

**Standard Operating
Procedures**

for

**Salmon and Steelhead
Production Programs**

in the

**Salmon and Snake River
Basins**

Prepared by
Idaho Department of Fish and Game
Nez Perce Tribe
Shoshone-Bannock Tribes
U.S. Fish and Wildlife Service
Idaho Power Company

2014 Salmon/Snake River Annual Production Plan: Standard Operating Procedures (SOPs) for Hatcheries, Traps, and Weirs

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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

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 fresh water during the summer. The B-strain steelhead commonly spend two years in the ocean before returning to fresh water in late summer or autumn.

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 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).

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. Introduction and Background for Hatchery and Trapping Facilities

Niagara Springs Fish Hatchery (NSFH)- is operated by Idaho Department of Fish and Game (IDFG) and is owned and funded by the Idaho Power Company (IPC). 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 (see below). 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.

Oxbow Fish Hatchery (OFH)- is operated by IDFG and is owned and funded by the IPC. OFH is the spawning facility for the Oxb-A steelhead that are trapped at the Hells Canyon Trap. The production goal for the Oxb-A stock is to produce 800,000 yearling smolts at 4.5 fpp at release. All progeny are transported as eyed eggs to NSFH for final incubation and rearing.

Hells Canyon Trap (HC Trap) - is a satellite facility of OFH and is owned and operated by the IPC. The HC Trap is operated to collect OxbA steelhead broodstock. Broodstock

collection occurs primarily in the fall. If flow conditions permit, approximately 25% of the broodstock is collected in the spring. Adults trapped at HC Trap are transported to OFH for holding and spawning. See Appendix 5 for a detailed description the trapping protocols for the HC Trap.

Pahsimeroi Fish Hatchery (PFH)- is operated by IDFG and is owned and funded by the IPC. PFH is the broodstock collection facility for PahA summer steelhead. The production goal for the PahA stock is to spawn enough adults to produce 1,000,000 yearling smolts at 4.5 fpp at release. All progeny are transported from PFH as eyed eggs to NSFH for final incubation and rearing.

Hagerman National Fish Hatchery (HNFH) is owned and operated by the U. S. Fish and Wildlife Service (USFWS) and is funded through the Lower Snake River Compensation Plan (LSRCP). The Adult mitigation goal for the HNFH production is to produce 40,880 steelhead annually. The original smolt production target deemed necessary to meet the adult mitigation goal is 1.7 million yearling smolts at 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 to 1.36 million yearling smolts. With a recent effort to increase water quality using nitrogen degassing and oxygen supplementation, steelhead production (BY13) increased to 1.46 million yearling smolts. In addition, HNFH will be constructing a reuse aquaculture system in 2014 that will initially produce an additional 90,000 smolts increasing production to 1.55 million starting in BY14. Staff at HNFH rear two stocks of summer steelhead (SawA and EF Natural) for release into the upper Salmon River drainage.

Magic Valley Fish Hatchery (MVFH) is operated by IDFG and is funded through the LSRCP. The Adult mitigation goal for the MVFH production is to return 34,980 steelhead annually. The original smolt production target deemed necessary to meet the adult mitigation goal is 1.75 million yearling smolts at 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 1.54 million yearling smolts. Currently, three 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. The three stocks include Pahsimeroi-A (PahA), Upper Salmon River-B (USRB) USRB, and Dworshak-B (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.

Sawtooth Fish Hatchery (SFH) is operated by IDFG and is funded through the LSRCP program. SFH is the broodstock collection and spawning site for the SawA stock. SFH also incubates eggs that are part of the East Fork Salmon River Natural (EF Natural) steelhead supplementation program. In addition, SFH also incubates PahA eggs that are spawned at PFH and contribute to LSRCP mitigation responsibilities. Eggs incubated at SFH are transferred primarily to HNFH but some are also transferred to MVFH for final incubation and rearing.

East Fork Salmon River Satellite Facility (EF Trap)- is operated by IDFG and is funded through the LSRCP. The EF trap is a satellite facility of SFH and is the broodstock

collection site for the EF Natural steelhead supplementation program.

Dworshak National Fish Hatchery (DNFH)- is owned by the US Army Corps of Engineers and is operated by the USFWS and the Nez Perce Tribe (NPT). DNFH is the broodstock collection facility for DworB steelhead. Green eggs from DworB steelhead are transferred to Clearwater Fish Hatchery where they are incubated until the eyed stage. Eyed eggs are transferred to MVFH for final incubation and rearing. Approximately 830,000 DworB steelhead yearling smolts are currently released into the Salmon River drainage. Managers are currently in the process of phasing out the releases of DworB steelhead into the Salmon River and replacing them with a locally adapted stock of B-run steelhead in the upper Salmon River.

1.2. Niagara Springs Fish Hatchery (NSFH)

NSFH is the rearing facility for OxbA and PahA steelhead stocks that are part of the IPC hatchery mitigation program. Steelhead at NSFH are reared from eyed eggs received from OFH and PFH. Yearling smolts are released into the Pahsimeroi River below the PFH weir, into the Snake River below Hells Canyon Dam, and into the Little Salmon River at Stinky Springs or Hazard Creek. A renovation project at NSFH began in March, 2012, and was completed in December 2013. Upon completion of the new hatchery building in March, 2013, all steelhead from PFH and OFH were transferred to NSFH as eyed eggs. The new building incorporates filtered water through a U.V. treatment system to supply pathogen-free water to the hatchery incubators and vats. Thirty-eight new 50-foot vats allow fingerlings to grow inside the hatchery building in a protected, pathogen and predator-free rearing area.

1.2.1. Niagara Springs Fish Hatchery (NSFH)

Eggs are incubated on chilled well water at the egg-taking stations to slow their development. Eyed eggs from both OFH and PFH are shipped to NSFH in April and May (at approximately 400 TUs) and placed in upwelling incubators inside the hatchery building. Upon arrival at NSFH, eyed eggs are disinfected with Iodine at 100-ppm for at least 30 minutes prior to tempering and placing in upwelling incubators. Loading densities in the incubators range from 20,000 to 50,000 eggs. Incubator flows range between 20 to 25 gpm.

1.2.2. Nursery Rearing

After hatching, fry exit upwelling incubators directly into nursery rearing vats. 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/ft³/in. Fish hatched at NSFH from OFH eyed eggs are transferred from indoor vats to outdoor raceways 1 through 8 via the clipping trailer when they reach approximately 70 fpp. Fish hatched from PFH eyed eggs are ponded in the remaining eleven raceways, 9 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/ft³/in. 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.

1.2.3. Raceway Rearing

Fish are reared in 19 - 300 ft raceways at a maximum density index of 0.35 lbs/ft³/in and a maximum flow index of 0.9 lbs/gpm/in. The raceways were remodeled during hatchery construction in BY13. As densities increase, tail screens are removed and fish are allowed to move down to the next screened raceway section. Steelhead are fed Rangen feeds throughout the early rearing period at NSFH. Feed is dispensed by hand in the outdoor raceways until the fish are 50 fpp. When fish reach 50 fpp, they are switched to Rangen Hagerman Steelhead slow-sinking 450 extruded diet to allow staff to utilize two bulk tanks, a feed conveyor system, a fines separator and bridge feeders.

At least one-half of the fish are vaccinated after fin clipping with autogenous *Aeromonas salmonicida* bacteria. Fish are dipped in an oxygenated, vaccination solution of 18 liters of water to 2 liters of vaccine with a one-percent (1%) salt solution incorporated into the vaccine to reduce stress brought about by physical handling and to increase the uptake of vaccine by the fish. Vaccine will be applied at a rate of 220 lbs of fish per liter of vaccine, for at least 40 seconds. Mortalities will be recorded on all the raceways each month after vaccination until stocking, and mortality results summarized in the NSFH annual report.

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. PIT tagging typically occurs in January and a representative number of fin-clip quality checks are performed in all raceways prior to fish release. Dissolved oxygen is monitored during periods of peak loading. Water temperature remains a constant 59°F.

1.2.4. Fish Health

Fish health inspection and diagnostic services are provided by personnel at the Eagle Fish Health Laboratory (EFHL). 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, *Renibacterium salmoninarum* (causative agent of salmonid bacterial kidney disease; RS) and other pathogens. A pre-liberation inspection of 60 fish from each stock (PahA and OxbA) including an organosomatic index of fish quality is done on all lots no more than 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), RS, *Flavobacterium psychrophilum*, *Aeromonas salmonicida*, *Yersinia ruckerii* and *Myxobolus cerebralis*.

1.2.5. Fish Release/Transportation

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 begins on March 18 and concludes the fourth week of April. 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. 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. To reduce potential traffic and safety issues, releases at the Little Salmon River are coordinated with MFH and MVFH, and Bruce McLeod of the NPT. Releases at the Pahsimeroi River and Snake River sites are coordinated with the PFH and OFH managers.

1.2.6. Communication

NSFH distributes monthly hatchery production summaries, monthly hatchery narratives and annual reports. These are currently not sent to the Contact list ([Section 6](#)), but are maintained at the hatchery and IDFG headquarters and are available by request. 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. In addition, the IPC hatchery evaluation biologist and IDFG hatchery supervisors maintain close contact with the hatchery manager and staff for consultation if problems arise.

1.2.7. Monitoring and Evaluation

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 2](#). Marks and tags are applied by the Pacific States Marine Fisheries Commission marking crew.

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

HC Trap is the broodstock collection site for OxbA steelhead and is part of the IPC mitigation program. All steelhead trapped are transported to OFH for holding and spawning. Approximately 600 adult steelhead are trapped in the fall and held over winter; an additional 150 adults are trapped the following spring. This trapping scenario provides for pre-spawning mortality and culling for disease management. Steelhead spawning occurs in the spring and the resulting eggs are transferred to NSFH beginning in late April.

1.3.1. Ladder Operation

The HC Trap is operated as a cooperative effort by IPC and OFH staffs. Fall trapping at the HC Trap takes place in October and November when water temperatures fall below 60°F. 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 ft³/s at Hells Canyon Dam requires cessation of trapping because the trap is inundated with water. Trapping resumes in April and continues until the broodstock target of 150 fish is reached. A detailed description of trapping protocols is provided in [Appendix 5](#).

1.3.2. Adult Handling

All returning adult steelhead are scanned for CWTs and PIT tags and examined for other marks, tags, and injuries. Natural steelhead will have a tissue sample collected for Genetic Stock Identification (GSI) and released below HCD the same day. Incidental catches including wild trout, bull trout, and fall Chinook will also be transported and released below HCD. Adults to be held for broodstock are maintained in holding ponds at OFH until spawning occurs in the spring. 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 1](#) for detail). 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 out-plants may take place at agreed upon locations if excess fish are trapped. Carcasses from pre-spawning mortality are placed into a garbage dumpster and picked up weekly by the local sanitation company.

1.3.3. Spawning/Egg Take/ Egg Incubation/ Egg and Fry Shipping

OFH is the broodstock collection facility for OxbA summer steelhead. The production goal is to trap and spawn enough adults to produce 800,000 yearling smolts. To achieve this goal, approximately 1,073,170 green eggs are taken. Using an average fecundity of 5,800 eggs per female and an average eye-up rate of 83%, approximately 183 adult steelhead pairs are needed to meet the production goal of 880,000 eyed eggs. Trapping 600 adult steelhead in the fall and 150 more in the spring allows for pre-spawn mortality, possible culling of adults or eggs, and a little buffer in case spring trapping is not possible.

Spawning occurs twice each week beginning about March 10 and continuing until early-May. Fish are euthanized using a Seafood Innovations Model SI-5 stunner. Eggs from one female are drained of ovarian fluid and fertilized with milt from one male. Females with poor egg quality or bloody ovarian fluid and males with bloody or watery milt are not used for production. 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 53°F to 42°F 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 Jentsorter Model JM4 counter and picker. All progeny are transferred as eyed eggs to NSFH in ten gallon coolers with 54°F well water. Surplus eggs or fry may be used for resident Fish Management actions and are transported with equipment driven by IDFG employees; stocking sites and coordination is done through the Fisheries Bureau.

1.3.4. Fish Health

All females will have ovarian fluid and/or kidney/spleen samples collected to assay for viral replicating agents. Eggs will not be culled for IHN, but may be culled for other viral replicating agents such as IPN, VHS, or infectious salmon anemia virus (ISA). Sixty kidney samples are collected for enzyme-linked immunosorbent assay (ELISA) testing for *RS* and 20 head wedges are collected and examined for *Myxobolus cerebralis*.

1.3.5. Communication

OFH distributes monthly and annual reports to the IDFG Bureau and IPC hatchery biologist. During steelhead trapping, HC trap data is uploaded to the Fish Inventory System (FINS) database for each day the trap is operated. Adult releases are uploaded to

the IDFG release database at least weekly. 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 Fish Hatchery (PFH)

PFH is the broodstock collection facility for PahA summer steelhead. The production goal is to trap and spawn enough adults to produce 1,000,000 yearling smolts. To achieve this goal, approximately 1,382,400 green eggs are taken annually. Using an assumed average fecundity of 4,800 eggs per female and an eye-up rate of 80%, approximately 288 pairs of adult steelhead broodstock are needed to supply NSFH with 1,144,000 eyed eggs. PahA smolts are released into the Pahsimeroi and Little Salmon rivers. PFH also traps and spawns additional PahA adult steelhead to provide 500,000 eyed eggs for the SBT egg box program and 534,000 eyed eggs for the LSRCP programs at MVFH. These additional eggs require the spawning of 275 pairs of adult steelhead. The PahA eggs that are part of the LSRCP mitigation are transferred to SFH as green eggs where they are incubated to the eyed stage before being transferred to MVFH for final incubation and rearing. To meet the smolt release target of 470,000 smolts, approximately 145 females (4,800 eggs/females x 75% eye up x 90% eye to smolt) will be spawned. Staff from the SFH transport the green eggs from PFH to SFH. PahA smolts that are part of the LSRCP program are released into the mainstem Salmon River and the Little Salmon River.

In addition to the PahA program, PFH also traps hatchery-origin B-run steelhead (USRB) that are part of the LSRCP mitigation program. These adults are 100% CWT tagged with intact adipose fins to allow them to be distinguished from the PahA stock. USRB adults are currently trapped and spawned at PFH with resulting eggs incubated at PFH to the eyed stage before being transferred to MVFH; managers are currently working to develop plans that will allow these eggs to be incubated at SFH. A description of the development of this program is provided in [Appendix 3](#).

1.4.1. Ladder Operation

Trapping begins approximately February 20 and continues until a period when no fish are trapped for 10 days (typically mid-May). The trap will be checked weekdays during that period. 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).

1.4.2. Adult Handling

At trapping, all fish are measured for length, scanned for PIT tags, examined for gender, checked for various clips, tags, injuries, and readiness to spawn

Tissue samples for genetic stock identification (GSI) are collected from all unmarked steelhead and wild adult trout that enter the trap. All unmarked steelhead and trout are released upstream of the weir. 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 1](#) for detail)

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. Recaptured fish will be euthanized and given to the general public or charities.

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 nitrification 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/Egg Incubation/Egg and Fry Shipping

On spawn days, steelhead in the trap are sorted and checked for readiness to spawn. 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%.

Eggs are watered hardened in a 100 ppm solution of Argentyne at the lower PFH site (approximately 30 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 Argentyne 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 and fry. 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 16 inches. Dead eggs are picked and enumerated with a Jensorter electronic counter/picker.

