport vehicle, disposition of the fish should be immediately discussed with the IDFG trap tender. Since there are no means of releasing excess fish from the trap, they will have to be loaded onto the transport vehicle and delivered immediately to the Hells Canyon boat launch for release back into the Snake River. Under no circumstances should a truck believed to contain too many live fish be delivered to Oxbow Hatchery.

Failure to crowd all fish from the trap into the hoist bucket or failure to remove all fish from the hoist bucket to the transport tank can also create a problem. In either case fish may become trapped under the hoist bucket when it is returned to its resting location in the trap where they can be crushed or suffocate from insufficient water flow. If there is any indication that fish may be stranded in this location it is the responsibility of the IPC trap operator to investigate and resolve the situation immediately. Any fish discovered must be removed by dipnet immediately. Under no circumstances should fish be left in this location for retrieval at a later date or time.

Once the transport vehicle leaves the trap in route to Oxbow Hatchery any number of mechanical failures can occur. Typically it is not necessary to check the condition of the fish during transport to the hatchery. However, should delays of 30 minutes or more occur, it is advisable to check the fish at 15 minute intervals to ensure that all life support systems are functioning properly and fish are not becoming stressed. Assuming the life support systems remain functional and water temperature in the tank does not exceed 60^{o} F, mechanical problems with the truck do not present immediate risk to the fish. Under these circumstances the fish should remain healthy for 2-3 hours leaving adequate time to implement repairs, tow the vehicle to an offloading site or transfer the fish to another vehicle. Elevated water temperatures, high loading density or lack of oxygen will serve to shorten response times and increase the risk of mortality.

Failure of the trucks life support systems is a more critical situation, even at moderate loading densities and water temperature. Should a failure of the oxygen system be encountered, the first consideration is to assess the distance and travel time to Oxbow Hatchery or back to the Hells Canyon boat launch. If the hatchery is within 15 minutes travel time it is suggested that the transport operator deliver the fish without stopping to evaluate their condition. If the truck is 15 minutes or less from the Hells Canyon boat launch the transport operator is advised to return there and release the fish into the Snake River. If equipment failure occurs more than 15 minutes away from either the hatchery or the boat ramp operator judgment will be a big factor. At low loading densities (<20 fish) and colder water temperatures ($<50^{o}$ F) it may be possible to complete transport to the hatchery without incident. If this option is taken the fish should be checked at 15 minute intervals to assess their well-being. At higher densities and water temperatures fish may become stressed in a matter of minutes and some mortality may be unavoidable. **Releasing fish into Hells Canyon Reservoir to avoid heavy fish mortality is not allowed under IDFG's trapping authority from the National Marine Fisheries Service and should not be done.** In the event that serious mortality appears imminent, the transport operator should immediately alert either the Hells Canyon Plant or the Oxbow Shop by radio. In

doing so the transport operator should provide as much information as possible as to the nature of the problem. This radio information should be relayed immediately to IDFG personnel at Oxbow Hatchery. Any special instructions from the hatchery for dealing with the situation should be relayed back to the transport operator.

While releasing fish into Hells Canyon Reservoir is not authorized, an emergency release to the Snake River below Hells Canyon Dam is an acceptable means of averting catastrophic fish mortality. Should the transport operator make the decision to return to the Hells Canyon boat launch to minimize fish loss, a word of caution is in order. Immediately before releasing fish from the truck, IPC personnel should make one final assessment of their condition. If there are dead fish in the truck these fish should be discretely removed by hand and set aside out of plain sight for later delivery to Oxbow Hatchery. The remaining live fish should then be released and efforts made to revive the most heavily stressed individuals if possible. Any fish which die after release from the truck should be retrieved (if possible) and delivered to the hatchery. If it appears that the majority of the fish are dead or near enough to death that they will likely not recover it is preferable to simply deliver the fish to Oxbow Hatchery for data retrieval and carcass salvage. Under no circumstances should fish carcasses be dumped in the river as a means of disposal.

7.5.4. Spring Chinook Salmon Trapping

As previously stated, the Hells Canyon Settlement Agreement clearly specifies that for purposes of collecting adult spring Chinook salmon the HC Trap may be operated from May 1 through July 15 annually. Most of the equipment and procedures used in the collection of spring Chinook salmon broodstock are identical to those used in the collection of adult steelhead. The most substantial difference between the two operations is that river water temperatures are much warmer during spring Chinook salmon trapping than they are during steelhead trapping. A given volume of warm water holds less oxygen than the same volume of cooler water. Additionally, a fish's metabolic rate increases with temperature. Together these factors increase both the likelihood and speed at which fish may become stressed and die. Additional care must be taken to ensure successful delivery of spring Chinook salmon to Oxbow Hatchery.

Preparations and Planning

Since commencement of spring Chinook salmon trapping follows immediately on the heels of steelhead trapping in the spring, it is assumed that all related equipment will be in sound operating condition thus eliminating the need for inspections and test runs. However, if the trap has been out of operation for an extended period of time a complete review and test of all equipment is encouraged.

The trap will be operated by qualified IPC personnel only. Persons assigned to this task should have some prior experience with the trap or should be assisted by a qualified person.

Trap Operation

Prior to initiation of trapping IDFG will communicate its numeric trapping goals to IPC which shall include any other anticipated uses of adult spring Chinook salmon such as out of basin transfers and C&S distributions done in coordination with other agencies or tribes. It is important to note that before any live fish can be transferred out of the basin a 60 fish sample is preferred for disease concerns. As mentioned in the steelhead section, a 20 lethal and 40 non-lethal sample at the onset of trapping can achieve this goal. Spring Chinook salmon trapping

generally commences on May 1 immediately following the completion of steelhead trapping. As with steelhead trapping, river flows in excess of 40,000 cfs may make trap operation quite variable if not impossible within the referenced time frame. The trap will be operated 3 days per week (M-W) until a sufficient number of fish are trapped to provide for production and distribution goals. Daily trapping at the HC Trap typically occurs from 8am to 4pm. Any deviation in scheduling to accommodate vacation, holidays, employee illness or other unique circumstance will be discussed and mutually agreed to by IDFG and IPC prior to the event whenever possible. Termination of trapping will be dictated primarily by river water temperature. If daily maximum river water temperatures at Oxbow Hatchery exceed 70^{o} F IDFG may request that trapping operations be terminated for the season.

IDFG will have someone on site at all times when the trap is in operation. The primary function of this individual will be to ensure the wellbeing of any threatened or endangered species which may be collected incidentally to target species. IPC will have no obligation to operate the trap when IDFG personnel are unavailable. The role of the IDFG trap tender is to:

- Tally the number of fish entering the trap by species.
- Monitor the welfare of fish in the trap.
- Shut down the weirs and alert IPC personnel when sufficient fish have been trapped to warrant removal and transport to Oxbow Hatchery.
- Monitor trap pumps and alert IPC personnel of any problems with the trap or the health of the fish and suggest remedial actions.
- Assist with or otherwise direct IPC personnel in the safe and proper disposition of threatened or endangered species.

Unless otherwise noted, the details of actual Chinook salmon trapping operation are identical to those previously described for steelhead trapping. Please refer to the Steelhead Trapping section of this document for further information.

Fish Loading and Transport Procedures

Adult Chinook salmon will be removed from the trap and transported from the HC Trap to Oxbow Fish Hatchery only by IPC personnel in IPC owned and operated vehicles. Due to the heightened risk of fish stress associated with warm river water temperature, IPC and IDFG personnel should strive to load no more than 75 adult Chinook salmon per truckload for transport to Oxbow Hatchery. Eighty fish per truckload should be considered the absolute maximum capacity under any circumstance. Unless otherwise noted, the details of actual Chinook salmon loading and transport are identical to those previously described for steelhead loading and transport. Please refer to the Steelhead Fish Loading and Transport Procedures section of this document for further information. Unless otherwise specified only one truckload of fish will be delivered to the Hatchery per day. IPC will provide a driver for a maximum of three loads per day.

At the end of the day, it will be the responsibility of IPC personnel to ensure the security of the fish trap. All pumps are to be shut off and all gates and electrical cabinets must be securely locked.

