Standard Operating Procedures

for

Fish
Production Programs

in the

Clearwater River Basins

Prepared by
Idaho Department of Fish and Game
Nez Perce Tribe
U.S. Fish and Wildlife Service

Contents

0. Preamble

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

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

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

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

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

1. Summer Steelhead

- *Definition of species* - All steelhead *Oncorhynchus mykiss* in Idaho are classified as summer steelhead, determined by time of entry into the Columbia River. Idaho steelhead enter fresh water in one year and spawn the following spring. Idaho has A and B strains of steelhead that are classified based on life history characteristics. Generally A-strain steelhead spend one year in the ocean and return to 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.
- *Rearing locations* - Hatchery steelhead released into the Clearwater are reared at two hatcheries: Dworshak National Fish Hatchery (DNFH) and Clearwater Fish Hatchery (CFH). Information on rearing and releases from MVFH can be found in the Snake and Salmon Basin SOP.
- *Broodstock collection and spawning locations* - Broodstock collection and spawning activities for the steelhead program in the Clearwater are conducted at the following locations: Dworshak National Fish Hatchery (DNFH), Kooskia National Fish Hatchery (KNFH), and in the SF Clearwater through the Volunteer Anglers (SFClwAng) program.
- *Calculation of Broodstock need* – Appendix 7.1 shows the brood calculator used to determine brood need to reach production goal for the program releases. The number of eggs collected is based on 5-yr running historical average of adult survival, eye-up percentage, disease rates and smolt survival rates to meet smolt release targets. Suppose the production goal is to trap and spawn enough adults to produce (x) number of smolts for release. Applying a production cushion (c) and eyed egg-to-smolt survival (ess) to total smolt goal, gives the eyed eggs needed (e=(x*(1+c))/(ess)). After accounting for green-to-eyed egg and culling survival (ges and cs, respectively), the green egg goal before culling can be determined (g=e/(ges)/(cs)). Using an average fecundity of green eggs per female (fec) gives the number females needed (F=g/fec). A 1:1 M:F spawning ratio gives the number of males needed (M=F) and the total number to spawn (TotSp=F+M). Total fish needed when accounting for % pond mortality (pm) can be calculated (TotPM=TotSp/(1-pm)). Sometimes the F:M ratio is not 50%:50% in the collected broodstock and additional fish would need to be trapped to get the 1:1 M:F spawning ratio. Using the % females in the broodstock (fb), the total number of fish that needs to be trapped can be calculated (TotTrap=(TotPM/2)/(1-fb), round up to even number).
- *Smolt releases* - All steelhead smolts from DNFH, CFH, and MVFH are released as yearling smolts and are transported to the release sites from April through early May.

1.1. Overview of facilities and brood stock

1.1.1. Dworshak National Fish Hatchery (DNFH)

- *Hatchery description and location* - DNFH is located on the North Fork Clearwater River at its confluence with the mainstem Clearwater River.
- *Owner and operator* – DNFH is owned by the US Army Corps of Engineers and is operated by the USFWS and the Nez Perce Tribe (NPT).
- *Programs at facility (Fig. 1.3)* - DNFH traps, spawns, incubates, and rears DworB hatchery steelhead for release as smolts. DNFH also collects broodstock to meet a portion of the IDFG DworB steelhead program at Magic Valley Fish Hatchery (MVFH; see Snake-Salmon River SOP for details). Angler collection of locally adapted SF Clearwater Origin B-Run broodstock (SFClwB) will be used for all or a portion of the broodstock for DNFH's smolt releases to SF Clearwater. DNFH also incubates SFClwB eggs to be transferred at the eyed egg stage to CFH for rearing and release to SF Clearwater (see CFH Section 1.1.2 below).
- *Stocks reared and release locations (Fig. 1.3)*- DworB: DNFH rears DworB smolts for release in mainstem Clearwater (at DNFH), Clear Creek, Lolo Creek and SF Clearwater (at Red House Hole; as needed). DworB green eggs are transported to CFH, incubated to eyed stage, before being transported to MVFH for final rearing and release of smolts in Pahsimeroi River (see Snake-Salmon River SOP for details). SFClwB: A portion of DNFH's smolt release to SF Clearwater (at Red House Hole) will be SFClwB stock from angler broodstock collection (incubated and reared at DNFH).

- *Production Goals (smolts, 6 fpp)* – Mainstem Clearwater (at DNFH) – 1.2 million DworB smolt, Clear Creek – 300k DworB smolt, Lolo Creek – 200k DworB smolt, SF Clearwater (Red House Hole) – 400k SFClwB/DworB smolt.
- *Adult mitigation goal (if applicable)* - The annual adult return goal for Dworshak National Fish Hatchery (DNFH) is 20,000 steelhead back to the Clearwater River. Escapement goals to the project area above Lower Granite Dam assumed a harvest rate of about 66% on Dworshak and Clearwater hatchery adult returns in ocean and Columbia River fisheries downstream of the project area. While annual adult steelhead returns originating from the combined production at Dworshak and Clearwater hatcheries are intended primarily for harvest mitigation, approximately 18% is intended to supplement natural spawning in portions of the Clearwater drainage. Fish intended for supplementation are released with adipose fins intact and are not intended to contribute to mark-selective fisheries. Collaboratively managed hatchery production and supplementation efforts associated with this program are consistent with the intent and protocols of the most current US vs. Oregon Management Agreement.
- *Facility or stock changes (if applicable)* – Historically, all broodstock for DNFH smolt releases in SF Clearwater were DworB stock collected at DNFH. For the SF Red House release group, the goal is to collect broodstock from the SF Clearwater River from angler broodstock collection to the extent possible, with Dworshak NFH broodstock collections as a backup.

1.1.2. Clearwater Fish Hatchery (CFH)

- *Hatchery description and location* - The Clearwater Fish Hatchery consists of the main hatchery and three satellite facilities: Red River, Powell, and Crooked River. The main Clearwater Hatchery is located at Ahsahka, Idaho approximately 45 miles east of Lewiston, Idaho on highway 12 on the NF Clearwater River. Red River facility is located near the Red River Ranger station approximately 15 miles east of Elk City, Idaho. The Powell facility may be seen by driving on state highway 12 to approximately milepost 163.5 and then turning south on the Elk Summit road and travel two miles to the entryway sign of the Powell fish trap. The Crooked River facility is located approximately 35 miles east of Elk City, Idaho.
- *Owner and operator* – The Clearwater Fish Hatchery and its three satellite facilities were constructed by the Army Corp of Engineers under the Lower Snake River Compensation Plan. The Idaho Department of Fish and Game operates the hatchery with funding provided through the U.S. Fish and Wildlife and Lower Snake River Compensation Plan office.
- *Programs at facility* - In recent years, IDFG has converted the CFH steelhead program to angler collection of locally adapted broodstock in the SF Clearwater (SFClwB). SFClwB broodstock are spawned at DNFH. CFH incubates and rears SFClwB hatchery steelhead (DworB stock added if needed) for release as smolts in SF Clearwater. CFH also incubates DworB eggs (from DNFH) to eyed stage before being transported to MVFH to supplement the USAL-B program, a stock within the upper Salmon River basin founded on DWOR stock fish reared at MVFH (see Snake-Salmon River SOP for details).
- *Stocks reared and release locations* – SFClwB (DworB as needed): CFH rears SFClwB smolts for release in Red House Hole, Meadow Creek, Newsome Creek (all SF Clearwater). DworB: DworB green eggs are transported to CFH, incubated to eyed stage, before being transported to MVFH for final rearing and release of smolts in the Little Salmon River, Pahsimeroi River and Yankee Fork Salmon River (see Snake-Salmon River SOP for details).
- *Production Goals (smolts, fpp)* – Red House Hole – 219k SFClwB smolt, Meadow Creek – 501k SFClwB smolt, Newsome Creek – 123k SFClwB smolt.
- *Adult mitigation goal (if applicable)* - The annual adult mitigation goal for Clearwater Fish Hatchery (CFH) is 14,000 adult steelhead to the project area above Lower Granite Dam. Escapement goals to the project area above Lower Granite Dam assumed a harvest rate of about 66% on Dworshak and Clearwater hatchery adult returns in ocean and Columbia River fisheries downstream of the project area. While annual adult steelhead returns originating from the combined production at Dworshak and Clearwater hatcheries are intended primarily for harvest mitigation, approximately 18% is intended to supplement natural spawning in portions of the Clearwater drainage. Fish intended for supplementation are released with adipose fins intact and are not intended to contribute to mark-selective fisheries. Collaboratively managed hatchery production and supplementation efforts associated with this program are consistent with the intent and protocols of the most current US vs. Oregon Management Agreement.

- *Facility or stock changes (if applicable) -* Original design memorandum shows the production for CFH may be as high as two million steelhead smolts; however, the annual production target has been reduced due to limited water availability and to provide more rearing space for Chinook Salmon. Historically, the steelhead smolt releases from CFH have ranged from approximately 600K to 1.04 million. Currently the release goal for CFH is 843,000 full term smolts (FTS). The reduction of FTS release number is from downstream multi agency negotiations and insufficient water to rear fish in 24 one hundred foot sections of raceways. In addition, historically, all broodstock for CFH smolt releases in SF Clearwater were DworB stock collected at DNFH. In recent years, IDFG has converted the CFH to an angler based collection of locally adapted broodstock in the South Fork Clearwater (SFClwB stock). Currently, DworB stock is used only as needed.

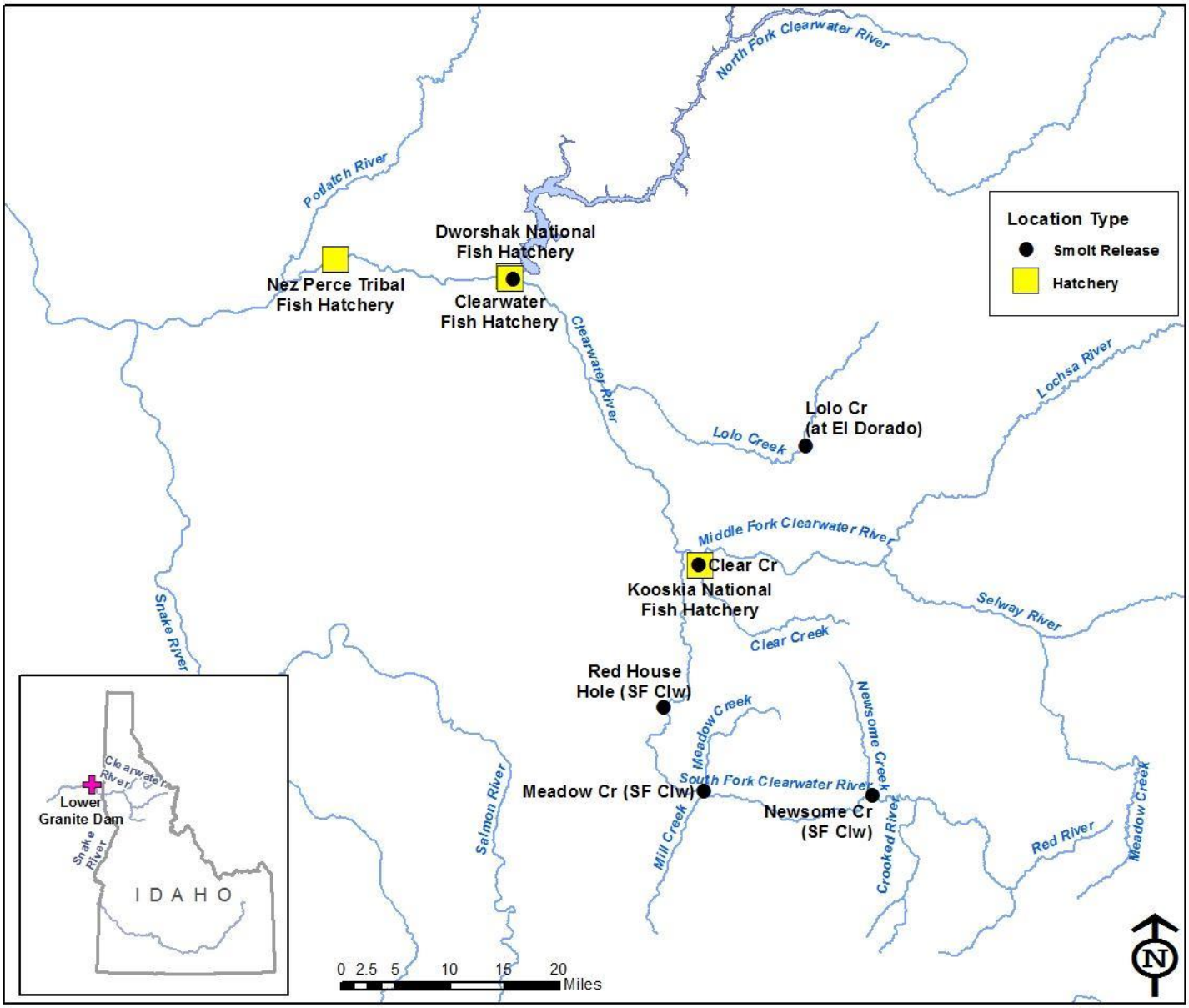

Figure 1.1. Steelhead trapping, hatchery facilities and smolt release locations.

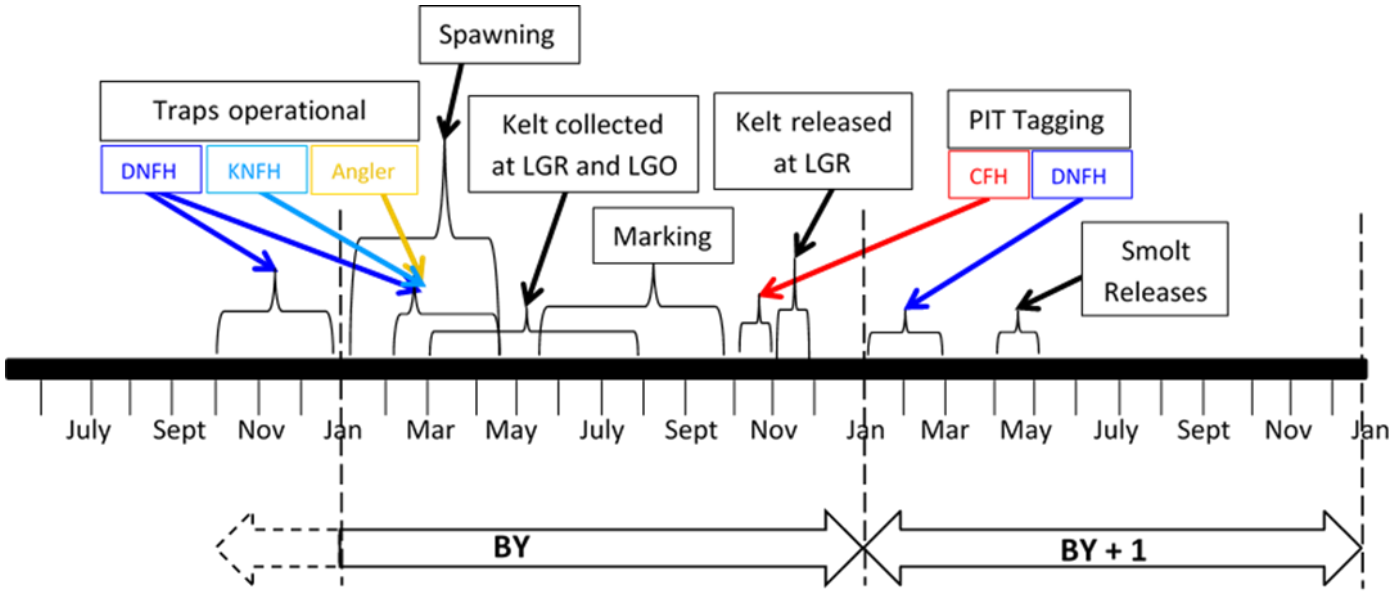

Figure 1.2. Timeline for Steelhead Production. Date ranges with black labels are shown to include all facilities' operations. Color-coded labels identify activities that have variability in timing for the different facilities.

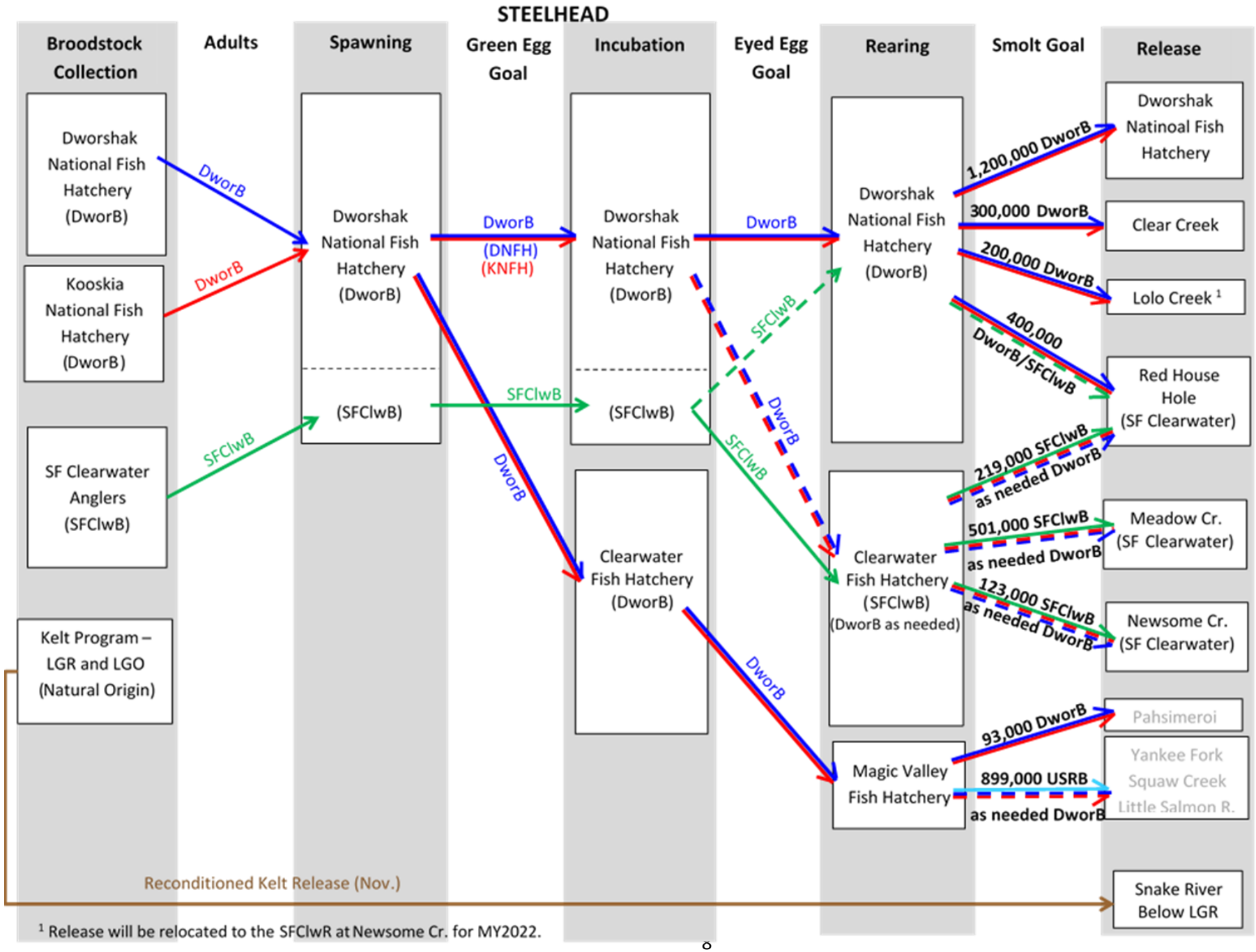

Figure 1.3. Fish and egg movements for Steelhead.

1.2. Dworshak National Fish Hatchery

1.2.1. Trapping and Brood Acquisition

- *Trapping/Brood Acquisition location* – Broodstock incubated and/or reared at DNFH is acquired from three sources: DNFH Ladder, Kooskia National Fish Hatchery (KNFH), and the SF Clearwater Anglers (SFClwAng).
- *Trap configuration* -
    - DNFH: 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.
    - KNFH: KNFH is located 1.5 miles southeast of Kooskia, Idaho near the confluence of Clear Creek and the Middle Fork Clearwater River. Returning adults may be trapped if needed by closing a weir that spans Clear creek, directing adults to a trap and holding pond adjacent to the weir.
    - SFClwAng: Volunteer anglers, with guidance from IDFG staff, will catch fish in the South Fork Clearwater River for broodstock using standard hook and line angling techniques.
- *Dates operated* –
    - DNFH: Broodstock collection in the fall typically occurs October through mid-December. Spring broodstock collection occurs February through mid-April.
    - KNFH: Broodstock collection occurs mid-March through early July and then the trap is opened in the fall October through December.
    - SFClwAng: Broodstock collection begins in February and continues until either the broodstock needs are met, the anglers are no longer catching fish, or DNFH's final spawn day which occurs in mid-April.
    - *Trapping/Brood Acquisition protocol (frequency, movement of fish)* -
    - DNFH: Typically, the fish ladder and trap are operated intermittently during the trapping season. No weekend ladder operation occurs unless necessary to meet goals. This allows for active monitoring of the fish counter during the week, and ensures excess fish are not collected. As a result, fish holding times in the hatchery are somewhat reduced, and un-trapped fish are available for tribal and sport harvest. Typically, the trap is opened anywhere from 5 minutes to a few hours, depending on run strength and timing. The number of fish collected is tracked by a counter located at the entrance of the holding pond. The actual number of steelhead collected has been about 75% of the counter reading. Ladder operation may be modified in-season if weekly goals are not met. DNFH targets 150 steelhead trapped and retained each month in October and November, and 100 in December for a total of approximately 400 steelhead retained by the end of December, to represent the early component of the return. Spring collection for steelhead broodstock will commence in February and continue until about mid-April. The ladder is opened for collection of spring returns one week prior to spawn dates.
    - KNFH: The adult trap will be opened early to mid-March for steelhead adult collection as needed for broodstock collection. The proposed operation is to close the trap in early April after Chinook and Coho Salmon smolt releases, and bypass the water intake and Obermeyer weir during this usually high water period. The trap is typically reopened in mid to late May for Chinook trapping. The trap start and end times will be adjusted as needed depended on adult returns to the basin. During this dewatered period the picket (fish) weir is opened to allow passage of steelhead. The NPT and IDFG are also interested in operation of the weir and will be kept informed.
    - SFClwAng: Adult steelhead will be collected from SF Clearwater River in an attempt to develop a localized brood source for that component of DNFH production. See CFH section for full discussion of brood collection (Section 1.3.1).
    - Kelt Prog: Kelts are collected at Lower Granite Dam and Little Goose Dam (or other Snake or Clearwater River tributary collection sites) and a portion are transferred to DNFH and/or NPTH for reconditioning (see Appendix 7.5). These adults are not utilized for broodstock.

1.2.2. Adult Handling

- *Measurements (marks, tags, sex, etc.)* –

- DNFH: Returning adults to the Dworshak Ladder are measured for length, sexed, scanned for PIT tags and CWTs, checked for marks, and marked with a left opercle notch (LON), then sorted for spawning or holding. A subsample of CWT fish will be retained and utilized for broodstock to the extent possible. Data from sorts will be entered into the Fish Inventory System (FINS). See Appendix 7.3 for more info on CWT and PIT tag recoveries.
- KNFH: Returning adults to the Kooskia trap are measured for length, sexed, scanned for PIT tags and CWTs, checked for markings and marked with a right opercle notch (RON), then sorted for broodstock, outplanting or subsistence. Data from trapping will be entered into the Fish Inventory System (FINS).
- SFClwAng: Measurements for SFCLwAng brood will be taken streamside at the South Fork Angler trapping locations. All CWT fish will be retained and utilized for broodstock to the extent possible. Remaining CWT fish will be killed for tag recovery.
- Kelt Prog: Kelts collected from Lower Granite Dam or Little Goose Dam (or other Snake or Clearwater River tributary collection sites) are measured for marks and tags. Un-tagged fish will receive a PIT tag and tissue sampled for genetic analysis.

- *Tissue sampling protocol* - DNFH: IFWCO and IDFG personnel will collect DNA samples from spawned adults at DNFH for their respective programs for a basin-wide parentage-based genetic tagging program (PBT) baseline (see Appendix 7.3).
- *Dispositions (holding, releases) –*
  - DNFH: Fish collections via the trap may exceed the broodstock goal to ensure adequate numbers of adults are available on any given spawning day. If there are excess fish to the spawning needs, the 3-Ocean adults are retained for subsequent spawning and all other excess steelhead trapped are returned to the main stem of the Clearwater River at the Hocus boat ramp upstream of the hatchery for the fisheries. All released fish will be marked with a left operculum v-notch.
  - KNFH: Returning adults are measured and examined for gender, various clips, tags, and marks then sorted for spawning or holding. If needed, Steelhead will be trapped for broodstock. No steelhead evaluation is planned at KNFH at this time.
  - SFClwAng: All adults collected for broodstock are transported to DNFH for holding and spawning and processing. Among fish caught by anglers, only hatchery origin adult fish may be retained for broodstock (AD clip, CWT and/or fin erosion). Retained hatchery origin fish are transferred to specially designed fish holding tubes. Collected fish will be transported daily to DNFH for holding. CFH staff will operate transport trucks to collect fish from the holding tubes and transport them to DNFH until approximately mid-March at which time regional IDFG fisheries staff will take over transport operations. Natural origin fish, as evidenced by the lack of one or more of hatchery mark/tags, are released immediately.
  - Kelt Prog: Kelts collected from Lower Granite Dam and Little Goose Dam (or other Snake or Clearwater River tributary collection sites) are reared at DNFH and/or NPTH. These fish are on-station from March through November. Re-mature kelts are returned to the Snake River below Lower Granite Dam. Non-mature kelts are kept an additional year of reconditioning at DNFH and/or NPTH.
- *Carcass dispositions –*
  - DNFH: The food bank will be utilized when possible for carcass disposal. Carcasses will be provided to local schools for fish dissections for the Hatchery in the Classroom Program. Carcasses may also be used to fill requests from research groups to acquire fish for scientific study. Any non-hormone injected carcasses that are not utilized by the food bank, or for classroom dissections will be disposed at the transfer station or planted in designated up-stream reaches for nutrient enhancement. Any fish that have been exposed to hormone treatments (SGnRHa) will be disposed at the transfer station.
  - KNFH: Any adult steelhead that expires in the trap will be frozen and transported to the local Landfill every Thursday.

- SFClwAng: SF collected broodstock mortalities that occur during transport or holding are disposed of following the same guidelines described for DNFH above.
- Kelt Prog: All kelt mortalities are frozen and land-filled.

1.2.3. Adult outplants (if applicable)

- *Trigger for outplanting* – DNFH: Decisions to outplant will be made during the in-season coordination calls. Any out-planting involving the NPT will be coordinated with Mike Key.
- *Purpose* – Return excess fish back to river for fisheries and natural spawning.
- *Outplant protocol (sex ratio, timing, marking, sampling)* –
  - DNFH: Excess adults will be loaded onto the Dworshak distribution truck and released at the mainstem Clearwater River Hocus Boat Ramp just East of the Hatchery.
  - KNFH: All natural (unmarked) fish will be loaded onto a transport truck and taken nine miles up Clear Creek to the second bridge and released. Adult hatchery steelhead (not taken for CWT) for out-planting will be loaded onto a NPT truck at time of sorting; if a large truck is needed, we will contact NPT Mike Key for spring out-plants. If trap numbers are low, we will use a 400 gallon tank in a one ton truck for out-plants. Out-planted steelhead will be given a right operculum v-notch. Any Tribal requests for steelhead will be coordinated through Nancy McAllaster, NPT (208-843-7320 ext.2126). Other native species (bull trout, suckers, whitefish etc.) trapped will be passed upstream of the weir.
  - SFClwAng: Excess adults will be loaded onto the Dworshak distribution truck and released at the Mainstem Clearwater River Hocus boat ramp just East of the Hatchery.
  - Kelt Prog: Mature kelts are returned to the Snake River below Lower Granite Dam. Non-mature kelts are kept for an additional year of reconditioning at DNFH and/or NPTH.