Broodstock collection and spawning for the Upper Salmon River B (USRB) steelhead program occurs at Pahsimeroi Fish Hatchery. Currently, all USRB eggs are incubated at PFH; managers are evaluating options to ultimately incubate the USRB eggs at Sawtooth

Fish Hatchery. Once eyed, the eggs are shipped to Magic Valley Hatchery for final incubation and rearing. See [Appendix 3](#) for a description of activities related to this program.

To minimize risks associated with horizontal pathogen transfer, eggs are shipped to NSFH and MVFH in coolers provided by the respective facility.

1.4.4. Fish Health

All spawned females will be tested for viral replicating agents by ovarian fluid or tissue (kidney/spleen) samples. Sixty kidney samples are collected for ELISA testing for *RS*. Twenty head wedges are collected and examined for *Myxobolus cerebralis*.

1.4.5. Communication

Steelhead trapping updates are entered on the Hatchery Database Management System daily throughout the run and are available online through the HDMS database website <http://fishandgame.idaho.gov/ifwis/hdmsdownload/defaultpage.aspx>. Records of adult outplants are uploaded to the Department's fish release database as they occur. Pahsimeroi Hatchery personnel coordinate with the SBT, NSFH, and MVFH to determine a schedule to obtain and transfer eyed eggs and fry.

1.5. Hagerman National Fish Hatchery (HNFH)

HNFH is located in the Hagerman Valley, Idaho along the Snake River. HNFH is the rearing facility for the SawA and EF Natural steelhead stocks and all steelhead eggs are received from SFH. The SawA smolts are released into the mainstem Salmon River at SFH and into the Salmon River at McNabb Point. All EF Natural smolts are released into the EF Salmon River at the EF satellite facility (approx. 18 miles upstream of the mouth).

1.5.1. Egg Incubation

HNFH receives eyed eggs from SFH that have experienced between 370 and 450 TUs. Shipments occur in May and June. 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). Parental based tagging (PBT) data is recorded for tracking throughout the facility until distribution. After hatching, most sac fry swim from incubators directly into indoor rearing tanks; the remaining fry are emptied into the tank by staff.

1.5.2. Nursery Rearing

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 Skretting Fry food 8 hours per day at a minimum frequency of once per hour. Once fish reach the 1.5mm Steelhead floating feed, a 2x vitamin pack is included. Flows in rearing tanks are ramped up to, and then maintained at 100 gpm. Fish are reared inside to a density index of 0.80 and a flow index of 1.00. Fish are adipose fin clipped from the hatchery buildings in August at approximately 100 fpp and ponded in final rearing raceways.

1.5.3. Raceway Rearing

Fish are reared in three flow-through banks of raceways at a maximum density index of 0.20 and a maximum flow index of 1.20. Water is serially reused in the second and third bank. All fish are hand fed daily with Skretting floating steelhead feed with 2x vitamin pack up through 4.5mm after which they are placed on Rangen extruded 450 bulk Hagerman Diet with 2x vitamin pack until release. Starting with Skretting 4.5mm, feed is placed into demand feeders twice weekly. A length-at-release standard of 180 to 250 mm is used to guide culture practices. Meeting the release size standard is achieved by adjusting the hatchery constant. Oxygen and ammonia are monitored during periods of peak loading. Water temperature remains a constant 59⁰F.

1.5.4. Fish Health

All fish on station receive on site monthly fish health exams and pre-liberation inspections are performed at least four weeks prior to the first day of liberation. Fish health inspections are conducted by the Idaho Fish Health Center staff (USFWS) at the Dworshak National Fish Hatchery Complex. Prior to release, a 60 fish sample is taken and assayed for IHNV, IPNV, VHSV, *Aeromonas salmonicida*, *Yersinia ruckerii*, *Renibacterium salmoninarum* (*Bacterial Kidney Disease*), *Myxobolus cerebralis*, external parasites, Gas Bubble Disease, and 20 hematocrits. Monitoring is also conducted for the parasite *Nucleospora salmonis*. Fish health exam forms are provided to the hatchery as well as a summary at year-end. All steelhead are administered a vaccination for *Aeromonas salmonicida*. Initial treatment is administered at 400 fpp and a booster is given at 200 fpp.

1.5.5. Fish Release/Transportation

All of the HNFH steelhead smolt releases are trucked. Hauling occurs Monday through Friday during April and early May. IHOT fish transportation guidelines and NZMS HAACP plans are followed. Hauling is coordinated with several hatcheries to minimize traffic and safety concerns.

1.5.6. Communication

HNFH distributes a monthly hatchery production summary, a monthly narrative, and an annual report. HNFH evaluates production programs through a Hatchery Evaluation Team (HET). The HET meets quarterly to plan and coordinate specific studies and program changes or adjustments. The HET will need to review and approve any requests for a particular brood year in advance.

1.5.7. Monitoring and Evaluation

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 2](#). Marks and tags are applied by the Pacific States Marine Fisheries Commission marking crew.

1.6. Magic Valley Fish Hatchery (MVFH)

MVFH is the rearing facility for the LSRCP steelhead mitigation program and is located in the Hagerman Valley, Idaho along the Snake River. The annual smolt production target is

1.55M yearling smolts composed of three stocks (PahA, Dworshak B, and USRB). Eyed eggs received at MVFH are from adults spawned at PFH and DNFH. All stocks are transported for direct stream release at multiple sites in the Salmon River drainage (including the Little Salmon River).

1.6.1. Egg Incubation

Eyed eggs are received from SFH, PFH, and CFH when they have accrued between 370 and 450 TUs. Disinfected eyed eggs are loaded into upwelling incubators at 50,000 to 65,000 eggs per jar with a flow rate of 6 to 8 gpm. Record of spawning pairs loaded into indoor nursery incubators are maintained to facilitate the tracking of parental based tagging ([Appendix 1](#)). All stocks are reared in the incubation building.

1.6.2. Nursery Rearing

Sac fry volitionally swim from incubators into indoor rearing tanks. 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. 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. Fish are transferred in groups of approximately 32,000 fish per outside section for a total of 50 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. Raceway Rearing

Fish are reared in four banks of raceways split in half with two west banks and two east banks. Density typically reaches an index of 0.30 and a maximum flow index of 1.20.

The upper decks 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. Approximately 32,000 fish will be placed in each section. 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 a Rangen 450 extruded floating feed 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. When fish approach density indexes of 0.30, inventory in the lower 50 feet of the A deck, 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. 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. 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. Dissolved oxygen and total gas saturation are monitored intermittently throughout the rearing cycle. Water temperature remains a constant 58⁰F.

1.6.4. Fish Health

Fish health inspection and diagnostic services will be provided by the EFHL. 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, including an organosomatic index of fish quality. Specific pathogens tested for at pre-liberation will include IHNV, IPNV, VHSV, *RS*, *Aeromonas salmonicida*, *Yersinia ruckerii*, and *Myxobolus cerebralis*.

1.6.5. Fish Release/Transportation

All of the MVFH steelhead smolt releases are trucked. Hauling occurs Monday through Friday during April. IHOT fish transportation guidelines and NZMS risk assessment guidelines are followed. Hauling is coordinated with several hatcheries to minimize traffic and safety concerns.

1.6.6. Communication

MVFH distributes monthly hatchery production summaries and annual reports. These are sent to IDFG Fisheries Bureau personnel, Doug Munson (EFHL Pathologist), Phil Mamer (EFHL Supervisor), and the LSRCP office coordinator. Monthly summaries and annual reports are available upon request.

1.6.7. Monitoring and Evaluation

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 2](#). All marks and tags are applied by the Pacific States Marine Fisheries Commission marking crew.

1.7. Sawtooth Fish Hatchery and Weir (SFH)

SFH is the broodstock collection, spawning and early incubation facility for SawA steelhead that are part of the LSRCP mitigation program. Additionally, EF Natural and PahA steelhead are incubated to the eyed stage at SFH prior to being transferred to HNFH and MVFH. Managers are working on a plan to allow the Upper Salmon River B eggs to be transferred to SFH from PFH as green eggs in 2014. The eggs will be incubated to eye up on heated water then transferred to MVFH. A description of the development of this program is described in [Appendix 4](#).

1.7.1. Ladder Operation

Ladder and trap operations begin the last week of March and continue until early May. 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.

1.7.2. Adult Handling

Fish are sorted on Mondays and Thursdays. At sorting, fish are examined for gender, fork length measured, checked for various marks, radios, CWT, injuries, and readiness to spawn. Subsequent to sorting, ripe fish are spawned. Unmarked steelhead and other trapped species are released upstream of the hatchery weir. 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 1](#) for detail). ([Appendix 1](#)).

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/ Egg Incubation/ Egg and Fry Shipping

Approximately 352 females will be spawned. Adult brood need is 915 (assumes ~ 60:40 male:female ratio, 5,200 eggs per female fecundity, and 88% eye-up) to produce the eyed egg request. Spawning protocol is random 1: 1 with two female's eggs combined prior to water hardening of eggs.

All eggs are water hardened and disinfected with PVP iodine per product label. Prior to transport, eggs will receive a flush with formalin three times per week during incubation. 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. Only eyed eggs (no live fish) are transferred to HNFH and MVFH due to concerns with transfer of fish pathogens between stations.

1.7.4. Fish Health

All spawned females will be tested for viral replicating agents by ovarian fluid or tissue (kidney/spleen) samples. Sixty kidney samples are collected for ELISA testing for *RS*. Twenty 20 head wedges are collected and examined for *Myxobolus cerebralis*. The kidney samples and head wedges can be taken from among the 150 fish sampled for viral replicating agents.

1.7.5. Communication

Coordination of eyed egg shipments among the hatcheries is discussed weekly. Weekly communication for egg delivery status is undertaken with SBT Biologists. Twice weekly, run status is updated on the IDFG Webpage. Weekly summaries are provided to interested parties via e-mail. Eyed egg requests are finalized at the annual AOP meeting.

1.8. East Fork Salmon River Weir

East Fork Salmon River Weir (EF weir) is a satellite facility of SFH and is utilized to collect broodstock for the East Fork Natural (EF Natural) steelhead supplementation 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.

The hatchery production goal is to release 60,000 integrated steelhead smolts into the E.F. Salmon River near the adult trap annually. To achieve this production goal, approximately 87,500 green eggs are needed from approximately 16 females. 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. Specific broodstock and spawning protocols are detailed in the draft HGMP. 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.

1.8.1. Ladder Operation

Ladder and trap operations begin the last week of March and continue until mid-May. Once the velocity barrier is in place, fish swim into attraction water and into a trapping and holding area.

1.8.2. Adult Handling

Fish are checked daily. At checking, fish are examined for gender, fork length measured, checked for various marks, radios, CWT, injuries, and readiness to spawn. Subsequent to checking, ripe fish are spawned when ripe males and females meeting program protocols are available. 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 1](#) for detail). 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.

Due to whirling disease amplification issues, carcasses are not used for nitrification of local waters. Carcasses are returned to SFH, frozen, and transferred to a rendering plant.

1.8.3. Spawning/Egg Take/Egg Incubation/Egg and Fry Shipping

Target is 14 pairs for integrated broodstock of natural origin adult fish. Spawning protocol is random 2 males: 1 female with half individual females eggs fertilized by single male. Green eggs are transported to Sawtooth FH for eye-up, and then to HNFH for final incubation and rearing.

1.8.4. Fish Health

All spawned females will be tested for viral replicating agents by ovarian fluid or tissue (kidney/spleen) samples. Up to 60 kidney samples are collected for ELISA testing for *RS*. Twenty head wedges are collected and examined for *Myxobolus cerebralis*.

1.8.5. Communication

Coordination of eyed egg shipments among the hatcheries is discussed weekly. Eyed egg requests are finalized at the annual AOP meeting. Weekly communications occurs with IDFG research, hatchery, and Salmon Region personnel, and SBT.

1.9. Shoshone Bannock Tribes Egg Box Program

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. 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 remote site incubators (RSI) located in Yankee Fork, Panther Creek, and Indian Creek. Eyed summer steelhead eggs are outplanted into streamside RSIs in the spring, incubated in stream water, and fry allowed to volitionally emigrate in early summer.

Production objectives for the project for 2008 – 2017 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.

Operational and maintenance objectives include: 1) testing the incubator technology for successful hatching; 2) increasing egg to fry survival; 3) determining optimum incubator densities and configurations; 4) providing incentives for habitat improvements; 5) minimizing cost; 6) minimizing process; 7) minimizing fish handling; 8) increasing community education, involvement, and caring; 9) fulfilling the requirements of *US v Oregon*; 10) fulfilling the requirements of the LSRCP; and 11) Idaho Power Company mitigation.

1.9.1. Egg Incubation

Gametes to accomplish the SSI Program are acquired from Pahsimeroi Fish Hatchery or Dworshak National Fish Hatchery. Egg incubation procedures prior to transfer to the SSI Program are appropriately described within the specific hatchery section of this AOP (e.g., Pahsimeroi Fish Hatchery). Egg incubation procedures described in this section, pertain to period when eyed-eggs are acquired by the SSI Program to when fry vacate the RSI.

RSIs consist of a 50-gallon polyurethane cylinder which is connected to natural river water using PVC piping. The RSI 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 RSI is controlled from the inlet system by a valve. The outflow system includes a 2” PVC pipe, located at the top of the RSI, 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 RSI. 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 RSI on a weekly basis, but contingent upon egg development at the local hatchery. Each RSI receives a similar number of eggs during the outplanting events.

Incubators are monitored twice weekly from initial construction through complete fry emigration. SSI staff adjusts 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 RSI are enumerated to determine hatch success and fry seeding.

1.9.2. Fish Release/Transportation

Eggs are transferred in bags within iced coolers to constructed incubators within each tributary. 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.

1.9.3. Communication

PFH, SFH, and SBT personnel coordinate to determine a schedule to obtain and transfer eyed eggs. Results and conclusions from the streamside incubation project are presented in an annual report to the Lower Snake River Compensation Plan.

1.10. Dworshak National Fish Hatchery

Dworshak National Fish Hatchery provides DworB summer steelhead green eggs to Idaho Department of Fish and Game for the Salmon River B-run hatchery steelhead program at MVFH. 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.

1.10.1. Ladder Operation

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. Adults are collected during two time periods:

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. Approximately 600 adults are kept from these groups for spawning in January. Beyond the "early return" steelhead, spawning starts in late January and continues through mid-late April for all programs. 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).

The Dworshak steelhead program seldom observes a 1:1 sex ratio in adult returns. The typical sex ratio is about 2.3 females:1 male. A total of 550 females provide all the eggs needed for the Dworshak program. To meet egg requests for all programs, approximately 1,200 females are needed, this includes eggs for LSRCP programs at CHF and MVFH Magic Valley fish hatcheries. Due to high incidence of Infectious Hepoetic Necrosis (IHN) in late spawn takes, additional broodstock have been necessary to meet CFH and MVFH egg requests. To meet all programs, about 4,000 to 4,500 fish are collected to account for the male to female ratio and pre-spawning mortality. 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.

1.10.2. Adult Handling

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.

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.

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, 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 male:female spawning ratio. Males treated with formalin will be included in the group of fish to be disposed of in the Clearwater River.

1.10.3. Spawning and Egg Take

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. No backup males are used. 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 CO² 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.

1.10.4. Egg Incubation

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.

1.10.5. Egg and Fry Shipping

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.

1.10.6. Fish Health

Formalin is applied to adults during holding, as needed, to control fungus. Testing of adults is performed by the Idaho Fish Health Center (USFWS) including 100% individual testing for virus. Refer to Magic Valley Hatchery for further fish health information.

1.10.7. Communication

During the spawning season, information on broodstock collection numbers, biological information, spawning numbers, and other information is reported in weekly updated reports and recorded in established databases. A summary of spawning operations and all data are provided in annual spawning reports available from Dworshak NFH.