Contingency Plans

The most common problems associated with spring Chinook salmon trapping are identical to those of steelhead trapping: too many fish can be accumulated in the trap; fish can become

stranded under the hoist bucket; and a mechanical failure on the truck can occur in route to Oxbow Hatchery. As with steelhead, the only acceptable emergency release site is the Hells Canyon boat launch. Liberation of fish into Hells Canyon Reservoir is not allowed. Due to the increased likelihood of fish stress associated with warmer water temperatures, problem assessment and implementation of corrective measures must occur without delay. If upon final assessment at the release site it appears that the majority of the fish are dead or near enough to death that they will likely not recover, it is preferable to simply deliver the fish to Oxbow Hatchery for data retrieval and carcass salvage. Under no circumstances should fish carcasses be dumped in the river as a means of disposal.
As before, careful observation and sound judgment on the part of IPC and IDFG personnel are the key to preventing fish stress and mortality.

Chinook Salmon Transfer to Rapid River Hatchery

Excessively warm summer time river water temperatures preclude holding and spawning spring Chinook salmon at Oxbow Hatchery. Successful holding and spawning is accomplished by transferring adult Chinook salmon to Rapid River Hatchery where they can experience more favorable water temperatures in the summer months.

To minimize pre-spawning mortality, adult Chinook salmon will be transferred to Rapid River Hatchery as soon as possible. Chinook will receive a left operculum punch before being loaded on the tanker so Rapid River personnel can distinguish Oxbow fish from fish they trapped. A mixture of 500 to 700 pounds of block ice and or chilled water will be used to reduce the water temperature in the 1,000 gallon transport tank to 50^{o} F prior to leaving Oxbow Hatchery. Add 10 grams of sodium thiosulfate along with the block ice to neutralize the small amount of chlorine that's present in the ice. If the 125 gallon or 300-gallon pickup mounted tank is used, one-three 5 gallon buckets of ice is added to chilled water to reach the desired 50^{o} F temperature. Additional coolers of ice are to be carried in the pickup for emergency. Add one grams of sodium thiosulfate for each bag of ice. The condition of the fish should be evaluated in Cambridge and again in New Meadows. If the tank water temperature is found to be above 56^{o} F additional ice from the coolers should be added. No MS-222 is used. The following criteria will be used to determine when fish will be transferred.

- No more than 65 Chinook salmon will be transported in the 1,000 gallon transport tank per trip.
- No more than 5 Chinook will be transported in the 125-gallon tank, and no more than 20 Chinook will be transported in the 300-gallon tank that is equipped with fresh flows.
- If the holding pond temperature at Oxbow Hatchery is < 65^{o} F fish will be transferred to Rapid River Hatchery once per week.
- If the holding pond temperature at Oxbow Hatchery is between 65 ^{o} and 68^{o} F, fish will be transferred to Rapid River Hatchery twice per week.
- If holding pond temperature at Oxbow is from >68^{o} F fish will be transferred to Rapid River within 24 hours or a mutually agreed upon time between the IDFG Bureau and IPC.
- If daily maximum river water temperatures at Oxbow Hatchery exceed 70^{o} F IDFG may request that trapping operations be terminated for the season.
- 5 or less fish will be transported in the pickup mounted tank.
- Fish will not be held longer than one week at Oxbow Hatchery.
- No fish will be transferred on weekends.

There are no emergency release sites identified between Oxbow Hatchery and Rapid River Hatchery. Should mechanical failure occur in route to Rapid River Hatchery IPC personnel are

instructed to simply complete the delivery and report the incident to appropriate IPC and IDFG personnel before offloading.

Disposition of Threatened or Endangered Species

Pursuant to the terms of the National Marine Fisheries Services' incidental take permit # 903 (expired), and the Hatchery Genetic Management Plans (HGMP) for the Oxbow Hatchery steelhead and Chinook salmon programs submitted to NOAA Fisheries in 2011, IDFG and IPC are authorized to incidentally capture non-target species such as wild steelhead, Sockeye, wild spring Chinook salmon, and wild and hatchery fall Chinook salmon in the HC Trap. While NMFS recognizes and allows the capture of these listed species, they specifically require that all such fish be identified and immediately returned to the Snake River in an unharmed condition. Mortality of these fish resulting from stress or improper handling is a very serious violation of the permit and will likely result in a thorough investigation.

Since there are no means to sort and release wild fish at the trap, all trapped fish will be delivered to Oxbow Hatchery for inspection. IDFG hatchery personnel will determine which fish, if any, meet the criteria for return to the Snake River. Once identified as such, the non-target species listed above must be returned to the Snake River below Hells Canyon Dam the same day as they were captured with the exception of Sockeye and hatchery fall Chinook salmon. In the event that a Sockeye is captured, personnel from IDFG's Eagle Fish Hatchery are to be contacted immediately so that a potential transfer to the Eagle Fish Hatchery can be coordinated. Hatchery fall Chinook salmon may be held overnight and returned below Hells Canyon Dam the following morning. No more than 25 hatchery fall Chinook should be held in the pink elephant overnight. It is imperative that the lids on the pink elephant are latched and locked to prevent fish from jumping out at night. These fish may be transported by IPC in the IPC transport vehicle or by IDFG in the small pickup truck mounted transport tank. IDFG personnel are encouraged to transport fish in the pickup truck mounted tank whenever possible. Often during steelhead trapping, the last load of fish back down river will be in the dark. One person can do this, but safety is critical. Put tire chocks behind the wheels of the small pickup truck when backing down the Hells Canyon Ramp. The person driving is required to carry a hatchery cell phone, and it's the responsibility of the hatchery manager to check to ensure that the truck arrives safely back at the hatchery after about 2.5 hours have elapsed.

Since the Oxbow Hatchery is a Commercial Driver's License (CDL) required facility, the hatchery manager is required to maintain a current class B CDL with tanker endorsement and no air brake restrictions. In accordance to IDFG's policy, the manager is also subject to random drug inspections. By having a CDL, it gives the hatchery manager some flexibility to drive a second adult tanker back below Hells Canyon Dam or help other hatcheries if needed. The hatchery manager or any other IDFG employee is not authorized to drive the IPC owned tanker because of insurance liability. The hatchery manager would follow all the same precautions that the IPC drivers follow when hauling adults. It is recommended to use the IPC drivers when possible, and it is not recommended backing the adult tanker down the boat ramp at Hells Canyon Dam in the dark.

Incident Reporting

Any mortalities occurring at the HC Trap or in the transport vehicle should be delivered to the hatchery for data retrieval and proper disposal. Under no circumstances should fish carcasses be dumped in the river, given to the public, or taken home by IDFG or IPC employees for

disposal. Any mishaps either at the trap, on the transport vehicle or at the hatchery, resulting in the mortality of 5 or more hatchery origin fish or 1 wild fish will be communicated to the IPC maintenance supervisor, Stuart Rosenberger and the Oxbow Hatchery Manager immediately.

7.6. Location of in-stream PIT tag arrays in the Snake River Basin

Table 7.6a. STEELHEAD: A description of PIT tag arrays in the Snake River basin used for estimation of abundance, life history characteristics, and genetic diversity for steelhead. The genetic stock, major population group (MPG), ICTRT population, site code (Array ID), and site description including GPS data are shown. Fish detected at locations denoted NA* in ICTRT column may belong to more than one population and as a result detections at these arrays were excluded from genetic diversity summaries.