1.2.4. Spawning/Egg take

- *Calculation of broodstock need (fecundity, eyeup, eye to smolt)* –The production goal is to trap and spawn enough adults to produce a total of 2.1 million yearling smolts at DNFH. See introduction to Section 1 and Appendix 7.1 for details on broodstock calculation.
  - DNFH: The production goal is to trap and spawn enough adults to produce 1.7 million smolts for the DNFH NF, Clear Creek, and Lolo Creek releases. The fish needed to produce these green eggs will come from trapping at DNFH, or from KNFH in low DNFH collection years.
  - SFClwB: The production goal is to collect and spawn enough adults to produce 400K smolts for the DNFH program (South Fork Red House Hole release). If insufficient SF Clearwater adults are available, the remainder will be made up from DworB steelhead trapped at DNFH.
  - Kelt: The Columbia River Inter-Tribal Fish Commission (CRITFC) and the NPT are conducting a Kelt Steelhead Reconditioning Project at DNFH through a property use permit (real-estate agreement) between Bonneville Power Administration (BPA) and the ACOE.

    Additional factors influencing the number of fish trapped and spawned at DNFH include the following: (1) potential for request of additional eggs for CFH releases in the SF Clearwater River if the angler based collection of locally adapted broodstock (SFClwB) is unable to meet the broodstock goal for that program, (2) potential for request of additional eggs for the MVH USRB program if a brood shortfall is anticipated at Pahsimeroi weir (see Snake-Salmon River AOP), (3) the prevalence of viral replicating agents in adults and culling rate variability, (4) overall egg quality, (5) preserving the run-timing from August through April, and (6) reducing juvenile IHNV infections by maximizing limited reservoir water supplies.
- *Spawning protocol (schedule, method, M/F ratio)* –
  - DNFH: IFWCO has set length criteria for using milt multiple times in an attempt to increase the number of larger and older-age class returning steelhead and reduce the number of times smaller males are used in brood. Male steelhead less than 720 mm (Jacks) will not be used for broodstock unless larger males are not available and the ability to make brood would be compromised. This will minimize the number of 1-ocean fish in the brood. Male steelhead ranging from 720 mm and 769

mm will be designated **small** males and will only be used once. A portion of these males are 1-ocean and this will nearly eliminate the probability that a 1-ocean fish is used multiple times while allowing a small proportion (< 5%) of 1-ocean jacks in the broodstock. Males between 770 mm and 819mm will be designated **medium/large** and milt will only be used once. Male steelhead ranging from 820 mm and 849 mm will be designated **large** males. They can be used multiple times but only when XL males are not available and their use more than 3 times should be limited. Mark cups "L" to denote that they can be used up to 3 times if XL males are not available. Male steelhead greater than 850 mm are designated **XL** males and should be a priority for multiple use, but no more than 5 times. This will maximize the probability that 3-ocean fish are used multiple times and ensure that the largest 2-ocean fish are overrepresented in the broodstock. Mark cups "XL" to denote that they can be used up to 5 times. Milt will be examined for motility prior to utilization.

  - Only females 75 cm in length and larger will be used as broodstock. All CWT fish will be retained but broodstock collection will be minimized to the extent possible. A 1:1 male-female spawning ratio is achieved by trapping additional broodstock because the average trapped male-female ratio is 1:2.3. Typically, the steelhead program for DNFH releases will originate from 10 egg takes to maintain acceptable density limits and reduce fish stress in the DNFH nursery.
  - SFClwAng: Same as above.

- *Eggs received (if applicable) –*
- *Egg transfers (if applicable) -* DNFH will incubate up to 1.3 million green eggs for CFH. Green eggs for MVFH will be brought to CFH for incubation.
- *Egg incubation method (egg distribution, treatments, picking) -* DNFH will incubate eggs from the steelhead females, with fall-return females representing approximately 25% of the egg take and spring-return females making up the remaining egg take. After eye-up and enumeration, approximately 2.6 million green eggs will go into the DNFH program.
- *Treatment, loading density, flow rate -* Formalin treatments to minimize fungus in the incubation stacks will be completed 3 days/week. Initial loading is 1 female per tray until enumeration at which point an average of 4,200 eggs are counted into each tray. This number may change as it is dependent on a number of factors including fecundity and eye up percentage. Water is metered into each incubation stack at 5 gpm.
- *PBT tracking -* PBT is tracked utilizing hard data, in-house spreadsheets and the FINS system. Whenever possible, PBT groups are not mixed, to maintain PBT integrity through release.
- *Method into rearing tanks –* At swim up, trays are either manually moved into the nursery utilizing a hand cart and tote filled with water, or moved utilizing an Aqua Life 2 ½" fish pump and cannoline hose.
- *Surplus egg distribution (if applicable)-* Eyed eggs in excess of program needs can be provided to the Kelt Reconditioning Project, the IDFG for sturgeon projects, or out-planted to the Yankee Fork of the Salmon River or the North Fork Clearwater River upon Co-Manager approval.

1.2.5. Early rearing

- *Environmental protocols (flow indices, density indices) -* Early rearing occurs in the nursery on reservoir water. NF River water is available as a backup water source, but is not used to avoid pathogen transfer.
- *Feeding protocol -* Biologists will determine the appropriate size and rate of feed which will be delivered by hand up to 8 times/day. Feed is typically introduced just after ponding in the nursery.
- *Marking and tagging (AD, CWT; date range, size at application) -* Columbia River Fisheries Program Office (CRFPO) will AD clip and CWT steelhead during or after transfer to Burrows ponds from May until August. Adipose fins are clipped and fish are CWT'd in accordance with the marking plan put forth by the Idaho Fish and Wildlife Conservation Office (IFWCO). Steelhead are marked in proportion to the release sites and spawning takes to ensure that marking represents the entire brood year.
- *Fish movement/facility configuration -* DNFH will early-rear steelhead in its nursery until the fish reach approximately 100-150 fpp. The fish will be moved from nursery tanks to outside burrows ponds from mid-May to early September. Fish will be moved from the nursery to the ponds using a Heathro Fish Pump.

1.2.6. Final rearing

- *Target environmental protocols (flow indices, density indices)* – Fifty eight Burrows ponds will be used for steelhead rearing. The Burrows ponds will be initially ponded at approximately 135K fish/pond. After the fish are moved from the nursery tanks, initial stocking will be in System I, utilizing reservoir water, to minimize exposure to the IHN virus found in the NF River water supply.
- *Feeding protocols*- Fish will be hand fed up to 6 times per day until a feed pellet size of 2.5mm is reached at which point feed will then be distributed utilizing demand feeders. Lolo program fish will be hand fed through the duration of rearing. Biologists will determine the appropriate size and rate of feed through routine size sampling and feed projections.
- *Mortality enumeration/estimate* - Mortality will be hand counted and recorded daily.
- *Water monitoring* - After the fish are moved from the nursery tanks, initial stocking will be in System I on reservoir water. The fish will be kept on reservoir water until they are approximately 60 fish per pound to better manage against IHN outbreaks from exposure to the river water.
- *Fish movement/facility configuration* - As density and flow levels increase in System I, the steelhead will be moved into Systems II and III using the Heathro Fish Pump in conjunction with the Vaki Micro Fish Counter to inventory these fish into ponds where they will remain until release. Fish in these systems are reared on NF River water.
- *Acclimation (if applicable)* -
- *Marking and tagging (PIT)* –PIT tags will be inserted into steelhead January in BY+1. See Appendix 7.4.1 for more information about PIT tags.
- *Quality monitoring (counts, growth, length, marks quality, tag retention)* - The estimated average total length at release is 200 mm, or 5.8 fpp. Thirty days post tagging, a subsample of 500 fish from each CWT-tagged pond will be checked for tag retention. Dead fish recovered from ponds containing PIT tagged fish are scanned for tags and PIT information is loaded into regional database (PTAGIS). Sample length and weights are collected at the time fish are ponded, during PIT tagging, and prior to release to monitor growth and condition.

1.2.7. Fish health

- *Service provider* - USFWS Pacific Region Fish Health Program
- *Sampling protocols (what is sampled, sampling schedule)* –
    - Adults: DNFH: At spawning, a minimum of 150 ovarian fluid samples and 60 tissue samples will be collected and assayed for viruses over the run. An exception to this practice occurs in the case of transfers of eggs to MVFH where 100% ovarian fluid samples will be processed for virus testing from these females. Sixty tissue samples will be tested for Bacterial Kidney Disease. Up to 60 intestinal tissue samples will also be examined for *Ceratonova shasta*.
    - Juveniles: Diagnostic exams will be performed as needed. In lieu of a traditional 60 fish pre-release exam performed 4-6 weeks prior to release, a six month health history will be attained. Six months prior to release a minimum of 10 fish per month will be examined for overall health and for viral, bacterial, and parasitic pathogens. Prior to release, an additional gross examination of fish is performed to assess smolt readiness and final disease status. Visual inspection to determine levels of precocity will be performed at every examination. A six month report will be written to include monthly monitoring and any diagnostics during that time frame.
- *Vaccination methods* –DNFH: A portion of the males are injected with the hormone sGnRHa prior to spawning, using the liquid form under INAD 13-298. This is to insure that there are enough males that are ripe during the early spawns. Milt assessment of quantity and quality of motility will be conducted at the time of spawning.
- *Treatment methods* – DNFH: Early returning adults are treated up to three times per week with formalin for fungus.

1.2.8. Fish release/transportation

- *Truck specifications* - U.S. Army Corp of Engineer (ACOE) fish transportation trailers will be used for transferring the fish from the hatchery to the release sites.

- *Hauling/Release schedule -* Weather permitting, releases into Lolo Creek (near the El Dorado Creek confluence) will occur from mid- to late-April. Nez Perce Tribal Hatchery (NPTHC) personnel will coordinate snow removal efforts to the Lolo Creek site. If snow conditions do not permit release mid- to late-April into Lolo Creek, then a decision will be made by the Co-managers to outplant the fish into the mainstem Clearwater River at the Five Mile boat launch (near the mouth of Lolo Creek) or somewhere else, or hold the fish at DNFH (when feasible) until weather permits for release into Lolo Creek.
- *Hauling/Release guidelines -*

1.2.9. Research/Additional requests

- *Programs and requests* - DNFH works with IDFG, the NPT, the Lewis Soil Conservation District, and others to implement the Hatchery in the Classroom project. Area schools receive steelhead eggs from DNFH for in-classroom incubation, hatch, and early rearing. The surviving juveniles are released into Spaulding Creek and Lawyer Creek on the Clearwater River each spring, as part of larger fish education events. Generally, a few hundred to 3,000 eyed steelhead eggs total are provided from DNFH for this program. Requests above this number require approval through the Clearwater AOP. In the event of poor adult returns or for other reasons, managers may cancel the program for a given year. Some schools also receive frozen adult steelhead carcasses from DNFH for in-classroom dissection to learn fish anatomy.
- *Research requests* - Future Research requests will be vetted through the DNFH Evaluation Team utilizing the *Guidelines for Conducting Research and Evaluation Projects at DNFH.* The Team will review the proposal and make recommendations to the Dworshak Complex Manager for decision or elevation to the co-managers.

1.2.10. Communication

- *Written reports (e.g., Monthly summaries, annual reports)* - DNFH and the IFWCO generate weekly spawning and return reports, monthly production activity reports, and annual spawning and adult return reports.
- *FINS and IDFG release databases -* All information from adult trapping to fish releases are entered into FINS and other databases.
- *Meetings (e.g., AOP, Anad, HET, etc.) -* Hatchery staff attends all pertinent meetings dealing with hatchery applications.
- *Direct consultation for egg/smolt transport –* Consultation between hatcheries, with hatchery evaluation staff, with leadership staff, and with co-managers occurs as needed to facilitate egg/smolt transport.

1.3. Clearwater Fish Hatchery

1.3.1. Trapping and Brood Acquisition

- *Trapping/Brood Acquisition location* – Broodstock incubated and/or reared at CFH is acquired from four sources: SF Clearwater Anglers (SFClwAng), DNFH Ladder, Kooskia National Fish Hatchery (KNFH), and Kelt Program. The DNFH, KNFH and Kelt broodstock are primarily for eggs to be incubated and transferred for rearing at MVFH. DNFH, KNFH and Kelt broodstock also are a secondary brood source for SF Clearwater if angler collection of SFClwB is short of goal. See Dworshak Section 1.2.1 above for details on these brood sources.
- *Trap configuration -*
    - SFClwAng: Volunteer anglers, with guidance from IDFG staff, will catch fish in the South Fork Clearwater River for broodstock using standard hook and line angling techniques.
- *Dates operated -* Dates of operation vary each year due to environmental conditions (high water, ice, fish timing etc.). Typical collection dates are Mid-February to late - March.
- *Trapping/Brood Acquisition protocol (frequency, movement of fish)* -
    - SFClwAng: Adult steelhead will be collected from SF Clearwater River to develop a localized brood source for CFH production. Clearwater Regional staff will coordinate with anglers to collect adults for spawning. Among fish caught by anglers, only hatchery origin adult fish may be retained for broodstock. Qualified IDFG regional or hatchery staff will make the hatchery origin determination based on the presence of either an adipose fin clip, a coded-wire tag, or obvious fin erosion associated with hatchery rearing. Natural origin fish as evidenced by the lack of one or more of those indicators, are released immediately. CFH staff collect brood from the start of the collection until the week before CFH smolt hauling occurs in mid-March.

1.3.2. Adult handling

- *Measurements (marks, tags, sex, etc.) –*
    - SFClwAng: Fish caught by anglers are checked for marks and tags; only hatchery origin adult fish may be retained for broodstock and transported to DNFH (AD clip, CWT and/or fin erosion).
    - All stocks*:* Adults at DNFH are processed according to protocol described in "Adult Handling" from Section 1.2.1.
- *Tissue sampling protocol -* IDFG personnel will collect DNA samples from all spawned adults at DNFH (all programs) for a basin-wide parentage-based genetic tagging program (PBT) baseline (see Appendix 7.2 for detail).
- *Dispositions (holding, releases) –*
    - SFClwAng: All adults collected for broodstock are transported to DNFH for holding and spawning and processing. Among fish caught by anglers, only hatchery origin adult fish may be retained for broodstock (AD clip, CWT and/or fin erosion). Retained hatchery origin fish are transferred to specially designed fish holding tubes. Collected fish will be transported daily to DNFH for spawning. CFH staff will operate transport trucks to collect fish from the holding tubes and transport them to DNFH until approximately mid-March at which time regional IDFG fisheries staff will take over transport operations. Natural origin fish, as evidenced by the lack of one or more of hatchery mark/tags, are released immediately.
- *Surplus distribution - S*urplus SFClwAng fish, above and beyond CFH and DNFH needs, remaining in the Dworshak holding pond at the end of spawning, will be loaded onto the Dworshak distribution truck and released at the Mainstem Boat Launch just East of the Hatchery.
- *Carcass dispositions –* All adults collected for broodstock are transported to DNFH for holding, spawning and carcass disposal. See "Carcass disposition" in Section 1.2.1 for details on protocol.

1.3.3. Adult outplants (if applicable)

- *Outplant protocol (sex ratio, timing, marking, sampling) –* Adults collected for CFH broodstock, but not used, will be made available to NPT/DNFH to help backfill the Red house release group for radio tagging. Working closely with co-managers (IDFG) to collect local broodstock (SFClwB). Additionally, NPT may employ tribal anglers to assist with capturing adult steelhead for broodstock collection using traditional fishing methods.

1.3.4. Spawning/Egg take

- *Calculation of broodstock need (fecundity, eyeup, eye to smolt)* - The production goal is to trap and spawn enough adults to produce 843k smolts for the CFH programs to release in SF Clearwater. See the introduction to Section 1 and Appendix 7.1 for details on broodstock calculation. The fish will come primarily from angler collection from SF Clearwater (SFClwB stock). If insufficient SF Clearwater adults are available, the remainder will be made up with DworB broodstock from DNFH, KNFH and Kelt Program sources (see Section 1.2.1 for DworB broodstock collection).
    - SFClwB: A priority schedule has been established for the use of SFClwB stock, pending availability of adult pairs. CFH staff implements a strategy to increase production of SFClwB origin smolts by whole raceway groups. The first priority is to collect enough eggs from SFClwB broodstock to rear 75% of the Meadow Creek (SF Clearwater) release goal. If additional adults from the angler program are available, additional raceways would be included to achieve, in order of priority, the entire Meadow Creek release (501,000 smolts), the entire Red House Hole release (219,000 smolts) and the entire Newsome Creek release (123,000 smolts). If insufficient SFClwB adults are available to meet the green eggs needed to achieve the CFH production goal, DNFH will trap additional DworB adults to cover any shortfall.
- *Spawning protocol (schedule, method, M/F ratio) –*
    - SFClwB: Adult holding and spawning will occur at DNFH per "Spawning protocol" described in Section 1.2.4. IDFG staff will perform spawning, disease sampling, and testing of samples with the assistance of DNFH staff to oversee facility operations and process CWT. Adults not used for broodstock will be made available to DNFH for their localized group. First spawn date for egg

collection for CFH programs is late February. Spawning occurs on every Tuesday for DNFH spawn days and every Wednesday for SFClwB only fish.

1.3.5. Egg incubation

- *Eggs received (if applicable) –* At DNFH, the eggs will be eyed, shocked and then transferred to CFH.
- *Egg transfers (if applicable) -* DNFH eggs destined for MVH production will be transferred green to CFH. Once eyed and enumerated, MVFH will be contacted and transport dates will be established.
- *Egg incubation method (egg distribution, treatments, picking) –* After receiving eyed eggs from DNFH, they will be disinfected and placed in Heath egg trays. They will be picked and enumerated the next day. The eggs will then be placed in Heath egg trays for the remaining incubation period. Incubation of DNFH eggs destined for MVH production will be transferred green to CFH.
- *Treatment, loading density, flow rate -* Eggs are treated everyday with either formalin or iodine. Eggs are loaded one female to one tray at a flow rate of 5-6 gpm.
- *PBT tracking -* PBT integrity is tracked for the entire incubation cycle
- *Method into rearing tanks –* Once the fry are buttoned up, the fry are ponded in the indoor vats by use of a portable tank and remain there until they are approximately 100 fish per pound. Each vat is loaded with approximately 50k swim-up fry.
- *Surplus egg distribution (if applicable)*

1.3.6. Early rearing

- *Environmental protocols (flow indices, density indices) -* Fry remain in vats until they are approximately 100 fish per pound. Each vat is loaded with approximately 50k swim-up fry. Flow and Density indices are maintained within recommended values.
- *Feeding protocol -* Fish will be hand fed 6-8 times a day, then put on automatic feeders as feed sizes progress.
- *Marking and tagging (AD, CWT; date range, size at application) -* When fry are 100 fish per pound, typically end of July into first of August, they are run through the marking trailer and are put into the 12 steelhead raceways outside. As fish are moved outside, they receive ad-clips and CWT's.
- *Fish movement/facility configuration -* When fry are 100 fish per pound, they are run through the marking trailer and are put into the 12 C and D bank raceways outside where they will stay until release.

1.3.7. Final rearing

- *Target environmental protocols (flow indices, density indices) –* Raceways are loaded with approximately 50,000 -70,000 fish.
- *Feeding protocols-* Fish are fed by hand 2-6 times a day depending on the rearing cycle.
- *Mortality counting -* Morts are removed, counted and scanned for tags weekly. The final release number is determined by subtracting monthly fish loss from the inventory until the date of release.
- *Water monitoring -* Water monitoring is done monthly unless conditions dictate otherwise.
- *Fish movement/facility configuration -* When fish are moved from inside to outside, they will remain in raceways 7C - 12C; 7D - 12D for the remainder of the rearing cycle.
- *Acclimation (if applicable) -*
- *Marking and tagging (PIT) –* In October, fish will be PIT tagged to evaluate juvenile emigration timing and survival from release to Lower Granite Dam for each release group and to estimate a combined adult escapement back to Lower Granite Dam which will be used to estimate SARs. This tagging is a cooperative effort between CSS and LSRCP. PIT tags are randomly separated by code with 70% of the tags representing the run-at-large migration group and the balance (30%) returned to the river during outmigration. PIT tags will be distributed across release groups in proportion to the release group size.
- *Quality monitoring (counts, growth, length, marks quality, tag retention) -* The fish are sampled monthly between the 25th and 28th of the month. During months of rapid growth, fish may be sampled biweekly. Pound counts are taken to track fish growth and monitor if growth is following the annual growth projections. Length frequencies are taken two weeks prior to release. A 300 fish sample from raceways which are 100% CWT will be checked for tag retention approximately three-weeks post tagging. These

retention checks will satisfy marking QC/QA needs as well as release reporting requirements. Fish will remain in raceways until they are full smolt size and age, at a maximum of 4.5 to 6.0 fish per pound.

1.3.8. Fish health

- *Service provider* - IDFG, Eagle Fish Health Lab
- *Sampling protocols (what is sampled, sampling schedule) –*
    - Adults: All sampling of broodstock collected for CFH occurs at DNFH. All females spawned at DNFH for CFH will be tested for viral replicating agents. A total of 60 kidney/spleen samples will be collected while the remainder of the virology samples will be ovarian fluid. All samples will be shipped to Eagle Fish Health Lab for testing. Egg culling for IHNV will not occur. Eggs will be culled for other viral replicating agents such as, but not limited to, IPN, VHS and ISA. A total of 60 kidney samples will be taken to monitor for *R. salmoninarum* using ELISA. A total of 60 head wedges will be taken to monitor for *M. cerebralis*.
    - Juveniles: Juvenile fish are monitored visually by hatchery staff for any abnormal behavior or clinical disease signs. If there is a reason for concern, Eagle Fish Health is contacted as needed for a diagnostic exam. At least quarterly fish health inspections will be conducted based on water source and/or fish stock. Pre-liberation inspections will be performed on 60 fish within 30 to 45 days of release. Inspections will screen for the presence of parasitic, bacterial, and viral pathogens as appropriate.
- *Vaccination methods* - N/A
- *Treatment methods* - N/A

1.3.9. Fish release/transportation

- *Truck specifications* - Smolts are hauled in various truck specifications from single compartment to multiple compartments
- *Hauling/Release schedule* - When transporting fish, CFH follows IDFG and IHOT guidelines. Releases typically happen the first three weeks in April.
- *Hauling/Release guidelines* - All steelhead smolts are direct release. If tank and stocking water temperature is not within 5-10 degrees F, fish are acclimated to stocking water temp but pumping stocking water in tanks until desired temp is achieved.

1.3.10. Communication

- *Written reports (e.g., Monthly summaries, annual reports)* - Monthly hatchery performance sheets are distributed to HQ, M&E, Fish Health and LSRCP.
- *FINS and IDFG release databases –* All information is captured in the FINS database from trapping to release and all smolt releases are entered into the IDFG release database in a timely manner.
- *Meetings (e.g., AOP, Anad, HET, etc.) –* Hatchery staff attends all pertinent meetings dealing with hatchery applications.
- *Direct consultation for egg/smolt transport –* Direct consultation to M&E, HQ and cooperators is performed when things outside of the AOP and SOP occur.

2. Spring/Summer Chinook Salmon

- *Definition of species* - Chinook salmon *Oncorhynchus tshawytscha* are native to the Columbia River drainage and spawn in freshwater during summer and fall. Idaho's Chinook enter the freshwater system the same year they spawn, usually beginning in the spring. Spawning begins in August and continues as late as November. Spring, Summer, and Fall Chinook are designated by the time of entry into the Columbia River system.
- *Rearing locations* - Spring/summer hatchery Chinook salmon released into the Clearwater drainage are reared at four hatcheries: Dworshak National Fish Hatchery (DNFH), Kooskia National Fish Hatchery (KNFH), Nez Perce Tribal Hatchery (NPTHC), and Clearwater Fish Hatchery (CFH).
- *Broodstock collection and spawning locations* - Broodstock collection activities for the spring/summer Chinook salmon program in the Clearwater are conducted at the following locations: Dworshak National Fish Hatchery (DNFH), Kooskia National Fish Hatchery (KNFH), Nez Perce Tribal Hatchery (NPTHC), Red River Satellite Facility (REDR), Crooked River Satellite Facility (CROK) and Powell Satellite Facility (Powell; Summer run). Spawning activities are conducted at DNFH, NPTHC, CFH, and Powell.
- *Calculation of Broodstock need* - Appendix 7.1 shows the brood calculator used to determine brood needed to reach production goals for the program releases. The number of eggs collected is based on 5-yr running historical average of adult survival, eye-up percentage, disease rates and smolt survival rates to meet smolt release targets. Suppose the production goal is to trap and spawn enough adults to produce (x) number of smolts for release. Applying a production cushion (c) and eyed egg-to-smolt survival (ess) to total smolt goal, gives the eyed eggs needed (e=(x*(1+c))/(ess)). After accounting for green-to-eyed egg and culling survival (ges and cs, respectively), the green egg goal before culling can be determined (g=e/(ges)/(cs)). Using an average fecundity of green eggs per female (fec) gives the number females needed (F=g/fec). A 1:1 M:F spawning ratio gives the number of males needed (M=F) and the total number to spawn (TotSp=F+M). Total fish needed when accounting for % pond mortality (pm) can be calculated (TotPM=TotSp/(1-pm)).
- *Smolt releases* – To meet adult mitigation goals, the original annual production from Chinook Salmon hatcheries in the Clearwater drainage was approximately 1.35 million smolts. This level of production assumed that about 0.87% of smolts released would return to LGR but actual SAR's have averaged less than half of that value. To offset these below anticipated SARs, attempts have been made to increase production from Chinook Salmon hatcheries in the Clearwater drainage and annual releases now total approximately 6,380,000 smolts (Spring and Summer runs combined, including new production) and 925,000 parr and pre-smolts.