2. SPRING/SUMMER CHINOOK SALMON

Chinook salmon *Oncorhynchus tshawytscha* are native to the Columbia River drainage and spawn in fresh water during the summer and fall months. Idaho's Chinook enter the fresh water system the same year they spawn, usually beginning in spring of each year. 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.

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 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), McCall Fish Hatchery (MFH), Johnson Cr weir, Yankee Fork weir, and Sawtooth Fish Hatchery (SFH).

2.1. Introduction and Background for Hatchery and Trapping Facilities

Rapid River Fish Hatchery (RRFH) is operated by IDFG and is owned and funded by the IPC. RRFH is the primary broodstock collection, spawning, incubation and rearing facility for the IPC spring Chinook salmon mitigation program. The mitigation goal for the RRFH is to release 3,000,000 yearling Chinook salmon (2.5M on site, 350,000 in the Snake River below Hells Canyon Dam, and 150,000 in the Little Salmon River). 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.

Oxbow Fish Hatchery (OFH)- is operated by IDFG and is owned and funded by the IPC. Spring Chinook salmon trapped at the Hells Canyon Trap 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.

Hells Canyon Trap (HC Trap)- is owned and operated by the IPC. HC Trap is a satellite facility of OFH and is used to collect spring Chinook salmon broodstock for RRFH.

McCall Fish Hatchery (MCFH)-is operated by IDFG and is funded through the LSRCP. MCFH is the incubation and rearing facility for the South Fork Salmon River summer Chinook salmon mitigation program. The production goal for this program is to release 1.0M yearling smolts into the SFSR. The Adult mitigation goal for the MCFH production is to return 40,000 summer Chinook salmon annually. The MCFH also rears 100,000 summer-run Chinook salmon that are part of the Johnson Creek supplementation program run by the Nez Perce Tribe. Smolts from this program are released into Johnson Creek.

South Fork Salmon River Trapping Satellite (SFSR Trap)- is a satellite facility of MCFH that is operated by IDFG and funded through the LSRCP. The SFSR Trap is utilized to trap and spawn all broodstock for the MCFH program. Broodstock is also collected to provide 300,000 eyed eggs for the SBT egg box program. All green eggs are transported to MCFH for incubation and rearing.

Beginning in 2010, additional broodstock have been collected to initiate the development of a summer run of Chinook salmon in the South Fork Clearwater River. Green eggs for this program and transported to Clearwater Fish Hatchery for incubation and rearing.

In addition to the SFSR stock held at the SFSR satellite, summer Chinook salmon collected at the Johnson Creek Weir by NPT staff are transported to SFSR satellite where they are held and spawned. Green eggs from these adults are transported to MCFH for incubation and rearing.

Johnson Creek Weir (JC Weir) is operated by the NPT. The JC Weir is the broodstock collection site for the JCAPE program. Current production goal is to release 100,000 yearling smolts into Johnson Creek annually. Broodstock trapped at the JC Weir are transported to the SFSR satellite facility and are ponded and held until spawning. Eggs from this program are incubated and reared at MCFH. Only natural origin Chinook are utilized for broodstock and all other Johnson Creek adults are passed above the weir to spawn naturally.

Pahsimeroi Fish Hatchery (PFH)-is operated by IDFG and is owned and funded by the IPC. PFH is the broodstock collection, spawning, incubation and rearing facility for Pahsimeroi summer Chinook salmon. The production goal for the PFH is to release 1.0M yearling Chinook salmon smolts into the Pahsimeroi River annually.

Sawtooth Fish Hatchery (SFH)-is operated by IDFG and is funded through the LSRCP. SFH is the broodstock collection, spawning, incubation and rearing facility for the upper Salmon River spring Chinook salmon mitigation program. SFH also provides broodstock for the Yankee Fork Supplementation program operated by the SBT. The current production goal for the SFH is to release 1.8 million yearling smolts annually (1.6M in the mainstem Salmon River at SFH and 200,000 in the Yankee Fork Salmon River). The adult return mitigation goal is to provide 97,225 adults annually. The original smolt production target deemed necessary to meet the adult mitigation goal is 2.24 million yearling smolts at 15fpp and an SAR of 0.87%. Currently, the rearing capacity at SFH is limited to 1.8M yearling smolts.

East Fork Salmon River Satellite Facility (EF Trap)- is operated by IDFG and is funded through the LSRCP. The EF trap is a satellite facility of SFH. Currently no Chinook salmon artificial production programs are conducted in the EF Salmon River. The EF trap is currently 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.

2.2. Rapid River Fish Hatchery (RRFH), Oxbow Hatchery (OFH) and

Hells Canyon (HC) Trap

RRFH is the broodstock collection, spawning, incubation and rearing facility for the Rapid River spring Chinook salmon stock. Approximately 2,500 spring Chinook salmon are needed annually for broodstock for the RRFH spring Chinook salmon program. This number includes jacks and accounts for pre-spawning mortality at the 20-year average as well as average female culling required by disease management constraints and average fecundity. This brood level provides 3.6 million green eggs and 3.0 million smolts at an average of 88% eyed egg-to-smolt survival to meet the smolt release goals. *Ralph Steiner*

Rapid River Fish Hatchery is composed of the hatchery complex and Rapid River weir located approximately two miles downstream from the hatchery complex. HC trap and OFH operate as part of the RRFH program. All spring Chinook salmon are reared at the Rapid River Hatchery and released voluntarily into Rapid River or transported for release to the Snake River at Hells Canyon and the Little Salmon River. A portion of the marked adult spring Chinook salmon that are trapped at HC trap are transported to RRFH where they are held and mixed with marked adult spring Chinook salmon collected at Rapid River weir.

2.2.1. RRFH weir operation

The RRFH weir management related to broodstock collection is determined by projected number of returning salmon. Collection of broodstock and fish disposition are modified to accommodate projected return as projections are refined throughout adult migration. The adult trapping facility is put into operation approximately March 16. Spring Chinook arrive at the trap beginning in May. Trapping continues through the first week of September. When trapping ceases, the adult trap is reconfigured to allow migration around the weir. 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 bar racks inserted at the end of the ladder once approximately 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.

2.2.2. HC trap operation

The HC Trap operates three days/week Monday – Wednesday as flows permit (less than 40k ft³/s) (See Appendix 5 for a detailed summary of HC Trap – trapping protocols). Trapping for spring Chinook salmon begins in May and continues into July. Trapping ceases when holding pond temperatures exceed 70°F--usually about the first or second week in July. HC trap operation is affected by projected return to RRFH. The trap is operated by IPC and adults are transported to OFH for holding or distribution. 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 and transported by IPC personnel. Adult broodstock receive a left opercle punch prior to transport to RRFH. Beginning in 2014, adult broodstock leaving OFH will not receive an intraperitoneal injection of Erythromycin for *RS*. All fish entering the trap are electronically scanned for PIT tags and scrutinized for jaw tags, VIE tags, radio transmitters, and fin clips. After being

added to RRFH broodstock, monitoring is consistent with practices at RRFH.

Natural Chinook will have a tissue sample collected for Genetic Stock Identification (GSI) and transported and released below HCD the same day trapped. 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 loaded directly from the fish trap or will be sequestered at the hatchery, and will not be anesthetized or injected. The decision to release hatchery fish will be made by co-managers 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. Dispersed fish will not be anesthetized or treated with antibiotics.

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.

2.2.3. Adult handling

Upon arrival into the trap, all marked hatchery fish to be added to broodstock are, counted, measured, scanned for PIT tags and CWT, scrutinized for other tags e.g., jaw tags, and transported to the hatchery holding ponds for broodstock. Arriving ad-clipped spring Chinook salmon are not sexed at this time because dimorphism is not expressed when they arrive at the trap. 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. Formalin treatments will be applied at 167 mg/L seven days a week upon ponding of broodstock. Pre-spawning mortality of adult spring Chinook salmon will be categorized by suspected cause. Adults returns that are surplus to broodstock needs will be distributed or disposed of according to priorities outlined in the SOP. These hatchery fish will 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. 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 ([Appendix 1](#)). Because of the current pond configurations and multiple release sites, PBT tracking at RRFH can only be identified to the hatchery level.

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. Unmarked Chinook salmon will be counted, sexed, measured, given a right operculum punch, sampled for DNA, and released above the weir.

2.2.4. RRFH Spawning/Egg take/Incubation/Shipping

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. Tissue samples will be taken for DNA analysis from all parental crosses that result in eggs placed in incubation. 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 iodine. All 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. A total of 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.

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.

Egg inventory numbers are made available to EFHL.

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 3.4 million eyed eggs. Upon receiving ELISA results, eggs are segregated or culled based on titers >0.249 . Hatchery personnel are in regular communication with staff from the EFHL for guidance on culling and segregation. Beginning on the fourth day of incubation, all egg lots are treated with formalin three times each week at 1,667 mg/L for 15 minutes. This continues until each egg lot accumulates 800 daily thermal units (TU). After eggs have accumulated 300 TU incubator trays are rodded weekly or more often if necessary throughout the incubation period to remove silt.

At eye-up (approximately 500 TU), all egg lots are shocked and picked using a Jensorter[®] model BM-4 picker/counter then returned to the cleaned incubators. A second pick is performed at 750 TU. Hatch occurs about 800 TU. At 1,000 TU, all egg lots undergo another pick off to remove dead eggs or fry and eggshells. At 1,500 TU fry

undergo a fourth pick off and swim-up fry are ponded at 1,750 TU. OFH Egg incubation Due to space limitations at RRFH it is routinely necessary to transport green eggs from RRFH to OFH for incubation. Eggs for transport will be placed in egg tubes and water hardened in coolers filled with 100-mg/L iodophore for 30 minutes. Then, iodophore is displaced from the coolers with well water. About one gallon of ice is added, and the coolers sealed for transport. When the green eggs arrive at OFH they are disinfected in 100-mg/L iodophore 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 iodophore and placed in vertical stack incubators. The EFHL will notify OFH with the results ELISA BKD analysis and culling will take place at OFH.

2.2.5. Early Rearing

Fry are moved from vertical stack incubators to eleven outside raceways. Density and flow indices do not exceed 0.49 lb/ft³/in and 1.11 lb/gal/min/in, respectively. In mid-June, when the fingerlings are marked, they are moved to the final rearing ponds.

Fish are sampled biweekly for weight. 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.

2.2.6. Final Rearing

Rearing continues in the rearing ponds until mid-April. Final rearing density and flow indices do not exceed 0.22 lb/ft³/in and 2.25 lb/gal/min/in respectively at the beginning of release.

The fish are sampled biweekly for weight. 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 was completed and continuing until release, a quality check of adipose fin (AD) clips is performed on the sub-samples and fish are categorized as full clip, partial clip, or no clip.

Fish released will be 100% AD clipped and receive approximately 120,000 CWT's. 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. Seventy percent of PIT-tagged fish within the release are treated as run-at-large (monitor mode) at each 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 2](#))

Pursuant to US vs. OR 2008 – 2017 Management Agreement Table B1, release sites will include Rapid River, the Snake River below Hells Canyon Dam, and the Little Salmon River. For production at or above 3.0 million, releases will be 2.5 million into Rapid River and alternating releases of 100,000 to Hells Canyon and 50,000 to Little Salmon River (footnote 11 to Table B1 US vs. OR 2008-2007 Management Agreement).

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.

2.2.7. RRFH Fish Health

Spring Chinook salmon reared at this facility 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 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. The preliberation sample is performed within 30 to 45 days of release.

2.2.8. OFH Fish Health

Juvenile spring Chinook salmon are not reared at OFH. All juveniles are reared at RRFH.

2.2.9. Communication

Trapping information is updated on site and uploaded to the IDFG Fisheries Bureau via the hatchery database (FINS) daily and to IPC weekly. The Fisheries Release Database is updated and uploaded at the end of release. PIT tag files for returning adults are uploaded to PTAGIS at the end of the trapping season. As incubation and rearing progresses, Monthly Production Summaries and a Monthly Narrative Report are submitted to the IDFG Anadromous Fish Hatchery Supervisor and IPC. Release groups are reported to the IDFG Fisheries Bureau via the IDFG Fish Release Database and to the IDFG Research Bureau via the Data Entry Form for Release Database.

2.2.10. Transportation

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. *Ralph Steiner*

2.3. McCall Fish Hatchery (MCFH) and South Fork Salmon (SFSR) Weir

MCFH is the rearing facility for the SFSR summer Chinook salmon stock. Based on average fecundity and survival rates, 1,460 broodstock fish are needed to meet all production targets that include 300,000 eyed eggs (SBT Dollar Creek in-stream incubator boxes), 500,000 green eggs (Crooked River summer Chinook introduction to be reared at Clearwater FH) and a 1.0 million yearling smolt release at Knox Bridge on the SFSR.

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 integrated and segregated components of the broodstock are maintained at MCFH. The number of natural-origin adults incorporated into the broodstock and the number of hatchery-origin adults passed upstream of the weir to spawn naturally are based on a sliding scale of abundance for natural-origin adults (see SFSR Chinook Salmon HGMP for details). Smolts produced for the integrated broodstock will be marked differentially (100% CWT, no-fin clip) from the segregated

component (100% Ad-clip).

The sliding scale that was developed to build the integrated broodstock program will continue to be used at the MCFH in 2014. The production goal for the integrated component is 250,000 smolts, and the spawn crosses used to create the offspring will be a mix of hatchery-origin by natural-origin (HxN), hatchery-origin by hatchery-origin (HxH), and natural-origin by natural- origin (NxN) adults.

The number of adults needed for the integrated broodstock program is calculated based on the smolt release goal of 250,000 and accounts for average pre-spawn mortality, fecundity, and green-egg to smolt survival at MCFH (Table 1 below). The goal is to utilize equal numbers of male and female natural origin returns (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 SFSR trap. This forecast provides a starting point for the hatchery staffs to develop broodstock acquisition plans (Table 2 below). 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 (HxN, HxH, and NxN) will be determined based on the number of returning natural-origin 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 1.		Table 2. Sliding Scale for Integrated Broodstock				
		Escapement of NORs to SFSR Weir	Number of NORs Released Above Weir	Max % of NORs Retained for Broodstock	Target Fraction of Integrated Broodstock made of NORs	Maximum pHOS
Predicted escapement to SFSR	3,760					
Predicted NOR escapement to Weir*	2256	0-49	0	NA	NA	1.00
Hatchery Production Target	1,000,000	50-99	25-50	50%	20%	0.90
SegSmolt Rel Target	750,000	100-149	60-89	40%	30%	0.80
IntSmolt Rel Target	250,000	150-299	105-209	30%	40%	0.50
Avg Fecundity	4,700	300-599	210-419	30%	50%	0.50
Green Egg - Smolt	0.7	600-899	480-719	20%	60%	0.40
PreSpawn Adult Survival in Ponds	0.8	900-1199	720-1009	20%	70%	0.35
Int Brood Stock Need	190	1200-1999	1010-1809	20%	80%	0.25
		2000-3000	1810-2810	10%	90%	0.10

Spawn crosses used to create the 750,000 smolt segregated component for the SFSR, the 300,000 eyed egg for the Shoshone –Bannock Egg-box program, and 500,000 green eggs for the SFCR program will be hatchery by hatchery (HxH).

Additionally, MCFH rears up to 100,000 Johnson Creek origin summer Chinook salmon yearling smolts annually.

2.3.1. SFSR Weir Operation

Summer Chinook for the MCFH summer Chinook program are collected at the SFSR weir. 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 week of June. Hatchery personnel monitor flows physically at the SFSR and on-line to determine the appropriate river stage to lower weir panels.

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 smothering. 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.