Genetic Stock	MPG	ICTRT	Array ID	Site Description	Latitude	Longitude
LOCLWR	Clearwater R	CRLMA-s	CLC	Clear Creek near Kooskia NFH	-115.950184	46.132739
LOCLWR	Clearwater R	CRLMA-s	HLM	Potlatch River near Helmer	-116.428412	46.799006
LOCLWR	Clearwater R	CRLMA-s	JUL	Potlatch River near Juliaetta	-116.709318	46.565323
LOCLWR	Clearwater R	CRLMA-s	KHS	Big Bear Cr. @ Kendrick HS	-116.646846	46.619115
LOCLWR	Clearwater R	CRLMA-s	LAP	Lapwai Creek, near its mouth	-116.812535	46.443273
LOCLWR	Clearwater R	CRLMA-s	MIS	Mission Creek	-116.735597	46.367062
LOCLWR	Clearwater R	CRLMA-s	PCM	Pine Creek Mouth, Potlatch R.	-116.596836	46.630673
LOCLWR	Clearwater R	CRLMA-s	SWT	Sweetwater Cr. near its mouth	-116.795757	46.369217
LOCLWR	Clearwater R	CRLMA-s	WEB	Webb Creek	-116.831974	46.325992
LOCLWR	Clearwater R	CRLMA-s	BIGBEC	Big Bear Creek, Potlatch River	-116.621142	46.730007
LOCLWR	Clearwater R	CRLMA-s	KOOS	Kooskia National Fish Hatchery	-115.946826	46.129706
LOCLWR	Clearwater R	CRLMA-s	LBEARC	Little Bear Creek, Potlatch River watershed	-116.707271	46.674010
LOCLWR	Clearwater R	CRLMA-s	POTREF	East Fork Potlatch River	-116.349116	46.847724
LOCLWR	Clearwater R	CRLMA-s	POTRWF	West Fork Potlatch River	-116.451557	46.923856
SFCLWR	Clearwater R	CRSFC-s	CRT	Crooked River Satellite Fac.	-115.527782	45.820931
SFCLWR	Clearwater R	CRSFC-s	RRT	Red River Satellite Facility	-115.347147	45.711179
SFCLWR	Clearwater R	CRSFC-s	CROTRP	Crooked River Trap	-115.527745	45.821205
SFCLWR	Clearwater R	CRLOL-s	LC1	Lower Lolo Creek at rkm 21	-115.976159	46.294360
SFCLWR	Clearwater R	CRLOL-s	LC2	Upper Lolo Creek at rkm 25	-115.933747	46.290498
SFCLWR	Clearwater R	CRSFC-s	SC1	Lower SF Clearwater R at rkm 1	-115.981313	46.137022
SFCLWR	Clearwater R	CRSFC-s	SC2	Lower SF Clearwater R at rkm 2	-115.977760	46.127209
SFCLWR	Clearwater R	CRSFC-s	REDR	Red River	-115.354049	45.710066
SFCLWR	Clearwater R	CRSFC-s	REDTRP	Red River Trap	-115.434575	45.793850
UPCLWR	Clearwater R	CRSEL-s	SW1	Lower Selway River Array	-115.565886	46.110318
UPCLWR	Clearwater R	CRSEL-s	SW2	Upper Selway River Array	-115.515533	46.085934
UPCLWR	Clearwater R	CRLOC-s	LRL	Lower Lochsa River Array Site	-115.596497	46.145727
UPCLWR	Clearwater R	CRLOC-s	LRU	Lochsa River Upper Site	-115.589663	46.163821
UPCLWR	Clearwater R	CRLOC-s	FISTRP	Fish Creek Trap	-115.355127	46.340115
GRROND	Grande Ronde R	GRJOS-s	JOC	Joseph Creek ISA @ km 3	-117.016408	46.030237
GRROND	Grande Ronde R	GRJOS-s	JOSEPC	Joseph Creek, Grande Ronde R. Basin	-117.209152	45.899793
GRROND	Grande Ronde R	GRLMT-s	WEN	Wenaha River Mouth	-117.454124	45.946151
GRROND	Grande Ronde R	GRUMA-s	CCW	Catherine Creek Ladder/Weir	-117.828617	45.190964
GRROND	Grande Ronde R	GRUMA-s	UGR	Upper Grande Ronde at rkm 155	-117.903379	45.593520
GRROND	Grande Ronde R	GRUMA-s	UGS	Upper Grande Ronde Starkey	-118.388958	45.248955
GRROND	Grande Ronde R	GRUMA-s	CATHEW	Catherine Creek Weir	-117.828617	45.190964
GRROND	Grande Ronde R	GRUMA-s	GRANDW	Grande Ronde R. Weir	-118.388983	45.248961
GRROND	Grande Ronde R	GRUMA-s	LOOKGC	Lookingglass Creek	-117.960012	45.757199
GRROND	Grande Ronde R	GRWAL-s	WR1	Wallowa River at river km 14	-117.733757	45.633679
GRROND	Grande Ronde R	GRWAL-s	WR2	Wallowa River at rkm 32	-117.579223	45.594466
GRROND	Grande Ronde R	GRWAL-s	BCANF	Big Canyon Facility	-117.698633	45.61904
GRROND	Grande Ronde R	GRWAL-s	LOSTIW	Lostine River Weir	-117.484500	45.543266
GRROND	Grande Ronde R	GRWAL-s	WALH	Wallowa Hatchery	-117.301573	45.417567
IMNAHA	Imnaha R	IRMAI-s	BSC	Big Sheep Creek ISA at km 6	-116.850735	45.506482
IMNAHA	Imnaha R	IRMAI-s	CMP	Camp Creek at rkm 2 - Imnaha	-116.866939	45.551819
IMNAHA	Imnaha R	IRMAI-s	COC	Cow Creek ISA @ stream mouth	-116.744037	45.76774
IMNAHA	Imnaha R	IRMAI-s	CZY	Crazyman Creek at 0.6 km	-116.844780	45.22930
IMNAHA	Imnaha R	IRMAI-s	IML	Imnaha R. Weir Adult Ladder	-116.868663	45.194276
IMNAHA	Imnaha R	IRMAI-s	IR1	Lower Imnaha R. ISA @ km 7	-116.750231	45.761052
IMNAHA	Imnaha R	IRMAI-s	IR2	Lower Imnaha R. ISA @ km 10	-116.764304	45.742702
IMNAHA	Imnaha R	IRMAI-s	IR3	Upper Imnaha R. ISA @ km 41	-116.804096	45.489957
IMNAHA	Imnaha R	IRMAI-s	IR4	Imnaha Weir Downstream Array	-116.868774	45.194460
IMNAHA	Imnaha R	IRMAI-s	IR5	Imnaha Weir Upstream Array	-116.868593	45.193188

Table 7.6a. (cont.)