2.1. Overview of facilities and brood stock

2.1.1. Dworshak National Fish Hatchery (DNFH)

- *Hatchery description and location* - The DNFH is located at the confluence of the North Fork Clearwater River and mainstem Clearwater River.
- *Owner and operator* – DNFH is owned by the US Army Corps of Engineers and is operated by the USFWS and the Nez Perce Tribe (NPT).
- *Programs at facility (Fig. 2.3)* - DNFH traps, spawns, incubates and rears Dwor stock hatchery Chinook for the following: rear to smolt for release, spawn for green-egg transfer to CFH for rearing to smolts, rear to Parr for transfer to NPTHC for rearing to smolts. DNFH also traps and transfers live adults to CFH where they are held until spawning.
- *Stocks reared and release locations (Fig. 2.3)* - DNFH rears Dwor stock smolts for release in NF Clearwater (at DNFH). DNFH rears Dwor stock parr for transfer to NPTHC for rearing and eventual smolt release at NPTHC and Lapwai Creek. DNFH spawns Dwor stock to provide green eggs for transfer to CFH, to support Selway River (Lower) programs, and, if needed, Clear Creek to supplement Kooskia stock.
- *Production Goals (smolts, fpp)* – NF Clearwater (at DNFH) – 1.65 million Dwor smolt at 20fpp, Transfer to NPTHC – 380k Dwor parr at 140 fpp (reared to smolt for release at NPTHC and Lolo Creek).
- *Adult mitigation goal (if applicable)* - Based on assumptions used to estimate mitigation goals for the LSRCP Chinook Salmon hatchery programs, the total combined annual mitigation goal for adult Chinook Salmon returns to the project area above Lower Granite Dam from DNFH is approximately 9,135 spring Chinook salmon. Original LSRCP mitigation goals to the project area above Lower Granite Dam assumed a harvest rate of about 80% for adult hatchery origin Chinook salmon from the Clearwater River in ocean and

Columbia River fisheries downstream of the project area. In addition to harvest mitigation, a portion of the combined Chinook Salmon hatchery mitigation production from DNFH is intended to supplement natural spawning in portions of the Clearwater drainage. Fish intended for supplementation are released with adipose fins intact and are not intended to contribute to mark-selective fisheries. Collaboratively managed hatchery production and supplementation efforts associated with this program are consistent with the intent and protocols of the most current US vs. Oregon Management Agreement.

- *Facility or stock changes (if applicable)* –

2.1.2. Kooskia National Fish Hatchery (KNFH)

- *Hatchery description and location* - KNFH is located 1.5 miles southeast of Kooskia, Idaho near the confluence of Clear Creek and the Middle Fork Clearwater River.
- *Owner and operator* – Kooskia National Fish Hatchery is owned and funded by the USFWS, and managed and operated by the NPT as part of the Dworshak Fisheries Complex.
- *Programs at facility (Fig. 2.3) -* KNFH traps spring Chinook. Adult broodstock is transferred to DNFH and CFH for spawning. Green eggs from DNFH are transferred back to KNFH for incubation and rearing; and green eggs are transferred to CFH for rearing to smolts.
- *Stocks reared and release locations (Fig. 2.3) -* KNFH rears 650,000 Kooskia stock smolts for release at KNFH into Clear Creek. In addition, Kooskia stock (combined with Dwor stock as needed) are reared to smolt stage at CFH; these smolts are released into Clear Creek (a portion acclimated at Kooskia before release), the Selway River-Lower, and the NF Clearwater.
- *Production Goals (smolts, fpp)* – KNFH – 650k Kooskia smolts at 20 fpp released at KNFH,
- *Adult mitigation goal (if applicable)* - Based on assumptions used to estimate mitigation goals for the LSRCP Chinook Salmon hatchery programs the total combined annual mitigation goal for adult Chinook Salmon returns to the project area above Lower Granite Dam from KNFH is approximately 5,200 spring Chinook salmon. See DNFH section above for general explanation of this calculation ("Adult mitigation goal" in Section 2.1.1).
- *Facility or stock changes (if applicable)* –

2.1.3. Nez Perce Tribal Hatchery (NPTHC)

- *Hatchery description and location* - Nez Perce Tribal Hatchery Complex is located at RKM 38 on the north bank of the Clearwater River
- *Owner and operator* – Nez Perce Tribal Hatchery Complex is owned by the Bonneville Power Administration and operated by the Nez Perce Tribe.
- *Programs at facility (Fig. 2.3) -* NPTHC traps spawns, incubates and rears NPTHC and Dwor stock hatchery Chinook for the following: rear to pre-smolt and smolt for release, rear parr received from DNFH to smolt for release.
- *Stocks reared and release locations (Fig. 2.3) -* NPTHC rears NPTHC stock to pre-smolt for release into Yoosa Creek (Lolo Creek), smolts for release into Lolo Creek (Clearwater) and pre-smolt for release into Newsome Creek (SF Clearwater). NPTHC rears Dwor stock received as parr from DNFH to smolt for release to NPTHC and Lolo Creek.
- *Production Goals (smolts, fpp)* – Lolo Creek – 150k at 30 fpp NPTHC pre-smolts, Newsome Creek – 75k at 30 fpp NPTHC pre-smolt, Lolo Creek- 200k at 20 fpp NPTHC smolts, NPTHC on Station – 200k at 20 fpp Dwor smolt, Lolo Creek – 180k at 20 fpp Dwor smolt.
- *Adult mitigation goal (if applicable)* – Based on assumptions used to estimate mitigation goals for the LSRCP Chinook Salmon hatchery programs the total combined annual adult mitigation goal for adult Chinook Salmon returns to the project area above Lower Granite Dam from NPTHC is approximately 1,176 spring Chinook salmon. See DNFH section above for general explanation of this calculation ("Adult mitigation goal" in Section 2.1.1).
- *Facility or stock changes (if applicable)* –

2.1.4. Clearwater Fish Hatchery (CFH)

- *Hatchery description and location* - The Clearwater Fish Hatchery consists of the main hatchery and three satellite facilities: Red River, Powell, and Crooked River. The main Clearwater Hatchery is located at

Ahsahka, Idaho approximately 45 miles east of Lewiston, Idaho on highway 12 on the NF Clearwater River. Red River facility is located near the Red River Ranger station approximately 15 miles east of Elk City, Idaho. The Crooked River facility is located approximately 35 miles east of Elk City, Idaho. The Powell facility may be seen by driving on state highway 12 to approximately milepost 163.5 and then turning south on the Elk Summit road and travel two miles to the entryway sign of the Powell fish trap.

- *Owner and operator* – The Clearwater Fish Hatchery and its three satellite facilities were constructed by the Army Corp of Engineers under the Lower Snake River Compensation Plan. The Idaho Department of Fish and Game operates the hatchery with funding provided through the U.S. Fish and Wildlife and Lower Snake River Compensation Plan office.
- *Programs at facility (Fig. 2.3)* - CFH spawns, incubates and rears SF Clearwater stock (SFClw) collected from Red River Satellite Trap (RRSat) and Crooked River Satellite Trap (CRSat). SFClw stock is reared to smolt for release. CFH spawns, incubates and rears Powell Summer run stock (PowSum) collected from Powell Trap. CFH also may receive summer stock green eggs from South Fork Salmon River Trap (SFSR) for incubation and rearing. PowSum and SFSR stocks are reared to smolt for release. CFH may also receive eyed eggs from DNFH (Dwor stock) and KNFH (Koosk stock) that are reared at CFH to smolts for release. Upon availability, live adults also are transported from DNFH and KNFH to CFH where they are spawned and eggs are reared to smolt stage for releases into the NF Clearwater, Selway R., and Clear Cr.
- *Stocks reared and release locations (Fig. 2.3)* – SFClw: CFH rears SFClw smolts for release in Red River. Dwor: CFH may receive Dwor stock eyed eggs and/or adults for spawning and rears the progeny to smolts for release in NF Clearwater (at CFH) and Selway River (Lower). Dwor smolts may be released at Clear Creek as needed. Koosk: CFH may receive Koosk stock eyed eggs and/or live adults for spawning and rears the progeny to smolts for release in Clear Creek and Selway River (Lower). PowSum: CFH rears PowSum smolts for release at Powell (Walton Creek). CFH also may receive SFSR green eggs which are reared to smolts for release at Powell (Walton Creek)(see Snake-Salmon River SOP for details on SFSR brood collection and spawning).
- *Production Goals (smolts, fpp)* – All production has 16 FPP release goal. Full production release goals are as follows: Red River - 1.28 million SFClw smolts, NF Clearwater Baffle - 389k Dwor smolt, NF Clearwater Regular - 320k Koos/Dwor smolt, Selway River (Lower) - 400k Koos/Dwor smolt, Clear Creek - 720k Koos/Dwor smolt, Powell - 640k PowSum/SFSR smolt for a total of 3.749M smolts. Release goals reflected in US v. OR are as follows: 1.1 million SFClw smolts, Selway River (Lower) - 400k Koos/Dwor smolt, and Clear Creek - 635k Koos/Dwor smolt for a total of 2.135M smolts.
- *Adult mitigation goal (if applicable)* - Based on assumptions used to estimate mitigation goals for the LSRCP Chinook Salmon hatchery programs the total combined annual mitigation goal for adult Chinook Salmon returns to the project area above Lower Granite Dam from CFH is approximately 11,915 spring Chinook salmon. See DNFH section above for general explanation of this calculation ("Adult mitigation goal" in Section 2.1.1).
- *Facility or stock changes (if applicable)* - Original natural populations of spring/summer Chinook Salmon in the Clearwater drainage were extirpated after the construction of Lewiston Dam in 1927. The dam was removed in 1973 and subsequent hatchery production of spring/summer Chinook Salmon in the basin was sourced from the original Hells Canyon spring run population that was also the brood source for the hatchery Program at Rapid River Hatchery in the Salmon River drainage. However, based on historic evidence, the original natural population in the Clearwater River may have had a run timing resembling that of summer run populations in the South Fork Salmon River drainage. Based on that information and a desire to diversify fisheries in the Clearwater drainage, managers initiated a relatively small 200,000 smolt summer Chinook Salmon hatchery mitigation program at the CFH beginning in BY 2009. The program replaced a comparable segment of Spring Chinook Salmon production from CFH and the original brood for the program was sourced from the hatchery returns of summer Chinook Salmon to the South Fork of the Salmon River. The original BY09 summer run smolts were released in 2011 at Crooked River but conversions of adult returns to that trap location were poor so releases were relocated to the Powell satellite facility on the

upper Lochsa River in 2014 (BY12). The intent is to build a program that releases between 640,000 to 1,000,000 smolts with all brood being collected from adult returns to the Clearwater Basin.

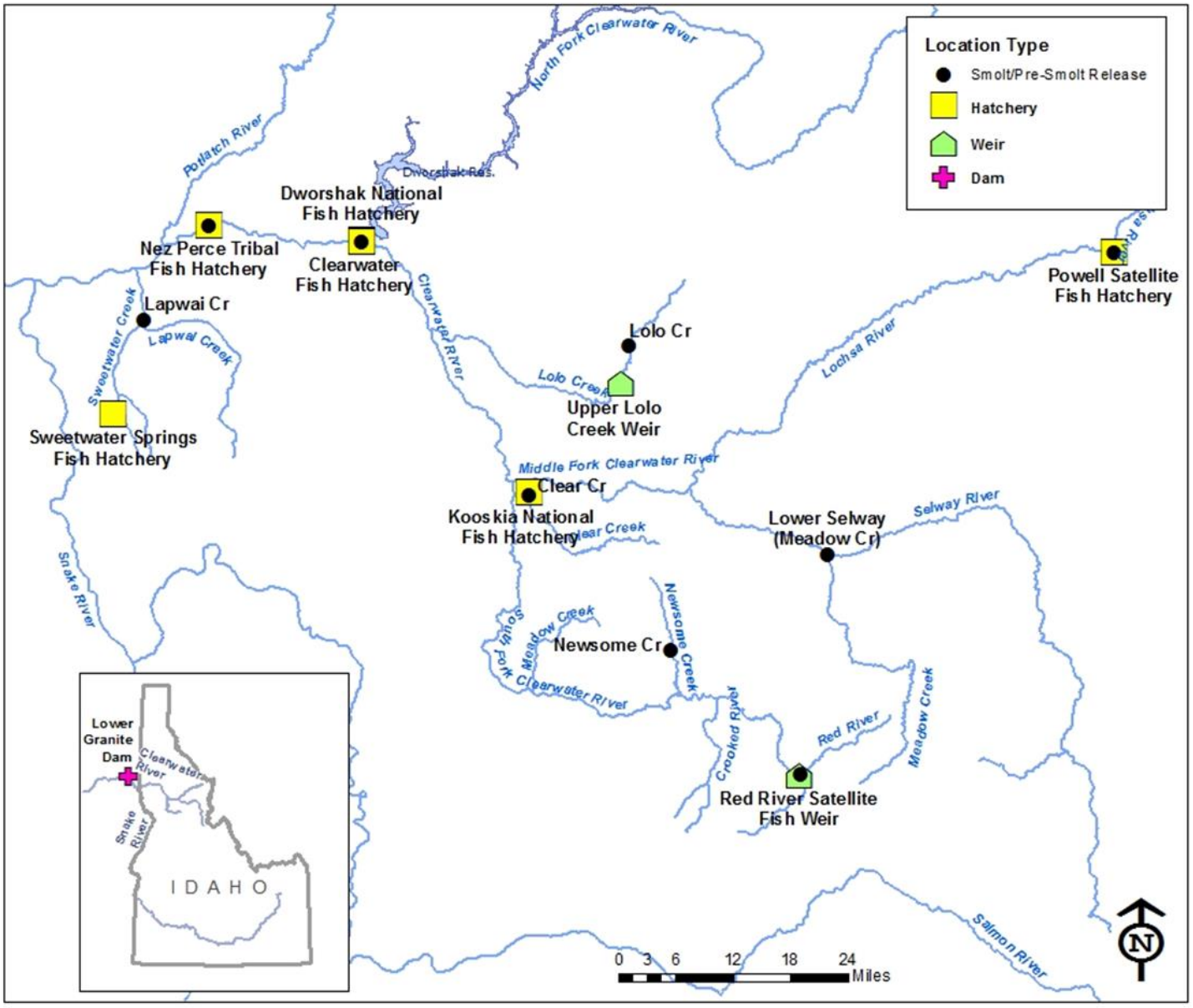

Figure 2.1. Locations of Spring/Summer Chinook Salmon hatchery facilities and smolt/parr/pre-smolt releases.

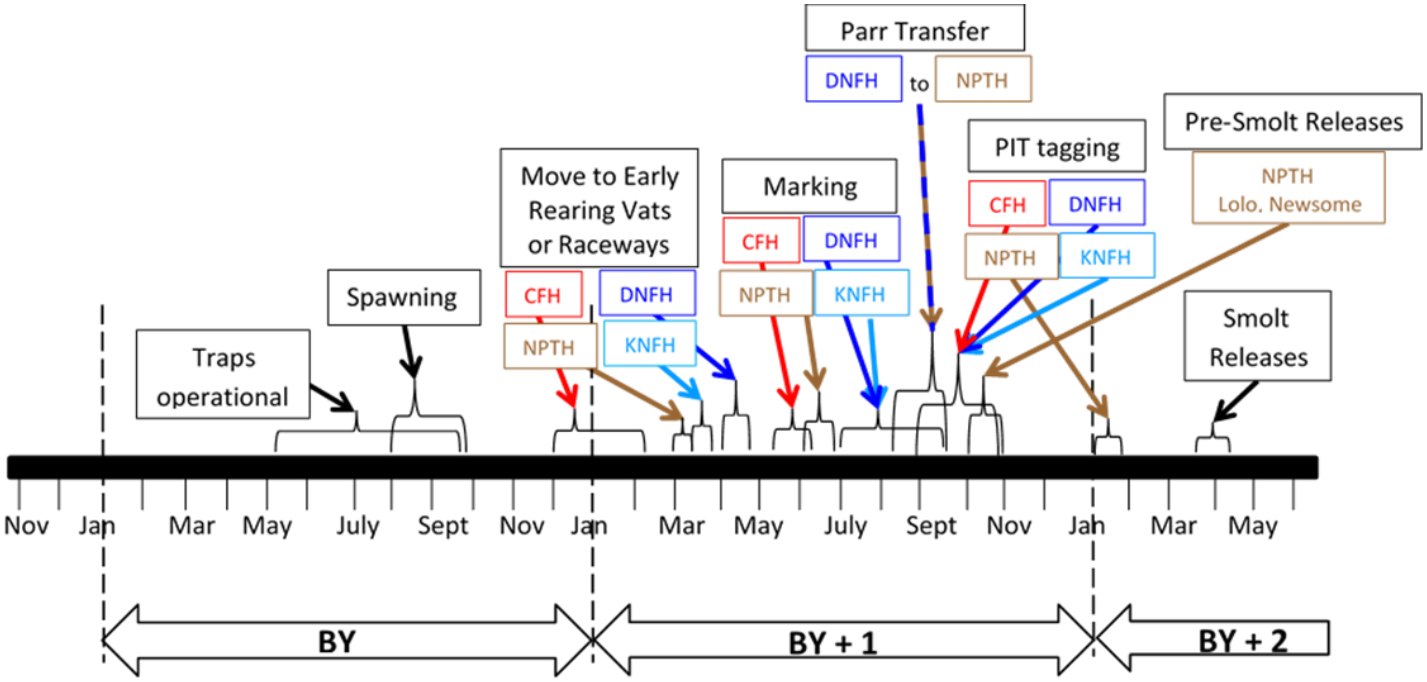

Figure 2.2. Timeline for Spring/Summer Chinook Production. Date ranges with black labels are shown to include all facilities' operations. Color-coded labels identify activities that have variability in timing for the different facilities.

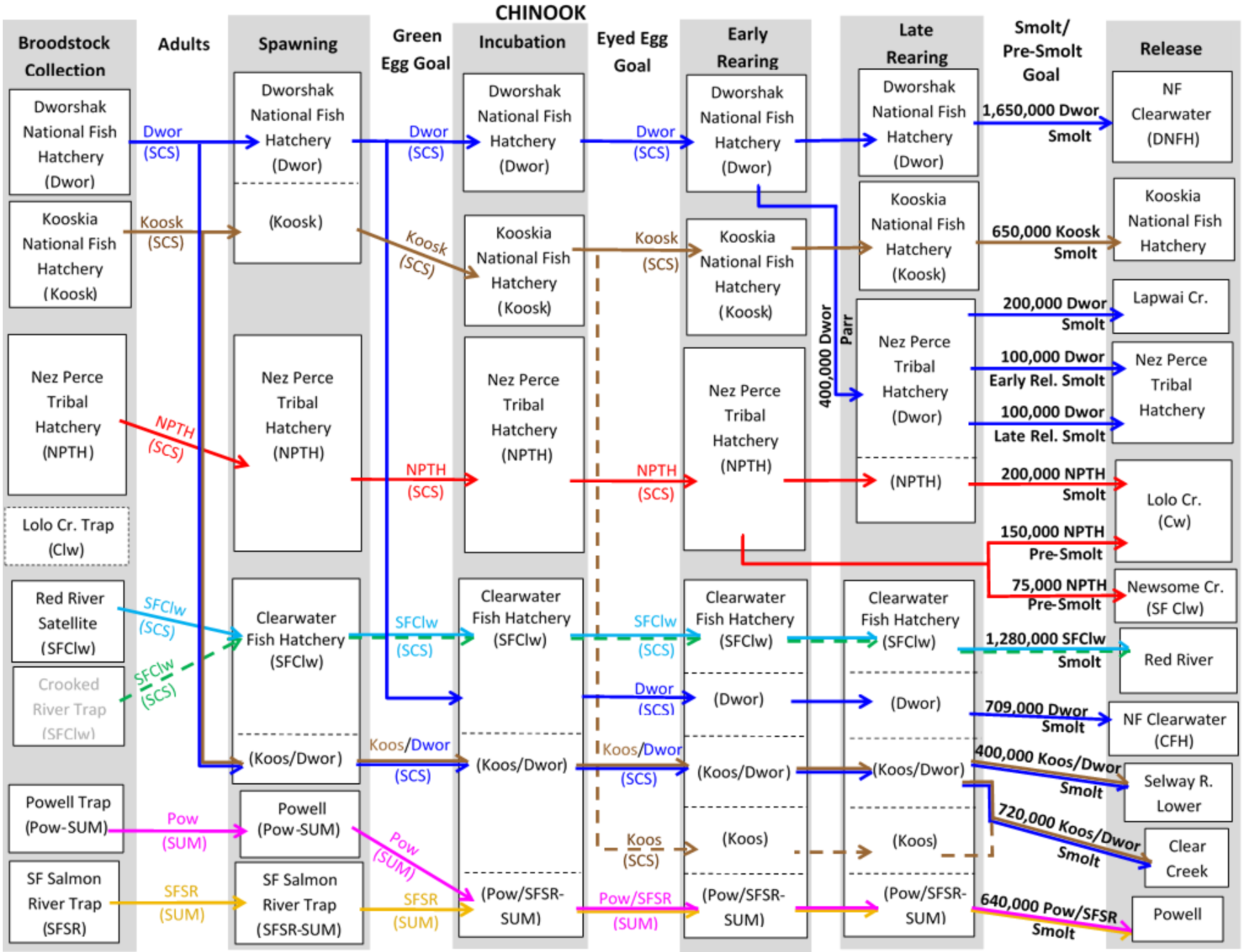

Figure 2.3. Fish and egg movements for Spring/Summer Chinook.

2.2. Dworshak National Fish Hatchery

2.2.1. Trapping and Brood Acquisition

- *Trapping/Brood Acquisition location* – Broodstock spawned, incubated and reared at DNFH is acquired from DNFH ladder.
- *Trap configuration* - A fish ladder in the N.F. Clearwater River traps returning adults at the hatchery. The holding pond at the top of the ladder is 15'x 75'x 8'. Broodstock are collected passively using a ladder that enters the hatchery from the NF Clearwater River.
- *Dates operated* - Co-managers have agreed that DNFH will begin operation in mid-June and continue until mid-August or until all broodstock are acquired. Operation of the Dworshak ladder may be modified by co-manager agreement to meet basin-wide needs.
- *Trapping/Brood Acquisition protocol (frequency, movement of fish)* - Ladder operation will be optimized to ensure adequate broodstock collection. The DNFH trap will be sorted once the ladder counter reaches 250 adults. The co-managers plan to trap as many spring Chinook as necessary to ensure that broodstock needs are met at all Clearwater facilities (DNFH, KNFH, CFH, NPTH).

2.2.2. Adult handling

- *Measurements (marks, tags, sex, etc.)* - Returning adults are measured and examined for gender, various clips, tags, and marks, then sorted for spawning or holding. A subsample of coded wire tagged fish will be kept for tag retrieval. See Appendix 7.3 for more information on CWT.
- *Tissue sampling protocol* - Genetic samples are collected from all spawned adults to develop the PBT baseline.
- *Dispositions (holding, releases)* –Returning adults to KNFH that have been trapped and collected to meet broodstock needs are transported to DNFH for holding until spawning to minimize negative impacts from excessive Clear Creek water temperatures that typically occur at KNFH in the summer. See KNFH Section 2.3 for details on trapping, incubation and rearing of Kooskia stock.
- *Surplus distribution* - Fish that have not been injected with antibiotics or hormones and have been held through appropriate withdrawal periods, may be offered to NPT for subsistence programs and the local food bank. This would include, with the AOP partners support, excess jacks and adults collected for CWT.
- *Carcass dispositions* – Chinook carcasses will be used by research groups if possible. Fish that have not been injected with antibiotics or hormones may be utilized for stream enrichment in approved water bodies or utilized by the food bank. All other adult carcasses will be disposed at the landfill.

2.2.3. Adult out-plants (if applicable)

- *Trigger for out-planting* - Fish that have not been injected with antibiotics or hormones and have been held through appropriate withdrawal periods may be out-planted under 3 scenarios; ad-intact fish collected during trap sorting, adults surplus to program needs, or at the direction of the co-managers.
- *Purpose* – Release of fish surplus to program, or adipose intact adults.
- *Out-plant protocol (sex ratio, timing, marking, sampling)* – Appendices 7.6.1 and 7.6.2 list the pre-arranged streams to receive adult spring Chinook salmon and marks given to out-planted fish.

2.2.4. Spawning/Egg take

- *Calculation of broodstock need (fecundity, eye up, eye to smolt)* - Brood needs at DNFH will contribute to programs at DNFH, CFH, and NPTH, or as a backup at KNFH. See the introduction to Section 2 and Appendix 7.1 for details on broodstock calculation. Brood numbers on the broodstock calculator include jacks (goal for jacks is less than 5% contribution to production annually). Broodstock collection is minimized to the extent possible. The production goal is to trap and spawn enough adults to produce approximately 3.53 million smolts or parr/ pre smolts, for these programs.
    - Dwor reared at DNFH: The production goal is to trap and spawn enough adults to produce 1.65 million smolts for release at NF Clearwater (at DNFH).
    - Dwor reared at NPTH: The production goal is to trap and spawn enough adults to produce 400k parr to be transferred to NPTH, for release as smolts at NPTH and Lapwai Creek. The fish needed to produce these green eggs will come from trapping at DNFH.

- Dwor reared at CFH: The goal is to produce 1.509M smolts to be reared at CFH. This production includes some proportion of Dwor and Koos stock. The general plan is to have 389k Dwor stock smolts released to NF Clearwater, 400k Koos/Dwor stock smolts released to Selway River (Lower), and 720k Koos/Dwor stock smolts release to Clear Creek. Dwor stock eggs for the NF Clearwater releases will be taken at DNFH and transferred as green eggs to CFH for rearing. Dwor stock for the Selway River (Lower) and Clear Creek releases will either be transferred as green eggs from DNFH or transferred as live adults from DNFH to be spawned, incubated and reared at CFH (in addition to Koos stock eggs and live adults being transferred to CFH).

- *Spawning protocol (schedule, method, sex ratio) -* The first fish trapped at DNFH will not be processed/spawned until at least 250 fish have been collected in the trap. Thereafter, if available, between 250 and 350 fish will be processed weekly until end of trapping to meet the overall broodstock goal. Distribution of adult brood from the DNFH ladder will be determined utilizing a co-manager weekly coordination call. CO2 will be utilized as an anesthetic until 1st spawn to allow for utilization of euthanized fish for food and to allow outplanting of adults without necessitating a drug-withdrawal holding period. The anesthetic used during spawning, typically beginning during the 3rd week of August, will be Aqui-S. Utilization of this anesthetic allows for gentle sorting of adults, as well as only a 3-day drug withdrawal holding period, compared to a 21 day holding period for fish spawned in MS-222. When possible, DNFH will spawn males and females at a 1:1 ratio. Jacks will incorporate not more than 5% of the total males spawned. Adult males >85 cm may be utilized up to 3 times as agreed upon by co-managers as a means to increase ratio of 5-year old adults returning to the basin. Females will be spawned as they become ripe. A typical spawning season consists of 4-7 egg takes to meet production goals. KNFH adult broodstock are held at DNFH until spawning, which normally occurs the third week of August. See KNFH Section 2.3 for details on trapping, incubation and rearing of Kooskia stock.

2.2.5. Egg incubation

- *Eggs received (if applicable) –*
- *Egg transfers (if applicable) –* Kooskia stock eggs taken at DNFH for KNFH will be transferred to KNFH as green eggs for incubation and rearing. All Dwor and Kooskia stock eggs taken for CFH will be transferred to CFH as green eggs for rearing at CFH.
- *Egg incubation method (egg distribution, treatments, picking) -* DNFH stock eggs will be incubated at DNFH. Eyed eggs may be culled based on disease sampling and by eye-up percentages. Upon receiving ELISA results from adult females, eggs with OD levels above 0.25 will be culled. In the event of low adult returns, with anticipated egg numbers below program goals or policy requests, hatcheries may consider rearing Chinook salmon eggs from females with ELISA optical densities between 0.25 and 0.60 that would normally be culled. The number of these higher-ELISA progeny to be raised will be limited by the availability of sufficient rearing space to maintain low density indices and biosecurity (segregation and other measures) appropriate for rearing fish from high-titer brood. This decision to raise fish from high ELISA-titer brood will be made prior to spawning each year. Eggs will begin incubation on secondary reservoir water and then be switched over to chilled supply utilizing temperature units to catch the egg takes up to each other developmentally. Eggs will be treated with a formalin drip treatment three days a week until just prior to hatching. Picking will occur after shocking and enumeration. Just prior to enumeration, BKD culls and low survival culls will be removed from the incubation stacks.
- *Treatment, loading density, flow rate -* At enumeration eggs will be mechanically picked utilizing a Van Galen egg sorting machine and allocated into trays at a rate of approximately 5,000 eggs per tray and then placed into incubation stacks utilizing chilled water at a flow rate of 5 gpm. Treatments will continue three days a week until just prior to hatching. Picking of mortality in egg trays and egg shell removal will begin shortly after enumeration and continue as deemed necessary to maintain healthy incubation environments.
- *PBT tracking -* PBT is tracked utilizing hard data, in-house spreadsheets and the FINS system. Whenever possible, PBT groups are not mixed, to maintain PBT integrity through release.