A PIT tag array system into 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.

2.3.2. Adult Handling

Upstream migration of returning salmon will be stopped by the SFSR weir allowing for adult interception in the adjoining trap. All Chinook are processed through the trap where they are identified by mark type and gender, measured and scanned for PIT tags and CWTs, and any definable injuries are noted. Tissue samples are collected from all natural-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 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 1](#)). All CWT snouts collected are sent to the Nampa Research office for tag extraction and processing. Unmarked adults receive an operculum hole punch prior to being passed upstream to spawn naturally. This is done to help management efforts in evaluating weir efficiency. No salmon processed through the SFSR trap will be injected with erythromycin due to environmental concerns and logistics needed to insure a 30-day withdrawal period is reached prior to in-stream disposal of broodstock carcasses. Salmon intended as brood stock are placed into the holding ponds separated by sex; East holding pond – females, West holding pond – males and a subdivided section for outplants or subsistence redistributions.

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. The APHIS veterinarian-in-charge is notified of any reportable pathogen.

All unmarked returning salmon are visibly checked for the presence of any detectable elastomer mark; indicating the fish to be a Johnson Creek supplementation “stray.” Any Johnson Creek strays encountered are segregated, and then transferred to Nez Perce fishery personnel who are responsible for transporting/releasing the fish into Johnson Creek. All unmarked salmon will be scanned using a coded-wire-tag detection wand as part of being processed through the SFSR Trap. On a positive CWT detection, additional attention is exercised to check for the possible presence of an elastomer mark.

Chinook from the integrated program are unmarked and 100% CWT. Returning adults will be used in the integrated broodstock and passed above the weir in proportions outlined in the sliding scales (Table 2). Returning adults in excess of the above needs will be handled according to a prioritized distribution schedule that will be 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. The 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 the West 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.

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.

2.3.3. Spawning/Egg take/Incubation/Shipping

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. 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. To facilitate this action, hatchery males will be dispatched immediately following milt collection. A minimum of 477 segregated summer Chinook females will need to be spawned to meet program objectives as follows: 216 females to provide for 750,000 segregated and a minimum of 75 females for 250,000 integrated MCFH smolt production, 80 females to produce 300,000 eyed eggs for SBT Dollar Creek egg boxes and 106 females (to provide 500,000 green eggs for the introduction of summer Chinook to Crooked River as part of the Clearwater Fish Hatchery Chinook salmon program funded by LSRCP. Spawning activities take place on Tuesdays and Fridays and may

begin at primary sort – Tuesday of the 2nd week of August. Spawning is limited to a maximum of 150 females per day. A kidney sample for ELISA BKD analysis will be collected from all females spawned. Ovarian fluid and cranial wedges, number to be determined by fish pathologists, are collected from a portion of the spawned females for viral testing and whirling disease. All eggs collected are linked to an individual egg tray, or genetic samples, based on the ELISA BKD disease sample collected.

2.3.4. Egg incubation

Hatchery production eggs and eggs spawned for SBT egg boxes are returned to MCFH for incubation in Heath style incubators trays following water hardening at SFSR trap. Green eggs collected for summer Chinook introduction in Crooked River are transported to Clearwater FH for incubation by IDFG personnel following water-hardening at the SFSR trap. Segregated eggs are loaded into trays at two females per tray and any integrated eggs produced 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. A light “rodding” of trays to remove sediments begins weekly once eggs accumulate 400 FTU’s. At 550-600 FTU’s eggs are shocked then picked/ enumerated the following day. Eggs generated from females demonstrating ELISA optical densities greater than 0.250 will be destroyed 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).

2.3.5. Fish Health

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 preliberation sample consisting of 60 randomly selected fish is examined for *R. salmoninarum*, bacteria, viral replicating agents, and whirling disease *M. cerebralis*. Goede’s organosomatic index is performed as a part of this preliberation examination. The preliberation examination is performed between 30 and 45 days prior to release. The APHIS veterinarian-in-charge is notified of any reportable pathogen.

2.3.6. Early Rearing

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. Hourly hand feeding during the day commences when 80% of set out fry have achieved swim-up. Extruded starter feed, produced by Skretting/ BioOregon, is used during early rearing. Flows are set at 80 gpm then increased to 140 gpm (maximum) when fry are well on feed. Individual vats are extended to full length when the density index reaches 0.50 to 0.55. Approximately ½ of the fry are marked (hand Ad-clipped) into outdoor ponds in early to mid-June (200-350

fpp). At this time 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 (100 – 150 fpp) are marked (MATS Automated Trailer) into the outdoor ponds during the 3rd week of July with ending individual vat densities ranging from 0.30 – 0.55 (flow indices 0.70 – 1.20).

2.3.7. Final Rearing

Final rearing takes place in one of two outdoor rearing ponds which are partially covered to allow for natural light penetration. Summer Chinook in the ponds are hand fed a dry pellet diet produced by Skretting/BioOregon. Sample counts are conducted monthly to monitor growth. No prophylactic erythromycin medicated feed treatments are scheduled. At time of release density and flow indices do not exceed 0.25 and 2.00, respectively. Ponds are connected to a collection basin where fish are crowded for loading onto transport trucks for release.

Parr are marked into both of the outdoor rearing ponds during June and July mark sessions. Also, fish that receive a CWT are distributed equally between the outdoor ponds. Currently, all segregated SFSR summer Chinook are Ad-clipped, and approximately 120,000 of these are also CWT. Additionally, 26,000 of the segregated brood smolts and 26,000 of the integrated brood smolts receive a PIT tag prior to release. The current mark schedule is set to hand AD-clip 500,000 SFSR segregated parr starting in June. The MATS trailer will be used to AD-clip 100,000 and AD-clip w/ CWT 120,000 SFSR segregated parr and CWT only 250,000 integrated brood parr beginning in July. PIT tags will be inserted into 52,000 pre-smolts from both pond one and pond two in mid-February. 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.

Hatchery staff remove PIT tags from pre-release mortalities and sweep raceways with a magnet post release to recover any shed PIT tags.

The Nez Perce Tribe operates six PIT tag arrays (see [Appendix 6](#)) in the South Fork Salmon River Basin (SFSR) to help evaluate the survival of the juvenile releases out of the SFSR and survival back as adults. The two PIT tag arrays in the Mainstem South Fork also help provide real time estimates of adults into the SFSR and help evaluate natural and hatchery origin returns. Information about PIT tag recaptures can be viewed at "www.ptocentral.org/dbaccess/InStrmDtctn/InStrmDtctn_query.html".

2.3.8. Communication

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. In addition, monthly production narratives are provided to representatives from each organization.

As eggs are enumerated MCFH will coordinate with SBT fishery personnel to determine a schedule to transfer eyed eggs. Spawning summaries will be included in the annual run report.

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.

2.3.9. Transportation strategies

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. Approximately 8,500 pounds of fish are transported during each release trip and 2 release trips are scheduled each day. At Knox Bridge, water from the SFSR is pumped onto the trucks to provide tempering prior to release. Release takes place using a transfer tube stretching from the roadway to the river. Historically, as one rearing pond was emptied the Johnson Creek origin summer Chinook smolts being reared in the hatchery collection basin were removed and transferred to the empty pond to facilitate stocking of the second pond of SFSR SU. Discussions about alternatives to this procedure are underway in 2014 in an effort to release Johnson Creek during the optimum conditions for smolt survival in Johnson Creek and the downstream migratory corridor.

2.3.10. Adult Outplants

Adults returning to the SFSR vary in terms of numbers, origin, sex ratios, and age class. Because of this, it is our desire to have general agreement on what to do with fish that are in excess of harvest, broodstock, and subsistence distribution. Given the variability of the adult returns on an annual basis, the most useful guidance tool is a table that lists out the priorities of where and how the excess fish will be handled. Fish that are out-planted into areas are intended to help boost natural spawning with the anticipation of bringing back more natural fish. Fish that are out-planted need to be sexed to ensure an equal sex ratio if possible. Last, 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) to ensure that fish sufficiently mature to decrease chances of fish straying into other tributaries.

The table below provides a prioritized list of release locations and numbers for locations within the larger SFSR drainage. These locations and numbers give adult spawners a chance to seed under-utilized habitat in order to maximize spawner success, with the anticipation of bringing back more natural adults in future years. In order to ensure that monitoring and evaluation programs have the correct evaluation tools, all out-planted fish need to be differentially marked with a unique opercle punch pattern to differentiate 1) fish recycled for the fishery, 2) fish out-planted into upper mainstem SFSR, and 3) fish out-planted into EFSSFR (three distinct marks). In addition, for fish out-planted into the EFSSFR a genetic sample will be taken (the opercle punch is adequate), in order to evaluate the fish that may spawn in Johnson Creek. The NPT has an ongoing genetic parentage study for all returning adults to Johnson Creek.

The table presumes that prior to out-planting, harvest, broodstock, and subsistence distribution needs are satisfied. Out-planting will occur after the upper mainstem South Fork Salmon River reaches the Nez Perce Tribe minimum viable number of 1,000 spawners. Releases should occur late enough to encourage fish to remain in outplant sites for intended spawning (i.e. after July 25) to ensure that fish sufficiently mature to decrease chances of fish straying into other tributaries(SFSR-South Fork Salmon River, EFSFSR – East Fork South Fork Salmon River, 2LOP- Two left opercle punches, 2ROP- Two right opercle punches).

Outplant table for excess adult Chinook from upper mainstem South Fork Salmon River weir, listed by Priority, stream, numbers, and applied marks

Prioriti- zation of Outplants	Outplant Stream	Release Location	Number males Outplanted	Number Females Outplanted	Core Mark
1	SFSR	Goat Ck/ Roaring Ck	200	400	2LOP
2	EFSFSR	Above Glory Hole	200	400	2ROP
3	EFSFSR	Below Glory Hole	200	400	2ROP
4	SFSR	Goat Creek/ Roaring Ck	200	400	2LOP
5	EFSFSR	Above Glory Hole	200	400	2ROP
6	EFSFSR	Below Glory Hole	200	400	2ROP
7	EFSFSR	Above Glory Hole	200	400	2ROP
8	EFSFSR	Below Glory Hole	200	400	2ROP
		SFSR Total	400	800	
		EFSFSR Total	1,200	1,800	
		Grand Total	1,600	2,600	

2.4. Johnson Creek Weir

The goal of the Johnson Creek Artificial Propagation Enhancement (JCAPE) project 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.

2.4.1. Supplementation (O&M) Goal

Conduct necessary operations to produce 100,000 smolts annually for release into Johnson Creek. In order to meet this supplementation goal, up to 40 pairs of natural

origin adults are needed to produce 100,000 smolts annually.

2.4.2. Monitoring and Evaluation (M&E) Goal

Establish baseline information on the Johnson Creek summer Chinook salmon population. Monitor and evaluate the effectiveness of supplementation to aid in the recovery of the natural population of Johnson Creek summer Chinook salmon.

2.4.3. Weir operation

The Johnson Creek weir is installed mid June to early July when water flows subside to 700cfs or below. Adult Chinook, encountering the Johnson Creek weir, enter a trap box. The weir contains an upstream trap box to capture upstream migrating adults. The weir is monitored daily and fish are processed out of the trap box each day. The weir is removed when no fish have been captured for seven consecutive days, usually in mid September.

2.4.4. Adult handling

Up to 40 pairs of natural origin adults are kept for brood stock, and are taken and held until spawning at the South Fork Salmon River (SFSR) trap. At the SFSR trap, Johnson Creek adults are treated similar to SFSR adults (see MCFH adult handling). Additional natural origin and all hatchery origin adults captured at Johnson Creek weir are either: 1) released upstream for natural spawning; or 2) euthanized and placed into Johnson Creek for nutrient enhancement (stray AD fin clipped fish only). All fish released above the weir will be marked in a manner that identifies them as having been trapped at the weir (either a opercle punch or opercle tag of some sort).. Broodstock transported to the SFSR are both opercle and floy tagged.

A maximum of 40 natural origin Johnson Creek adult pairs (including jacks) are taken for broodstock and transported to the SFSR trap for holding. Eggs from 32 females allow for high BKD culling and to maintain smolt production near 100,000. Broodstock are marked with a numbered tyvek opercle tag and a numbered floy tag to differentiate from SFSR broodstock.

2.4.5. Spawning/egg take plans, mating protocol

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. An additional male is used when sperm quantity or quality is questionable.

During spawning, 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. Brood fish are also examined for viral replicating agents and *Myxobolus cerebralis*. Eggs from parents with serious pathogens are culled. The APHIS veterinarian-in-charge is notified of any reportable pathogens. **NC**

Johnson Creek origin eggs are transported in individual egg bags to the MCFH for incubation in Heath style incubators trays. Eggs are loaded into trays at one female per tray. Incubation procedures are the same as those used for SFSR production eggs.

The JCAPE project has cryopreserved semen available for use in spawning ([Appendix 4](#)). The use of these samples would follow the guidelines established by the NPT Cryopreservation project and with approval from NOAA Fisheries.

2.4.6. Carcass disposition

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.

Early rearing

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. Hourly hand feeding during the day commences when 80% of fry achieve swim-up. 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 0.40 to 0.45. Following June reserve SFSR salmon ad fin clip marking, the Johnson Creek Chinook are divided into additional vats to reduce rearing densities. All Johnson Creek Chinook receive a CWT in mid-July (MATS) and are moved back into the indoor vats for continued rearing. As density indices approach 0.40 Chinook parr are subdivided into additional vats.

Johnson Creek Chinook parr are moved into the outdoor collection basin in late October to early November. Chinook are hand fed a dry pellet diet with a low phosphorus formulation and fortified with an EIBS vitamin pack (2.5 mm and 3.0 mm feed size). Sample counts are conducted monthly to monitor growth.

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). This program, initiated prior to the first releases of supplemented fish, has been collecting baseline life-history characteristic information, to examine survival of the wild fish in Johnson Creek and any potential effects that the supplementation program may have on the natural population.

All Johnson Creek Chinook smolts are CWT tagged and approximately 2,000 are PIT tagged. MATS marking trailers operated by PSMFC personnel are used to insert CWT in July. Fishery personnel from the NPT are responsible for PIT tagging (2,000). PIT tagging typically occurs in mid-January before smolt release. A baseline mark quality assessment is conducted 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

Johnson Creek Chinook are reared at MCFH and follow MFH fish health protocols. The EFHL provides diagnostic and inspection services to these fish. 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.

2.4.8. Communication

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 ([Section 6](#)), 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.

2.4.9. Transportation

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 300 – 400 gallon tanks for transporting smolts to Johnson Creek near Wapiti Ranch for release. 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.

2.5. Shoshone Bannock Tribal Egg Box Program

The Shoshone-Bannock Tribes initiated an eggbox program to utilize excess or surplus summer Chinook salmon production from McCall Fish Hatchery 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 fry. This is accomplished by outplanting eyed-eggs, received from McCall Fish Hatchery, in remote site incubators (RSI) located in Dollar Creek. Eyed summer Chinook eggs are placed into in-stream RSIs in late fall, incubated in stream water, and fry allowed to volitionally emigrate the following spring.

Production objectives for the project for 2008 – 2017 are consistent with the *US v Oregon* Agreement, which include incubating 300,000 eyed-eggs.

Operational and maintenance objectives include: 1) testing the incubator technology for successful hatching; 2) increasing egg to fry survival; 3) determining optimum incubator densities and configurations; 4) providing incentives for habitat improvements; 5) minimizing cost; 6) minimizing process; 7) minimizing fish handling; 8) increasing community education, involvement, and caring; 9) fulfilling the requirements of *US v Oregon*; and 10) fulfilling the requirements of the LSRCF.