Genetic Stock	MPG	ICTRT	Array ID	Site Description	Latitude	Longitude
IMNAHA	Imnaha R	IRMAI-s	DRY2C	Dry Creek - tributary to Imnaha R.	-116.867075	45.121790
IMNAHA	Imnaha R	IRMAI-s	FREEZC	Freezeout Creek - tributary to Imnaha R.	-116.762169	45.350411
IMNAHA	Imnaha R	IRMAI-s	GUMBTC	Gumboot Creek, Imnaha R. Basin	-116.941111	45.155719
IMNAHA	Imnaha R	IRMAI-s	HORS3C	Horse Creek, Imnaha R. Basin	-116.727273	45.549508
IMNAHA	Imnaha R	IRMAI-s	IMNAHW	Imnaha R. Weir	-116.868664	45.194276
IMNAHA	Imnaha R	IRMAI-s	LSHEEF	Little Sheep Facility	-116.930252	45.477819
IMNAHA	Imnaha R	IRMAI-s	MAHOGC	Mahogany Creek, Imnaha R. Basin	-116.899988	45.200210
MFSALM	Salmon R	MFBIG-s	TAY	Big Creek at Taylor Ranch	-114.853817	45.103532
MFSALM	Salmon R	MFUMA-s	BRC	Bear Valley Adult Video Weir	-115.284171	44.427939
SFSALM	Salmon R	SFMAI-s	ESS	EFSF Salmon R. at Parks Cr.	-115.533150	44.956205
SFSALM	Salmon R	SFMAI-s	KRS	SF Salmon R. at Krassel Cr.	-115.726994	44.978472
SFSALM	Salmon R	NA*	SFG	SF Salmon at Guard Station Br.	-115.579712	45.175659
SFSALM	Salmon R	SFMAI-s	STR	SF Salmon Satellite Facility	-115.702953	44.666874
SFSALM	Salmon R	SFMAI-s	YPP	Yellow Pine Pit Lake	-115.333883	44.928995
SFSALM	Salmon R	SFMAI-s	JOHNSC	Johnson Creek	-115.548602	44.733928
SFSALM	Salmon R	SFSEC-s	ZEN	Secesh River at Zena Cr. Ranch	-115.733020	45.033300
SFSALM	Salmon R	SFSEC-s	LAKEC	Lake Creek	-115.949204	45.329059
LSNAKE	Lower Snake R	SNASO-s	ACB	Asotin Cr. at Cloverland Brdg.	-117.108679	46.325584
LSNAKE	Lower Snake R	SNASO-s	ACM	Asotin Creek near mouth	-117.055707	46.341368
LSNAKE	Lower Snake R	SNASO-s	AFC	No./So. Fk Asotin Cr. Jct. ISA	-117.292147	46.272487
LSNAKE	Lower Snake R	SNASO-s	CCA	Lower Charley Creek ISA	-117.282497	46.288458
LSNAKE	Lower Snake R	SNASO-s	ALMOTC	Almota Creek - tributary to Snake River	-117.359348	46.701606
LSNAKE	Lower Snake R	SNASO-s	ALPOWC	Alpowa Creek, Lower Snake R. River	-117.398266	46.402354
LSNAKE	Lower Snake R	SNASO-s	ASOTIC	Asotin Creek, Snake River above Clarkston, WA	-117.181953	46.330643
LSNAKE	Lower Snake R	SNASO-s	GEORGC	George Creek, Asotin Creek watershed	-117.198841	46.192301
LSNAKE	Lower Snake R	SNASO-s	TENMC2	Tenmile Creek, tributary to Snake River	-117.041854	46.195250
LSNAKE	Lower Snake R	SNTUC-s	LTR	Lower Tucannon River	118.162901	46.544192
LSNAKE	Lower Snake R	SNTUC-s	MTR	Middle Tucannon River	118.016274	46.505239
LSNAKE	Lower Snake R	SNTUC-s	UTR	Upper Tucannon River	117.738342	46.415922
LSNAKE	Lower Snake R	SNTUC-s	PENAWC	Penawawa Creek - tributary to Snake River	117.541357	46.747772
LSNAKE	Lower Snake R	SNTUC-s	TUCH	Tucannon River Hatchery	117.662840	46.320108
UPSALM	Salmon R	SREFS-s	SALEFT	East Fork Salmon R. Trap	114.428956	44.118413
UPSALM	Salmon R	SRLEM-s	18M	Eighteenmile Creek	113.353660	44.682795
UPSALM	Salmon R	SRLEM-s	AGC	Agency Creek, Lemhi R. Basin	113.639543	44.956739
UPSALM	Salmon R	SRLEM-s	BHC	Bohannon Creek Lemhi R Basin	113.746897	45.112189
UPSALM	Salmon R	SRLEM-s	BTL	Lower Big Timber, Lemhi Basin	113.374118	44.697568
UPSALM	Salmon R	SRLEM-s	BTM	Big Timber Creek - Middle	113.377624	44.660444
UPSALM	Salmon R	SRLEM-s	BTU	Big Timber Creek - Upper	113.397036	44.613860
UPSALM	Salmon R	SRLEM-s	CAC	Canyon Creek ISA @ km 1	113.365281	44.691090
UPSALM	Salmon R	SRLEM-s	CRC	Carmen Creek, Salmon R. Basin	113.893466	45.246485
UPSALM	Salmon R	SRLEM-s	HEC	Hawley Cr/18 Mile Cr Array	113.311550	44.668594
UPSALM	Salmon R	SRLEM-s	HYC	Hayden Creek In-stream Array	113.631937	44.861654
UPSALM	Salmon R	SRLEM-s	KEN	Kenney Creek In-stream Arrays	113.654847	45.026792
UPSALM	Salmon R	SRLEM-s	LB8	Big Eightmile Creek	113.462458	44.738218
UPSALM	Salmon R	SRLEM-s	LBS	Big Springs Creek	113.433214	44.727349
UPSALM	Salmon R	SRLEM-s	LCL	Lee Creek, Lemhi R. Basin	113.474641	44.747074
UPSALM	Salmon R	SRLEM-s	LLR	Lower Lemhi River	113.885278	45.176475
UPSALM	Salmon R	SRLEM-s	LLS	Lemhi Little Springs Instream	113.545027	44.780552
UPSALM	Salmon R	SRLEM-s	LRW	Lemhi River Weir	113.624721	44.865960
UPSALM	Salmon R	SRLEM-s	WPC	Wimpey Creek, Lemhi R. Basin	113.720497	45.097938
LOSALM	Salmon R	SRLSR-s	RAPH	Rapid River Hatchery	116.394575	45.353681
UPSALM	Salmon R	SRNFS-s	NFS	North Fork Salmon R.	113.992002	45.408645
UPSALM	Salmon R	NA*	USE	Upper Salmon R. at rkm 437	113.916319	45.028530
UPSALM	Salmon R	NA*	USI	Upper Salmon R. at rkm 460	113.964145	44.889763
UPSALM	Salmon R	SRPAH-s	PAHH	Pahsimeroi Hatchery	114.039471	44.684139
UPSALM	Salmon R	SRPAN-s	PCA	Panther Creek Array	114.358101	45.295253
UPSALM	Salmon R	SRUMA-s	RFL	Redfish Lake Creek	114.905043	44.164727
UPSALM	Salmon R	SRUMA-s	STL	Sawtooth Hatchery Adult Trap	114.883772	44.153369
UPSALM	Salmon R	SRUMA-s	VC1	Valley Creek, Upstream Site	114.942150	44.218672
UPSALM	Salmon R	SRUMA-s	VC2	Valley Creek, Downstream Site	114.931460	44.221900
UPSALM	Salmon R	SRUMA-s	YFK	Yankee Fork Salmon R.	114.720453	44.287737

Table 7.6b. CHINOOK: A description of PIT tag arrays in the Snake River basin used for estimation of abundance, life history characteristics, and genetic diversity for Chinook Salmon. The genetic stock, major population group (MPG), ICTRT population, site code (Array ID), and site description including GPS data are shown. Fish detected at locations denoted NA* in ICTRT column belong to more than one population and as a result individuals detected at these locations were excluded from genetic diversity summaries.