- *Method into rearing tanks* –There is no indoor nursery rearing at DNFH; swim-up fry are moved directly to raceways. In the spring of BY+1 (generally late April), fry at DNFH are transferred directly from the egg trays into the A & B banks of the outside raceways utilizing an Aqua-Life Biostream fish transfer pump.
- *Surplus egg distribution (if applicable)* - When excess eggs are produced, due to surpassing of metrics from the broodstock calculator, an email will be sent to the co-managers to ascertain if there is a need to utilize these eggs at NPTH, CFH or KFH. If the eggs are not requested and approved for transfer, these eggs will be injected into approved rearing habitat utilizing a Redd Zone egg injection unit. See appendix 7.8 for more details.

2.2.6. Early rearing

- *Environmental protocols (flow indices, density indices) -* All raceways at Dworshak are equipped with LHO's (low head oxygenators) to help maintain healthy levels of oxygen and nitrogen in the rearing environment. Chinook will be ponded into raceways in PBT distinct groups within screened off sections of individual ponds. As fish grow larger, screens will be removed to allow fish access to more rearing space. The screens will be removed in a manner to allow for density indices to remain as low as possible. Maximum density will be maintained below .35 and will only approach this index just prior to marking at the end of August. Each program reared in the raceways will be PBT distinct and remain separate from other rearing programs during the duration of that programs rearing time at DNFH, to the extent possible.
- *Feeding protocol -* Bio-Oregon starter feeds will be utilized for early rearing. Feeding frequency will start at 8 times a day and decrease as fish get larger. Fish will begin feeding on #0 crumb and size will increase as fish grow larger.
- *Marking and tagging (AD, CWT; date range, size at application) -* Fish will stay in their initial raceways until marking in early September of BY+1.
    - Dwor stock reared at DNFH - Dwor stock smolt releases to NF Clearwater (at DNFH) will be 100% AD clipped and receive approximately 120,000 CWTs, 2 groups of 60k. The AD clips and CWTs are applied beginning in early September.
    - Dwor stock to NPTH – Dwor stock is early-reared to parr at DNFH and then transported to NPTH for marking and tagging and final rearing to smolts. Dwor stock smolts to be released at Lapwai Creek will be 100% AD clipped and 60,000 CWT/AD. CWT tagging and AD clipping occurs at DNFH by USFWS during early rearing. Tags are provided by LSRCP.
- *Fish movement/facility configuration -* The NPTH on-site release group early reared at DNFH will be transferred to NPTH in mid-August at ~200 fpp and marked/tagged there. The NPTH Lapwai Creek release group early reared at DNFH will be transferred to NPTH in September, within one week after marking/tagging at DNFH in September. DNFH program fish will also be marked/tagged in September (~100 fpp), and then moved to their final raceways at final densities. Raceways at DNFH will be ponded with either 45,000 or 65,000 juveniles after marking and tagging.
- *Target environmental protocols (flow indices, density indices) –* Raceways will be ponded with either 45,000 or 65,000 juveniles (100 fpp) at marking. Fish will remain in the same individual raceways for the remainder of their rearing cycle at DNFH. Approachment of density indices of .35 will not occur until just prior to release.
- *Feeding protocols-* Bio-Oregon will be utilized throughout rearing at DNFH.
- *Mortality counting -* Mortality will be picked daily.
- *Water monitoring -* Flow measurements are taken monthly and when flow changes are undertaken. Dissolved oxygen will be monitored throughout the rearing cycle.
- *Fish movement/facility configuration –* The NPTH on-site release group early reared at DNFH will be transferred to NPTH in mid-August. Dwor stock Lapwai parr are transferred within 1 week of marking in early September of BY+1 from DNFH to NPTHC (see Section 2.4.7 for details on final rearing).
- *Acclimation (if applicable) -*
- *Marking and tagging (PIT)* – Smolt releases to NF Clearwater will have PIT tags (42,000) for the Comparative Survival Study (CSS) administered by FWS Columbia River Fisheries Program Office (Vancouver). See Appendix 7.4.1 for more information on PIT tags.

- *Quality monitoring (counts, growth, length, marks quality, tag retention) -* Five hundred CWT fish from a 100% CWT raceway will be checked for tag retention before release. Sample counts will be completed monthly and length-weight frequency completed just prior to release.

2.2.7. Fish health

- *Service provider -* USFWS Pacific Region Fish Health Program
- *Sampling protocols (what is sampled, sampling schedule) –*
    - Adults: Every adult female will be sampled and tested individually for *Renibacterium salmoninarum* (Bacterial Kidney Disease) with the ELISA test. Generally eggs from females with optical densities above the .250 ELISA cut off level will be culled (see "Egg Incubation" Section 2.2.5 for details). Up to 150 ovarian fluid samples will be sampled for viruses. In addition, 60 tissue samples will be taken for virus. Up to 60 intestinal tissue samples will also be examined for *C. Shasta*. No antibiotic injections will be given to adults as they return beginning with BY 2017.
    - Juveniles: Diagnostic exams will be performed as needed. In lieu of a traditional 60 fish pre-release exam performed 4-6 weeks prior to release, a six month health history will be attained. Six months prior to release a minimum of 10 fish per month will be examined for overall health and for viral, parasitic, and bacterial pathogens, including BKD. Prior to release, a visual inspection to determine levels of precocity will be performed. One to two weeks prior to release, an additional gross examination of fish is performed to assess smolt readiness and final disease status. Visual inspection to determine levels of precocity will be performed at every examination. A six month report will be written to include monthly monitoring and any diagnostics during that time frame.
- *Vaccination methods - None*
- *Treatment methods* – Kooskia stock adult fish transferred to DNFH for holding and spawning receive formalin treatment immediately upon arrival at DNFH. Dworshak and Kooskia stock adults will be treated up to three times per week with formalin for fungus.

2.2.8. Fish release/transportation

- *Truck specifications –*.
- *Hauling/Release schedule -* Parr transfers to NPTHC will be completed between August and September for both on-site and Lapwai groups BY+1. DNFH will direct release smolts (by forced release from raceways) into NF Clearwater in the spring (Mar-Apr) of BY+2. In years where the North Fork has high total gas levels, fish may be released via pump into the Main-stem Clearwater River. Chinook will be released on two consecutive evenings from A and B banks with a number of environmental factors considered: flows, turbidity, and an increasing hydrograph to maximize survival during release and outmigration.
- *Hauling/Release guidelines -*

2.2.9. Communication

- *Written reports (e.g., Monthly summaries, annual reports) -* FWS puts out weekly spawning reports and weekly return reports, monthly production activity reports, and annual spawning and adult return reports are also produced.
- *FINS and IDFG release databases -* Complete FINS data will be tracked starting with BY 16 and all subsequent years.
- *Meetings (e.g., AOP, HET, etc.) -* Dworshak staff will participate in AOP, HET and other associated meetings as well as coordination calls and online meetings, when possible.
- *Direct consultation for egg/smolt transport –* Spring Chinook coordination will begin in the spring in advance of trapping season. Weekly conference calls scheduled for Tuesdays and standardized report tables keep all parties updated, informed, and coordinated on in-season run development, harvest estimates, broodstock collection, priorities for excess broodstock, out-planting plans, etc.

2.3. Kooskia National Fish Hatchery

2.3.1. Trapping and Brood Acquisition

- *Trapping/Brood Acquisition location –* Broodstock for rearing at KNFH are collected at KNFH, transferred to DNFH as live adults, spawned at DNFH, incubated and reared at KNFH. Broodstock necessary for rearing 635,000 smolts at CFH are collected at KNFH, and transferred as live adults to CFH where they will be

spawned, incubated, and reared. Upon availability, broodstock may also be trapped at KNFH and transferred to other facilities to meet broodstock goals throughout the Clearwater basin.

- *Trap configuration -* KNFH is located 1.5 miles southeast of Kooskia, Idaho near the confluence of Clear Creek and the Middle Fork Clearwater River.
- *Dates operated -* Trap will be opened for Chinook collection around mid-May until warm water temperatures dictate its closure.
- *Trapping/Brood Acquisition protocol (frequency, movement of fish)* - Returning adults collected for broodstock will be transported to DNFH until broodstock goals are met for KNFH. Once these goals are met, trapped adults will be transferred to CFH to fill the 635,000 smolt release goal. After these two programs have met broodstock goals, trapped adults will be available to fill other programs as needed. Transport of adults will be completed by the hatchery using the fish to meet their program.

2.3.2. Adult handling

- *Measurements (marks, tags, sex, etc.) -* Returning adults are measured and examined for gender, various clips, tags, and marks and then designated as broodstock (for transport to DNFH) or natural release. CWTs will be recovered after spawning is completed.
- *Tissue sampling protocol -* Genetic samples are collected from all spawned adults to develop the PBT baseline (see Appendix 7.2 for detail).
- *Dispositions (holding, releases) -* Returning adults collected for broodstock will be transported to DNFH for holding until spawning. Chinook for adult outplanting will be loaded directly into NPT trucks at KNFH for release (see Section 2.3.3 for details). Tribal use of un-anesthetized jacks for the elder program will need to be coordinated prior to adult sorting (NPT contact Nancy McAllaster, 208-621-2126).
- *Surplus distribution -* Excess broodstock adults will be out-planted in the Clearwater Basin.
- *Carcass dispositions –* All carcasses will be sent to the landfill.

2.3.3. Adult outplant (if applicable)

- *Trigger for outplanting -* when broodstock needs and CNS needs are met, managers will decide where out-planting will take place.
- *Purpose –*
- *Outplant protocol (sex ratio, timing, marking, sampling)* – Appendix 7.6.1 lists the prearranged streams to receive adult spring Chinook salmon. Chinook loaded for adult outplanting will be loaded directly into NPT trucks at KNFH. Outplanting will be coordinated between Mike Key (NPT) and Chris Griffith (FWS). All adults outplanted from KNFH will receive one right opercula v-notch as shown in Appendix 7.6.2.

2.3.4. Spawning/Egg take

- *Calculation of broodstock need (fecundity, eye up, eye to smolt)* - Brood needs from KNFH will contribute to programs at KNFH and CFH. See introduction to Section 2 and Appendix 7.1 for details on broodstock calculation. The production goal is to trap and spawn enough adults to produce 600k Koos smolts and 1,120k Koos/Dwor smolts for these programs.
    - Kooskia reared at KNFH: The production goal is to trap and spawn enough adults to produce 650k smolts for release at KNFH.
    - Kooskia reared at CFH: CFH production includes some proportion of Dwor and Koos stock. The general plan is to have Koos/Dwor stock smolts released to Selway River (Lower), NF Clearwater, and Clear Creek. Koos stock (to be combined with Dwor stock) for the Selway River (Lower) and Clear Creek releases will either be transferred as green eggs from KNFH or transferred as live adults from KNFH to be spawned, incubated and reared at CFH (in addition to Dwor stock eggs and live adults being transferred to CFH).
- *Spawning protocol (schedule, method, M/F ratio)* – KNFH adult broodstock are held at DNFH until spawning, which normally occurs the third week of August. See DNFH Spawning Protocol (Section 2.2.4) for details on spawning method.

2.3.5. Egg incubation

- *Eggs received or transferred (if applicable) –* Kooskia stock eggs taken at DNFH for KNFH and CFH programs will be transferred to both hatcheries as green eggs for incubation.

- *Egg incubation method (egg distribution, treatments, picking) -* Eggs collected that are in the low range of the ELISA values will be kept and the medium to high eggs are discarded. Generally, all eggs from females above the .250 ELISA optical density cut off level will be culled. In the event of low adult returns with anticipated egg numbers below program goals or policy requests, hatcheries may consider rearing Chinook Salmon eggs from females with ELISA optical densities between 0.25 and 0.60 that would normally be culled. The number of these higher-ELISA progeny to be raised will be limited by the availability of sufficient rearing space to maintain low density indices and biosecurity (segregation and other measures) appropriate for rearing fish from high-titer brood. This decision to raise fish from high ELISA-titer brood will be made on an annual basis during the coordination calls.
- *Treatment, loading density, flow rate -* Daily mortalities will be counted and subtracted from inventory.
- *PBT tracking -* All adults spawned for release at KNFH will be PBT sampled.
- *Method into rearing tanks –* Fry will be transported from the Heath Trays to the outside nursery typically mid-March of BY+1, depending on development.
- *Surplus egg distribution (if applicable)* - Surplus eggs will be planted into designated streams as eyed-eggs. See appendix 7.8 for further details.

2.3.6. Early rearing

- *Environmental protocols (flow indices, density indices) -* Maximum density indices will be kept below .35.
- *Feeding protocol -* Bio-Oregon starter feeds will be utilized for early rearing. Feeding frequency will start at 8 times per day, decreasing as fish get larger when moved to outside nursery (mid-March in BY+1). Fish will begin feeding on #0 crumb and size will increase as fish grow larger.
- *Marking and tagging (AD, CWT; date range, size at application)* - At least 50,000 Chinook will not be AD clipped as per the US v Oregon agreement. All other fish will be AD clipped in July-August of BY+1. Approximately 100,000 of AD clipped fish will be CWT tagged in August of BY+1.
- *Fish movement/facility configuration -* Fry are pumped into the Burrows Ponds at 110,000 per pond for final rearing typically early June of BY+1.

2.3.7. Final rearing

- *Target environmental protocols (flow indices, density indices) –* The Burrows ponds are typically put on Clear Creek water in October of BY+1. Burrows Ponds are ponded at approximately 116,000 per pond. Maximum density indices of .35 will not be exceeded.
- *Feeding protocols -* Bio-Oregon will be utilized throughout rearing.
- *Mortality counting -* Daily mortalities will be counted and subtracted from inventory.
- *Water monitoring -* Flow measurements are taken monthly and when flow changes are undertaken. Dissolved oxygen will be monitored as fish approach density limits.
- *Fish movement/facility configuration -* Chinook can be split from Burrow's ponds to raceways in February of BY+2 if densities warrant.
- *Acclimation (if applicable) -* All burrows ponds will be released at KNFH to make room the additional 635k smolts that will be transported from CFH to KNFH for a two week acclimation and subsequent release into Clear Creek (Koosk and Dwor stock). This is an effort to increase site fidelity of the adults and enhance fishing opportunities above the North Fork. These fish will be released the last week in March of BY+2.
- *Marking and tagging (PIT) –* KNFH smolts will receive PIT tags in January of BY+2. Most of the PIT tags will be requested to be handled in a monitoring mode at the dams with the remaining in the default return to river mode. PIT tag IDs will be supplied to the IDFG, so that they may submit the Separation by Code request for the combined KNFH and CFH release groups.
- *Quality monitoring (counts, growth, length, marks, quality, tag retention) -* Prior to release, 500 AD clipped/CWT fish from each mark group (CWT tag code) are checked for tag retention. Quality checks for CFH fish are done at CFH prior to transport to KNFH.

2.3.8. Fish health

- *Service provider -* USFWS Pacific Region Fish Health Program
- Adults: Every adult female will be sampled and tested individually for *Renibacterium salmoninarum* (Bacterial Kidney Disease) with the ELISA test. Generally eggs from females with optical densities above the

.250 ELISA cut off level will be culled (see "Egg Incubation" Section 2.2.5 for details). Up to 150 ovarian fluid samples will be sampled for viruses. In addition, 60 tissue samples will be taken for virus. Up to 60 intestinal tissue samples will also be examined for *C. Shasta*. No antibiotic injections will be given to adults as they return beginning with BY 2017.

- Juveniles: Adults: Diagnostic exams will be performed as needed. In lieu of a traditional 60 fish pre-release exam performed 4-6 weeks prior to release, a six month health history will be attained. Six months prior to release a minimum of 10 fish per month will be examined for overall health and for viral, parasitic, and bacterial pathogens, including BKD. One to two weeks prior to release, an additional gross examination of fish is performed to assess smolt readiness and final disease status. Visual inspection to determine levels of precocity will be performed (annual target of <=5%) at every examination. A six month report will be written to include monthly monitoring and any diagnostics during that time frame.
- *Vaccination methods - None*
- *Treatment methods* – Formalin treatment for fungus of adult broodstock from Kooskia will be started immediately at DNFH and will be treated up to three times per week as needed to control fungus.

2.3.9. Fish release/transportation

- *Truck specifications -*
- *Hauling/Release schedule -* KNFH will direct release a goal of 600k at 24 fpp in early March of BY+2. After this direct release, smolts from CFH will be transported to KNFH to acclimate to Clear Creek water for two weeks. These fish will be direct released the last week in March of BY+2.
- *Hauling/Release guidelines -*

2.3.10. Communication

- *Written reports (e.g., Monthly summaries, annual reports) -* FWS puts out weekly spawning reports and weekly return reports, and annual spawning and adult return reports are also produced.
- *FINS and IDFG release databases -*
- *Meetings (e.g., AOP, Anad, HET, etc.) -*
- *Direct consultation for egg/smolt transport –*

2.4. Nez Perce Tribal Hatchery Complex (NPTHC)

2.4.1. Trapping and Brood Acquisition

- *Trapping/Brood Acquisition location –*The adult ladder and trap at NPTHC is operated to collect spring Chinook adults as a broodstock source for the Lolo and Newsome Creeks pre-smolt programs, as well as the Lolo Creek smolt program. An adult fish weir is operated on Lolo Creek for the purpose of broodstock collection. *Trap configuration -* A fish ladder on the north shore of the Clearwater River traps returning adults at the hatchery. Volunteering adults swim up the fish ladder and through a V-trap at the top of the ladder into a trap box. The Lolo Creek trap is a temporary picket weir.
- *Dates operated -* Trapping operations at NPTHC begin in late-April and continue through August or until broodstock needs are met. The trap on Lolo Creek is operated from late May after peak flows are reached through mid-July when adult movement tapers off or until broodstock needs are met.
- *Trapping/Brood Acquisition protocol (frequency, movement of fish)* -
    - NPTHC trap: Broodstock selection will be based on existing fin clips, marks, or tags. In general, NPTHC trapped fish will be used according to the following ordered priority list: (1) meet existing US v Oregon mandated production for NPTHC, (2) use to backfill at other Clearwater Sub-basin facilities to meet their US v Oregon mandated production, (3) use for production above US v Oregon levels, pending co-manager approval. The standard NPTHC trap protocol is as follows: (a) retain all AD clipped adults, (b) retain all CWT only adults, and (c) release all natural (no clips, no CWT) fish back into the Clearwater River at the Lenore boat launch, however during a low adult return year unclipped/untagged adults may be kept for broodstock.
    - Upper Lolo Creek trap: In high return years, localized broodstock may be collected, at which time pass/keep ratios will be developed. When retained, trapped fish will be transported by NPT staff from the weir to NPTHC for holding and sexual maturation.

2.4.2. Adult handling

- *Measurements (marks, tags, sex, etc.) -* Returning adults are measured and examined for gender, various clips and tags, and marks then sorted for spawning or holding. Coded wire tags will be collected from all trap and pond mortalities. Adults returning to Lolo Creek are processed as above.
- *Tissue sampling protocol -* Genetic samples are collected from all spawned adults and mortalities, as well as all adults trapped at Lolo and Creek in order to develop the PBT baseline (see Appendix 7.2).
- *Dispositions (holding, releases) -* The NPTHC trap protocol is as follows: (a) retain all AD clipped adults, (b) retain all CWT only adults, and (c) release all natural (no clips, no CWT) fish back into the Clearwater River at the Lenore boat launch. Currently all hatchery adults trapped at the upper Lolo Creek weir are kept for broodstock, natural fish are passed above the weir but may be retained during low return years.
- *Surplus distribution -* Currently no surplus distribution occurs at NPTHC
- *Carcass dispositions –* Spring Chinook carcasses will be distributed to headwater tributaries and the mainstem Clearwater River with the tails being removed at the caudal peduncle.

2.4.3. Adult outplants (if applicable)

- *Trigger for outplanting -* No outplanting is planned from NPTHC, but contingencies are in place if the co-managers direct outplanting to occur in excess of broodstock needs.
- *Purpose –* Natural spawning.
- *Outplant protocol (sex ratio, timing, marking, sampling) –* Only adults and jacks that have not been inoculated may be out-planted. Any adults anesthetized with AQUI-S require a 72-hour withdrawal period prior to being released. All adults out-planted from NPTHC will receive one left operculum punch as shown in Appendix 7.6.2.

2.4.4. Spawning/Egg take

- *Calculation of broodstock need (fecundity, eye-up, eye to smolt)* - Brood needs from NPTH will contribute to pre-smolt and smolt programs at NPTHC. See the introduction to Section 2 and Appendix 7.1 for details on broodstock calculation. The production goal is to trap and spawn enough adults to produce 225k NPTH pre-smolts and 200k NPTH smolts.
    - NPTHC stock reared at NPTHC: The production goal is to trap and spawn enough adults at NPTH to produce 75k pre-smolts for release at Newsome Creek, 150k pre-smolts for release at Lolo Creek, and 200k smolts for release in Lolo Creek.
- *Spawning protocol (schedule, method, M/F ratio) -* The first sort and spawn can occur as soon as early-August. Spawning typically occurs on Tuesday of each week at NPTHC, through the end of August. A spawning ratio of 1:1 will be used. Jacks will be limited to five percent of the male contribution. Spawning will continue until the egg take goal is achieved or all females are spawned. Fish that have been inoculated and are utilized for spawning will be buried on site at NPTHC.

2.4.5. Egg incubation

- *Eggs received (if applicable)* – N/A
- *Egg transfers (if applicable)* - N/A
- *Egg incubation method (egg distribution, treatments, picking) -* Fertilized eggs will be water hardened for 30 minutes in 100 parts per million Iodophore and placed in heath trays for incubation. At between 600 and 625 temperature units (TU's) eyed eggs will be shocked; machine sorted the following day and transferred back into Heath trays to hatch. Eggs are reared on chilled river water and well water supply. Picking will occur after enumeration weekly to ensure accurate egg count and a good rearing environment. Just prior to enumeration, BKD culls and low survival culls will be removed from the incubation stacks.
- Eggs collected that are in the low range of the ELISA values will be kept and the medium to high eggs are discarded. Generally, all eggs from females above the .250 ELISA optical density cut off level will be culled. In the event of low adult returns with anticipated egg numbers below program goals or policy requests, hatcheries may consider rearing Chinook Salmon eggs from females with ELISA optical densities between 0.25 and 0.60 that would normally be culled. The number of these higher-ELISA progeny to be raised will be limited by the availability of sufficient rearing space to maintain low density indices and biosecurity

(segregation and other measures) appropriate for rearing fish from high-titer brood. This decision to raise fish from high ELISA-titer brood will be made prior to ponding each year.

- *Treatment, loading density, flow rate -* Eggs are treated daily until hatching with formalin. Loading densities is 1 female/heath tray with a flow rate of 5-6 GPM
- *PBT tracking -* Parentage is tracked from spawning cross until release.
- *Method into rearing tanks –* Fry will be transported from the Heath Trays to the outside nursery typically in mid-March of BY+1, depending on development.
- *Surplus egg distribution (if applicable)* Surplus eggs if any will be incorporated into other programs while still maintaining PBT integrity. Surplus eggs may also be outplanted as eyed-eggs. See appendix 7.8 for details

2.4.6. Early rearing

- *Environmental protocols (flow indices, density indices) -* Each vat is loaded with approximately 30k-35k swim-up fry. Fry remain in indoor vats until they are ~160 fpp not to exceed 0.30 Density Index.
- *Feeding protocol -* Fry will be started on feed when moved to the nursery and fed every hour (mid-March in BY+1).
- *Marking and tagging (AD, CWT; date range, size at application) –*
    - NPTHC Pre-smolts and Smolts – 100% of the NPTHC pre-smolts will be coded wire tagged in mid-july when fish reach a size of 160 FPP. 100% of the NPTHC Lolo Creek smolt release will be PBT tracked with 200k CWT and 1,000 PIT tags applied. Marking and tagging is conducted by NPT, with CWT and PIT tags purchased by NPTH M&E
    - Dwor stock Smolts –Dwor stock smolts will be released in 2, 100k early and late release groups on station at NPTHC. Each group will be 100% AD with 30k CWTs when fish reach 160 fpp. Tags are provided by the NPTHC M&E. Dwor stock is early-reared to parr at DNFH and then transported to NPTHC for marking and final rearing. The Lapwai Creek smolts will be CWT tagged by USFWS fish marking at DNFH prior to transfer to NPTH, PIT tagging will be completed by NPTH M&E with the PIT tags provided by LSRCP.
- *Fish movement/facility configuration -*
    - NPTHC Pre-smolts and Smolts- Juvenile production destined for the Lolo Creek smolt release in BY +2 will be held in production room tanks until the outside rearing vessels become available in mid-April. Typically, Lolo/Newsome pre-smolts are transferred to Sweetwater Springs in mid-June to continue early rearing.
    - Dworshak stock- Transfer of the NPTH Onsite smolt release groups to NPTHC will occur in mid to late August at 200 fpp. Transfer of the Lapwai Creek smolt release group will occur in late August or early September after fish have been marked by USFWS.

2.4.7. Final rearing

- *Target environmental protocols (flow indices, density indices) –*
    - NPTHC Pre-smolts and Smolts – Lolo and Newsome pre-smolts are reared at densities below 0.1 while Lolo Creek smolts are reared at densities below 0.2
    - Dwor stock Smolts - NPTHC on station smolts and Lapwai Creek smolts are reared at densities below 0.2
- *Feeding protocols -* In order to meet target size at release, feed schedules are adjusted weekly based on sample counts taken on each individual rearing vessel. Fish will be fed 1-4 times per day depending on how many pounds of feed is required to meet growth requirements.
- *Mortality counting -* Mortalities are enumerated and picked daily for all groups.
- *Water monitoring -* Flow measurements are taken weekly and when flow changes are undertaken. Dissolved oxygen monitoring is conducted daily for all groups.
- *Fish movement/facility configuration –*
    - NPTHC Pre-smolts and Smolts – Lolo and Newsome pre-smolts are transferred to the acclimation facilities (Newsome Creek AF and Yoosa/Camp AF, respectively) when conditions permit (early September of BY+1). Juvenile production of smolts destined for Lolo Creek will be held in production room tanks until the outside rearing vessels become available in mid-April.

- Dwor stock Smolts - Dwor stock parr will be transferred to the 100' linear raceways until they will be transferred to the NATURES S-channels for final rearing and release.