2.5.1. Egg incubation

Gametes to accomplish the program are acquired from the adult Chinook salmon trapped at the South Fork Salmon River Satellite Facility, which is operated by McCall Fish Hatchery. Egg incubation procedures prior to transfer to the program are appropriately described within the specific hatchery section of this AOP (e.g., McCall Fish Hatchery). Egg incubation procedures described in this section, pertain to period when eyed-eggs are acquired by the program to when fry vacate the RSI.

In-stream RSIs are constructed from various sized Rubbermaid storage containers. Each side of the RSI (6 total) is modified to allow water to filtrate the incubator. The four sides and bottom are removed and replaced with 1/8" Vexar screen mesh. To top of the incubator is also modified (i.e., cut out) and replaced with 1/4" Vexar screen mesh to allow swim-up fry to vacate the RSI. Emergent fry can easily pass through the 1/4" mesh but not the 1/8" mesh. Neutrally buoyant bio-saddles are placed in three layers separated by 1/4" mesh screen and loaded with eyed-eggs.

The system is designed to incubate eggs, rear alevins, and volitionally release swim-up fry. Upon hatching alevins develop in the interstitial spaces provided by the bio-saddles. Eyed-eggs are typically outplanted on one to three occasions. Once an RSI is loaded with eggs, it is place in a specific stream habitat type and anchored to the streambed via tie wire and rebar.

Depending upon funding, incubators may or maynot be monitored prior to hatching. When fry emigration is complete, dead eggs and dead fry remaining in the RSI are enumerated to determine hatch success and fry seeding.

2.5.2. Communication

McCall FH and Shoshone-Bannock personnel will coordinate to determine a schedule to spawn, obtain, and transfer eyed-eggs. Results and conclusions from the eggbox program will be presented in an annual report to the appropriate funding agency.

2.6. Pahsimeroi Hatchery (PFH) and Weir

The mitigation goal for PFH is to release 1,000,000 summer Chinook smolts annually into the Pahsimeroi River. Approximately 300 pair of adult summer Chinook are required to meet this mitigation based on the following life stage specific survival estimates: a pre-spawning mortality rate of 3%- 5%, 4,500 eggs/female fecundity, an estimated 85% eye-up rate, and culling of bacterial kidney disease positive adults at an expected rate of 3%.

PFH is composed of upper and lower facilities. Adults are trapped at the Lower PFH. Eggs are incubated and fish are reared at the Upper PFH.

The hatchery program for summer-run Chinook salmon in the Pahsimeroi River is managed as an integrated "stepping stone" program in which both integrated and segregated components of the broodstock are maintained at PFH. The number of natural-origin adults incorporated into the broodstock and the number of hatchery-origin adults passed upstream of the weir to spawn naturally are based on a sliding scale of abundance for natural-origin adults (see PFH Chinook Salmon HGMP for details). Integrated smolts will be marked

differentially (100% CWT, no-fin clip) from the segregated smolts (100% Ad-clip).

The number of adults needed for the integrated broodstock program is calculated based on the smolt release goal of 200,000 and accounts for average prespawn mortality, fecundity, and green-egg to smolt survival at each facility (Table 1). The goal is to utilize equal numbers of male and female natural origin returns (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 staffs to develop broodstock acquisition plans (Table 2). 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 (HxN, HxH, and NxN) will be determined based on the number of returning natural-origin 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 1.		Table 2. Sliding Scale for Integrated Broodstock				
		Escapement of NORs to Pahsimeroi Weir	Number of NORs Released Above Weir	Max % of NORs Retained for Broodstock	Target Fraction of Integrated Broodstock made of NORs	Maximum pHOS
Predicted NOR Escapement to Weir	300	0-49	0	NA	NA	100%
Hatchery Production Target	1,000,000	50-124	25-94	50%	20%	90%
SegSmolt Release Target	800,000	125-249	75-149	40%	30%	80%
IntSmolt Release Target	200,000	250-499	175-398	30%	40%	50%
Average Fecundity	4,600	500-999	399-898	30%	50%	50%
Green Egg - Smolt Survival	0.793	1000-1499	899-1398	20%	60%	40%
PreSpawn Adult Survival in Ponds	0.871	1500-1999	1399-1898	20%	70%	30%
Integrated Brood Stock Need	126	2000-3000	1899-2899	10%	90%	10%

Spawn crosses used to create the 800,000 segregated component for the Pahsimeroi R. program will be hatchery by hatchery (HxH).

2.6.1. Weir operation

The PFH weir and trap operates to collect summer Chinook from approximately June 15 through October 1. 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.

2.6.2. Adult Handling

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 all fish containing CWT's and are sent to the Nampa Research office for CWT extraction and processing. Tissue samples for genetic analysis are collected from all marked 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 1](#)).

Chinook from the integrated broodstock are unmarked and 100% CWT. Returning adults will be used in the integrated broodstock and passed above the weir in proportions outlined in the sliding scales. Returning adults in excess of the above needs will be handled according to a prioritized distribution schedule that will be determined by the cooperators.

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. 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.

A total of 300 pairs of broodstock are needed to meet mitigation goals and only up to 10% of the males will be jacks. 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. Beginning in 2012, at the request of the IDFG Fish Health Lab personnel, adult Chinook salmon will not be injected with erythromycin. Only these ponded broodstock fish are injected with erythromycin. 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 distributes to registered food banks in that order of priority. All brood females are sampled for *RS* by ELISA technology. **NC**

Salmon ponded for broodstock are treated with 60 minute 167 ppm flow-through formalin treatments 3 times per week between July 1 and September 1. These formalin treatments are needed to control mycosis and to prevent outbreaks of ICH.

2.6.3. Spawning/egg take/ mating protocol

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. The spawning goal is to collect approximately 1,283,000 green eggs to yield the mitigation target of

1,000,000 smolts at release.

Eggs from females with ELISA optical densities of 0.25 and above are culled from production. 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. The APHIS veterinarian-in-charge is notified of any reportable pathogens detected in brood fish sampling.

2.6.4. Egg incubation

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 50°F to 40°F. 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 16 inches. Dead eggs are picked and enumerated with a Jentsorter electronic counter/picker.

2.6.5. Early rearing

Early rearing takes place in the Upper PFH vat room on 50°F 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. Hand feeding begins two days after ponding to allow for proper sealing of egg yolk prior to exposure to feed. Fish food is distributed to all vats with Ziegler belt feeders and supplemented with hand feeding. 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/ft³/in. Target size for ponding is 120 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. Following marking, fish are moved outside into two covered rearing ponds.

2.6.6. Final rearing

Feeding regimes vary based on size of fish and rearing water temperature. Due to the perennial infestation of *Ichthyophthirius multifiliis*, prophylactic treatments of formalin, at a 167 mg/l are applied on an alternating day basis during July and August to limit mortalities to this parasite. Fish are reared until they reach their release size of approximately 15 fpp.

The fish are scheduled to be released at the end of March each year. Screens are removed

and the fish are allowed to volitionally move out of the two rearing ponds and into the Pahsimeroi River. After two weeks of volitional release, remaining fish are forced out of the rearing ponds by hatchery personnel. Final release numbers are determined using sample counts along with marking numbers minus mortality. Pre-liberation condition factors and mark quality assessments are conducted prior to release.

2.6.7. Juvenile fish health

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. The preliberation sample is performed within 30 to 45 days of release.

Egg inventory numbers are available to EFHL in December to facilitate erythromycin medicated feed pre-mix needs.

2.6.8. Communication

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. Trapping information is also uploaded to the Hatchery Data Management System daily and is available online through the HDMS database website <http://fishandgame.idaho.gov/ifwis/hdmsdownload/defaultpage.aspx>.

Monthly inventory summaries are provided to an electronic distribution list which includes IDFG Fisheries Bureau, LSRCP, and IPC offices.

2.6.9. Fish Release/Transportation

All Chinook smolts are released volitionally from the rearing ponds at the upper facility. from April 1 to April 16. 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 ISS program 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.

2.7. Sawtooth Hatchery (SFH) and Weir

Current production target at SFH is 1.8M yearling smolts (1.4M for segregated weir release, 200,000 for the integrated smolt weir release and 200,000 for the smolt release into Yankee Fork Salmon River). Approximately 900 broodstock are needed for the SFH spring Chinook salmon program. This number includes jacks and accounts for pre-spawning mortality. This brood level will provide 2.2 million green eggs at 4,860 egg fecundity and 1.8 million smolts at an average of 88% eyed egg-to-smolt survival to meet the SFH component. Currently, SFH has sufficient specific, pathogen-free water to rear indoors 600,000 parr to 7 cm target size prior to transfer to final rearing on raw river water. Additional well water is available to six small, outside raceways to rear an additional 1.2 million 7 cm fry.

The hatchery program for spring-run Chinook salmon in the upper Salmon River is managed as an integrated “stepping stone” program in which both integrated and segregated components of the broodstock are maintained at SFH. The number of natural-origin adults incorporated into the broodstock and the number of hatchery-origin adults passed upstream of the weir to spawn naturally are based on a sliding scale of abundance for natural-origin adults (see SFH Chinook Salmon HGMP for details). Integrated smolts will be marked differentially (100% CWT, no-fin clip) from the segregated smolts (100% Ad-clip). The sliding scale that was developed to build the integrated broodstock program will continue to be used at SFH in 2014. The production goal for the integrated component is 200,000 smolts, and the spawn crosses used to create the offspring will be a mix of hatchery-origin by natural-origin (HxN), hatchery-origin by hatchery-origin (HxH), and natural-origin by natural origin (NxN) adults.

The number of adults needed for the integrated broodstock program is calculated based on the smolt release goal of 200,000 and accounts for average prespawn mortality, fecundity, and green-egg to smolt survival at SFH (Table 1 below). The goal is to utilize equal numbers of male and female natural origin returns (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 (Table 2). 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 (HxN, HxH, and NxN) will be determined based on the number of returning natural-origin 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 1.		Sliding Scale for Integrated Broodstock				
		Escapement of NORs to Sawtooth Weir	Number of NORs Released Above Weir	Max % of NORs Retained for Broodstock	Target Fraction of Integrated Broodstock made of NORs	Maximum pHOS
Predicted NOR Escapement to Weir	2,115	0-49	0	NA	NA	100%
Hatchery Production Target	1,800,000	50-124	25-94	50%	25%	90%
SegSmolt Release Target	1,600,000	125-249	75-149	40%	30%	80%
IntSmolt Release Target	200,000	250-499	175-398	30%	40%	50%
Average Fecundity	4,860	500-999	399-898	30%	50%	50%
Green Egg - Smolt Survival	0.83	1000-1499	899-1398	20%	60%	40%
PreSpawn Adult Survival in Ponds	0.95	1500-1999	1399-1898	20%	70%	30%
Integrated Brood Stock Need	100	2000-3000	1899-2899	10%	90%	10%

Spawn crosses used to create the 1,400,000 segregated harvest component for the upper Salmon River will be hatchery by hatchery (HxH) and broodstock for the 200,000 yearling smolts for the Yankee Fork Salmon may be a combination of adults trapped in the Yankee

Fork Salmon River and adipose clipped adults captured at SFHA 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.

Prior to the completion of the Crystal Springs Fish Hatchery for the Yankee Fork Chinook Salmon Supplementation Program, smolt production for the Yankee Fork program will be reared at SFH. Tribal staff will participate with IDFG personnel in spawning activities, genetic tissue collection, tagging operations, and loading and transport of smolts and adults to the Yankee Fork. Smolt releases in the Yankee Fork will be representative of adults from across the run. For adult returns in excess of broodstock needs, outplants may occur in the Yankee Fork Salmon River. 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.

2.7.1. SFH Weir operation

Depending on spring runoff conditions, ladder and trap operations will begin between mid-May and mid-June and continue through Labor Day weekend. 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. Adult broodstock need is approximately 900 fish.

Adults are treated with formalin three to seven days per week depending on river water temperatures and fish health. Genetic samples are collected from all unmarked fish and all hatchery spawned broodstock.

2.7.2. Adult handling

The adult trap is worked up daily and all fish are 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 are released above the hatchery intake after daily trap operations have ended. Hatchery-origin marked fish are defined as fish with either an adipose fin-clip only (AD), adipose clip/Coded Wire Tag (AD/CWT), or CWT only. Unmarked fish are defined as fish with no external markings or CWT. Brood fish that contribute to the segregated group are all hatchery-origin. Brood fish that contribute to the integrated group have at least one natural-origin parent. Approximately 50 pairs of adults are necessary to meet the current 200,000 integrated smolt goal. The spawn crosses are 1 male to 1 female. The progeny from the integrated crosses are kept separate from any segregated progeny until smolt release or until marking. Incubation and fish rearing practices are the same for both integrated and segregated smolts. 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 1](#)).

Chinook from the integrated broodstock are unmarked and 100% CWT. Returning adults

will be used in the integrated broodstock and passed above the weir in proportions outlined in the sliding scales. Returning adults in excess of the above needs will be handled according to a prioritized distribution schedule that will be determined by the cooperators.

To reduce prespawning mortality due to *Ichthyophthirius multifiliis*, broodstock holding water will be treated with 167 mg/l formalin for up to 7 days per week. Once water temperatures exceed 65°F, an extended formalin treatment of 40 mg/l for 6 hours will be implemented if *I. multifiliis* is detected (under veterinary extra-label prescription). 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). A 20 fish sample is collected to monitor *Myxobolus cerebralis* prevalence. The APHIS veterinarian-in-charge will be notified if reportable pathogens are detected. Pre-spawning mortality of adult spring Chinook salmon will be categorized by suspected cause.

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.

Adult and jack Chinook surplus to brood need are ponded separate from broodstock and made available for Tribal ceremonial and subsistence and charitable organizations and adult outplants to SBT YFCSS. Excess Chinook are not treated with injectable erythromycin, anesthetized with MS-222 or treated with formalin.

2.7.3. Carcass disposition

Carcasses are placed into totes in the back of a refrigerated freezer trailer. At the end of the season these carcasses will be taken to a rendering plant.

2.7.4. Spawning/egg take plans, mating protocol

Approximately, 450 females and 450 males are needed for broodstock for the SFH spring Chinook salmon program. Marked hatchery fish are spawned with marked hatchery fish across brood years where possible using the following spawning protocol; > 100 pairs then 1m: 1f random cross, 50 to 100 pair then 2m : 1f split random cross , 25 to 50 pair then 3m: 1f split random cross and < 25 pair 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. If cryopreserved sperm is needed fill out request form ([Appendix 4](#)). Assistance will be provided to NPT cryopreservation program.

2.7.5. Egg Incubation

Eggs are water hardened and 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 immediately prior to enumeration. 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.

2.7.6. Early Rearing

At swim-up about 800,000 Chinook fry are transferred into 14 indoor vats with screens initially placed at half vat length. Approximately 60,000 fry are set out in each vat. The remaining 1.2M Chinook fry are transferred about evenly into one of six outside small raceways supplied with well water. Hourly hand feeding during the day commenced when 90% of set out fry achieved swim-up. After the transition to #1 starter feed automatic clock belt feeders will present the feed to the fry. Extruded starter feeds will be used during early rearing. Flows are set at 50 gpm then increased to 110 gpm (maximum) when fry were well on feed. All fry (100 – 150 fpp) will be marked (MATS Automated Trailer) into outside raceways beginning the third week of May.