Genetic Stock	MPG	ICTRT	Array ID	Site Description	Latitude	Longitude
HELLSC	Clearwater R - Dry	CRLAP	LAP	Lapwai Creek, near its mouth	-116.812535	46.443273
HELLSC	Clearwater R - Dry	CRLAP	MIS	Mission Creek	-116.735597	46.367062
HELLSC	Clearwater R - Dry	CRLAP	SWT	Sweetwater Cr. near its mouth	-116.795757	46.369217
HELLSC	Clearwater R - Dry	CRLAP	WEB	Webb Creek	-116.831974	46.325992
HELLSC	Clearwater R - Dry	SCLAW	CLC	Clear Creek near Kooskia NFH	-115.950184	46.132739
HELLSC	Clearwater R - Dry	SCLAW	KOOS	Kooskia National Fish Hatchery	-115.946826	46.129706
HELLSC	Clearwater R - Dry	SCUMA	SC1	Lower SF Clearwater R at rkm 1	-115.981313	46.137022
HELLSC	Clearwater R - Dry	SCUMA	SC2	Lower SF Clearwater R at rkm 2	-115.977760	46.127209
HELLSC	Clearwater R - Dry	SCUMA	CRT	Crooked River Satellite Fac.	-115.527782	45.820931
HELLSC	Clearwater R - Dry	SCUMA	RRT	Red River Satellite Facility	-115.347147	45.711179
HELLSC	Clearwater R - Dry	SCUMA	CROTRP	Crooked River Trap	-115.527745	45.821205
HELLSC	Clearwater R - Dry	SCUMA	REDR	Red River	-115.354049	45.710066
HELLSC	Clearwater R - Dry	SCUMA	REDTRP	Red River Trap	-115.434575	45.793850
HELLSC	Clearwater R - Dry	CRPOT	HLM	Potlatch River near Helmer	-116.428412	46.799006
HELLSC	Clearwater R - Dry	CRPOT	JUL	Potlatch River near Juliaetta	-116.709318	46.565323
HELLSC	Clearwater R - Dry	CRPOT	KHS	Big Bear Cr. @ Kendrick HS	-116.646846	46.619115
HELLSC	Clearwater R - Dry	CRPOT	PCM	Pine Creek Mouth, Potlatch R.	-116.596836	46.630673
HELLSC	Clearwater R - Dry	CRPOT	BIGBEC	Big Bear Creek, Potlatch River	-116.621142	46.730007
HELLSC	Clearwater R - Dry	CRPOT	LBEARC	Little Bear Creek, Potlatch River watershed	-116.707271	46.674010
HELLSC	Clearwater R - Dry	CRPOT	POTREF	East Fork Potlatch River	-116.349116	46.847724
HELLSC	Clearwater R - Dry	CRPOT	POTRWF	West Fork Potlatch River	-116.451557	46.923856
HELLSC	Clearwater R - Wet	CRLOC	LRL	Lower Lochsa River Array Site	-115.596497	46.145727
HELLSC	Clearwater R - Wet	CRLOC	LRU	Lochsa River Upper Site	-115.589663	46.163821
HELLSC	Clearwater R - Wet	CRLOC	FISTRP	Fish Creek Trap	-115.355127	46.340115
HELLSC	Clearwater R - Wet	CRLOL	LC1	Lower Lolo Creek at rkm 21	-115.976160	46.294360
HELLSC	Clearwater R - Wet	CRLOL	LC2	Upper Lolo Creek at rkm 25	-115.933747	46.290498
HELLSC	Clearwater R - Wet	SEMEA	SW1	Lower Selway River Array	-115.565886	46.110318
HELLSC	Clearwater R - Wet	SEMEA	SW2	Upper Selway River Array	-115.515533	46.085934
HELLSC	Grande Ronde R	GRCAT	CCW	Catherine Creek Ladder/Weir	-117.828617	45.190964
HELLSC	Grande Ronde R	GRCAT	CATHEW	Catherine Creek Weir	-117.828617	45.190964
HELLSC	Grande Ronde R	GRLOO	LOOKGC	Lookingglass Creek	-117.960012	45.757199
HELLSC	Grande Ronde R	NA*	WR1	Wallowa River at river km 14	-117.733757	45.633679
HELLSC	Grande Ronde R	GRLOS	WR2	Wallowa River at rkm 32	-117.579223	45.594466
HELLSC	Grande Ronde R	GRLOS	BCANF	Big Canyon Facility	-117.698633	45.619040
HELLSC	Grande Ronde R	GRLOS	LOSTIW	Lostine River Weir	-117.484500	45.543266
HELLSC	Grande Ronde R	GRLOS	WALH	Wallowa Hatchery	-117.301573	45.417567
HELLSC	Grande Ronde R	GRUMA	UGS	Upper Grande Ronde Starkey	-118.388958	45.248955
HELLSC	Grande Ronde R	GRUMA	GRANDW	Grande Ronde River Weir	-118.388983	45.248961
HELLSC	Grande Ronde R	GRWEN	WEN	Wenaha River Mouth	-117.454124	45.946151
HELLSC	Imnaha R	IRBSH	BSC	Big Sheep Creek ISA at km 6	-116.850735	45.506482
HELLSC	Imnaha R	IRBSH	CMP	Camp Creek at rkm 2 - Imnaha	-116.866939	45.551819
HELLSC	Imnaha R	IRBSH	LSHEEF	Little Sheep Facility	-116.930252	45.477819
HELLSC	Imnaha R	IRMAI	COC	Cow Creek ISA @ stream mouth	-116.744037	45.767740
HELLSC	Imnaha R	IRMAI	CZY	Crazyman Creek at 0.6 km	-116.844780	45.229300
HELLSC	Imnaha R	IRMAI	IML	Imnaha River Weir Adult Ladder	-116.868663	45.194276
HELLSC	Imnaha R	IRMAI	IR1	Lower Imnaha River ISA @ km 7	-116.750231	45.761052
HELLSC	Imnaha R	IRMAI	IR2	Lower Imnaha River ISA @ km 10	-116.764304	45.742702
HELLSC	Imnaha R	IRMAI	IR3	Upper Imnaha River ISA @ km 41	-116.804096	45.489957
HELLSC	Imnaha R	IRMAI	IR4	Imnaha Weir Downstream Array	-116.868774	45.194460
HELLSC	Imnaha R	IRMAI	IR5	Imnaha Weir Upstream Array	-116.868593	45.193188
HELLSC	Imnaha R	IRMAI	DRY2C	Dry Creek - tributary to Imnaha River	-116.867075	45.121790
HELLSC	Imnaha R	IRMAI	FREEZC	Freezeout Creek - tributary to Imnaha River	-116.762169	45.350411
HELLSC	Imnaha R	IRMAI	GUMBTC	Gumboot Creek, Imnaha River Basin	-116.941111	45.155719
HELLSC	Imnaha R	IRMAI	HORS3C	Horse Creek, Imnaha River Basin	-116.727273	45.549508
HELLSC	Imnaha R	IRMAI	IMNAHW	Imnaha River Weir	-116.868664	45.194276
HELLSC	Imnaha R	IRMAI	MAHOGC	Mahogany Creek, Imnaha River Basin	-116.899988	45.200210

Table 7.6b. (cont.)