- *Acclimation (if applicable) –* Transfer of the pre-smolt groups to the Newsome Creek and Lolo Creek acclimation facilities will occur in early September (when water temperatures cool to 50° F or below). NPTHC stock pre-smolts are released to Lolo/Newsome Creeks (following a minimum acclimation period of 4 weeks) in mid-October of BY+1.
  - *Marking and tagging (PIT) –* Prior to release, the following fish will receive PIT tags: Lolo Creek pre-smolts – 6,000 tags (3,000 tags in each rearing pond) in mid-July, Newsome Creek pre-smolts – 3,000 tags in mid-July, at Sweetwater Springs for all pre-smolt releases, Lolo Creek smolts – 2,000 tags, NPTHC early and late on station smolts – 1600 tags each, Lapwai Creek smolts – 600 tags. PIT tagging conducted by NPTHC monitoring and evaluation staff in fall of BY+1 for SURPH survival to LGR.
  - *Quality monitoring (counts, growth, length, marks quality, tag retention) -* Sample counts are conducted weekly for each individual rearing vessel and feed schedules are adjusted to meet target release size. Prior to releases, staff will take lengths and weights on up to 200 fish from each release group. 21 days post coded wire tagging NPTHC M&E will conduct CWT and AD clip quality control checks. PIT tag delayed mortality is quantified within 7 - 10 days of tagging.

2.4.8. Fish health

- *Service provider -* WDFW Fish Health Program
- *Sampling protocols (what is sampled, sampling schedule) –*
  - Adults: All females will be tested by the ELISA test for Bacterial Kidney Disease (BKD). Generally, all eggs from females that are identified at a level of 0.250 OD or higher will be culled. A 150 fish sample (ovarian fluids) will be taken for viral replicating agents. In addition, 60 tissue samples will be taken for virus, bacteria and parasites. Samples will be collected by NPTH and delivered to fish health.
  - Juveniles: Diagnostic exams will be performed as needed. 4 pre-release exam site visits that include a gross examination of fish is performed to assess smolt readiness and final disease status. Reports will be written and provided summarizing exam results.
- *Vaccination methods -* n/a
- *Treatment methods* – Adults will be treated with formalin up to three times per week for fungus

2.4.9. Fish release/transportation

- *Truck specifications -*
- *Hauling/Release schedule* – NPTHC stock pre-smolts are released to Lolo/Newsome Creeks (following acclimation) in early October of BY+1, with all remaining fish forced out by mid-October of BY+1. NPTHC stock Lolo Creek smolts will be transported and direct released in mid to late April of BY+2, this release will be conducted in conjunction with steelhead outplants. Dwor stock smolts will be volitionally released on-site at NPTHC in 2 separate groups (directly from linear raceways). The early release occurring in mid to late March and the late release occurring in mid-April of BY+2. Dwor stock smolts will be released at Lapwai Creek (transport and direct release) in mid to late April of BY+2.
- *Hauling/Release guidelines -*

2.4.10. Communication

- *Written reports (e.g., Monthly summaries, annual reports) -* A monthly NPTHC narrative and fish health report will be completed and submitted to BPA/COTR, NPT Research and Production divisions, IDFG/CFH and all other interested parties. NPTHC also produces an annual operating plan and an annual operations report for BPA and the co-managers. Fish Research produces weekly weir reports, final weir summary report, spawning ground summary reports, and SURPH survival summary reports.
- *FINS and IDFG release databases -* All information is captured in the FINS database from trapping to release
- *Meetings (e.g., AOP, INAD, HET, etc.) -* NPTH personnel will participate in AOP, HET and other associated meetings as well as coordination calls and online meetings when possible.
- *Direct consultation for egg/smolt transport –*

2.5. Clearwater Fish Hatchery

2.5.1. Trapping and Brood Acquisition

- *Trapping/Brood Acquisition location –*
    - Red R: Spring Chinook are trapped at the Red River Satellite weir (SFClw stock). Red River satellite facility is 15 miles east of Elk City, Idaho, 186 river miles upstream from Lower Granite Dam, and 618 miles from the mouth of the Columbia River.
    - Powell: Summer Chinook are trapped at the Powell trap. Powell satellite facility is 122 river miles east of CFH at the headwaters of the Lochsa River. The Powell facility is at the confluence of Crooked Fork Creek and Colt Killed Creek (White Sands), which form the Lochsa River.
    - Crooked R: Spring Chinook that stray into the Crooked River trap will be collected and included in Red River broodstock.
        - *Trap configuration -*
    - Red R: A removable tripod and floating panel weir blocks fish passage across Red River and diverts them into the fish ladder.
    - Powell: A water supply diversion and intake screen structure are on Walton Creek, and a pump house is on Colt Killed Creek. A weir diverts fish that come up into Walton Creek into the fish ladder and fish trap.
    - Crooked R: The weir at this location consists of removable posts and panels supported by an iron bridge across Crooked River. There are no holding ponds at the site, and all fish are either released directly from the trap or transported to Red River holding ponds.
- *Dates operated –*
    - Red R: The Red River weir will begin operation for Chinook trapping in late May or early June. Trapping operations will continue until the following conditions are met: after September 1 and five consecutive days of zero fish are trapped.
    - Powell: The Powell weir will begin operation for Chinook trapping in late May to early June. Trapping operations will continue until the following conditions are met: after September 1 and five consecutive days of zero fish are trapped.
    - Crooked R: The Crooked River weir will begin operation for Chinook trapping in late May to early June. Trapping operations will continue until the following conditions are met: after September 1 and five consecutive days of zero fish are trapped.
- *Trapping/Brood Acquisition protocol (frequency, movement of fish)* -
    - Red R: The fish trap at Red River is emptied daily during the trapping season. Fish are put into one of two holding ponds, directly onto a transport truck depending on the time of year or passed above the weir if natural origin. Fish which are put into the holding ponds are only there temporarily then transported to CFH for final holding.
    - Powell: The fish trap at Powell is emptied daily during the trapping season. Fish are put into one of two holding ponds or put back into the Lochsa if of natural origin. Fish are retained in these ponds until spawning. If there is an excess of fish from brood needs, coordination with occur with cooperators to see how to deal with fish above brood needs.
    - Crooked R: The fish trap at Crooked River is emptied daily during the trapping season. There are no holding ponds at Crooked River so fish need to be loaded onto a transport truck or passed above the weir if of natural origin. Fish that are put into a transport truck are either taken to Red River for temporary holding, then ultimately hauled to CFH or hauled directly back to CFH.

2.5.2. Adult handling

- *Measurements (marks, tags, sex, etc.) -* When fish are collected at the traps, the fish are scanned for tags, checked for marks, length is recorded, PBT samples are collected for fish passed above weirs, marks are applied as necessary. All of the information is captured on data sheets, faxed to the hatchery and data is entered into the FINS database daily.
- *Tissue sampling protocol -* Genetic samples are collected from all spawned adults to develop the PBT baseline (see Appendix 7.2).

- *Dispositions (holding, releases) –*
    - Red R/Crooked R: Spring Chinook broodstock trapped at Red River and Crooked River are ultimately transported to CFH, where the adults are spawned and resulting eggs are incubated and reared.
    - Powell: Summer Chinook broodstock trapped at Powell are held and spawned at Powell.
- *Surplus distribution -* The general procedure for providing fish for subsistence will be first to tribal programs, then to charitable organizations if still in good shape.
- *Carcass dispositions –* Carcasses from CFH are hauled back to the SF and distributed between several locations with vehicle access to the river. Carcasses from Powell are distributed in the Lochsa and tributaries.

2.5.3. Adult outplants (if applicable)

- *Trigger for outplanting* – When Clearwater basin production programs are above brood stock, harvest and C&S needs, then adult out-planting will occur. If adult Chinook available for release into natural spawning areas exceed the numbers agreed to in AOP, further consultation will occur.
- *Purpose –* The out-planting protocol (for excess hatchery broodstock) provides for both outplanting for natural spawning and distribution for subsistence use.
- *Outplant protocol (sex ratio, timing, marking, sampling)* – Appendix 7.6 has tables indicating the preferred out-planting sites, release numbers, and identifying marks given to Spring/Summer Chinook that are outplanted.

2.5.4. Spawning/Egg take

- *Calculation of broodstock need (fecundity, eye-up, eye-to-smolt)* - Brood needs at CFH will contribute to Spring and Summer Chinook programs at CFH (combined with contributions from Dwor and Koosk stock to Spring Chinook releases and SFSR stock to Summer Chinook releases). See the introduction to Section 2 and Appendix 7.1 for details on broodstock calculation. The production goal is to trap and spawn enough adults to produce smolts outlined in the AOP tables.
    - Spring SFClw stock reared at CFH: The goal is to trap and spawn enough adults to meet production needs outlined for Red River in the AOP tables.
    - Koosk/Dwor reared at CFH: The goal is to trap and spawn enough adults to meet CFH production needs outlined in the AOP tables which cannot be fulfilled with trapping conducted at Red River.
    - Summer Pow and SFSR stock reared at CFH: The goal is to trap and spawn enough adults to meet production needs outlined in the AOP tables for release at Powell. The primary brood source is from Powell trap. However, summer Chinook trapped at SFSR trap may be incorporated into the broodstock for the summer Chinook Salmon program at CFH if adult brood needs cannot be met at Powell trap facilities. After all fisheries are closed on SFSR, additional fish may be trapped on SFSR for this program if needed to achieve the smolt release goal. By commencement of spawning, if too many adults have been taken, then adult C&S, food bank and out-plants will be implemented at locations and levels determined in AOP and Appendix 7.6.
- *Spawning protocol (schedule, method, M/F ratio)* –
    - *Spring stock:* Spring Chinook broodstock trapped at SF Clearwater facilities and a portion transferred from Kooskia and/or Dworshak are spawned at CFH. Spawning ratios of 1:1 will be used unless the broodstock population is less than 100 females. During the entire spawning year, at most five to ten percent of the total broodstock will be composed of jacks. An effort will be made to use all returning fish for spawning. If presented with an excess number of one sex, gametes from individual parents may be subdivided and each part fertilized with gametes with different parents. The first sort will occur early August. All females will be sorted twice per week, and all ripe females will be spawned each time. Spawning will continue until all females are spawned or full production is met.
    - *Summer Pow stock:* Adults are held and spawned at Powell. Spawning ratios of 1:1 will be used unless the broodstock population is less than 100 females. During the entire spawning year, at most five to ten percent of the total broodstock will be composed of jacks. An effort will be made to use all returning fish for spawning. If presented with an excess number of one sex, gametes from individual parents may be subdivided and each part fertilized with gametes with different parents.

The first sort will occur early August. All females will be sorted twice per week, and all ripe females will be spawned each time. Spawning will continue until all females are spawned or full production is met. Green eggs are then transported to CFH for incubation and rearing.

2.5.5. Egg incubation

- *Eggs received (if applicable) –*
    - Spring Dwor stock: Adults trapped at DNFH are held and spawned on site. Green eggs are transferred to CFH incubation the same day.
    - Spring Koosk stock: Adults trapped at KNFH are transported to DNFH for spawning. Green eggs are then transported to CFH for incubation the same day.
    - Summer Pow and SFSR stock: Adults trapped at Powell and SFSR are held and spawned at Powell and SFSR, respectively. Green eggs are then transported from SFSR to CFH for incubation and rearing. See Snake-Salmon River SOP for details on brood collection and spawning at SFSR.
- *Egg transfers (if applicable) -*
- *Egg incubation method (egg distribution, treatments, picking) -* All of the egg's taken for CFH production will be held in one of the two incubation rooms. Eggs collected that are in the low range of the ELISA values will be kept and anything above a 0.25 OD will be culled. Generally, all eggs from females that are identified at a level of 0.25 OD or higher will be culled. In the event of low adult returns with anticipated egg numbers below program goals or policy requests, hatcheries may consider rearing Chinook Salmon eggs from females with ELISA optical densities between 0.25 and 0.60 that would normally be culled. The number of these higher-ELISA progeny to be raised will be limited by the availability of sufficient rearing space to maintain low density indices and biosecurity (segregation and other measures) appropriate for rearing fish from high-titer brood. This decision to raise fish from high ELISA-titer brood will be made on an annual basis during the in-season coordination calls. Eggs will not be culled due to presence of IHN but culling will occur due to presence of other viruses such as IPN, VHS, or ISA.
- *Treatment, loading density, flow rate -* Eggs are treated every other day with formalin until hatch. The trays are loaded with a maximum of 2 females per tray. A flow rate of 5-6 gpm is maintained.
- *PBT tracking -* PBT integrity is tracked to release site for the entire incubation cycle
- *Method into rearing tanks –* When eggs are at the proper TU, fry are moved into vats using a portable tank.
- *Surplus egg distribution (if applicable) -* If too many eggs are taken for the hatchery program, these eggs can be used to backfill appropriate IDFG programs, other agency programs. If not needed, surplus eggs may be appropriately out planted. CFH will project early rearing inventories when 50% of the production has reached the eyed stage. Typically this will occur the first week of October. See appendix 7.8 for additional details.

2.5.6. Early rearing

- *Environmental protocols (flow indices, density indices) -* Each vat is loaded with approximately 70k swim-up fry. Fry remain in indoor vats until they are ~120 fpp. Flow and density indices are maintained within recommended values.
- *Feeding protocol -* Fish will be hand fed 6-8 times a day, then put on automatic feeders as feed sizes progress.
- *Marking and tagging (AD, CWT; date range, size at application) -* When the fry reach approximately 120 fish per pound, they are run through the marking trailer and into outdoor raceways. Marking occurs late April through June.
- *Fish movement/facility configuration -* Once the fry are buttoned up, they are ponded in the 60 indoor vats and remain there until they are approximately 120 fpp.

2.5.7. Final rearing

- *Target environmental protocols (flow indices, density indices) –* Once fish are moved outside, they will remain in those containers until release. Fish densities are not to exceed 0.3.
- *Feeding protocols-* Fish are fed by hand 2-6 times a day depending on the rearing cycle.

- *Mortality counting* - Morts are removed, counted and scanned for tags weekly. The final release numbers for both spring and summer Chinook Salmon is determined by subtracting monthly fish loss from the inventory at the time of AD clipping until the date of release.
- *Water monitoring* - Water monitoring is done monthly unless conditions dictate otherwise.
- *Fish movement/facility configuration* - When the fry reach approximately 120 fish per pound, they are run through the marking trailer and then into either the 10 C and D bank raceways or into the 22 A and B bank raceways for final rearing. The NF Clearwater fish that are destined to be reared in the adult holding ponds are placed in the 200 foot sections on the North Bridge raceways and then pumped to the 4 adult holding ponds once all adults are removed and the ponds thoroughly disinfected. Two of the adult holding ponds have baffled raceways.
- *Acclimation (if applicable)* –
    - Red R: The acclimation pond will be watered up by the third week of March. Fish will be transported from CFH to Red River and placed in the acclimation ponds Mid-March to early April and released the same day at dusk. Release from acclimation may be adjusted depending on ice conditions.
    - Clear Creek: Fish will be transported from CFH to KNFH and placed in acclimation ponds mid-March, depending on the release of KNFH-reared smolts. KNFH has the ability to acclimate 600,000 smolts for up to 14 days depending on weather/river conditions. Anything above 600,000 is direct released into Clear Creek.
    - Powell: Fish are transported to Powell pond for acclimation Mid-March. Transport will occur Mid- to late-March. Fish will be released the same day at dusk. The duration of acclimation and timing of release will be adjusted depending on ice conditions.
- *Marking and tagging (PIT)* – Spring and Summer Chinook are given PIT tags in October. PIT tags are representatively distributed across release groups.
- *Quality monitoring (counts, growth, length, marks quality, tag retention)* - The fish are sampled monthly between the 25th and 28th of the month. During months of rapid growth, fish may be sampled biweekly. Pound counts are taken to track fish growth and monitor if growth is following the annual growth projections. Length frequencies are taken just prior to release, 300 fish per release group are sampled to quality check AD clips and CWT retention. Spring and summer Chinook smolts at about 16 fish per pound will be distributed to release sites.

2.5.8. Fish health

- *Service provider* - IDFG, Eagle Fish Health Lab
- *Sampling protocols (what is sampled, sampling schedule)* –
    - Adults: All females spawned will be tested for *R. salmoninarum* using ELISA. Eggs from females with optical densities above 0.250 are generally deemed to be at high risk of vertical transmission. As a general rule, eggs from high risk females should be culled from highest to lowest until hatchery production needs are met. Close coordination with the Fish Health Lab will be needed when egg needs do not align with ELISA results. At least 60 kidney/spleen and 60 ovarian fluid samples will be taken (120) fish from each stock and examined for viral replicating agents. If eggs are to be removed to another hatchery, all females will be examined for viral replicating agents. A total of 60 head wedges will be taken to monitor for *M. cerebralis*.
    - Juveniles: Juvenile fish are monitored visually by hatchery staff for any abnormal behavior or clinical disease signs. If there is a reason for concern, the Eagle Fish Health lab is contacted as needed for a diagnostic exam. At least quarterly fish health inspections will be conducted based on water source and/or fish stock. Pre-liberation inspections will be performed on 60 fish within 30 to 45 days of release. Inspections will screen for the presence of parasitic, bacterial, and viral pathogens as appropriate.
        - *Vaccination methods* - N/A
- *Treatment methods* – Adults will be treated with formalin for fungus as needed under veterinary extra label prescription.

2.5.9. Fish release/transportation

- *Truck specifications* - Smolts are hauled in various truck specifications from single compartment to multiple compartments, or direct released using electric fish pump.
- *Hauling/Release schedule* – When transporting fish, CFH follows IDFG and IHOT guidelines. Spring Chinook releases occur from mid-March to early April.
    - Red R: Release from acclimation may be adjusted depending on ice conditions, generally occurring late-March to early- April of BY+2. Non-acclimated smolts also will be released directly into Red River. Acclimated smolts are held in ponds then release the same day at dusk.
    - Clear Creek: CFH will assist in the release of the acclimated fish. Any overage of the release goal will be direct released at the KNFH weir with non-PIT tagged fish being prioritized for the direct release. Clear Creek transport and releases will be coordinated with Kent Hills.
    - NF Clearwater: Fish will be directly released into the NF Clearwater from the raceways using an electric fish pump. It is estimated to take 2 days for the release, occurring in Mid-March to the first of April of BY+2. Prerelease coordination will occur between IDFG and USACE/Dworshak to ensure releases are optimized for fish health/survival.
    - Selway-Lower: Mid-March to late March of BY+2, NPT will help transport smolts in NPT tankers to the Selway River for release near the mouth of Meadow Creek. Selway transport should be coordinated with Aaron Penney. The Selway release group is a combination transport effort between CFH and NPT.
    - Powell: Fish are transported to Powell pond for acclimation Mid-March. Transport will occur Mid- to late-March. Fish will be released the same day at dusk. The duration of acclimation and timing of release will be adjusted depending on ice conditions.
- *Hauling/Release guidelines* - If transport tank and stocking water temperature is not within 5-10 degrees F, fish are acclimated to stocking water temp but pumping stocking water in tanks until desired temp is achieved.

2.5.10. Communication

- *Written reports (e.g., Monthly summaries, annual reports)* - Monthly hatchery performance sheets are distributed to HQ, M&E, Fish Health and LSRCP.
- *FINS and IDFG release databases* - All information is captured in the FINS database from trapping to release and all smolt releases are entered into the IDFG release database in a timely manner.
- *Meetings (e.g., AOP, Anad, HET, etc.)* - Hatchery staff attends all pertinent meetings dealing with hatchery applications.
- *Direct consultation for egg/smolt transport* – Communication will be conducted through weekly coordination calls.

3. Coho Salmon

- *Definition of species* - A primary program objective is to develop a local Clearwater River Coho Salmon stock. To accomplish this, adult Coho Salmon returning to the Clearwater River of the Snake River basin are the priority for use as broodstock.
- *Rearing locations* – Coho salmon released into the Clearwater drainage are reared at two hatcheries: Dworshak National Fish Hatchery (DNFH) and Eagle Creek National Fish Hatchery (ECNFH)
- *Broodstock collection and spawning locations* - Primary trapping locations of broodstock collection for the Coho salmon program in the Clearwater are conducted at the following locations: Kooskia National Fish Hatchery (KNFH) and Lapwai Creek Trap (LCT). Secondary trapping locations are the following: Dworshak National Fish Hatchery (DNFH), Lower Granite Dam (LGR), and Kalama Fish Hatchery (KalFH). Broodstock collected from DNFH, KNFH, LCT, and LGR are spawned at DNFH. Broodstock collected from KalFH are spawned at KalFH.
- *Calculation of Broodstock need* - Appendix 7.1 shows the brood calculator used to determine brood need to reach production goal for the program releases. The number of eggs collected is based on 5-yr running historical average of adult survival, eye-up percentage, disease rates and smolt survival rates to meet smolt release targets. Suppose the production goal is to trap and spawn enough adults to produce (x) number of smolts for release. Applying a production cushion (c) and eyed egg-to-smolt survival (ess) to total smolt goal, gives the eyed eggs needed culling(e=(x*(1+c))/(ess)). After accounting for green-to-eyed egg and culling survival (ges and cs, respectively), the green egg goal before culling can be determined (g=e/(ges)/(cs)). Using an average fecundity of green eggs per female (fec) gives the number females needed (F=g/fec). A 1:1 M:F spawning ratio gives the number of males needed (M=F) and the total number to spawn (TotSp=F+M). Total fish needed when accounting for % pond mortality (pm) can be calculated (TotPM=TotSp/(1-pm)). Sometimes the F:M ratio is not 50%:50% in the collected broodstock and additional fish would need to be trapped to get the 1:1 M:F spawning ratio. Using the % females in the broodstock (fb), the total number of fish that needs to be trapped can be calculated (TotTrap=(TotPM/2)/(1-fb), round up to even number).
- *Smolt releases* – To meet long-term adult return goals (14,000 adults to Clearwater River sub-basin), smolt release goals have ranged as high as 1.1 million, with the last 5 years at 830k smolts released annually. Currently, production releases goals are 550k smolts reared out-of-basin from ECNFH. Release goal for smolts reared at DNFH and released into Clear Creek is 400k smolts annually, being acclimated at KNFH prior to release. In addition, eyed eggs from KalFH are reared at DNFH for a release of 100k smolts to Clear Creek. In 2015, releases of Coho Salmon reared at Cascade Hatchery began as the result of the U.S. vs. Oregon Management Agreement. However, the production from Cascade Hatchery (500k smolts) has now transitioned to be released in the Grand Ronde Basin in Oregon and are no longer released in the Clearwater Basin.

3.1. Overview of facilities and brood stock

3.1.1. Dworshak National Fish Hatchery (DNFH)

- *Hatchery description and location* - The DNFH is located on the North Fork Clearwater River approximately one kilometer upstream from the confluence of the mainstem Clearwater and the North Fork Clearwater River.
- *Owner and operator* – DNFH is owned by the US Army Corps of Engineers and is operated by the USFWS and the Nez Perce Tribe (NPT).
- *Programs at facility (Fig. 3.3) -* DNFH traps (secondary trapping location), spawns (primary spawning location), incubates and rears Clw stock hatchery Coho for release as smolts. Broodstock is received from the primary trapping facilities of KNFH and LCT as well as secondary trapping facility LGR for spawning, incubation and rearing at DNFH for release of smolts. DNFH also spawns and incubates some of this stock for rearing at ECNFH to release as smolts. In addition, DNFH receives eyed eggs from KalFH for rearing and release of smolts.
- *Stocks reared and release locations (Fig. 3.3) -* Clw broodstock from KNFH, LCT, DNFH, LGR: DNFH rears Clw smolts for release in Clear Creek. Eyed eggs are transferred to ECNFH for final rearing and release of smolts to Clear Creek and Lapwai Creek (see ECNFH Section 3.1.2 for rearing and release details). Clw broodstock from KalFH: Eyed eggs are transferred from KalFH and ECNFH to DNFH for rearing and release of smolts to Clear Creek.

- *Production Goals (smolts, fpp)* – Clear Creek (KNFH/LCT/DNFH/LGR stock) – 500k smolt Clear Creek, Clear Creek (KNFH/LCT/DNFH/LGR stock reared at ECNFH) – 275k smolt, Lapwai Creek (KNFH/LCT/DNFH/LGR stock reared at ECNFH) – 275k smolt.
- *Adult mitigation goal (if applicable)* – The long-term adult-return goal is 14,000 Coho to the Clearwater River sub-basin.
- *Facility or stock changes (if applicable)* –

3.1.2. Eagle Creek National Fish Hatchery (ECNFH)

- *Hatchery description and location* - The ECNFH hatchery is located approximately 40 miles southeast of Portland, OR. The hatchery can be easily reached from I-205 via State Highway 224 driving east towards Estacada. One mile past the intersection with State Highway 211, turn left onto Wildcat Mountain Drive for 2 miles, turning right onto Eagle Fern Road. Follow Eagle Fern Road another 7 miles, past Eagle Fern County Park and continue up Eagle Creek on George Road. About four miles past Eagle Fern Park, turn right onto Rainbow Road and follow it for 2 miles, ending at the Eagle Creek NFH.
- *Owner and operator* – USFWS
- *Programs at facility (Fig. 3.3)* - ECNFH receives eyed eggs from DNFH for rearing and release of smolts (Clw broodstock from KNFH, LCT, DNFH, LGR).
- *Stocks reared and release locations (Fig. 3.3)* - Clw broodstock from KNFH, LCT, DNFH, LGR: Eyed eggs are transferred from DNFH to ECNFH for rearing and release of smolts to Clear Creek and Lapwai Creek.
- *Production Goals (smolts, fpp)* – Clear Creek (KNFH/LCT/DNFH/LGR stock) – 275k smolt, Lapwai Creek (KNFH/LCT/DNFH/LGR stock) – 275k smolt
- *Adult mitigation goal (if applicable)* - The long-term adult-return goal is 14,000 Coho to the Clearwater River sub-basin.
- *Facility or stock changes (if applicable)* –

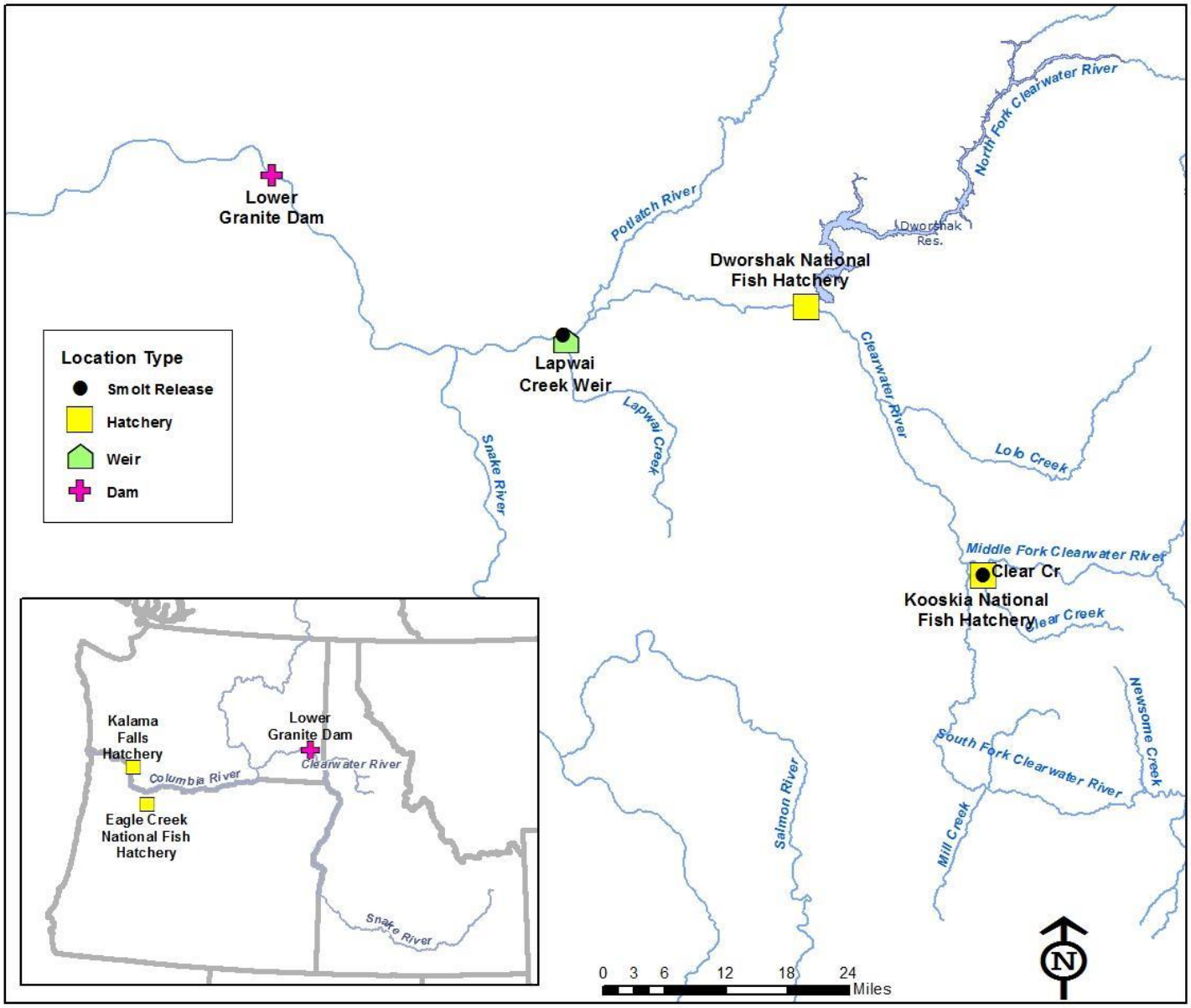

Figure 3.1. Coho trapping, hatchery facilities and smolt release locations.