2.7.7. Final Rearing

Final rearing takes place in one of fourteen outside raceways. These raceways are supplied with raw, river water. Fish marking begins the third week of May. If needed, final marking will begin mid-September. The target density index and flow index at release are 0.15-0.20 and 1.0 – 1.6 respectively. At release the hatchery mitigation smolts are crowded into the connected raceway tailrace then crowded from the tailrace to the Salmon River via a buried 24 inch pipeline. Smolts destined for the SBT program in the Yankee Fork SR will be loaded with a fish pump into transport tanker truck.

Standard protocol is to sample count at least monthly for growth monitoring during their rearing cycle, and approximately one week before release. Length frequencies and condition factors will be determined from a representative sample prior to release. A fin clip quality check and CWT retention check will be completed before release.

PSMFC tagging crews PIT tag fish in late March. Research personnel monitor PIT tag detection at dams. Starting in 2007, large scale representative PIT tagging was implemented at Sawtooth and has been ongoing since that time. 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 recovers PIT tags from pre-release mortalities and sweeps raceways with a magnet post release to recover any shed PIT tags. Returning adult fish pass through a PIT array located in the hatchery trap ladder and are scanned by a PIT antenna mounted in measuring board. ([Appendix 2](#))

2.7.8. Fish Health

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. The APHIS veterinarian-in-charge is notified if reportable pathogens are detected.

Egg inventory in December will be available to EFHL so as to make predictions for erythromycin medicated feed pre-mix needs.

2.7.9. Transportation strategies

Smolt destined for the Yankee Fork Salmon River (YFSR) as part of Shoshone-Bannock Tribal Chinook Supplementation program will be transported according to IHOT guidelines. Smolts will be transported early April using contract drivers part of HNFH transportation contract. Trucks will release smolts into a pipeline with outflow positioned over the YFSR near mouth of Jordan Creek.

2.7.10. Communication

Final plans are determined when fish run projection is clear. Discussion with ISS project leaders, IDFG, SBT, NPT and LSRCP is ongoing. Planning coordination occurs with NPT for cryopreservation program. 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. Weekly adult trapping information is available on the IDFG website.

2.8. East Fork Salmon River Weir (EFSR)

The EFSR weir is a satellite facility of SFH. The facility is operated by IDFG and is funded through the LSRCP. Depending on spring runoff conditions, ladder and trap operations will begin early June and continue through the end of September. Natural-origin adults trapped at the weir are sampled and passed above the weir to spawn naturally. Hatchery-origin adults are either transported to SFH or released into the mainstem Salmon River above the mouth of EFSR.

2.8.1. Adult Handling

Fish are checked daily. All fish are examined for gender, length measured, checked for various marks, radios, CWT, injuries, Genetic material and scale samples are collected from all unmarked Chinook salmon. Natural-origin Chinook salmon and other trapped species are released upstream of the hatchery weir.

2.8.2. Monitoring and Evaluation

Genetic samples from natural/wild adult Chinook salmon collected at the EFSR adult trap will be analyzed to assess the relative reproductive success of captive-reared adults previously released to spawn naturally in the EFSR. Genetic material from these adults will be analyzed with samples from all captive-reared adults released to spawn, all previous years' natural adult returns, and all carcasses recovered from the study area. These samples will be used in parental exclusion analyses through the use of

microsatellite markers. *Eric Stark*

2.8.3. Communication

Chinook Salmon Captive Propagation Technical Oversight Committee (CSCPTOC) meets quarterly providing program updates to participating agencies.

2.9. Yankee Fork Supplementation Project (YFCSS)

The Yankee Fork Chinook Salmon Supplementation (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. The goal of the YFCSS is to maintain, rehabilitate, and enhance salmon population viability with harvest potential, aid to spatial distribution, and contribute to diversity. In addition, supplementation action in Yankee Fork is necessary to prevent near-term extinction, avoid further losses of genetic variation, and promote recovery of the ESA listed population.

2.9.1. Weir operation

Two portable picket weirs are installed on the Yankee Fork Salmon River annually. The lower weir is located just below Pole Flat Campground (approximately 3.5 miles upstream of confluence) to trap returning natural-origin and hatchery-origin adults. The upper weir is installed just above 5 Mile Creek to hold transported hatchery adults for natural spawning. Construction of the weirs occurs in mid to late June when flow drops to a level for safe installation. The lower weir is removed generally in September after seven consecutive days of no trapping occurrences. The upper weir is not removed until after spawning is complete to ensure no downstream migration of hatchery-origin adults.

2.9.2. Adult Handling

Trap boxes will be checked every day by trap tenders. All fish are measured and right operculum punched at the lower weir for genetic tissue (DNA) and mark-recapture analysis to estimate total adult Chinook salmon escapement above the weir. All natural adults trapped at the weir are processed and immediately released above for natural distribution and spawning. Hatchery adults are transported and released at three sites above the upper weir for natural spawning. All mortalities are removed and data is collected on date, time, sex, cause of death (if known), and body condition. Mortalities are placed in the mainstem Yankee Fork spawning habitat to replenish depleted marine nutrients in the system.

If determined that hatchery returns to Sawtooth are sufficient to meet the broodstock goal appropriate for producing of 1.8 million Chinook smolts, surplus adults above broodstock needs may be recycled into fisheries downstream and in the close vicinity to the Sawtooth weir or outplanted to supplement natural spawning in Yankee Fork Salmon River. In the latter case, Tribal and IDFG personnel will coordinate to transport and release Sawtooth hatchery adult Chinook salmon above the Five-Mile weir in three locations. Adult outplants from SFH are left operculum punched (for further genetic evaluations).

2.9.3. Carcass disposition

Trap boxes will be checked every day by trap tenders. Mortalities will be removed and data will be collected on date, time, sex, cause of death (if known), and body condition. Biological samples will be collected and placed in proper containers for later analysis. Mortalities will then be spread across the spawning habitat to help replenish depleted marine nutrients in the system.

2.9.4. Spawning/egg take plans, mating protocol

TBD with final approval of HGMP.

2.9.5. Egg Incubation

Incubation for the YFCSS program will occur in the interim at the Sawtooth Fish Hatchery under normal guidelines and operations.

2.9.6. Early Rearing

Rearing for the YFCSS program will occur in the interim at the Sawtooth Fish Hatchery under normal guidelines and operations.

2.9.7. Final Rearing

Rearing for the YFCSS program will occur in the interim at the Sawtooth Fish Hatchery under normal guidelines and operations.

2.9.8. Fish Health

Chinook salmon reared at this SFH are inspected by EFHL personnel on a quarterly basis for *RS*, viral replicating agents, parasites, and bacterial pathogens such as *Aeromonas*, and *Flavobacterium psychrophilum*. The protocols adopted for the Sawtooth program is applied with these fish.

2.9.9. Fish Release/Transportation

Yankee Fork smolt releases and transportation is currently to be determined and will be finalized in a Memorandum of Agreement between the Tribes, IDFG, and LSRCP. Outplanted adults are transported using a 300 gallon tank mounted on a three-quarter ton truck. The tank has one compartment of 300 gallon capacity and was modified to include an oxygen tank, diffuser, and circulating pump. The tank is filled with water pumped directly from Yankee Fork or acquired at the SFH. Normal hauling guidelines are followed for adult fish, which is approximately one pound of fish per gallon of water.

2.9.10. Communication

The Tribes will coordinate with IDFG and SFH personnel on all activities related to the YFCSS program. The YFCSS will complete weekly, monthly, and annual reports to the cooperating agencies during in-season management and post-season analysis, respectively.

3. FALL CHINOOK SALMON

3.1. Introduction and Background for Hatchery and Trapping Facilities

The Idaho Power Company's mitigation goal is to release 1 million fall Chinook salmon smolts annually into the Snake River. Currently the Oxbow Fish Hatchery lacks the ability to rear the entire mitigation goal and therefore rears a portion of the goal (200,000) with the remaining fish (800,000) to be reared at another facility. Presently IPC contracts with the state of Oregon and LSRCF for rearing space at the Irrigon Fish Hatchery to rear the remaining 800,000 fall Chinook salmon.

3.2. Oxbow Fish Hatchery (OFH) -IDFG

The objective of the Oxbow Fish Hatchery (OFH) is to rear 200,000 sub-yearling fall Chinook salmon smolts annually for release into the Snake River below Hells Canyon Dam (HCD).

3.2.1. Adult Handling

No adults are collected at OFH for broodstock. See the Lyons Ferry Hatchery AOP for details regarding adult trapping at Lower Granite Dam and subsequent adult handling at Lyons Ferry Hatchery.

3.2.2. Egg Incubation

OFH receives fall Chinook salmon eggs from the Lyons Ferry Fish Hatchery (LFH), owned by the LSRCF and operated by Washington Department of Fish and Wildlife. The OFH portion of the IPC mitigation is listed as 9th in the US v OR priority table. Typically eyed eggs are picked up by OFH personnel the first week of December. Proper IDFG and ODFW permits will be in hand before picking the eggs up. Typically seven coolers of 30,000 eggs per cooler will be used to transport 210,000 eyed eggs to OFH. The coolers are topped with approximately 52°F well water at LFH and bungeed shut for the trip back. Upon arrival at OFH, eggs are disinfected with 100 ppm iodine for at least ten minutes. The eggs are inventoried and put away at approximately 2,500-3,000 eggs per tray. Well water is degassed with mini packed columns and KOCH™ Rings on the eggs in the incubation room.

The resulting eggs and fry are handpicked weekly until ponding at about 1,700 daily temperature units. Ponding typically occurs the first week of January.

3.2.3. Nursery Rearing

Fry should be completely buttoned up before ponding using five gallon buckets carried by hand to the outside raceways. Raceways are set up ahead of time using the small raceway screens and four small raceway nursery sections that each measure 154 ft³. Wood wedges and wood brooms will be kept separate between raceways and used only once per season. Initially, the Oxbow Well Pump (#1) can be turned on to supply disease free 54°F well water to the fish. The Pine Creek Well Pump (#2) serves as an automatic backup. The well water goes through two packed columns to break up the nitrogen and provide 100% oxygen saturation to the raceways. The fry are hand fed twice per hour

using hand sifters in addition to using four 12-hour Ziegler™ Belt Feeders. Raceways are swept and mortality is collected daily. Condition factors and sample counts are conducted weekly. Fry are initially fed at about a 3% body weight per day. Feed projections are changed weekly, striving for about a 1.0-inch of growth per month. Fry are reared to not exceed a density index of 0.30 lb/ft³/in and a flow index of 1.0 lb/gpm/in.

3.2.4. Raceway Rearing

Fry are extended as recommended flow and density indices dictate. Typically the Pine Creek Well Pump (#2) will have to be turned on about the third week of February. Each raceway has about 1,571 ft³ of available rearing space. Flow indices are often exceeded for the first two weeks of March as OFH staff try to get more growth on the fry using the warmer well water. Oxygen measurements are taken weekly throughout rearing using a portable HACH™ Hd-q oxygen meter. As oxygen measurements approach 5 ppm (54% saturation), river water is added to the raceways. This typically occurs the end of March. Around the middle of April, the marking crew comes to AD Clip, CWT tag, and PIT tag fish. Currently about 200,000 fish receive AD/CWT and another 3,000 fish receive AD/PIT. It takes a crew of about 15 people one week to complete marking operations. Fish have to be at least 100 fpp in order for clipping to occur. Typically, OFH staff push for early growth to get the fish to about 60 fpp when the marking crew arrives. It is the responsibility of the hatchery manager and trailer supervisor to ensure proper crowding and marking procedures are followed. The OFH crew will conduct quality checks on 300 fish per raceway prior to release.

Normal shipping of the fall Chinook will occur about the first week of May. The size at release goal is 50 fpp. Fish are crowded and pumped into a transport truck using a Aqua-Life Model BP25E-P-1 external priming fish pump and tower. Contract drivers and 5,000 gallon IPC tankers filled with 52°F water from the raceways are used to transport the fish. Typically it takes two trips to haul 200,000 sub-yearling smolts (4,000 lbs) below Hells Canyon Dam.

3.2.5. Fish Health

Ceratomyxa shasta (CS) is present in the Snake River. This *myxosporean* parasite has been established as a main source of mortality for migrating salmon. Consequently, the OFH tries to maintain the fry on disease free well water as long as possible before adding river water to the raceways.

Fall Chinook salmon reared at this facility are inspected by EFHL personnel for *RS*, viral replicating agents, parasites, and bacterial pathogens. Diagnostic services are 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. The preliberation sample is performed prior to release.

3.3. Irrigon Fish Hatchery (ODFW)

IPC contracts with the state of Oregon and the LSRCP to rear up to 800,00 subyearling fall Chinook salmon annually for release into the Snake River below Hells Canyon Dam (HCD).

3.3.1. Adult Handling

No adults are collected at Irrigon Fish Hatchery (IFH) for broodstock. See the Lyons Ferry Hatchery AOP for details regarding adult trapping at Lower Granite Dam and subsequent adult handling at Lyons Ferry Hatchery.

3.3.2. Egg Incubation

The IFH receives its eggs from the Lyons Ferry Hatchery. The IFH portion of the IPC mitigation is listed as 15th and 17th in the US v OR priority table. Typically eyed eggs are picked up by IFH personnel in early December. Incubation at IFH occurs in 82 vertical trays with 5,000 eggs per tray. Eggs are incubated from eyed eggs to emerging fry in the incubation trays.

3.3.3. Nursery Rearing

Early rearing at IFH occurs in 6-ft diameter circular tanks.

3.3.4. Raceway Rearing

Fish are moved to two raceways, 20-ft wide x 100-ft long x 4-ft deep each. Around mid-April, all fish receive an AD Clip (800,000), and a portion receives CWT and PIT tags. Currently 200,000 fish receive an AD/CWT and approximately 3,000 receive a PIT tag.

3.3.5. Release/Transportation

Normal fish hauling occurs in late May. The size at release goal is 50 fpp. Contract drivers and IPC 5,000 gallon tankers are used for transport. All 800,000 sub-yearling smolts (16,000 lbs) are hauled for release into the Snake River at the boat launch immediately below Hells Canyon Dam.

4. SOCKEYE SALMON

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. In the 2008 FCRPS Biological Opinion, NOAA Fisheries established a juvenile sockeye production target for this hatchery program of up to 1 million smolts.

Sockeye salmon are currently reared at five facilities: Eagle Fish Hatchery (Eagle FH) and Burley Creek Fish Hatchery (Burley Creek FH) rear sockeye to full term adults for captive broodstock needs and releases. Sawtooth Fish Hatchery (Sawtooth FH), Springfield Fish Hatchery (Springfield FH) and ODFW's Oxbow Fish Hatchery (Oxbow FH) rear juveniles to the full term smolt stage for release in early May. Springfield FH was completed in the fall of 2013 and received eyed eggs in December of 2013. The program will ramp up over a three year period as programs at Sawtooth FH and Oxbow FH ramp down. Brood Year 2015 will be the first year of full production at Springfield (1,000,000 smolt goal).

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 Sawtooth FH trap collect anadromous sockeye for broodstock. All spawning activities occur at Eagle FH and Burley Creek FH.

4.1. Introduction to Background to Hatchery and Trapping Facilities

Eagle Fish Hatchery (Eagle FH)-is operated by IDFG and is funded by Bonneville Power Administration (BPA). Eagle FH maintains a sockeye captive broodstock, anadromous sockeye holding, spawning, incubation, and captive broodstock rearing for the Sockeye Captive Broodstock Program. The current broodstock goal is to produce 500 to 800 captive adults to spawn annually. No adult release goal has been established, but captive brood adults in excess of egg production needs will be released to Redfish and Pettit lakes. Eyed eggs produced from the spawning events are used for replacement captive broodstock at Eagle FH and Burley Creek FH, provide eyed eggs to Sawtooth FH, Springfield FH and Oxbow FH (ODFW) for sockeye smolt production. Brood Year 2013 is scheduled to be the last year for smolt production at Sawtooth FH and Brood Year 2014 is scheduled to be the last year for smolt production at Oxbow FH. Springfield FH will rear up to 1,000,000 smolts annually.