Genetic Stock	MPG	ICTRT	Array ID	Site Description	Latitude	Longitude
TUCANO	Lower Snake R	SNASO	ACB	Asotin Cr. at Cloverland Brdg.	-117.108679	46.325584
TUCANO	Lower Snake R	SNASO	ACM	Asotin Creek near mouth	-117.055707	46.341368
TUCANO	Lower Snake R	SNASO	AFC	No./So. Fk Asotin Cr. Jct. ISA	-117.292147	46.272487
TUCANO	Lower Snake R	SNASO	CCA	Lower Charley Creek ISA	-117.282497	46.288458
TUCANO	Lower Snake R	SNASO	ASOTIC	Asotin Creek, Snake River above Clarkston, WA	-117.181953	46.330643
TUCANO	Lower Snake R	SNASO	GEORGC	George Creek, Asotin Creek watershed	-117.198841	46.192301
TUCANO	Lower Snake R	SNTUC	LTR	Lower Tucannon River	-118.162901	46.544192
TUCANO	Lower Snake R	SNTUC	MTR	Middle Tucannon River	-118.016274	46.505239
TUCANO	Lower Snake R	SNTUC	UTR	Upper Tucannon River	-117.738342	46.415922
TUCANO	Lower Snake R	SNTUC	TUCH	Tucannon River Hatchery	-117.662840	46.320108
MFSALM	Middle Fork Salmon R	MFBEA	BRC	Bear Valley Adult Video Weir	-115.284171	44.427939
MFSALM	Middle Fork Salmon R	MFBIG	TAY	Big Creek at Taylor Ranch	-114.853817	45.103532
HELLSC	South Fork Salmon R	SRLSR	RAPH	Rapid River Hatchery	-116.394575	45.353681
SFSALM	South Fork Salmon R	SFEFS	ESS	EFSF Salmon River at Parks Cr.	-115.533150	44.956205
SFSALM	South Fork Salmon R	SFEFS	YPP	Yellow Pine Pit Lake	-115.333883	44.928995
SFSALM	South Fork Salmon R	SFEFS	JOHNSC	Johnson Creek	-115.548602	44.733928
SFSALM	South Fork Salmon R	SFMAI	KRS	SF Salmon River at Krassel Cr.	-115.726994	44.978472
SFSALM	South Fork Salmon R	SFMAI	SFG	SF Salmon at Guard Station Br.	-115.579712	45.175659
SFSALM	South Fork Salmon R	SFMAI	STR	SF Salmon Satellite Facility	-115.702953	44.666874
SFSALM	South Fork Salmon R	SFSEC	ZEN	Secesh River at Zena Cr. Ranch	-115.733020	45.033300
SFSALM	South Fork Salmon R	SFSEC	LAKEC	Lake Creek	-115.949204	45.329059
UPSALM	Upper Salmon R	SREFS	SALEFT	East Fork Salmon River Trap	-114.428956	44.118413
UPSALM	Upper Salmon R	SRLEM	18M	Eighteenmile Creek	-113.353660	44.682795
UPSALM	Upper Salmon R	SRLEM	AGC	Agency Creek, Lemhi R. Basin	-113.639543	44.956739
UPSALM	Upper Salmon R	SRLEM	BHC	Bohannon Creek Lemhi R Basin	-113.746897	45.112189
UPSALM	Upper Salmon R	SRLEM	BTL	Lower Big Timber, Lemhi Basin	-113.374118	44.697568
UPSALM	Upper Salmon R	SRLEM	BTM	Big Timber Creek - Middle	-113.377624	44.660444
UPSALM	Upper Salmon R	SRLEM	BTU	Big Timber Creek - Upper	-113.397036	44.613860
UPSALM	Upper Salmon R	SRLEM	CAC	Canyon Creek ISA @ km 1	-113.365281	44.691090
UPSALM	Upper Salmon R	SRLEM	CRC	Carmen Creek, Salmon R. Basin	-113.893466	45.246485
UPSALM	Upper Salmon R	SRLEM	HEC	Hawley Cr/18 Mile Cr Array	-113.311550	44.668594
UPSALM	Upper Salmon R	SRLEM	HYC	Hayden Creek In-stream Array	-113.631937	44.861654
UPSALM	Upper Salmon R	SRLEM	KEN	Kenney Creek In-stream Arrays	-113.654847	45.026792
UPSALM	Upper Salmon R	SRLEM	LB8	Big Eightmile Creek	-113.462458	44.738218
UPSALM	Upper Salmon R	SRLEM	LBS	Big Springs Creek	-113.433214	44.727349
UPSALM	Upper Salmon R	SRLEM	LCL	Lee Creek, Lemhi R. Basin	-113.474641	44.747074
UPSALM	Upper Salmon R	SRLEM	LLR	Lower Lemhi River	-113.885278	45.176475
UPSALM	Upper Salmon R	SRLEM	LLS	Lemhi Little Springs Instream	-113.545027	44.780552
UPSALM	Upper Salmon R	SRLEM	LRW	Lemhi River Weir	-113.624721	44.865960
UPSALM	Upper Salmon R	SRLEM	WPC	Wimpey Creek, Lemhi R. Basin	-113.720497	45.097938
UPSALM	Upper Salmon R	SRLMA	USE	Upper Salmon River at rkm 437	-113.916319	45.028530
UPSALM	Upper Salmon R	SRLMA	USI	Upper Salmon River at rkm 460	-113.964145	44.889763
UPSALM	Upper Salmon R	SRNFS	NFS	North Fork Salmon River	-113.992002	45.408645
UPSALM	Upper Salmon R	SRPAH	PAHH	Pahsimeroi Hatchery	-114.039471	44.684139
UPSALM	Upper Salmon R	SRPAN	PCA	Panther Creek Array	-114.358101	45.295253
UPSALM	Upper Salmon R	SRUMA	RFL	Redfish Lake Creek	-114.905043	44.164727
UPSALM	Upper Salmon R	SRUMA	STL	Sawtooth Hatchery Adult Trap	-114.883772	44.153369
UPSALM	Upper Salmon R	SRVAL	VC1	Valley Creek, Upstream Site	-114.942150	44.218672
UPSALM	Upper Salmon R	SRVAL	VC2	Valley Creek, Downstream Site	-114.931461	44.221900
UPSALM	Upper Salmon R	SRYFS	YFK	Yankee Fork Salmon River	-114.720453	44.287737

Snake River Basin In-stream PIT-tag Detection Systems

Sixty-seven IPTDS are deployed across the basin to monitor abundance, life history and productivity of Steelhead and spring/summer Chinook salmon.

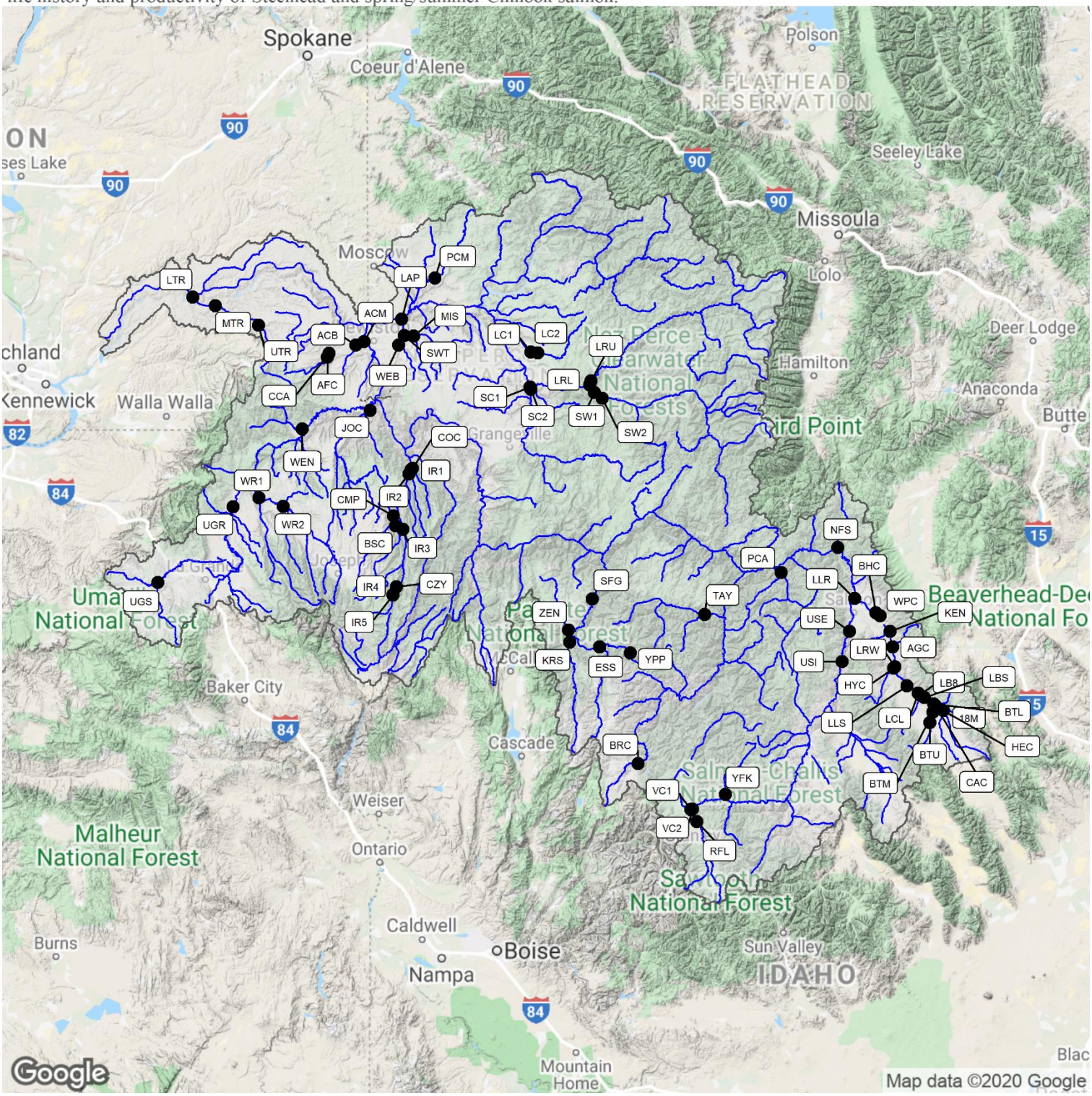

Figure 7.6a. Relative location of the Salmon River Basin Integrated Status and Effective Monitoring Project (ISEMP) Passive Integrated Transponders (PIT) tag arrays by PIT Tag Information System (PTAGIS) site code.

7.7. South Fork Trap Adult Holding Contingency Plan

Idaho Department of Fish and Game
Nez Perce Tribal Fisheries
McCall Fish Hatchery
South Fork Trap Adult Holding Contingency Plan
February 16, 2017

During the 2014 and 2015 SFSR trapping seasons natural disasters and mild winters caused catastrophic mortality events at the South Fork Adult Facility. These events have put the South Fork and Johnson Creek Summer Chinook production programs at risk and will continue to do so for the immediate future. A long term solution for the South Fork Facility will require additional time and resources to develop a solution that minimizes risks to the brood programs being held at that facility. Therefore, a risk mitigation plan is necessary until a long term solution can be identified and implemented.