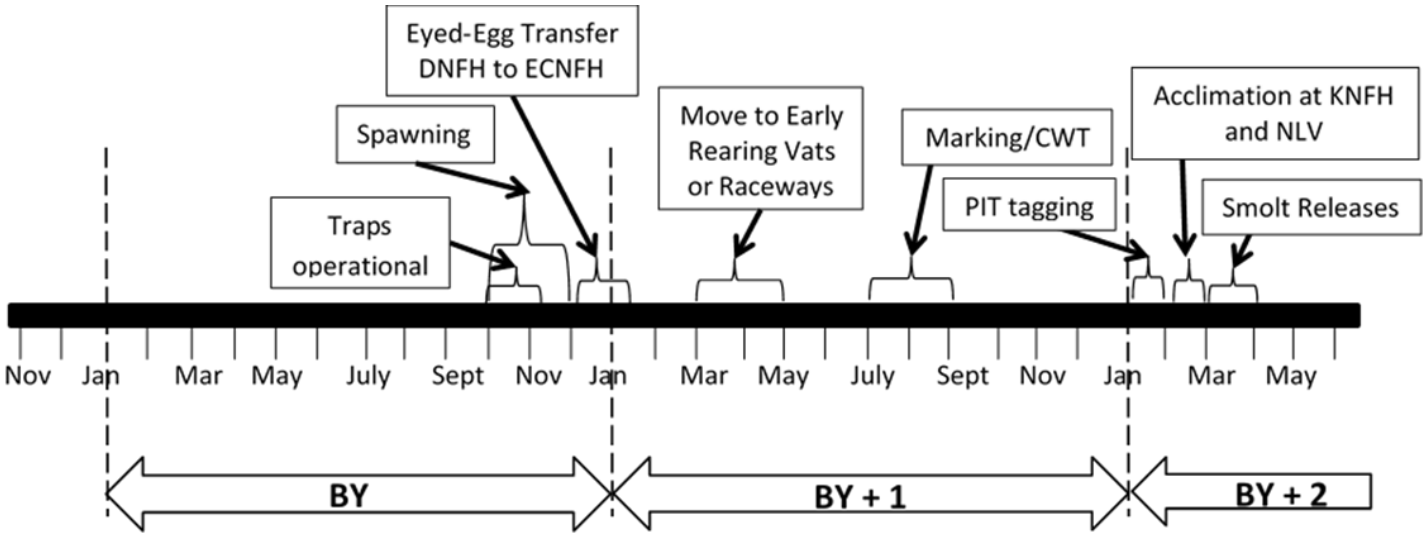

Figure 3.2. Timeline for Coho Production. Date ranges with black labels are shown to include all facilities' operations.

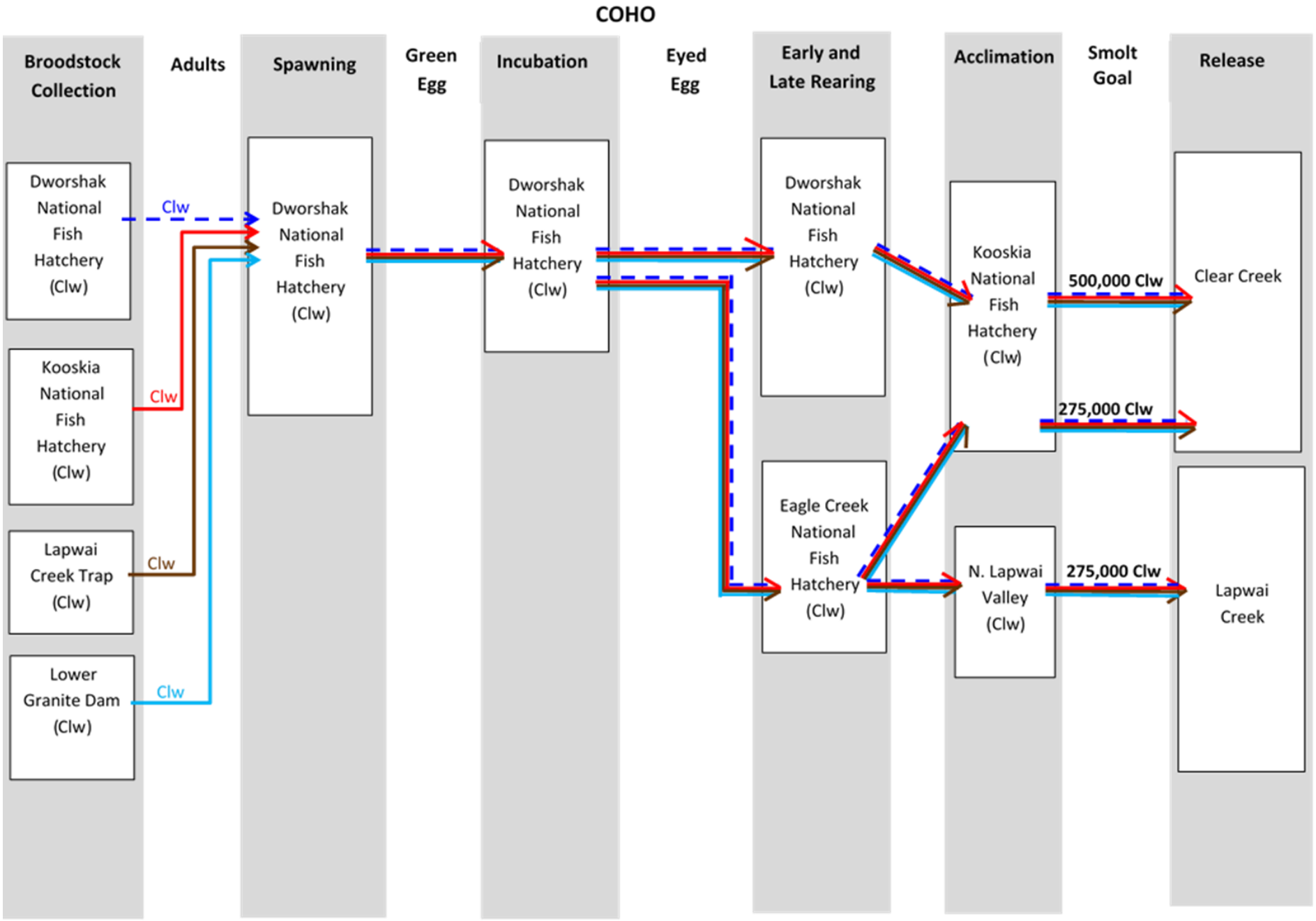

Figure 3.3. Fish and egg movements for Coho.

3.2. Dworshak National Fish Hatchery

3.2.1. Trapping and Brood Acquisition

- *Trapping/Brood Acquisition location* – Broodstock spawned, incubated and reared at DNFH can be acquired from KNFH, LCT, DNFH, and LGR. However, KNFH and LCT will be prioritized for broodstock as primary trapping locations (DNFH, LGR are secondary trapping locations).
- *Trap configuration* - KNFH: LCT: A picket weir is installed to trap Coho Salmon broodstock below the train bridge and upstream from the mouth of Lapwai Creek. DNFH: If broodstock is needed from DNFH, a fish ladder in NF 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 NF Clearwater River. LGR:
- *Dates operated* – KNFH: Weir operations generally start early- October to trap adult Coho Salmon at KNFH. LCT: Trap becomes operable starting early October. DNFH: The DNFH ladder will be operated during in the fall to trap early return steelhead. Depending on the projected return, the NPT may request that the ladder be operated several additional times to collect Coho Salmon broodstock as needed to meet production goals. LGR:
- *Trapping/Brood Acquisition protocol (frequency, movement of fish)* - KNFH: Adult hatchery steelhead or fall Chinook incidentally trapped at the KNFH weir will be transported to the S.F. Clearwater and released by the NPT. LCT: Pass/keep ratios will be adjusted on a weekly basis dependent on the projected return and actual captures. The adult weir will also be used for escapement, estimating sex composition, age structure and return timing. Fall Chinook salmon that are trapped during operation of the Lapwai Creek Coho Salmon weir will be placed downstream of the weir. DNFH: For trapping at DNFH, Coho Salmon staff will coordinate with Steelhead staff on anesthesia use and handling protocols to prevent pre-spawn mortality of Coho Salmon. LGR:

3.2.2. Adult handling

- *Measurements (marks, tags, sex, etc.)* - KNFH/LCT/DNFH/LGR: Returning adults are measured and examined for gender, various clips, tags, marks and given a unique opercle punch to display trapping location. All adults are either designated as broodstock (for transport to DNFH) or release upstream the trap. CWTs will be recovered after spawning is completed.
- *Tissue sampling protocol* - KNFH/LCT/DNFH/LGR: Genetic samples will be collected from all spawned adults at DNFH to develop the Parentage Based Tagging (PBT) baseline (see Appendix 7.2 for detail).
- *Dispositions (holding, releases)* - KNFH: Depending on adult return projection and estimated broodstock collection, adult Coho Salmon trapped at KNFH weir will be transported to DNFH for holding and spawning. Once Coho Salmon broodstock goals are met, surplus Coho Salmon will be passed above the weir. LCT: Adult Coho Salmon trapped at LCT will be transported to DNFH for holding and spawning. DNFH: Adult Coho Salmon trapped during this time will be counted and either out planted or put into Holding Ponds for broodstock. LGR: Adult Coho Salmon trapped at LGR will be transported to DNFH for holding and spawning.
- *Surplus distribution* -
- *Carcass dispositions* – Following spawning at DNFH, all adult Coho Salmon carcasses will be donated to the local food bank. Once the quality of the fish is too poor for the food bank all carcasses will be out planted into Lapwai, Sweetwater, Potlatch, Mission Creeks and mainstem Clearwater River following spawning for nutrient enhancement.

3.2.3. Adult outplants (if applicable)

- *Trigger for outplanting* - When broodstock needs are meet.
- *Purpose –*
- *Outplant protocol (sex ratio, timing, marking, sampling) –* Coho Salmon adults surplus to broodstock needs will be out-planted to Lolo, Eldorado, Orofino, Lapwai, Sweetwater, Mission Creeks and South fork Clearwater River or back into the Clearwater.

3.2.4. Spawning/Egg take

- *Calculation of broodstock need (fecundity, eyeup, eye to smolt)* - See the introduction to Section 3 and Appendix 7.1 for details on broodstock calculation. Brood needs at DNFH will contribute to (a) Coho

incubation and rearing at DNFH of Clw broodstock from KNFH, LCT, DNFH, and/or LGR, (b) Coho incubation and transfer of eggs to ECNFH of Clw broodstock from KNFH, LCT, DNFH, and/or LGR, and (c) Coho rearing at DNFH of Clw broodstock from KalFH. The production goal for KNFH/LCT/DNFH/LGR Clw stock is to trap and spawn enough adults to produce 1,050,000 smolts (775k to Clear Creek, 275k to Lapwai Creek; reared at DNFH and ECFH).

- KNFH/LCT/DNFH/LGR Clw stock reared at DNFH: The production goal is to trap and spawn enough adults to produce 500k smolts for release at Clear Creek.
- KNFH/LCT/DNFH/LGR Clw stock reared at ECNFH: The production goal is to trap and spawn enough adults to produce 275k smolts for release at Clear Creek and 275k smolts for release at Lapwai Creek. Brood need is calculated based on survival metrics from both DNFH (spawning and incubation) and ECNFH (rearing).

- *Spawning protocol (schedule, method, M/F ratio)* -

3.2.5. Egg incubation

- *Egg transfers (if applicable)* - When KNFH/LCT/DNFH/LGR Clw stock spawned at DNFH can provide eggs for the ECNFH smolt program, these eggs will be incubated at DNFH to eye-up stage and then transferred to ECNFH in late December of BY to early January of BY+1 for final rearing.
- *Egg incubation method (egg distribution, treatments, picking)* - Coho eggs will be incubated at DNFH. Eyed eggs may be culled based on disease sampling and by eye-up percentages. Upon receiving ELISA results from adult females, eggs with OD levels above 0.25 will be culled. Eggs are enumerated using a Van Gaalen egg sorter.
- *Treatment, loading density, flow rate* - At enumeration eggs will be mechanically picked utilizing a Van Galen egg sorting machine and allocated into trays at a rate of approximately 5,500 eggs per tray and then placed into incubation stacks utilizing chilled water at a flow rate of 5 gpm. Treatments will continue three days a week until just prior to hatching. Picking of mortality in egg trays and egg shell removal will begin shortly after enumeration and continue as deemed necessary to maintain healthy incubation environments.
- *PBT tracking* - All adults spawned for release have been PBT sampled.
- *Method into rearing tanks* – There is no indoor nursery rearing at DNFH for Coho; swim-up fry are moved directly to Burrows ponds. Fry at DNFH are transferred directly from the egg trays into the outside System 3 burrows ponds.
- *Surplus egg distribution (if applicable)* - Surplus eggs if any will be incorporated into the program while still maintaining PBT integrity.

3.2.6. Early rearing

- *Environmental protocols (flow indices, density indices)* - As many as three Burrows ponds will be used for Coho rearing. Maximum density indices of .35 will not be exceeded.
- *Feeding protocol* - Bio-Oregon will be utilized throughout rearing.
- *Marking and tagging (AD, CWT; date range, size at application)* - Fingerling Coho Salmon will be marked with a CWT (no AD clip) in mid- to late-August of BY+1.
- *Fish movement/facility configuration* -

3.2.7. Final rearing

- *Target environmental protocols (flow indices, density indices)* – Six Burrows ponds will be used for Coho rearing. Maximum density indices of .35 will not be exceeded.
- *Feeding protocols* - Bio-Oregon will be utilized throughout rearing.
- *Mortality counting* - Mortality will be picked and recorded daily.
- *Water monitoring* - Flow measurements are taken monthly and when flow changes are undertaken. Dissolved oxygen and temperature will be monitored and recorded daily.
- *Fish movement/facility configuration* -
- *Acclimation (if applicable)* - Smolts are transferred to KNFH in mid-February to early-March of BY+2 for final acclimation.
- *Marking and tagging (PIT)* – All trapping locations: PIT tags for a portion of the releases will be provided by the USFWS through Mitchell Act funding. Juvenile survival and emigration timing to LGR and Smolt-to-adult

survival and adult return timing shall be based on PIT tag information and counts at LGR and ladder counts at DNFH, KNFH, LCT, LFH, and NPTHC. KNFH: Smolt-to-adult survival based on monitoring adult returns at a weir in Clear Creek and Lapwai Creek. LCT: Smolt-to-adult survival based on monitoring adult returns at a weir in Lapwai Creek and Redd surveys in Lapwai Creek.

- *Quality monitoring (counts, growth, length, marks quality, tag retention) -*

3.2.8. Fish health

- *Service provider -* Washington Department of Fish and Wildlife
- *Sampling protocols (what is sampled, sampling schedule) –*
    - Adults: 60 spawned females will be tested by the ELISA test for Bacterial Kidney Disease (BKD). All eggs from females that are identified at a level of 0.250 OD or higher will be culled. A 100 fish sample (ovarian fluids) will be taken for viral replicating agents. In addition, 60 tissue samples will be taken for virus, bacteria and parasites.
    - Juveniles: · Diagnostic exams will be performed as needed. 4 pre-release exam site visits that include a gross examination of fish is performed to assess smolt readiness and final disease status. Reports will be written and provided summarizing exam results.
- *Vaccination methods -* None at this time
- *Treatment methods* – Adults will be treated up to three times per week with formalin for fungus.

3.2.9. Fish release/transportation

- *Truck specifications -*
- *Hauling/Release schedule -* DNFH: Mid-February all fish will be transferred to KNFH for final acclimation.
- *Hauling/Release guidelines -*

3.2.10. Communication

- *Written reports (e.g., Monthly summaries, annual reports) -* Clearwater Coho Salmon Project Leader produces monthly reports for coordination between hatchery management and staff communication. Semi-annual and annual reports are a contract requirement to the CRITFC and NOAA funding entities.
- *FINS and IDFG release databases -*
- *Meetings (e.g., AOP, Anad, HET, etc.) -*
- *Direct consultation for egg/smolt transport –*

3.3. Eagle Creek National Fish Hatchery

3.3.1. Egg incubation

- *Eggs received (if applicable) –* When KNFH/LCT/DNFH/LGR Clw stock spawned at DNFH can provide eggs for the ECNFH smolt program, these eggs will be incubated at DNFH to eye-up stage and then transferred to ECNFH in late December of BY to early January of BY+1 for final rearing.
- *Egg transfers (if applicable) -* Clw stock spawned at DNFH will be incubated to eyed stage at DNFH and transferred to ECNFH in mid- to late- December.
- *Egg incubation method (egg distribution, treatments, picking) -* Coho eggs will be incubated at DNFH until eye up. Eyed eggs may be culled based on disease sampling and by eye-up percentages. Upon receiving ELISA results from adult females, eggs with OD levels above 0.25 will be culled. Upon receiving IHNV results from adult females, eggs from positive IHNV results will be culled. Eggs are enumerated using a Van Gaalen egg sorter before being transferred to ECNFH.
- *Treatment, loading density, flow rate -* DNFH: At enumeration eggs will be mechanically picked with a Van Galen egg sorting machine and allocated to trays at a rate of approximately 5,500 eggs per tray and then placed into incubation stacks at a flow rate of 5 gpm. After eyeup eggs will be transferred to ECNFH. No treatments will take place after being transferred. Picking morts in egg trays and egg shell removal will begin shortly after the transfer and continue as necessary to maintain healthy incubation environments.
- *PBT tracking -* All adults spawned for release have been PBT sampled.
- *Method into rearing tanks –*
- *Surplus egg distribution (if applicable) -* Surplus eggs if any will be incorporated into the program while still maintaining PBT integrity.

3.3.2. Early rearing

- *Environmental protocols (flow indices, density indices) -* Maximum density indices of .35 will not be exceeded.
- *Feeding protocol -* Bio-Oregon will be utilized throughout rearing.
- *Marking and tagging (AD, CWT; date range, size at application) -* Marking of fish will occur at ECNFH with a portion of each release group given CWTs (Lapwai Creek and Clear Creek). Fish are not adipose fin clipped.
- *Fish movement/facility configuration -*

3.3.3. Final rearing

- *Target environmental protocols (flow indices, density indices) –* Maximum density indices of .35 will not be exceeded.
- *Feeding protocols-* Bio-Oregon will be utilized throughout rearing.
- *Mortality counting -* Mortality will be picked and recorded daily.
- *Water monitoring -* Flow measurements are taken monthly and when flow changes are undertaken.
- *Fish movement/facility configuration -*
- *Acclimation (if applicable) -* Approximately 275k Clw stock smolts reared at ECNFH will be transferred to KNFH mid-February of BY for final acclimation and direct release.
- *Marking and tagging (PIT)* – If FWS, through Mitchell Act, is able to provide PIT tags, then a portion of the release groups will be marked with PIT tags, being tagged in January of BY+2 at ECNFH. These marks estimate the following: juvenile survival to LGR based on PIT tag detection; timing of adult returns based on PIT tags and counts at LGR; smolt-to-adult survival based on PIT tags, the number of juveniles released and adult returns over LGR. Adults will be accounted for by redd surveys in Clear Creek – may be limited to broodstock counts at DNFH, KNFH and LCT.
- *Quality monitoring (counts, growth, length, marks quality, tag retention) -*

3.3.4. Fish health

- *Service provider -* Disease history of fish is completed by Pacific Region Fish Health Program.
- *Sampling protocols (what is sampled, sampling schedule) –*
    - Adults: see DNFH section above for details on sampling of broodstock (Section 3.2.8).
    - Juveniles: After ponding, monthly health exams will be performed. Diagnostic exams will be performed as needed. In lieu of a traditional 60 fish pre-release exam performed 4-6 weeks prior to release, a six month health history will be attained. Six months prior to release a minimum of 10 fish per month will be examined for overall health and for viral, bacterial, and parasitic pathogens. Prior to release, a visual inspection to determine levels of precocity will be performed. A six month report will be written to include monthly monitoring and any diagnostics during that time frame.
    - *Vaccination methods -* None
- *Treatment methods* – None on routine basis.

3.3.5. Fish release/transportation

- *Truck specifications -* Transportation back to the Clearwater basin will be subcontracted out.
- *Hauling/Release schedule -* Approximately 275k of KNFH/LCT/DNFH/LGR Clw stock smolts reared at ECNFH will be transported to Lapwai Creek and direct stream released in mid-March of BY+2. Another group of 275k KNFH/LCT/DNFH/LGR Clw stock smolts that were acclimated at KNFH will be direct released to Clear Creek in mid-March of BY+2.
- *Hauling/Release guidelines -* DNFH: Late February to early March all fish will be transferred to KNFH (275k) and Lapwai creek (275k) for final acclimation and direct release.

3.3.6. Communication

- *Written reports (e.g., Monthly summaries, annual reports) -* Clearwater Coho Salmon Project Leader produces monthly production reports, and both an annual operation plan and annual operation report for CRITFC and the co-managers.
- *FINS and IDFG release databases -*
- *Meetings (e.g., AOP, Anad, HET, etc.) -*
- *Direct consultation for egg/smolt transport –*

4. Fall Chinook Salmon

- *Definition of species* - The fall Chinook production program is a complex and highly integrated artificial program for Snake River fall Chinook implemented through the LSRCP program, the IPC Hells Canyon Settlement Agreement, and the Columbia Basin Fish and Wildlife Program. The basic intent of the program is to assist with the recovery of Endangered Species Act (ESA)-listed Snake River fall Chinook, mitigating for impacts of the mainstem hydro-system dams, and returning abundance of salmon to historic levels. Both short and long-term adult return goals for this program are identified in the Snake River Fall Chinook Management Plan. Snake River fall Chinook production is mandated in the 2018-2027 U.S. vs. Oregon Management Agreement (Table 9). Fall Chinook salmon production in the Clearwater River occurs through two programs – the Fall Chinook Acclimation Project (FCAP) and NPTHC. Beginning with the 2012 trapping season, activities for FCAP are covered under ESA Section 10 Permit Nos. 16607-2R, and Permit No. 16615-2R for NPTHC.
- *Rearing locations* – Fall Chinook released into the Clearwater drainage are reared at two hatcheries: Nez Perce Tribal Hatchery (NPTH) and Lyons Ferry Fish Hatchery (LFFH). Discussion of rearing at LFFH can be found in LFFH SOP documents. NPT also operates acclimation facilities for fall Chinook: North Lapwai Valley facility (NLV), Luke's Gulch facility (LG), Cedar Flats facility (CF), and Big Canyon Creek Acclimation facility (BCCA). Fish reared at NPTH are acclimated at NLV, LG, and CF. Fish reared at LFFH are acclimated at Big Canyon Creek Acclimation facility (BCCA).
- *Broodstock collection and spawning locations* - The primary trapping location of broodstock collection for the Fall Chinook salmon program in the Clearwater is at Lower Granite Dam (LGR). Secondary trapping occurs at Nez Perce Tribal Hatchery (NPTH). Spawning from both trapping facilities occurs at NPTH (a portion of LGR fish are spawned at LFFH; see LFFH SOP for details).
- *Calculation of Broodstock need* - Appendix 7.1 shows the brood calculator used to determine brood need to reach production goal for the program releases. The number of eggs collected is based on 5-yr running historical average of adult survival, eye-up percentage, disease rates and smolt survival rates to meet smolt release targets. Suppose the production goal is to trap and spawn enough adults to produce (x) number of smolts for release. Applying a production cushion (c) and eyed egg-to-smolt survival (ess) to total smolt goal, gives the eyed eggs needed (e=(x*(1+c))/(ess)). After accounting for green-to-eyed egg and culling survival (ges and cs, respectively), the green egg goal before culling can be determined (g=e/(ges)/(cs)). Using an average fecundity of green eggs per female (fec) gives the number females needed (F=g/fec). A 1:1 M:F spawning ratio gives the number of males needed (M=F) and the total number to spawn (TotSp=F+M). Total fish needed when accounting for % pond mortality (pm) can be calculated (TotPM=TotSp/(1-pm)). Sometimes the F:M ratio is not 50%:50% in the collected broodstock and additional fish would need to be trapped to get the 1:1 M:F spawning ratio. Using the % females in the broodstock (fb), the total number of fish that needs to be trapped can be calculated (TotTrap=(TotPM/2)/(1-fb), round up to even number).
- *Smolt releases* – NPTH is authorized to produce 1.4 million sub-yearling fall Chinook juveniles annually.