Redfish Lake Creek Trap (RFLC trap)- is operated by IDFG and is funded through the BPA. The RFLC trap is a satellite weir of SFH. Currently there is no adult holding facility at this site, so all trapped sockeye are transferred to Eagle FH or released directly to Redfish Lake Creek above the weir.

Sawtooth Fish Hatchery Trap - Trap is operated by Sawtooth FH (see section 2.7.1 for details). Sockeye are trapped from mid-July through September at the Sawtooth FH trap. Sockeye program staff assist with processing the trapped salmon each morning, all sockeye are loaded directly onto a transport vehicle and transferred to Eagle FH or to the

Redfish Lake Creek trap site for processing. Sockeye processed at the Redfish Lake Creek trap site will be released directly to Redfish Lake at the boat ramp.

Burley Creek Fish Hatchery (Burley Creek FH)-is operated by NOAA Fisheries and funded by BPA. Burley Creek FH maintains a duplicate (safety net) sockeye captive broodstock to the Eagle FH program, spawns, incubates, sockeye captive broodstock rearing, and releases mature adults for volitional spawning. The current production goal is to rear 500 to 800 captive adults annually for spawning and/or release. Eyed eggs produced from these spawning events are used for smolt production at Sawtooth FH, Springfield FH and Oxbow FH. As noted above, as Springfield FH production ramps up, production at Sawtooth FH and Oxbow FH will be discontinued.

Oxbow Fish Hatchery (Oxbow FH)-is operated by ODFW and funded by the Mitchell Act. BPA provides additional funding for sockeye smolt production. Oxbow FH's current sockeye smolt production goal is 100,000 smolts at 10 fish per pound (fpp). Smolts are transported from Oxbow FH to release in Redfish Lake Creek. This program will be discontinued after smolt rearing is completed for brood year 2014 (released in 2016).

Sawtooth Fish Hatchery (SFH)-is operated by IDFG and is funded through the LSRCF. BPA provides additional funding for the sockeye smolt production contracted through the Sockeye Captive Broodstock contract. SFH 's current production goal is 180,000 sockeye smolts at 20 fpp. Smolts are currently released into Redfish Lake Creek. This program will be discontinued after smolt rearing is completed for brood year 2013 (released in 2015).

Springfield Fish Hatchery (Springfield FH)-is operated by IDFG and is funded through the BPA as part of the Idaho Fish Accord Agreement. Springfield FH was completed in the fall of 2013. Springfield FH will become the primary sockeye smolt production facility with an annual production goal of up to 1,000,000 smolts at 10 fpp. After Springfield FH is fully operational, the sockeye smolt programs at Sawtooth FH and Oxbow FH will be discontinued.

4.2. Eagle Fish Hatchery/Burley Creek Fish Hatchery

Approximately 1,500 eyed eggs are needed to meet and maintain genetic diversity for broodstock replacement goals for the Eagle FH sockeye salmon captive broodstock program. A replicate group of eyed eggs is transferred to Burley Creek FH (NOAA Fisheries Manchester Marine Lab in Washington State) as a safety net strategy. Spawn crosses made from each brood year will also meet production goals in the Salmon River Basin. Production goals may be adjusted annually based on recommendations provided by the Stanley Basin Sockeye Technical Oversight Committee (SBSTOC) to agency policy staff. Current production goals for the Salmon River Basin are ramping up to 1,000,000 smolts (BY13: 450,000 smolts, BY14: 700,000 smolts, and BY15: 1,000,000 smolts) released in May to Redfish Lake Creek, and 250 captive reared adults released in September to Sawtooth Basin lakes. Note: Smolt production rearing goals are included in the Sawtooth FH, Springfield FH and Oxbow FH summaries above.

4.2.1. Ladder operation

Fish weirs on Salmon River at and Redfish Lake Creek are monitored daily from mid-July through mid-October. A representative group of anadromous sockeye salmon are trapped are transferred to Eagle FH to be incorporated into the captive broodstock. Anadromous sockeye not transferred to Eagle FH are released to Redfish Lake Creek (trapped at Redfish Lake Creek weir) or to Redfish Lake (trapped at SFH weir).

4.2.2. Adult fish health

Adults returned to Eagle FH to be incorporated into the spawning matrix are sampled for all viral and bacterial pathogens. Special precautions are taken to isolate/quarantine this group from the captive population.

Adult sockeye salmon transferred to Eagle FH are injected with a 20 mg/kg intra-peritoneal injection of erythromycin to control *Renibacterium*. To reduce prespawning mortality due to *Ichthyophthirius multifiliis*, broodstock holding water will be treated with 167 mg/l formalin (60 minute static bath) for up to three days per week. All brood females are sampled for *RS* using ELISA technology. Eggs from females with optical densities of 0.40 and above are culled from production. Eggs from females with optical densities between 0.25 and 0.40 will only be used in the egg box program.

4.2.3. Adult outplanting/markings

Returning adults will be incorporated into the spawning matrix at Eagle FH and/or released with captive reared adults to Redfish Lake. All captive reared adults will be PIT tagged and adipose clipped. All released sockeye will be genetically sampled for future Parental Based Tagging (PBT) analysis.

4.2.4. Adult monitoring and evaluation

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.

4.2.5. Spawning/egg take plans, mating protocol

Returning anadromous adults that are not released will be incorporated into the captive broodstock spawning matrix at Eagle FH. The spawning matrix used at Eagle FH is currently a 1 x 2 matrix. Crosses are made based on least related individuals determined from micro satellite analysis. Every attempt is made to represent all males in the population equally.

4.2.6. Carcass disposition

All carcasses as a result of spawning or pre-spawn mortalities will be disposed of at the local rendering plant.

4.2.7. Egg incubation

Eggs will be incubated between 8 to 10 degrees Celsius until the eyed stage. Survival to

eye will be calculated and eyed eggs will be used in various release strategies (depending on pathology results of the males and females used in the spawn crosses).

4.2.8. Juvenile fish health

Due to the relatively low number of fish reared annually, pre-transfer fish health sampling does not occur prior to transporting juveniles from Eagle FH to Manchester or 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. To date, sockeye salmon have remained relatively disease free.

4.2.9. Communication

Eagle FH produces monthly updates provided to IDFG Fisheries Bureau. Stanley Basin Sockeye Technical Oversight Committee (SBSTOC) meets quarterly providing program updates to participating agencies. 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. Oxbow Fish Hatchery (ODFW)

Oxbow FH is operated by Oregon Department of Fish and Wildlife (ODFW). Oxbow FH was identified by SBSTOC members as a facility that could rear approximately 100,000 sockeye to the smolt stage. Eyed eggs are currently transferred to the facility in November/December to meet production goals. After an 18 month rearing cycle the juveniles will be transferred to Idaho and released in the Salmon River Basin.

4.3.1. Fish health

Fish that die in the program during the course of any rearing year are assayed for typical viral and bacterial pathogens. To date, sockeye salmon have remained disease free. Two, 60 fish samples will be tested during culture for viral and bacterial pathogens. All pathology guidelines will be met before juveniles are transferred back to Idaho.

4.3.2. Monitoring and evaluation

All smolts are adipose fin clipped with a representative number receiving PIT tags to determine downstream survival and travel time through the hydrosystem. Approximately 2,000 sockeye smolts are PIT tagged one month prior to release. PIT tagged smolts are assigned to the return to river sort by code status and are returned to the river when interrogated at hydrosystem juvenile detection facilities. An additional study is in progress to characterize survival from nursery lakes to Lower Granite Dam using radio telemetry techniques. Approximately, 400 additional smolts will receive radio transmitters and PIT tags to monitor migration patterns to Lower Granite Dam. Radio telemetry smolts are also assigned the return to river sort by code status and are returned to the river at juvenile detection facilities.

4.3.3. Communication

Oxbow FH produces monthly updates provided to IDFG Fisheries staff. Stanley Basin Sockeye Technical Oversight Committee (SBSTOC) meets quarterly providing program

updates to participating agencies.

4.4. Sawtooth Fish Hatchery

Sawtooth FH is used as a rearing station for the sockeye smolt production. Eyed eggs are transferred to SFH in November and December to meet production goals. Current production goals at SFH are to rear up to 180,000 smolts for Salmon River Basin released in May.

4.4.1. Fish health

Fish that die in the program during the course of any rearing year are assayed or typical viral and bacterial pathogens. To date, sockeye salmon have remained disease free. A 60 fish sample will be tested before release for viral and bacterial pathogens. All pathology guidelines will be met before smolts are released.

4.4.2. Monitoring and evaluation

All smolts are adipose fin clipped with a representative number receiving PIT tags to determine downstream survival and travel time through the hydrosystem. Approximately 50,000 sockeye smolts are PIT tagged one month prior to release. PIT tagged smolts are also part of the CSS evaluation and as such, 70% are randomly assigned to the run at large sort by code category and 30% are assigned to the return to river sort by code category.. An additional study is in progress to characterize survival from nursery lakes to Lower Granite Dam using radio telemetry techniques. Approximately, 400 additional smolts will receive radio transmitters and PIT tags to monitor migration patterns to Lower Granite Dam. Radio telemetry smolts are returned to the river at juvenile detection facilities.

4.4.3. Communication

Sawtooth FH produces monthly updates provided to IDFG Fisheries Bureau. Stanley Basin Sockeye Technical Oversight Committee (SBSTOC) meets quarterly providing program updates to participating agencies.

4.5. Springfield Fish Hatchery (starting Brood Year 2013)

Springfiled FH was completed in the fall of 2013. Springfield FH will receive eyed eggs from the Eagle FH and Burley Creek FH programs for smolt production. Production goals are to rear up to one million full term sockeye smolts annually for Salmon River Basin releases in May.

4.5.1. Fish health

Fish that die in the program during the course of any rearing year are assayed or typical viral and bacterial pathogens. To date, sockeye salmon have remained disease free. A 60 fish sample will be tested before release for viral and bacterial pathogens. All pathology guidelines will be met before smolts are released.

4.5.2. Monitoring and evaluation

All smolts will be adipose fin clipped with a representative number receiving PIT tags to

determine downstream survival and travel time through the hydrosystem. Approximately 50,000 sockeye smolts will be PIT tagged prior to release (beginning with BY2014). 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.

4.5.3. Communication

Springfield FH produces monthly updates provided to IDFG Fisheries Bureau. Stanley Basin Sockeye Technical Oversight Committee (SBSTOC) meets quarterly providing program updates to participating agencies.

5. PACIFIC LAMPREY

5.1. Introduction and Background

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. This action continues a presence of adult Lamprey in the Snake River Basin until upstream adult and downstream juvenile passage problems are identified and corrected, and healthy, harvestable populations are restored. The Nez Perce Tribe believes it is imperative to restore this important component of the ecosystem and retain cultural values.

5.1.1. Adult Trapping, Transportation and Holding

NPT Fisheries began a new phase of operations by actively trapping adult lamprey at Bonneville, The Dalles, and John Day dams and transporting them to Nez Perce Tribal Hatchery. Trapping occurs at those locations from June through August. The adult Lamprey are held at the Nez Perce Tribal Hatchery in three holding tanks specifically setup for Lamprey. They remain in those tanks until April/May when they are loaded onto fish transport vehicles for distribution to receiving streams.

5.1.2. Fish Health

All adult Lamprey are injected with oxytetracycline by NPT staff as a prophylaxis against furunculosis.

5.1.3. Adult Release

NPT plans to outplant adult Lamprey during April/May annually. Releases in the Salmon Subbasin are planned for the South Fork Salmon River. The number of release sites per stream will depend on the number of adult Lamprey available each year. Genetic samples are collected by NPT staff for later analysis.

6. Contact List

Name	Agency	Location-Position	Phone	Email
Paul Abbott	IPC	Production	208-388-2353	Pabbott@idahopower.com
Dan Baker	IDFG	EFH-Manager	208-939-4114	dan.baker@idfg.idaho.gov
Marilyn Blair	FWS	DNFH-IFHC	208-476-7341	marilyn_blair@fws.gov
Gary Byrne	IDFG	HQ- Production	208-334-3791	gary.byrne@idfg.idaho.gov
Chris Sullivan	IDFG	NR-Hatchery Chinook M&E	208-465-8404	chris.sullivan@idfg.idaho.gov
Jerry Chapman	IDFG	NSFH-Manger	208-536-2283	jerry.chapman@idfg.idaho.gov
Lytle Denny	SBT	Fort Hall-M&E	208-239-4560	ldenny@sbtribes.com
Joe Dupont	IDFG	Lewiston- Reg.Fish Manager	208-799-5010	joe.dupont@idfg.idaho.gov
Scott Everett	NPT	Kelt Program	208-621-4635	scotte@nezperce.org
Todd Garlie	IDFG	PFH- Manager	208-876-4330	todd.garlie@idfg.idaho.gov
John Gebhards	NPT	McCall-JCAPE	208-634-5290	johng@nezperce.org
Jon Hansen	IDFG	Salmon-Harvest Monitoring	208-756-2271	jon.hanen@idfg.idaho.gov
Pete Hassemer	IDFG	HQ-Anadromous Manager	208-334-3791	pete.hassemer@idfg.idaho.gov
Jeff Heindel	IDFG	HQ-Production	208-287-2712	jeff.heindel@idfg.idaho.gov
Jay Hesse	NPT	Lapwai-Research	208-621-3552	jayh@nezperce.org
Becky Johnson	NPT	Lapwai-Production	208-621-4629	beckyj@nezperce.org
Steve Kammeyer	IDFG	MVFN-Assistant Manager	208-326-3230	steve.kammeyer@idfg.idaho.gov
Paul Kline	IDFG	HQ-Asst. Fisheries Chief	208-334-3791	Paul.kline@idfg.idaho.gov
Joe Krakker	FWS	LSRCP	208-378-5321	joe_krakker@fws.gov
Brian Leth	IDFG	NR-Hatchery Evaluation	208-465-8404	brian.leth@idfg.idaho.gov
Stefanie Leth	IPC	Production	208-388-2504	Sleth@idahopower.com
Chris Jeszke	IDFG	MVFN-Manager	208-326-3230	christopher.jeszke@idfg.idaho.gov
Jerry McGehee	IDFG	CFH-Complex Manager	208-476-3331	jerry.mcgehee@idfg.idaho.gov
Gene McPherson	IDFG	Salmon River Complex Manager	208-634-8137	gene.mcpherson@idfg.idaho.gov
Doug Munson	IDFG	EFHL-Fish Health	208-939-2413	doug.munson@idfg.idaho.gov
Craig Rabe	NPT	McCall-JCAPE M&E	208-634-5290	craigr@nezperce.org
Stuart Rosenberger	IPC	M&E	208-388-6121	SRosenberger@idahopower.com

Bill Schrader	IDFG	NR-Natural Production	208-465-8404	bill.schrader@idfg.idaho.gov
Jeffrey Seggerman	IDFG	OFH-Manger	541-785-3459	jeffrey.seggerman@idfg.idaho.gov
Sam Sharr	IDFG	HQ-Anadromous Coordinator	208-334-3791	sam.sharr@idfg.idaho.gov
Brent Snider	IDFG	MCFH-Manager	208-634-2690	brent.snider@idfg.idaho.gov
Chris Starr	LSRCP	LSRCP-Production	208-378-5329	chris_starr@fws.gov
Ralph Steiner	IDFG	RRFH-Manager	208-628-3277	ralph.steiner@idfg.idaho.gov
Carl Stiefel	IDFG	NR-Hatchery Steelhead M&E	208-465-8404	carl.stiefel@idfg.idaho.gov
Cassie Sundquist	IDFG	SFH-Manager	208-774-3684	cassie.sundquist@idfg.idaho.gov
Tod Sween	NPT	Production	208-621-3582	tods@nezperce.org
Kurt Tardy	SBT	Fort Hall-M&E	208-239-4560	ktardy@sbtribes.com
Brian Thompson	IDFG	NSFH-Assistant Manager	208-536-2283	brian.thompson@idfg.idaho.gov
Jeremy Trimpey	FWS	HNFH-Fish Biologist	208-837-4896	jeremy_trimpey@fws.org
Bob Turik	FWS	HNFH-Asst.Project Leader	208-837-4896	bob_turik@fws.org
Dave Venditti	IDFG	NR-ISS Research	208-465-8404	dave.venditti@idfg.idaho.gov
Jason Vogel	NPT	Lapwai-Research	208-621-3602	jasonv@nezperce.org
Don Whitney	IDFG	Lewiston-Harvest Monitoring	208-799-5010	donald.whitney@idfg.idaho.gov
Jack Yearout	NPT	Lapwai-Harvest Monitoring	208-843-7320	jacky@nezperce.org
Bill Young	NPT	McCall-M&E Project Leader	208-634-5290	billy@nezperce.org
Steve Yundt	FWS	LSRCP-M&E	208-378-5227	steve_yundt@fws.gov

7. APPENDICES

Appendix 1. Eagle Fish Health Lab Sampling Protocols

CHINOOK SALMON FISH HEALTH

Broodstock

All spawned females will be sampled for the ELISA-based culling program. At least 90 females will be sampled for viral replicating agents and 20 head wedges will be taken. Elevated pre-spawning mortality will be investigated.