This document outlines the risk mitigation plan for the South Fork Salmon and Johnson Creek programs for the 2017 trapping and holding season:

7.7.1. PREPARATION AND MONITORING PLANS:

- The South Fork Salmon River trap facility will be staffed only by designated trap tenders and permanent staff. This will eliminate the constant training of new individuals every week and improve communications between the trap staff and hatchery staff. Trap staff will be required to remain within 5 miles of the trap at all times.
- Holding Schematic: Holding Pond 1 (HP1) at the South Fork Salmon River Trap facility will be the designated pond for the roughly 600 total brood fish needed going into spawning to fulfill the South Fork Integrated, South Fork Segregated, and Johnson Creek programs. The fish in this pond do not account for prespawn mortality and will be referred to as the "brood pond". Holding pond 2 (HP2) will be designated for at most 400 additional brood needed to account for prespawn mortality and for any program needs above the aforementioned brood programs. Surplus adults and jacks held for fishery recycling, out plants, C&S, and welfare dispersal will be held in holding pond 3 (HP3) and which will not be treated with formalin.
- When processing the trap, all fish that get ponded will receive a unique mark which has not been determined at this time.
- Up to 3 IDFG Adult transport trucks capable of hauling 200 adults each will be staged at McCall Hatchery as well as 1 Nez Perce Truck capable of Hauling 35 Adults.
- A South Fork Salmon River temperature and turbidity monitoring station will again be installed 100 yards upstream of the weir this year. This station will be able to transmit real time water temperature and turbidity levels and will be remotely monitored while fish are in holding at the South Fork.
- Outfit the SFSR holding ponds with an emergency oxygen system. 6 diffusers for HP1, 4 diffusers each for HP2 and 3 for a total of 14 Point4 BDC900 diffusers will need to be purchased.
- The local weather forecast will be monitored every 4 hours by hatchery staff. If severe weather, (i.e. strong low pressure system) is predicted or observed or prolonged high pressure with above average daily high air temps combined with below average streamflow. All program managers will be notified and action taken depending on risk scenario.

- Construct temporary pump back system: A diesel powered pump and irrigation pipe capable of moving 4 cfs of water will be rented for from June 15th thru August 15th. The pump will be able to recirculate water from the trap box to the top of all 3 ponds and the circular tank. This will be an emergency response to when the water quality in the South Fork Salmon river is deemed insufficient to support salmonid life, (i.e. high temperature or high turbidity)*

  * THE PUMP BACK SYSTEM PLAN HAS NOT BEEN CONTRACTED AND NEEDS FURTHER REVIEW AT THIS TIME.

7.7.2. EMERGENCY ACTION PLAN:

Action will need to be taken as soon as an indicator such as the threat of severe weather, prolonged thermal problems, etc. occurs. This will require 2 permanent IDFG production staff to be on call at all times. If the hatchery manager is not available, the complex manager or assistant manager will be responsible for initiating the response and will notify additional resources as needed. Most likely, the trap staff will notify Hatchery staff who will then make the decision to load trucks and transport adults to Rapid River Hatchery after consulting with IDFG Fisheries Bureau Staff. Hatchery staff will contact NPT staff as soon as a potential threat has been identified to acquire input and/or assist with moving/releasing fish. The number of fish in holding at the time of action will determine the amount of resources needed. The IDFG resource pool will include; NPT McCall Fisheries Staff, IDFG R3M staff, Rapid River staff, Oxbow staff, Eagle Staff, and Headquarters staff. The closer to spawning, the more resources will be needed as more fish will be on hand.

Scenario 1: High water/extreme turbidity event or the threat there of

- Action: Initiate supplemental oxygen, initiate pump back system, pass any fish in the trap box downstream into the ladder, and finally close the facility water intake valve. Any fish in the ladder will fall back out into the river. Continuous monitoring of dissolved oxygen levels and water temperatures will commence while life-support systems are operated. Depending on length and severity of the low water quality event, the decision may be made to move the brood fish off site to Rapid River Hatchery.

Scenario 2: Extreme high water temperature

- Depending on number of hours over the course of a 24 hour period that the river water temperature is above 70 degrees F, supplemental oxygen will be added to control the available dissolved oxygen in the ponds and dissolved oxygen levels will be monitored until water the temperature returns to an acceptable level. If the water is above 70F for over 6 hours in a 24 hour period, program managers will be notified. If the weather forecast indicates this may be a prolonged trend than the determination may be made to move the brood off site to the Rapid River Hatchery.

7.8. Distribution of Spawned-Out and Excess Carcasses at Anadromous Fish Hatcheries

Adult fish in excess of scheduled brood stock needs will be distributed in the following priority order:

- Released in specified waters while sport or treaty tribal fisheries are open.
- Released for natural spawning in specified waters consistent with planning documents.
- Distributed to Idaho Indian treaty tribes for subsistence purposes.

- Distributed to other Indian tribes and non-profit charitable food distribution organizations.
- Distributed to the general public.

Spawned-out adults suitable for human consumption will be distributed in the following priority order:

- Idaho Indian tribes for subsistence purposes.
- Non-profit charitable organizations.
- General public.

Aforementioned priorities may be reordered with concurrence of all parties.