4.1. Overview of facilities and brood stock

4.1.1. Nez Perce Tribal Hatchery (NPTH)

- *Hatchery description and location* - Nez Perce Tribal Hatchery Complex is located at RKM 38 on the north bank of the Clearwater River
- *Owner and operator* – Nez Perce Tribal Hatchery Complex is owned by Bonneville Power Administration and operated by the Nez Perce Tribe.
- *Programs at facility (Fig. 4.3)* - NPTH traps, spawns, incubates and rears Snake River stock Fall Chinook to the sub-yearling life stage for release into the Clearwater River.
- *Stocks reared and release locations (Fig. 4.3)*-
- FACH broodstock from LGR and NPTH - NPTH rears sub-yearlings for acclimation at NPTH, NLV, LG and CF, for eventual release at NPTH, Lapwai Creek, SF Clearwater, and Selway River, respectively.
- *Production Goals (smolts, fpp)* – NPTH On station (NPTH)– 500k sub-yearlings, North Lapwai Valley (NLV) – 200k sub-yearlings, Luke's Gulch – 350k sub-yearlings, Cedar Flats– 350k sub-yearlings. All releases have a target size of 50 FPP.
- *Adult mitigation goal (if applicable)* -
- *Facility or stock changes (if applicable)* – N/A

4.1.2. Big Canyon Creek Acclimation facility (BCCA)

- *Facility description and location* - Located on the Clearwater River at Rkm 57 directly below the mouth of Big Canyon Creek. Acclimation occurs in 16 circular tanks measuring 6 m in diameter. BCCA is designed and operated for acclimation and release of Snake River juvenile fall Chinook salmon that are reared at LFH.
- *Owner and operator* – BCCA is operated by NPT as part of FCAP funded by LSRCP.
- *Programs at facility (Fig. 4.3)* - BCCA acclimates Snake River stock (SnakeR) sub-yearling fall Chinook that are reared at LFFH.
- *Stocks acclimated and release locations (Fig. 4.3)* - FACH broodstock from LGR: BCCA acclimates sub-yearlings for release at Big Canyon Creek.
- *Release Goals (smolts, fpp)* – BCCA releases include a 1st and 2nd release of 450,000 and 200,000 sub-yearlings, respectively. Target size for sub-yearling releases is 50 FPP.
- *Adult mitigation goal (if applicable)* - BCCA is operated in conjunction with two other acclimation facilities on the Snake River in an effort to restore ESA listed Snake River fall Chinook salmon and achieve the LSRCP mitigation goal of 18,300 adults to the project area (NPTH not included in this goal).
- *Facility or stock changes (if applicable)* – N/A

4.1.3. North Lapwai Valley facility (NLV)

- *Facility description and location* – Located approximately 1 km above the mouth of Lapwai Creek, NLV consists of two river rock-lined acclimation ponds constructed to serve as final rearing and acclimation of sub-yearling fall Chinook salmon transferred from NPTH. NLV was designed to acclimate and release sub-yearlings into the Clearwater River via Lapwai Creek.
- *Owner and operator* –The NLV facility is owned by the Nez Perce Tribe and The Bonneville Power Administration. The Facility is operated by the Nez Perce Tribe.
- *Programs at facility (Fig. 4.3) -* NLV acclimates Snake River stock (SnakeR) sub-yearling fall Chinook that were reared at NPTH for release into the Clearwater River via Lapwai Creek.
- *Release Goals (smolts, fpp)* – The release goal for the NLV facility is 200,000 sub-yearlings at 50 FPP
- *Facility or stock changes (if applicable)* – N/A

4.1.4. Luke's Gulch facility (LG)

- *Facility description and location* - Located on the S.F. Clearwater River approximately 13 km upstream of its mouth, LG serves as final rearing and acclimation of early sub-yearling fall Chinook salmon. Acclimation occurs in ten 5.8 m diameter circular aluminum tanks with fish being released directly into the S.F. Clearwater River.
- *Owner and operator* – The LG facility is owned by the Nez Perce Tribe and The Bonneville Power Administration. The Facility is operated by the Nez Perce Tribe.
- *Programs at facility (Fig. 4.3)* - LG acclimates Snake River stock (SnakeR) sub-yearling fall Chinook that were reared at NPTH for release into the SF Clearwater River.
- *Release Goals (smolts, fpp)* – The release goal for the LG facility is 350,000 sub-yearlings at 50 FPP
- *Facility or stock changes (if applicable)* – N/A

4.1.5. Cedar Flats facility (CF)

- *Facility description and location* - Located on the Selway River 8 km above its mouth, CF serves as the final rearing and acclimation of early sub-yearling fall Chinook salmon. Acclimation occurs in ten 5.8 m diameter circular aluminum tanks and fish are released directly to the Selway River
- *Owner and operator* – The CF facility is owned by the Nez Perce Tribe and The Bonneville Power Administration. The Facility is operated by the Nez Perce Tribe.
- *Programs at facility (Fig. 4.3)* - CF acclimates Snake River stock (SnakeR) sub-yearling fall Chinook that were reared at NPTH for release into the Selway River.
- *Release Goals (smolts, fpp)* – The release goal for the CF facility is 350,000 sub-yearlings at 50 FPP
- *Facility or stock changes (if applicable)* –

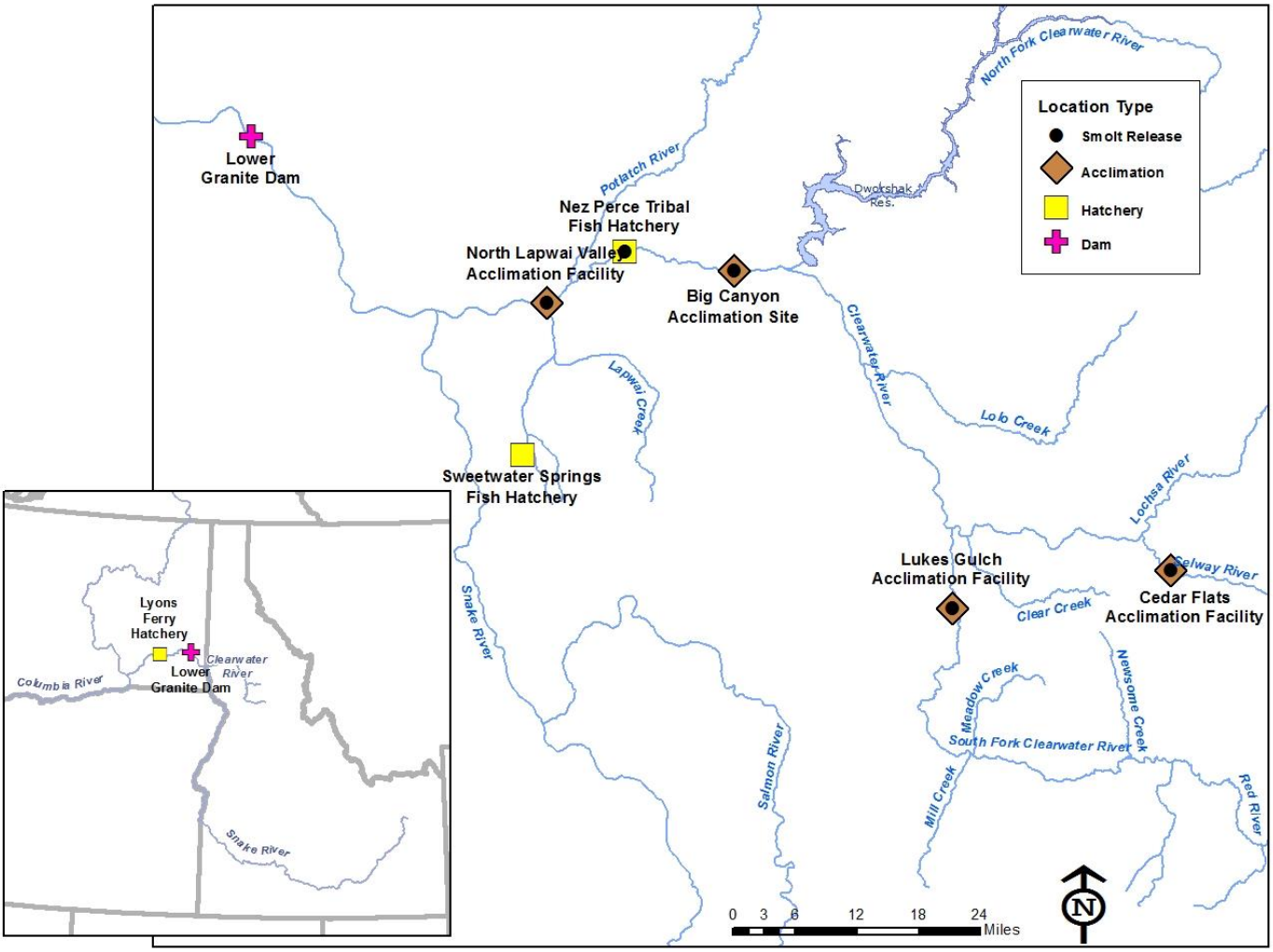

Figure 4.1. Fall Chinook Salmon hatchery and acclimation facilities, and sub-yearling release locations.

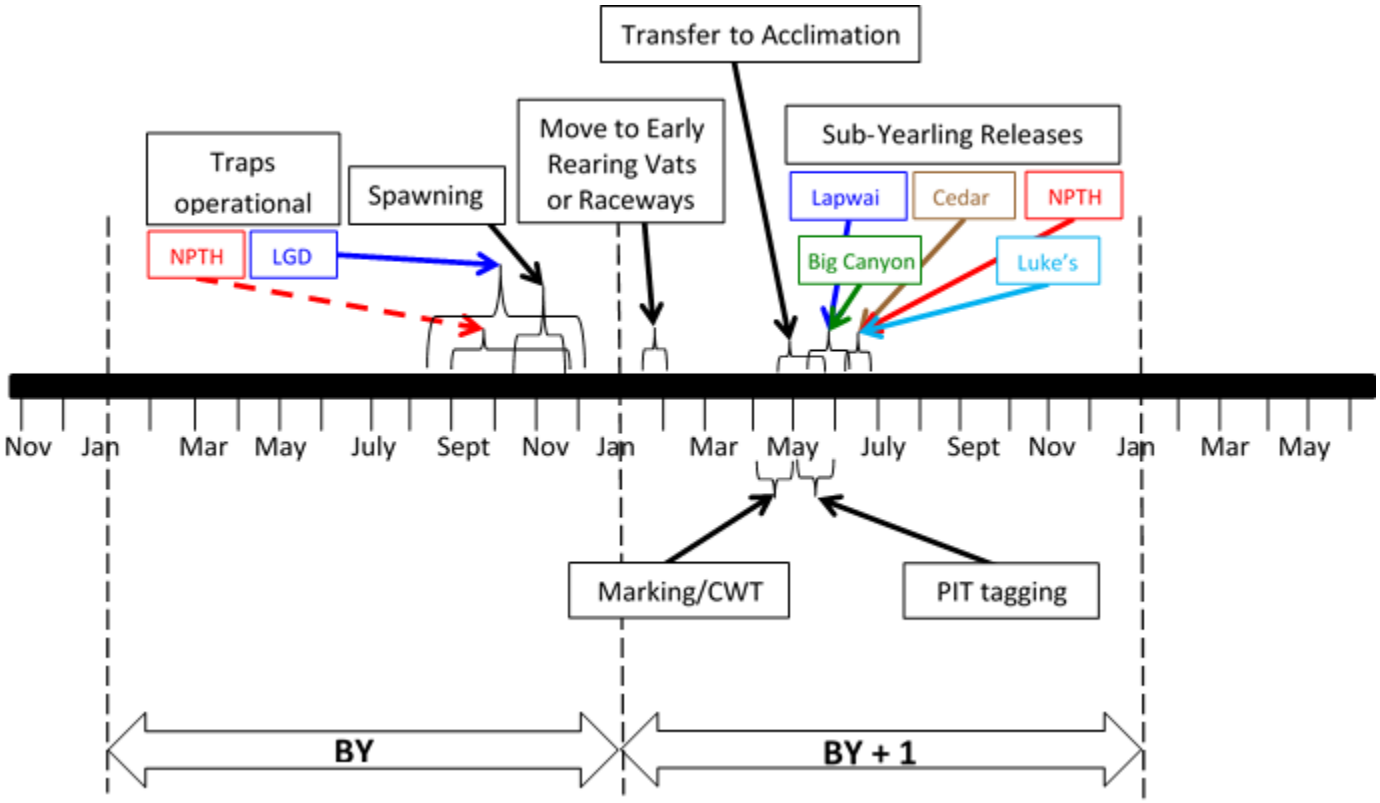

Figure 4.2. Timeline for Sub-Yearling Fall Chinook Production. Date ranges with black labels are shown to include all facilities' operations. Color-coded labels identify activities that have variability in timing for the different facilities.

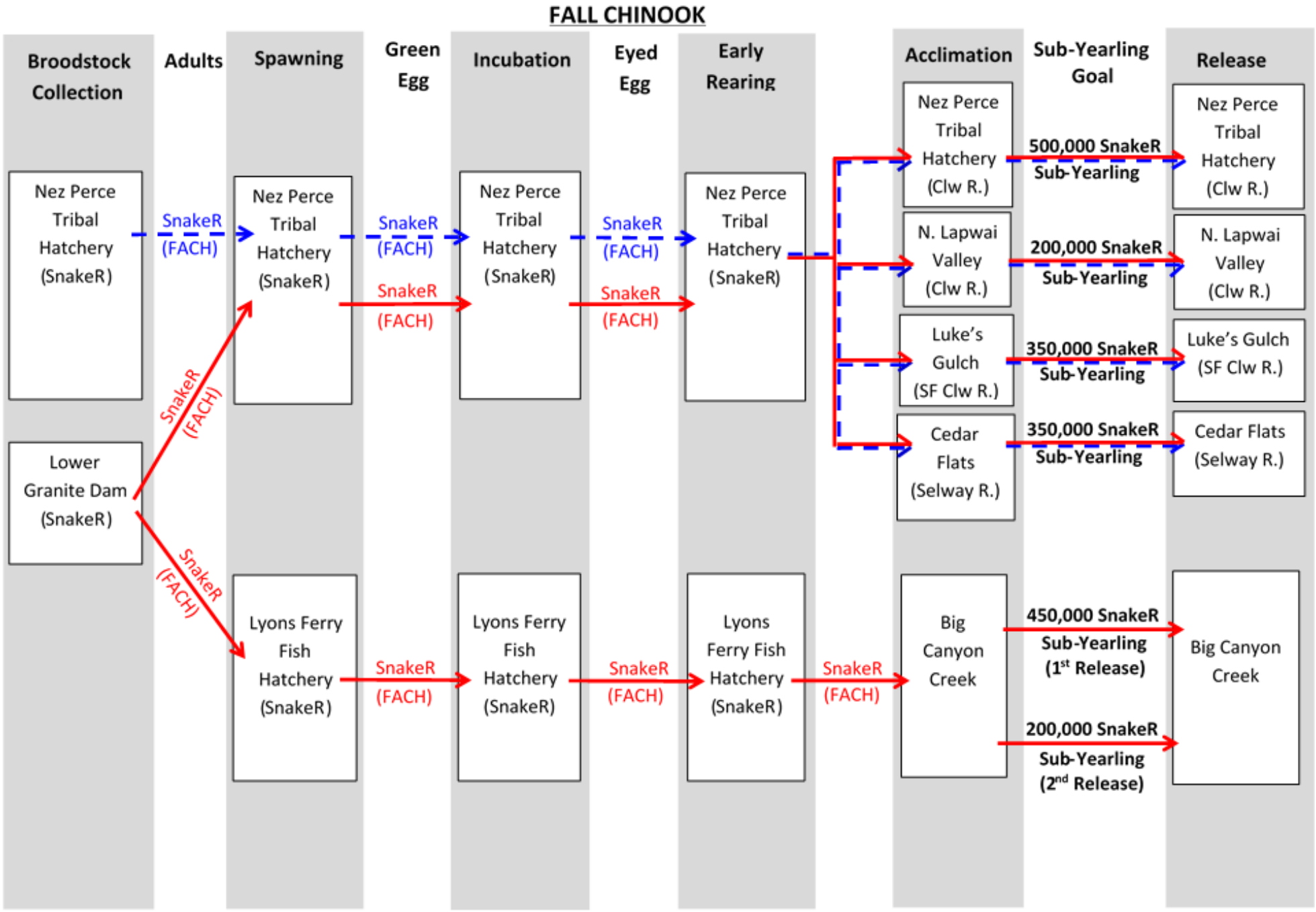

Figure 4.3. Fish and egg movements for Fall Chinook.

4.2. Nez Perce Tribal Hatchery

4.2.1. Trapping and Brood Acquisition

- *Trapping/Brood Acquisition location* – Snake River Fall Chinook adults will be collected at LGR and transported to NPTH, in accordance with the U.S. vs. Oregon Management Agreement. In the event of a broodstock shortage trapped at LGR additional adult fall Chinook may be trapped at the fish ladder at NPTH.
- *Trap configuration*

  Lower Granite Dam:

  NPTH: A fish ladder in the north shore of the Clearwater River traps returning adults at the hatchery. Volunteering adults swim up the fish ladder and through a V-trap at the top of the ladder into a trap box.
- *Dates operated* – LGR: Adult fall Chinook will be collected at LGR beginning August 18th or when water temperatures are below 70º F (22.2º C). Trapping at LGR will continue throughout the run and is anticipated to end by late November or early December. NPTH: Trapping at NPTHC typically occurs in September – November when necessary.
- *Trapping/Brood Acquisition protocol (frequency, movement of fish)* -
  - LGR: FCS are collected in the trap as a sub-sample of the returning run based on run size forecast and broodstock needs. The sub-sample rate once agreed upon may change mid-season based on actual captures. Trapping at LGR will continue throughout the run and is anticipated to end by late November or early December. The goal is for NPTH to receive 30% and LFFH to receive 70% of the females trapped at LGR. This schedule will be modified as needed to ensure equitable distribution of fish between the two programs.
  - NPTH: There will be weekly in-season updates on LGR adult hauled numbers and an assessment of actual fall Chinook adults counted at LGR with updated run forecasts to determine if and when the adult ladder and trap may be operated at NPTHC to meet full production. NPTHC intends to trap adults only if program goals cannot be met from LGR. NPTHC swim-ins are marked with a right operculum V-notch to differentiate them from the LGR fish. The NPTHC trap is opened opportunistically in order to meet program needs.

4.2.2. Adult handling

- *Measurements (marks, tags, sex, etc.)* – A hatchery/wild determination and scan for PIT tags/CWTs are conducted on fish hauled from LGR or trapped at NPTH, along with all other biological information. Returning adults are measured and examined for gender, various clips and tags, and marks then sorted for spawning or holding.
- *Tissue sampling protocol* -Scale samples are taken from all spawned fish and mortalities. CWTs will be collected from all spawned adults and pre-spawn mortalities. Genetic samples are also collected from all spawned adults to develop the Parentage Based Tagging (PBT) baseline (see Appendix 7.2 for detail).
- *Dispositions (holding, releases)* –
  - LGR: In an effort to minimize use of one-salt males in the broodstock, co-managers use historical age-class data from previous years CWT recoveries and run predictions to determine a "jack" cutoff length in advance of the trapping season. This cutoff is typically 70 cm. Any fish smaller than this cutoff length is not transported to NPTH.
  - NPTH: Fish smaller than the jack cutoff length described for LGR fish (above) are not kept, instead they are returned to the river. Excess broodstock may also be spawned to backfill for LFFH program if necessary. Fish transported to NPTH are usually placed in the north holding pond, but may also be placed in the south holding pond if densities become a concern. WDFW and NPTH have cooperatively developed a transportation schedule for adults trapped at LGR.
- *Surplus distribution* - Currently no surplus distribution occurs at NPTHC
- *Carcass dispositions* – Chinook salmon carcasses may be returned to free-flowing reaches of the Clearwater River for nutrient enhancement, if they have not been injected or inoculated. Fall Chinook carcasses will be distributed to headwater tributaries and the mainstem Clearwater River with the tails being removed at the caudal peduncle. Adult fish that have been injected with antibiotic or sGnRHa (Ovaplant) will be buried at

NPTHC.

4.2.3. Adult outplants (if applicable)

- *Trigger for outplanting* - Proposed out-plants and any fish research requests will be considered and reviewed by the co-managers. Adult outplants will be triggered in the event of broodstock in excess to program needs.
- *Purpose* – Excess broodstock is out-planted to supplement natural production.
- *Outplant protocol (sex ratio, timing, marking, sampling)* – Only adults and jacks that have not been inoculated with antibiotics, injected with sGnRHa (Ovaplant), or needed for run reconstruction (LGR trapped adults) may be out-planted. Inoculated fish will be sacrificed and buried onsite at NPTH. Any adults anesthetized with AQUI-S require a 72-hour withdrawal period prior to being released. All adults out-planted from NPTHC will receive one left operculum punch as shown in Appendix 7.5.2.

4.2.4. Spawning/Egg take

- *Calculation of broodstock need (fecundity, eyeup, eye to smolt)* - Brood needs from NPTH will contribute to programs at NPTH (on-site), NLV (Clearwater R), LG (SF Clearwater), and CF (Selway R) releases. See the introduction to Section 4 and Appendix 7.1 for details on broodstock calculation. The production goal is to spawn enough adults to produce 1.4 million Fall Chinook LGR/NPTH stock sub-yearling.
    - LGR/NPTH stock reared at NPTH: The production goal is to trap and spawn enough adults to produce 1,400k sub-yearlings for release at NPTH (500k), Lapwai Creek (200k), SF Clearwater (350k), and Selway River (350k).
- *Spawning protocol (schedule, method, M/F ratio)* - The first spawn occurs the third week of October. Spawning typically occurs on Tuesday of each week at NPTH, through the end of November when egg-take goals are met. AQUI-S will be used to anesthetize NPTH adults during broodstock collection, pending approval under an INAD through the USFWS. Use of this product will allow for greater accuracy in data collection (when compared to live handling of fish) during processing of trapped fish. A spawning ratio of 1:1 will be used. If a 1:1 spawning ratio cannot be achieved then multiple milt samples may be taken from larger males to maximize the contribution of large males. Out-of-Snake River Basin adults, identified as "strays" by CWT or PIT tag may be culled or transferred to lower river hatcheries to meet production goals. However, to meet NPTH production, strays may be retained at a rate not to exceed 5%. In early-November, Gonadotropin Releasing Hormone (sGnRHa) may be used on remaining un-spawned LGR females to facilitate maturation. Whenever possible, eggs from early spawned females will be used for the LG and CF facility programs, to support an early returning run to the SF Clearwater and Selway Rivers, respectively. However, the Clearwater River direct release from NPTH is the highest priority in the event of an egg shortage, that goal will always be met before either the LG or CF acclimated programs. The NLV program may be reduced to ensure the LG and CF program goals are met.

4.2.5. Egg incubation

- *Eggs received (if applicable)* –NA
- *Egg transfers (if applicable)* - NA
- *Egg incubation method (egg distribution, treatments, picking)* - Fertilized eggs will be water hardened for 30 minutes in 100 parts per million Iodophore and placed in heath trays for incubation. At between 600 and 625 temperature units (TU's) eyed eggs will be shocked; machine sorted the following day and transferred back into Heath trays to hatch. Eggs are reared on chilled river water and well water supply. Picking will occur after enumeration weekly to insure accurate egg count and a good rearing environment. The eggs from females with a high BKD ELISA value (>0.250) may be culled. In the event of low adult returns with anticipated egg numbers below program goals or policy requests, hatcheries may consider rearing Chinook Salmon eggs from females with ELISA optical densities between 0.25 and 0.60 that would normally be culled. The number of these higher-ELISA progeny to be raised will be limited by the availability of sufficient rearing space to maintain low density indices and biosecurity (segregation and other measures) appropriate for rearing fish from high-titer brood. This decision to raise fish from high ELISA-titer brood will be made prior to spawning each year.
- *Treatment, loading density, flow rate* - Eggs are treated daily until hatching with formalin. Loading densities

is 1 female/heath tray with a flow rate of 5-6 GPM

- *PBT tracking* -Parentage is tracked from spawning cross until release.
- *Method into rearing tanks* – At swim-up, the fish will be transferred to production room tanks at ~1,200 fpp (0.37 grams). Fry will be transported from the Heath Trays to the outside nursery typically end of January through February of BY+1, depending on development.
- *Surplus egg distribution (if applicable)*-NA

4.2.6. Early rearing

- *Environmental protocols (flow indices, density indices)* - Each vat is loaded with approximately 30k-33k swim-up fry. Fry remain in indoor vats until they are ~160 fpp not to exceed 0.30 Density Index.
- *Feeding protocol* - Fry will be given starter feed and fed hourly when moved to the nursery (January and February BY+1).
- *Marking and tagging (AD, CWT; date range, size at application)* –
    - NPTH: 100,000 fish will be marked with a CWT and an AD clip in early April at 160 FPP at NPTHC. The remainder of this release (400,000) will be unmarked and untagged.
    - NLV: Fish slated for final acclimation and release from NLV will be marked at NLV during transfer from NPTH when fish reach 160 FPP. This group will be comprised of 100,000 AD and CWT fish, and 100,000 unmarked and untagged fish.
    - LG: This group is comprised of 100,000 AD and CWT fish, and 250,000 unmarked and untagged fish. Fish are marked in early April at the Sweetwater Springs Facility when fish reach 160 FPP.
    - CF: This group is comprised of 100,000 AD and CWT fish, and 250,000 unmarked and untagged fish. Fish are marked in early April at the Sweetwater Springs Facility when fish reach 160 FPP.
- *Fish movement/facility configuration* –
    - NPTH:
    - NLV:
    - LG:
    - CF:

4.2.7. Final rearing

- *Target environmental protocols (flow indices, density indices)* –
- *Feeding protocols - I*n order to meet target size at release, feed schedules are adjusted weekly based on sample counts taken on each individual rearing vessel. Fish will be fed 1-4 times per day depending on how many pounds of feed is required to meet growth requirements.
- *Mortality counting* - Morts are picked daily
- *Water monitoring* –
    - NPTH: Flow measurements are taken weekly and when flow changes are undertaken. Dissolved oxygen monitoring is conducted daily for all groups.
    - NLV: Employees living at the facility monitor water flows, water temperatures and dissolved oxygen (DO) levels daily, and fish are released when water temperatures reach 63 F (17.2 C) and/or DO levels drop significantly.
    - LG: Employees living at the facility monitor water flows, water temperatures and dissolved oxygen (DO) levels daily.
    - *CF:* Employees living at the facility monitor water flows, water temperatures and dissolved oxygen (DO) levels daily.
- *Fish movement/facility configuration* -
- *Acclimation (if applicable)* – Three acclimation facilities are used for sub-yearling releases: NLV for release in Clearwater River, LG for release in SF Clearwater, and CF for release in Selway River. Fish are reared at NPTH and transferred to acclimation facilities in April of BY+1.
    - NLV: This facility was designed for and the program specifies a release of 200k sub-yearlings into the Clearwater River via Lapwai Creek by the end of May of BY+1. NLV is the acclimation facility for releases into Lapwai Creek.
    - LG: LG is the acclimation facility for releases into SF Clearwater River (350k sub-yearlings). Fish are

reared at NPTH, transferred to SWS and then transferred to LG in April of BY+1.
    - CF: CF is the acclimation facility for releases into Selway River (350k sub-yearlings). Fish are reared at NPTH, transferred to SWS and then transferred to CF in April of BY+1.
- *Marking and tagging (PIT) –* A portion of each release group will be PIT tagged for standard outmigration monitoring. NPTH releases are PIT tagged at their release/acclimation sites in mid-May.
- *Quality monitoring (counts, growth, length, marks quality, tag retention) –*
    - NPTH: At the start of the scheduled volitional release, hatchery employees take lengths and weights on a minimum of 400 fish (200 from each pond). All fish are scanned for CWT to determine initial tag retention and tagging mortality.
    - NLV: Hatchery staff will take lengths and weights on a minimum of 400 fish at the time of release. All fish are scanned for CWT to determine initial tag retention and tagging mortality.
    - LG: NPTHC staff will take lengths and weights on a minimum of 400 fish just before release. All fish are scanned for CWT to determine initial tag retention and tagging mortality.
    - CF: NPTHC staff will take lengths and weights on a minimum of 400 fish just before release. All fish are scanned for CWT to determine initial tag retention and tagging mortality.
- *Surplus juvenile distribution (if applicable)* - In the event production exceeds 110% of the program goals, surplus fry may be outplanted into the lower Clearwater River or utilized in some other way, pending co-manager approval. PBT integrity will be considered in determining how surpluses are distributed.