Juveniles

EFHL staff will conduct quarterly inspections of fish health at IDFG hatcheries. Inspections samples will attempt to detect bacterial infections, viral replicating agents, and *Renibacterium salmoninarum* via DFAT technology. Diagnostic visits are on demand. At least one bio-security audit will be applied each year. Thirty to 45 days prior to release, 60 fish per stock assessing prevalence and intensity of infection for viral replicating agents, *Renibacterium salmoninarum* (DFAT), *Myxobolus cerebralis* (etiologic agent of whirling disease), and bacterial agents such as *Aeromonas salmonicida* (etiologic agent of furunculosis).

STEELHEAD

Broodstock

All spawned females will be sampled for the viral replicating agents. Up to 60 females will be sampled for *Renibacterium salmoninarum* (BKD) and up to 20 head wedges will be taken to evaluate the prevalence of *Myxobolus cerebralis* (WD). Elevated pre-spawning mortality will be investigated.

Juveniles

EFHL staff will conduct quarterly inspections of fish health at IDFG hatcheries. Inspections samples will attempt to detect bacterial infections and viral replicating agents. Diagnostic visits are on demand. At least one bio-security audit will be applied each year. Thirty to 45 days prior to release, 60 fish per stock assessing prevalence and intensity of infection for viral replicating agents, *Renibacterium salmoninarum* (DFAT), *Myxobolus cerebralis* (etiologic agent of whirling disease), and bacterial agents such as *Aeromonas salmonicida* (etiologic agent of furunculosis).

Appendix 2. Parentage Based Tagging

Parentage 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 to this technology ultimately working 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 provides all ethanol vials 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. General sampling guidelines for hatchery staff include:

- 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).
- 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:

1. Use forceps and scissors or a scalpel, remove a small amount of tissue:
 - a. 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)
2. Carefully wipe clean instruments with a Kimwipe or paper towel and rinse the instrument in ethanol or clean water between each sample.
3. Place tissue into 2 ml tubes with 100% non-denatured ethanol (blue cap tubes = males, red cap tubes = females), and store in a cool location. Store only one sample per sample tube. The ethanol-filled tubes and color-coded caps are provide by EFGL.
4. Label individual sample tubes with field number. Provide an excel data sheet with individual sample tube number, sex identification, and any other available data (length, field ID, pit tag ID, etc.).

If possible, record every individual cross by genetic sample number, sex and date.

Appendix 3. Description and rationale for PIT and CWT tagging

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.

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.

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).

- A. **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.
 - a. The full USRB program (960,000 smolts- including releases into the Little Salmon River) will require approximately 1.4 million green eggs.
 - b. 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.
- B. **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.
 - a. 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.
- C. **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.

The following changes were made in 2012 and 2013:

1. 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).
2. 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.

3. 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.

For 2014 the following changes will occur:

1. 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).
2. 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.
3. DWOR B stock eggs will be transferred to Magic Valley Hatchery for release at PFH to meet B-stock release goals as unmarked fish.

Appendix 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).

Appendix 5. Hells Canyon Trapping Protocols

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.

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.

STEELHEAD TRAPPING

Preparations and Planning

Within the referenced time frame, HC trap operation will commence at the request of IDFG provided that they communicate their desired startup date to IPC at least 2 weeks in advance of the actual date. Additionally, IDFG personnel are required 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 1 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 must be taken for disease concerns. The disease samples are typically taken at least 2 weeks prior to normal steelhead trapping. Fall steelhead trapping generally commences in mid to late October when the river water temperature at Oxbow Hatchery drop to 60° 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 25% 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:

1. Tally the number of fish entering the trap by species.
2. Monitor the welfare of fish in the trap.
3. Shut down the weirs and alert IPC personnel when sufficient fish have been trapped to warrant removal and transport to Oxbow Hatchery.
4. Monitor trap pumps and alert IPC personnel of any problems with the trap or the health of the fish and suggest remedial actions.
5. 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 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.

1. 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.
2. Use an IPC supplied ID badge or fob to open the gate to enter the Hell's Canyon Dam complex. The OFH manager and senior technician are usually the only ones 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. When the gate opens, drive into the complex and park near the head of the stairway which leads to the trap.
3. Using a WB key, unlock the gate at the head of the stairs that lead down to the trap.

4. 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.
5. Using AAB11 key, unlock the large gray electrical cabinet (just to the right of the head of the stairs).
6. Start the #1 Shaft Water Pump by pushing the START button so labeled.
7. 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.
8. 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.
9. 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.**
10. 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;

1. Descend the stairs to the trap tender’s observation room.
2. Record the trap start time in the yellow data booklet.
3. 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.
4. Count fish (using hand-held counter) as they enter the trap at the finger weirs.
5. 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.
6. 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.
7. 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.
8. 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.
9. 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 1,500 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;

1. Turn spray water off.
2. Open the louvers on the crowder.
3. Run the crowder downstream to the trap entrance, and slowly close the crowder louvers being careful not to pinch or injure fish.
4. Net any fish that are trapped on the downstream side of the crowder and move them to the upstream side of the crowder.
5. Slowly run the crowder to the hopper entrance, “herding” fish into the hopper.
6. Push the rubber shield back inside of the crowder so it won’t hang up on the hopper.
7. Raise the hopper and set it on the fish truck using the crane.
8. Open the water valve and close the air valve on the hopper. The hopper plug should now float to the open position.
9. 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.
10. 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.
11. Close the water valve and open the air valve on the hopper.
12. Lower the hopper back into position in the trap.
13. Turn the spray water back on.
14. 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 (#7222) or 541-785-3459 using the telephone located on the mezzanine 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.

1. 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.
2. Begin counting fish.
3. 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° 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° 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.

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 fishes 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 must be taken for disease concerns. The disease samples are typically taken from the first 60 Chinook salmon trapped. 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° 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 well being 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:

1. Tally the number of fish entering the trap by species.
2. Monitor the welfare of fish in the trap.
3. Shut down the weirs and alert IPC personnel when sufficient fish have been trapped to warrant removal and transport to Oxbow Hatchery.
4. Monitor trap pumps and alert IPC personnel of any problems with the trap or the health of the fish and suggest remedial actions.
5. 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 prespawning mortality, adult Chinook salmon will be transferred to Rapid River Hatchery as soon as possible. A mixture of 500 to 700 pounds of block ice and or chilled water will be used to reduce the water temperature in the 1,500 gallon transport tank to 50° 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 120 gallon pickup mounted tank is used, one 5 gallon bucket of ice is added to chilled water to reach the desired 50° F temperature. Additionally, 2 coolers of ice are to be carried in the pickup. Add two 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° 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.

1. No more than 65 Chinook salmon will be transported in the 1,500 gallon transport tank per trip.
2. If the holding pond temperature at Oxbow Hatchery is < 65° F fish will be transferred to Rapid River Hatchery once per week.

3. If the holding pond temperature at Oxbow Hatchery is between 65 ° and 68° F, fish will be transferred to Rapid River Hatchery twice per week.
4. If holding pond temperature at Oxbow is from >68° F fish will be transferred to Rapid River daily.
5. If daily maximum river water temperatures at Oxbow Hatchery exceed 70° F IDFG may request that trapping operations be terminated for the season.
6. 5 or less fish will be transported in the pickup mounted tank.
7. Fish will not be held longer than one week at Oxbow Hatchery.
8. 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 encouraged to carry a 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 the second adult tanker back below Hells Canyon Dam or help other hatcheries if needed. 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 Stan Bechtold, Paul Abbott and the Oxbow Hatchery Manager immediately.

Appendix 6. Location of In-stream PIT tag arrays in the Snake River Basin

Snake River Basin ISEMP PIT tag arrays operated by Nez Perce Tribe and Quantitative Consultants Inc. Arrays are listed by river, PTAGIS site code, GPS coordinates, river kilometer, and date site operations began

River	Site Code	GPS	River km	Operational Date
Secesh River	ZENA0	N45.03340 W115.73373	522.303.215.059.003	3/12/2009
Secesh River	ZENB0	N45.03348 W115.73219	522.303.215.059.003	3/12/2009
East Fork South Fork Salmon	ESSA0	N44.95756 W115.52892	522.303.215.060.021	3/26/2009
East Fork South Fork Salmon	ESSB0	N44.95583 W115.53801	522.303.215.060.020	8/6/2009
South Fork Salmon	KRS	N44.97840 W115.72700	522.303.215.065	2/26/2008
South Fork Salmon	SFG	N45.17575 W115.57998	522.303.215.030	9/29/2009
Imnaha River	IR1	N 45.7611162 W116.750658	522.308.007	12/3/2010
Imnaha River	IR2	N 45.742839 W116.764563	522.308.010	11/13/2010
Imnaha River	IR3	N 45.49004 W116.80393	522.308.041	2/15/2011
Big Sheep Creek	BSC	N 45.503490 W116.850670	522.308.032.006	10/20/2010
Cow Creek	COC	N 45.76774 W116.744037	522.308.006.001	1/12/2011
Joseph Creek	JOC	N 46.030016 W117.016042	522.271.007.003	10/15/2010
Big Creek	TAYA0	N45.103909 W114.850642	522.303.319.029.011	7/14/2006
Big Creek	TAYB0	N45.103648 W114.849367	522.303.319.029.011	7/14/2006
Valley Creek	VC1	N44.221895 W114.931399	522.303.609.002	7/11/2002
Valley Creek	VC2	N44.218634 W114.942152	522.303.609.001	7/11/2002
South Fork Clearwater	SC1	N46.136950 W115.981653	522.224.120.001	9/22/2011
South Fork Clearwater	SC2	N46.127269 W115.977410	522.224.120.002	9/26/2011
Lolo Creek	LL1	N46.294434 W115.976119	522.224.087.021	11/4/2011
Lolo Creek	LL2	N46.290562 W115.934153	522.224.087.025	11/18/2011
Big Timber Creek	BTC	N44.6911 W113.37107	522.303.416.089.001	2/25/2010
Bohannon Creek	BHC	N45.11777 W113.7413	522.303.416.017.001	
Canyon Creek	CAC	N44.69197 W113.354677	522.303.416.090.001	11/12/2010
Hayden Creek	HYC	N44.86159 W113.63215	522.303.416.049.001	8/19/2009
Kenney Creek	KEN	N45.02703 W113.65801	522.303.416.029.001	10/16/2010
Lower Lemhi River	LLR	N45.17635 W113.88512	522.303.416.001	8/18/2009
Lemhi River Weir	LRW	N 44.86612 W113.62475	522.303.416.050	8/24/2009
Lemhi Little Springs	LLS	N 44.77865 W113.54208	522.303.416.066.001	7/5/2011

PIT Tag Locations

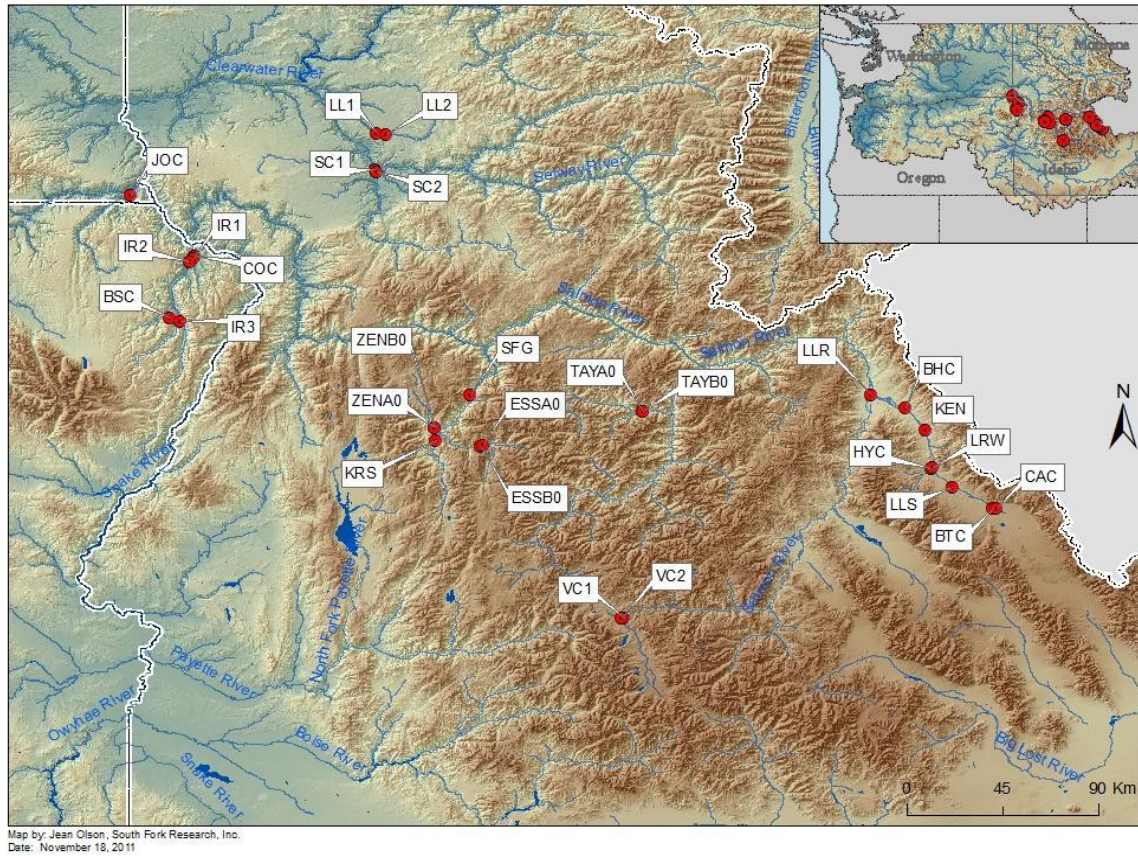


Figure 1. Relative location of the Snake River Basin ISEMP PIT tag array locations by PTAGIS site code.