7.9. Brood Calculator

7.9.1. Smolt Production

PROGRAM INPUTS							HISTORICAL HATCHERY PERFORMANCE METRICS (5-YR AVG)						FORM CALCULATED VALUES									
SPECIES	HATCHERY	RELEASE SITE	STOCK	PREFERED TRAPPING SITE	FORMAL SMOLT RELEASE GOAL	COMANAGER APPROVED CUSHION %[1]	% FEMALES IN BROODSTOCK	% MORTALITY DURING HOLDING	GREEN EGG FECUNDITY	% REMAINING AFTER DISEASE CULLING[2]	% SURVIVAL GREEN TO EYED EGG	% SURVIVAL EYED EGG TO RELEASE	RELEASE GOAL WITH CUSHION	EYED EGGS	GREEN EGGS	GREEN EGGS BEFORE DISEASE CULL	FEMALES SPAWNED	MALES SPAWNED	TOTAL ADULTS SPAWNED	TRAPPED ADULTS NEEDED	ADULTS TRAPPED TO MEET 1:1 RATIO	SMOLTS PER TRAPPED ADULTS NEEDED
					(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)	(U)	(V)	(W)	(X)
STLHD	HNFH	Sawtooth Weir	SawA	SFH	1,410,000	3.00%	50%	0.00%	5,150	100.00%	92.00%	92.00%	1,452,300	1,578,587	1,715,855	1,715,855	334	334	668	668	668	2,174
		Sawtooth Weir (RAS Eval)	SawA	SFH	90,000	3.00%	50%	0.00%	5,150	100.00%	92.00%	92.00%	92,700	100,761	109,523	109,523	22	22	44	44	44	2,107
		E. Fork Salmon R. - Upper	EFNat	EFSRSF	60,000	10.00%	50%	0.00%	5,900	100.00%	89.00%	88.90%	66,000	74,241	83,417	83,417	15	15	30	30	30	2,200
	MVFH	Sawtooth Weir	SawA	SFH	279,000	3.00%	50%	0.00%	5,100	100.00%	94.60%	84.00%	287,370	342,107	361,635	361,635	71	71	142	142	142	2,024
		Little Salmon R. - Stinky Sp.	PahA	PFH	186,000	10.00%	50%	0.00%	5,500	100.00%	93.00%	84.00%	204,600	243,571	261,905	261,905	48	48	96	96	96	2,131
		Pahsimeroi Weir	USRB	PFH	251,000	0.00%	60%	5.00%	6,200	100.00%	90.00%	84.00%	251,000	298,810	332,011	332,011	54	36	90	95	143	2,642
		Pahsimeroi Weir	DworB	DNFH	93,000	10.00%	67%	0.00%	6,681	100.00%	84.00%	84.00%	102,300	121,786	144,983	144,983	22	11	33	33	67	3,100
		Yankee Fork	USRB (DworB)	YFT	524,000	0.00%	60%	5.00%	6,200	100.00%	90.00%	84.00%	524,000	623,810	693,122	693,122	112	75	187	197	295	2,660
		Little Salmon - Stinky Sp.	USRB	YFT	217,000	2.00%	60%	5.00%	6,200	100.00%	90.00%	84.00%	221,340	263,500	292,778	292,778	48	32	80	85	127	2,604
	NSFH	Pahsimeroi Weir	PahA	PFH	800,000	10.00%	50%	0.00%	5,500	100.00%	93.00%	90.00%	880,000	977,778	1,051,374	1,051,374	192	192	384	384	384	2,292
		Little Salmon R. - Stinky Sp.	PahA	PFH	200,000	10.00%	50%	0.00%	5,500	100.00%	93.00%	90.00%	220,000	244,444	262,843	262,843	48	48	96	96	96	2,292
		Little Salmon R. - Stinky Sp.	OxbA	HCT	250,000	20.00%	50%	25.00%	5,500	96.00%	83.00%	97.00%	300,000	309,278	372,625	388,151	71	71	142	190	190	1,579
		Snake R. Hells Canyon	OxbA	HCT	550,000	20.00%	50%	25.00%	5,500	96.00%	83.00%	97.00%	660,000	680,412	819,774	853,931	156	156	312	416	416	1,587
SP/SU CHIN	RRFH	Rapid River Hatchery	RapidR	RRFH	2,500,000	10.00%	50%	9.10%	3,731	92.60%	92.90%	95.60%	2,750,000	2,876,569	3,096,414	3,343,860	897	897	1794	1974	1974	1,393
		Little Salmon	RapidR	RRFH	150,000	10.00%	50%	9.10%	3,731	92.60%	92.90%	95.60%	165,000	172,594	185,785	200,632	54	54	108	119	119	1,387
		Hells Canyon	RapidR	RRFH	350,000	10.00%	50%	9.10%	3,731	92.60%	92.90%	95.60%	385,000	402,720	433,498	468,140	126	126	252	278	278	1,385
	SFH	Salmon R. - Co. Line Br. - Integrated	USRInt	SFH	250,000	0.00%	50%	3.00%	4,600	96.00%	94.00%	91.00%	250,000	274,725	292,261	304,438	67	67	134	139	139	1,799
		Sawtooth Weir -Segregated	USRSeg	SFH	1,450,000	3.00%	50%	3.00%	4,600	96.00%	94.00%	93.00%	1,493,500	1,605,914	1,708,419	1,779,603	387	387	774	798	798	1,872
		Yankee Fork	USRSeg	SFH	300,000	3.00%	50%	3.00%	4,600	96.00%	94.00%	93.00%	309,000	332,258	353,466	368,194	81	81	162	168	168	1,839
	PFH	Pahsimeroi Weir - Integrated	PahInt	PFH	65,000	0.00%	50%	14.00%	4,500	94.00%	90.00%	96.00%	65,000	67,708	75,231	80,033	18	18	36	42	42	1,548
		Pahsimeroi Weir - Segregated	PahSeg	PFH	935,000	10.00%	50%	15.00%	4,500	94.00%	90.00%	96.00%	1,028,500	1,071,354	1,190,394	1,266,376	282	282	564	664	664	1,549
	McFH	SFSR Knox Br. - Integrated	SFSRInt	SFSRW	150,000	0.00%	50%	10.00%	4,000	95.00%	91.70%	85.00%	150,000	176,471	192,443	202,572	51	51	102	114	114	1,316
		SFSR Knox Br. - Segregated	SFSRSeg	SFSRW	850,000	10.00%	50%	10.00%	4,000	95.00%	91.70%	85.00%	935,000	1,100,000	1,199,564	1,262,699	316	316	632	703	703	1,330
		Johnson Creek	JohnCr	JCW	150,000	10.00%	50%	16.00%	4,500	97.00%	87.00%	92.00%	165,000	179,348	206,147	212,523	48	48	96	115	115	1,435
		CW Sum Chinook - Powell Ponds	SFSRSeg	SFSRW	640,000	0.00%	50%	5.00%	4,000	92.00%	94.00%	96.00%	640,000	666,667	709,220	770,891	193	193	386	407	407	1,572
FALL CHIN	IFH	Salmon R.-Hammer Cr			1,000,000								1,000,000	#DIV/0!	#DIV/0!	#DIV/0!	#VALUE!	#VALUE!	#DIV/0!	#VALUE!	#VALUE!	#DIV/0!
SOCKEYE	SpFH	Redfish Lake Creek	Redfish Lake	RFLC	300,000	0.00%	50.00%	2.00%	2,400	99.00%	82.16%	83.77%	300,000	358,123	435,885	440,288	184	184	368	376	376	798
		Redfish Lake Creek	Redfish Lake	EFH CB	400,000	0.00%	50.00%	4.00%	1,800	100.00%	79.38%	83.77%	400,000	477,498	601,534	601,534	335	335	670	698	698	573
		Redfish Lake Creek	Redfish Lake	NOAA CB	300,000	0.00%	50.00%	5.00%	1,700	100.00%	75.19%	83.77%	300,000	358,123	476,291	476,291	281	281	562	592	592	507
											CELL FORMULAS		G*(1+H)	O/(N)	P/(M)	Q/(L)	ROUNDUP(R/K,0)	S/(I)-S	T+S	ROUNDUP(U/(1-J),0)	ROUNDUP(S/(1-I)/(1-J),0)	O/V

[1] In the 2013 AOP process, the co-managers approved a 10% cushion to meet release targets

[2] Culling of eggs for BKD, IHN, etc.

7.9.2. Egg Box Production

PROGRAM INPUTS							HISTORICAL HATCHERY PERFORMANCE METRICS (5-YR AVG)						FORM CALCULATED VALUES									
SPECIES	HATCHERY	RELEASE SITE	STOCK	PREFERED TRAPPING SITE	FORMAL EGG RELEASE GOAL	COMANAGER APPROVED CUSHION %[1]	% FEMALES IN BROODSTOCK	% MORTALITY DURING HOLDING	GREEN EGG FECUNDITY	% SURVIVAL AFTER DISEASE CULLING[2]	% SURVIVAL GREEN TO EYED EGG	% SURVIVAL EYED EGG TO RELEASE	EGG RELEASE GOAL WITH CUSHION	EYED EGGS	GREEN EGGS	GREEN EGGS BEFORE DISEASE CULL	FEMALES SPAWNED	MALES SPAWNED	TOTAL ADULTS SPAWNED	TRAPPED ADULTS NEEDED	ADULTS TRAPPED TO MEET 1:1 RATIO	SMOLTS PER TRAPPED ADULTS NEEDED
					(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)	(U)	(V)	(W)	(X)
STHD	PFH	SBT Egg Box-Yankee Fork[3]	USRB (DworB)	PFH	500,000	10%	50%	5.00%	6,200	100.00%	90.00%	NA	550,000	550,000	611,111	611,111	99	99	198	209	209	2,632
	SFH	SBT Egg Box-Panther Creek	PahA	PFH	400,000	10%	50%	0.00%	5,500	100.00%	91.70%	NA	440,000	440,000	479,826	479,826	88	88	176	176	176	2,500
		SBT Egg Box-Indian Creek	PahA	PFH	100,000	10%	50%	0.00%	5,500	100.00%	91.70%	NA	110,000	110,000	119,956	119,956	22	22	44	44	44	2,500
SP/SU CHIN	PFH	Panther Creek - EGG BOX	PahSeg	PFH	800,000	0%	50%	15.00%	4,500	95%	91.70%	NA	800,000	800,000	872,410	918,326	205	205	410	483	483	1,656
	McFH	Curtis/Cabin Creek - EGG BOX	SFSRSeg	McFH	300,000	0%	50%	10.00%	4,000	95%	91.70%	NA	300,000	300,000	327,154	344,372	87	87	174	194	194	1,546

[1] In the 2013 AOP process, the co-managers approved a 10% cushion to meet release targets

[2] Culling of eggs for BKD, IHN, etc.

[3] Eggs don't go to SFH