4.2.8. Fish health

- *Service provider -*
- *Sampling protocols (what is sampled, sampling schedule) –*
    - Adults: All spawned females will be tested by the ELISA test for Bacterial Kidney Disease (BKD). Generally, all eggs from females that are identified at a level of 0.250 OD or higher will be culled. A 150 fish sample (ovarian fluids) will be taken for viral replicating agents. In addition, 60 tissue samples will be taken for virus, bacteria and parasites. Samples will be collected by NPTH and delivered to fish health.
    - Juveniles: Diagnostic exams will be performed as needed. 4 pre-release exam site visits that include a gross examination of fish is performed to assess smolt readiness and final disease status. Reports will be written and provided summarizing exam results.
- *Vaccination methods* - NA
- *Treatment methods* –All adults will receive formalin treatments up to three times per week to control fungus and decrease pre-spawning mortality.

4.2.9. Fish release/transportation

- *Truck specifications -*
- *Hauling/Release schedule –*
    - NPTH: A volitional release begins in early June of BY+1, unless river water temperatures warrant an earlier release. Hatchery or river conditions may warrant a shortened or no volitional release period.
    - NLV: If flow, temperature and DO conditions allow, fish will be reared as long as possible toward meeting the original goal of release at the end of May of BY+1 at 50 fpp. However, warming water temperatures and decreasing flows in the creek in May of BY+1 typically warrant an earlier release to avoid high mortalities and disease outbreaks.
    - LG: Final release from LG to the SF Clearwater River is typically mid-June of BY+1.
    - CF: Final release from CF to the Selway River is typically mid-June of BY+1.
- *Hauling/Release guidelines -*

4.2.10. Communication

- *Written reports (e.g., Monthly summaries, annual reports)* - NPTHC produces monthly production and pathology reports, and both an annual operation plan and annual operation report for BPA and the co-managers. Fish Research produces quarterly and annual reports to BPA.
- *FINS and IDFG release databases -*

- *Meetings (e.g., AOP, Anad, HET, etc.) -*
- *Direct consultation for egg/smolt transport –*

4.3. Big Canyon Creek Acclimation facility (BCCA)

4.3.1. Trapping, Brood Acquisition and Adult Handling

Trapping of broodstock for Big Canyon Creek releases occurs at LGR. Discussion of trapping, brood collection and adult handling is found in LFFH AOP.

4.3.2. Spawning, Incubation, and Rearing

Spawning, incubation, and rearing for Big Canyon Creek releases occurs at LFFH. See the LFFH AOP for details on protocol.

4.3.3. Final rearing

- *Target environmental protocols (flow indices, density indices) –*
- *Feeding protocols-*
- *Mortality counting -*
- *Water monitoring -*
- *Fish movement/facility configuration -*
- *Acclimation (if applicable) –*
    - Sub-yearling: Two releases of sub-yearlings occur at BCCA. For the first release approximately 450,000 sub-yearlings will be reared at LFFH for transfer to the BCCA facility in late April of BY+1. For the second release, approximately 200,000 sub-yearlings will be reared at LFFH for transfer to the BCCA facility in mid-May of BY+1.
- *Marking and tagging (AD, CWT, PIT) –* All tagging and marking operations are conducted at Lyons Ferry prior to transfer to acclimation.
    - Sub-yearling: The first release of sub-yearlings consists of 200,000 CWT/AD fish and 250,000 unmarked fish 11,000 fish are PIT tagged for the CSS study. The second release consists of 200,000 AD/CWT fish and 4,500 fish receive PIT tags for SURPH estimation.
- *Quality monitoring (counts, growth, length, marks quality, tag retention) –*
    - Sub-yearling: Sub-yearling release groups will be sampled for length and weight at time of release. A subsample of approximately 1,000 fish will be collected as they are being released. We sample 500 fish from each raceway at LFFH for CWT and AD clip retention 21 days after tagging/marking is completed. All mortalities at BCCA will be scanned for PIT tags.

4.3.4. Fish health

- *Service provider -* WDFW Fish Health Program
- *Sampling protocols (what is sampled, sampling schedule) –*
    - Sub-yearling: Import permit sampling (60 fish sample) will be conducted in March for BY+1.
- *Vaccination methods* - None
- *Treatment methods* – None on routine basis.

4.3.5. Fish release/transportation

- *Truck specifications -*
- *Hauling/Release schedule –*
    - Sub-Yearling: Target release date for the first group is in mid-May and the target release date for the second release is during the first week of June.
- *Hauling/Release guidelines -*

4.3.6. Communication

- *Written reports (e.g., Monthly summaries, annual reports) -* O&M and M&E quarterly and annual reports are submitted to BPA.
- *FINS and IDFG release databases -*
- *Meetings (e.g., AOP, Anad, HET, etc.) -*
- *Direct consultation for egg/smolt transport –*

5. Pacific Lamprey

- *Definition of species* – *Entosphenus tridentatus*
- *Purpose of Program* - The purpose of this stop gap effort by NPT 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, thereby continuing a presence 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.
- *Collection locations* - Pacific Lamprey are trapped at Bonneville Dam, John Day Dam and The Dalles Dam
- *Holding locations* –Approximately half of lamprey collected at traps are transported to NPTH for holding over winter, with remaining half directly released into the mainstem Clearwater River to continue volitional migration to spawning grounds.
- *Releases* – Adults overwintered at NPTH are released for natural spawning at Asotin Creek, Big Canyon Creek, Orofino Creek, Lolo Creek, Newsome Creek, Red River, SF Salmon River, Johnson Creek, Secesh River, Wallowa River, Minam River, Joseph Creek, with the addition of the Potlatch River as the most recently targeted tributary. As noted above, direct release of within-year migrating adults into mainstem Clearwater at Lenore is another strategy being implemented by NPT Fisheries.

5.1. Program details

5.1.1. Trapping and Brood Acquisition

- *Trapping/Brood Acquisition location* – NPT Fisheries conducts trapping operations, in cooperation with CRITFC and member tribes, for adult lamprey at Bonneville, The Dalles, and John Day dams and transports them to NPTH.
- *Trap configuration* -
- *Dates operated* – Trapping begins in June at Bonneville Dam with The Dalles and John Day dams added as the migrating fish pass those dams, and is completed by the end of August.
- *Trapping protocol (frequency, movement of fish)* - CRITFC crews check traps daily and collected lamprey are transported to holding tanks at Smolt Monitoring Facility at John Day Dam to be picked up on Wednesdays. For 2022, fish will be transported to the Bonneville Hatchery (to tanks inside the Captive Brood Building) where there are better holding conditions (cooler water temperatures and improved water quality), allowing for increased operational efficiency and flexibility (i.e. more fish transported per trip to downriver dams).

5.1.2. Adult handling

- *Measurements (marks, tags, sex, etc.)* -
- *Tissue sampling protocol* - Genetic samples are collected by NPT staff for analysis by CRITFC in the lab at Hagerman NFH.
- *Dispositions* – Adults are transported to NPTH for holding through the winter months.
- *Surplus distribution* -
- *Carcass dispositions* – Held in cold storage until collected by University of Idaho staff for marine nutrient studies.

5.1.3. Holding Protocols

- *Environmental protocols (flow indices, density indices)* -
- *Feeding protocol* - lamprey do not feed during freshwater migration.
- *Marking and tagging (AD, CWT, PIT; date range)* – various tagging efforts coordinated with CRITFC, USFWS, and NPT Research Division.
- *Mortality counting* – mortality is tracked during transport and holding phases of operations.
- *Water monitoring* - daily water quality checks (temperature, dissolved oxygen, flow rates).
- *Fish movement/facility configuration* -
- *Acclimation (if applicable)* -

5.1.4. Fish health

- *Service provider* - Washington Department of Fish and Wildlife

- *Sampling protocols (what is sampled, sampling schedule) –*:
- *Vaccination methods* – All lamprey collected are injected with oxytetracycline by NPT available for furunculosis.
- *Treatment methods* – None on routine basis.

5.1.5. Fish release/transportation

- *Purpose for outplanting –* Lamprey are out-planted for purpose of natural spawning in upstream locations.
- *Release locations –* Overwintered lamprey are released in Lolo Creek, Orofino Creek, and Newsome Creek, Big Canyon Creek, and the South Fork Salmon, Johnson Creek and Secesh River in Idaho, Asotin Creek in Washington, and the Wallowa River, Minam River, and Joseph Creek in Oregon, and since 2018 directly into the mainstem Clearwater River near Lenore.
- *Truck specifications -*
- *Hauling/Release schedule –* Out-planting typically occurs during the April/May following winter holding at NPTH.
- *Hauling/Release guidelines -*

5.1.6. Communication

- *Written reports (e.g., Monthly summaries, annual reports) -*
- *FINS and IDFG release databases -*
- *Meetings -*
- *Direct consultation for transport –*

6. Rainbow Trout

- *Definition of species* -The catchable Rainbow Trout stocking program uses triploid Rainbow Trout to provide fishing opportunity in the Clearwater Basin.
- *Rearing locations* – Rainbow Trout for release to the Clearwater Basin are reared at Lyons Ferry Fish Hatchery (LFH) and several IDFG hatcheries. The fish are transferred to CFH from these facilities for redistribution in the Basin or hauled directly to release location.

6.1. Overview of facilities, release and evaluation information

6.1.1. Lyons Ferry Fish Hatchery (LFH)

- Details for the LFH Rainbow Trout production can be found in Lyons Ferry AOP.

6.1.2. Clearwater Fish Hatchery (CFH)

- *Owner and operator* – LSRCP and IDFG
- *Programs at facility -* CFH functions as a redistribution station for Rainbow Trout reared at IDFG hatcheries and LFH.
- *Stocks reared -* Troutlodge, Hayspur and Spokane strain Rainbow Trout are used in this program.
- *Production Goals (smolts, fpp)* – The CFH regional Rainbow Trout program redistributes approximately 100,000 IDFG reared trout and approximately 16,000 LFH reared trout.
- *Facility or stock changes (if applicable)* –
    - *Dworshak Reservoir Mitigation:* The initial mitigation responsibility for Dworshak Dam Project was to provide 100,000 pounds of Rainbow Trout annually to be stocked into Dworshak Reservoir. This mitigation has evolved over the years to approximately 18,000 pounds of Rainbow Trout or 50,000 catchables. Since 1997, Hagerman NFH has raised Rainbow Trout for stocking into Southern Idaho reservoirs and IDFG reciprocates by stocking lakes in the Clearwater Basin. Based on creel information provided by IDFG, return to creel of historical Rainbow Trout out-plants into Dworshak Reservoir have been very low. Therefore, the release locations of the majority of these fish have been changed to lowland lakes or reservoirs in the North Fork Clearwater drainage. At this time, the only agreed-to release locations for COE mitigation Rainbow Trout are within the North Fork Clearwater Drainage.
    - *Clearwater Basin:* Until 2009, IDFG annually stocked approximately 50,000 (3,300 lbs) of Kamloops Rainbow Trout from LFH into the Clearwater River system. In 2010, IDFG and NPT agreed to a new allocation and release locations for these fish.
- *Marking and tagging* – Currently there is no annual marking/tagging.
- *Truck specifications -* When transporting fish, CFH follows IDFG and IHOT guidelines.
- *Hauling/Release schedule –* The CFH regional Rainbow Trout program redistributes approximately 100k IDFG reared trout. There are 25+ plant sites, requiring 100+ trips. Stocking occurs from March to October.
- *Hauling/Release guidelines -* If transport tank and stocking water temperature is not within 5-10 degrees F, fish are acclimated to stocking water temp by pumping stocking water in tanks until desired temp is achieved. *If receiving water temperature is greater than 70 degrees F, no stocking will occur.*
- *Evaluation plan -* Currently there is no annual monitoring and evaluation.

7. Appendices

7.1. Clearwater Brood Calculator

7.1.1. FULL PRODUCTION Brood Calculator

PROGRAM INPUTS							HISTORICAL HATCHERY PERFORMANCE METRICS (5-YR AVG)						FORM CALCULATED VALUES									
SPECIES	HATCHERY	PROGRAM	Life Stage	PREFERED TRAPPING SITE	FORMAL RELEASE GOAL	COMANAGER APPROVED CUSHION % (1)	% FEMALES IN BROODSTOCK	% MORTALITY DURING HOLDING	GREEN EGG FECUNDITY	% REMAINING AFTER DISEASE CULLING (2)	% SURVIVAL GREEN TO EYED EGG	% SURVIVAL EYED EGG TO RELEASE	RELEASE GOAL WITH CUSHION	EYED EGGS	GREEN EGGS	GREEN EGGS BEFORE DISEASE CULL	FEMALES SPAWNED	MALES SPAWNED	TOTAL ADULTS SPAWNED	TRAPPED ADULTS NEEDED	ADULTS TRAPPED TO MEET 1:1 RATIO	SMOLTS PER TRAPPED ADULTS NEEDED	NOTE #
					(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)	(U)	(V)	(W)	
STLHD	DNFH	MS Clearwater at DNFH		DNFH	1,200,000	4%	50.0%	7.3%	7,046	91.5%	88.9%	85.5%	1,248,000	1,459,649	1,641,900	1,794,426	255	255	510	551	551	2,265	
		Red House Hole - SF Clw		SFClw Angler	400,000	4%	50.0%	7.3%	7,046	91.5%	88.9%	85.5%	416,000	486,550	547,300	598,142	85	85	170	184	184	2,261	
		Clear Creek		DNFH	300,000	4%	50.0%	7.3%	7,046	91.5%	88.9%	85.5%	312,000	364,912	410,475	448,607	64	64	128	139	139	2,245	
		Lolo Creek		DNFH	200,000	5%	50.0%	7.3%	7,046	91.5%	88.9%	85.5%	210,000	245,614	276,281	301,947	43	43	86	93	93	2,258	
	MVH	Salmon River		DNFH	93,000	5%	50.0%	6.2%	6,681	100.0%	84.0%	85.0%	97,650	114,882	136,765	136,765	21	21	42	45	45	2,170	
	CFH	Clearwater		SFCLW	843,000	3%	50.0%	3.5%	7,267	100.0%	82.0%	80.0%	868,290	1,085,363	1,323,613	1,323,613	183	183	366	380	380	2,285	
SP/SU CHIN	DNFH	NF Clearwater (DNFH)		DNFH	1,650,000	1%	50.0%	3.6%	3,880	91.8%	95.8%	92.3%	1,666,667	1,805,706	1,884,871	2,053,236	530	530	1,060	1,100	1,100	1,515	(3)
		Trans. to NPTH-NPTH		DNFH	200,000	2%	50.0%	3.6%	3,880	91.8%	95.8%	92.3%	204,082	221,107	230,800	251,417	65	65	130	135	135	1,512	
		Trans. to NPTH-Lapwai Creek		DNFH	200,000	2%	50.0%	3.6%	3,880	91.8%	95.8%	92.3%	204,082	221,107	230,800	251,417	65	65	130	135	135	1,512	(4)
	KNFH	Kooskia NFH		KNFH	650,000	5%	50.0%	10.0%	3,580	94.5%	94.5%	90.0%	684,211	760,234	804,480	851,302	238	238	476	529	529	1,293	
	CFH	Red River		SFClw	1,280,000	0%	50.0%	5.0%	3,581	91.0%	96.0%	97.0%	1,280,000	1,319,588	1,374,570	1,510,517	422	422	844	889	889	1,440	
		Selway River-Lower		DNFH	400,000	0%	50.0%	5.0%	3,581	91.0%	96.0%	97.0%	400,000	412,371	429,553	472,037	132	132	264	278	278	1,439	
		Clear Creek		KNFH/DNFH	720,000	0%	50.0%	5.0%	3,581	91.0%	96.0%	97.0%	720,000	742,268	773,196	849,666	238	238	476	502	502	1,434	
		NF Clearwater-CFH (Baffle)		DNFH	389,000	0%	50.0%	5.0%	3,581	91.0%	96.0%	97.0%	389,000	401,031	417,741	459,056	129	129	258	272	272	1,430	(5)
		NF Clearwater-CFH (Regular)		DNFH	320,000	0%	50.0%	5.0%	3,581	91.0%	96.0%	97.0%	320,000	329,897	343,643	377,629	106	106	212	224	224	1,429	(6)
		Powell Pond (SUM)		Pow/SFSR	640,000	0%	50.0%	5.0%	3,741	98.0%	88.0%	97.0%	640,000	659,794	749,766	765,067	205	205	410	432	432	1,481	(7)
	NPTHC	Lolo Cr (Clw)	Pre-Smolt	NPTHC	150,000	1%	50.0%	5.0%	3,724	90.0%	88.0%	91.0%	151,515	166,500	189,205	210,227	57	57	114	120	120	1,263	
		Newsome Cr (SF Clw)	Pre-Smolt	NPTHC	75,000	1%	50.0%	5.0%	3,724	90.0%	88.0%	91.0%	75,758	83,250	94,602	105,114	29	29	58	62	62	1,222	
		Lolo Creek	Smolt	NPTHC	200,000	1%	50.0%	5.0%	3,724	90.0%	88.0%	91.0%	202,020	222,000	252,273	280,303	76	76	152	160	160	1,263	
FACH	NPTHC	Snake River		LGR/NPTH	1,400,000	1%	50.0%	8.0%	4,119	94.0%	90.0%	96.0%	1,414,000	1,472,917	1,636,574	1,741,036	423	423	846	920	920	1,537	
COHO	DNFH	Clearwater			500,000	10%	49.3%	15.1%	2,488	97.3%	80.2%	81.2%	550,000	677,090	844,462	868,074	349	359	708	835	810	659	
	ECFH	Clearwater			550,000	10%	49.3%	15.1%	2,488	97.3%	80.2%	81.2%	605,000	744,799	928,908	954,881	384	396	780	918	892	659	
												CELL FORMULAS	F*(1+G)	N/(M)	O/(L)	P/(K)	ROUNDUP (Q/J,0)	R/(H)-R	R+S	ROUNDUP (T/(1-I),0)	ROUNDUP(R/(1-H)/(1-I),0)	N/U	

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

(2) Culling of eggs for BKD, IHN, etc.

(3) Includes the New Production started in BY2015. Added production by increasing densities to 65k in all B-Bank rcwys.

(4) New production started in BY2015, Lolo release group.

(5) NEW PRODUCTION in 2015. First timing rearing smolt in the adult holding ponds

(6) NEW PRODUCTION in 2015. Increasing rearing densities across raceways and spreading the new smolts across release groups

(7) Powell is not a US v OR program; however we will target 640,000 summer Chinook smolts even if the spring Chinook production target is set at the base US v OR level.

7.1.2. US v OR Brood Calculator

PROGRAM INPUTS							HISTORICAL HATCHERY PERFORMANCE METRICS (5-YR AVG)						FORM CALCULATED VALUES										
SPECIES	HATCHERY	PROGRAM	Life Stage	PREFERED TRAPPING SITE	FORMAL RELEASE GOAL (F)	COMANAGER APPROVED CUSHION % (1) (G)	% FEMALES IN BROODSTOCK (H)	% MORTALITY DURING HOLDING (I)	GREEN EGG FECUNDITY (J)	% REMAINING AFTER DISEASE CULLING (2) (K)	% SURVIVAL GREEN TO EYED EGG (L)	% SURVIVAL EYED EGG TO RELEASE (M)	RELEASE GOAL WITH CUSHION (N)	EYED EGGS (O)	GREEN EGGS (P)	GREEN EGGS BEFORE DISEASE CULL (Q)	FEMALES SPAWNED (R)	MALES SPAWNED (S)	TOTAL ADULTS SPAWNED (T)	TRAPPED ADULTS NEEDED (U)	ADULTS TRAPPED TO MEET 1:1 RATIO (V)	SMOLTS PER TRAPPED ADULTS NEEDED (W)	NOTE #
STLHD	DNFH	MS Clearwater at DNFH		DNFH	1,200,000	4%	67.0%	7.3%	7,046	91.5%	88.9%	85.5%	1,248,000	1,459,649	1,641,900	1,794,426	255	126	381	411	834	3,036	
		Red House Hole - SF Clw		SFClw Angler	400,000	4%	67.0%	7.3%	7,046	91.5%	88.9%	85.5%	416,000	486,550	547,300	598,142	85	42	127	137	278	3,036	
		Clear Creek		DNFH	300,000	4%	67.0%	7.3%	7,046	91.5%	88.9%	85.5%	312,000	364,912	410,475	448,607	64	32	96	104	210	3,000	
		Lolo Creek		DNFH	200,000	5%	67.0%	7.3%	7,046	91.5%	88.9%	85.5%	210,000	245,614	276,281	301,947	43	21	64	70	141	3,000	
	MVH	Salmon River		DNFH	93,000	5%	67.0%	3.5%	6,681	100.0%	84.0%	85.0%	97,650	114,882	136,765	136,765	21	10	31	33	66	2,959	
	CFH	Clearwater		SFCLW	843,000	3%	67.0%	3.5%	7,267	100.0%	82.0%	80.0%	868,290	1,085,363	1,323,613	1,323,613	183	90	273	284	575	3,057	
SP/SU CHIN	DNFH	NF Clearwater (DNFH)		DNFH	1,350,000	1%	50.0%	3.6%	3,880	91.8%	95.8%	92.3%	1,363,636	1,477,396	1,542,167	1,679,920	433	433	866	899	899	1,517	(3)
		Trans. to NPTH-NPTH		DNFH	200,000	2%	50.0%	3.6%	3,880	91.8%	95.8%	92.3%	204,082	221,107	230,800	251,417	65	65	130	135	135	1,512	
		Trans. to NPTH-Lapwai Creek		DNFH	0	2%	50.0%	3.6%	3,880	91.8%	95.8%	92.3%	0	0	0	0	0	0	0	0	0	#DIV/0!	(4)
	KNFH	Kooskia NFH		KNFH	650,000	5%	50.0%	10.0%	3,580	94.5%	94.5%	90.0%	684,211	760,234	804,480	851,302	238	238	476	529	529	1,293	
	CFH	Red River		SFClw	1,100,000	0%	50.0%	5.0%	3,581	91.0%	96.0%	97.0%	1,100,000	1,134,021	1,181,271	1,298,101	363	363	726	765	765	1,438	
		Selway River-Lower		DNFH	400,000	0%	50.0%	5.0%	3,581	91.0%	96.0%	97.0%	400,000	412,371	429,553	472,037	132	132	264	278	278	1,439	
		Clear Creek		KNFH/DNFH	635,000	0%	50.0%	5.0%	3,581	91.0%	96.0%	97.0%	635,000	654,639	681,916	749,358	210	210	420	443	443	1,433	
		NF Clearwater-CFH (Baffle)		DNFH	0	0%	50.0%	5.0%	3,581	91.0%	96.0%	97.0%	0	0	0	0	0	0	0	0	0	#DIV/0!	(5)
		NF Clearwater-CFH (Regular)		DNFH	0	0%	50.0%	5.0%	3,581	91.0%	96.0%	97.0%	0	0	0	0	0	0	0	0	0	#DIV/0!	(6)
		Powell Pond (SUM)		Pow/SFSR	640,000	0%	50.0%	5.0%	3,741	98.0%	90.0%	97.0%	640,000	659,794	733,104	748,066	200	200	400	422	422	1,517	(7)
	NPTHC	Lolo Cr (Clw)	Pre-Smolt	NPTHC	150,000	1%	50.0%	5.0%	3,724	90.0%	88.0%	91.0%	151,515	166,500	189,205	210,227	57	57	114	120	120	1,263	
		Newsome Cr (SF Clw)	Pre-Smolt	NPTHC	75,000	1%	50.0%	5.0%	3,724	90.0%	88.0%	91.0%	75,758	83,250	94,602	105,114	29	29	58	62	62	1,222	
		Lolo Creek		NPTHC	200,000	1%	50.0%	5.0%	3,724	90.0%	88.0%	91.0%	202,020	222,000	252,273	280,303	76	76	152	160	160	1,263	
FACH	NPTHC	Snake River		LGR/NPTH	1,400,000	1%	50.0%	8.0%	4,119	94.0%	89.0%	96.0%	1,414,000	1,472,917	1,654,963	1,760,598	428	428	856	931	931	1,519	
COHO	DNFH	Clearwater			500,000	10%	49.3%	15.1%	2,488	97.3%	80.2%	81.2%	550,000	677,090	844,462	868,074	349	359	708	835	810	659	
	ECFH	Clearwater			550,000	10%	49.3%	15.1%	2,488	97.3%	80.2%	81.2%	605,000	744,799	928,908	954,881	384	396	780	918	892	659	
												CELL FORMULAS	F*(1+G)	N/(M)	O/(L)	P/(K)	ROUNDUP (Q/J,0)	R/(H)-R	R+S	ROUNDUP (T/(1-I),0)	ROUNDUP(R/(1-H)/(1-I),0)	N/U	

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

(2) Culling of eggs for BKD, IHN, etc.

(3) Includes the New Production started in BY2015. Added production by increasing densities to 65k in all B-Bank rcwys.

(4) New production started in BY2015, Lolo release group.

(5) NEW PRODUCTION in 2015. First timing rearing smolt in the adult holding ponds

(6) NEW PRODUCTION in 2015. Increasing rearing densities across raceways and spreading the new smolts across release groups

(7) Powell is not a US v OR program; however we will target 640,000 summer Chinook smolts even if the spring Chinook production target is set at the base US v OR level.

7.2. Parental Based Tagging (PBT)

A novel approach for mass marking hatchery broodstock is parentage-based tagging. Parentage-based tagging (PBT) involves the annual genotyping of all broodstock at each hatchery, creating a parental genotype database. Progeny from any of these parents (either collected as juveniles or returning adults), if genotyped, could be assigned back to their parents, thus identifying the hatchery they originated from and exact brood year they were produced in.
The exceptional advantage PBT has over mechanical tagging technologies is increased sample size. By genotyping all parental broodstock, every juvenile is "tagged" thereby vastly increasing the chances of encountering a tagged fish. The key for this technology to work is the ability to sample all (100%) of the hatchery broodstock and the goal for each hatchery program is to achieve PBT tagging rates at or near 100%.
Eagle Fish Genetics Lab (EFGL) provides Whatman sheets for sample preservation and sampling equipment to the spawning facilities, but relies largely on existing hatchery or other program personnel to take fin tissue samples, record sex and record spawn/sample date. A detailed protocol for genetic sampling is available on the BPA protocol website (https://www.monitoringresources.org/Document/Method/Details/4087), but general procedures are provided below. Standard 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). This includes sampling re-use males every time they are used to fertilize a female.
- Ensuring that all samples come from fresh, "live" tissue and that each sample is properly preserved until DNA extraction and free of contamination.
- Ensuring that every sample is properly labeled and inventoried.
- Ensuring that data/information from every fish sampled is recorded and tied to a field/hatchery sample number (sample/spawn date, take #, hatchery, sex, length, cross information, etc.) and that field/hatchery sample number is tied to a unique genetic (Progeny) number.

A specific sampling protocol includes:

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

7.3. Description and rationale for PIT and CWT tagging

7.3.1. Passive Integrated Transponder (PIT) Tags:

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

PIT tag detectors in juvenile bypass systems are used to deflect migrating juveniles into barges or back to the river depending on the time of year or the specifics of a study design. For juveniles, PIT tags are most commonly used to evaluate travel time, passage timing, survival from release to a specific dam, and to compare survival rates for alternative routes of passage through the hydro-system (Comparative Survival Study, CSS). All PIT tagged hatchery fish out-migrating 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 are present on the landscape. 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/re-ascension and after counting hour passage at Snake and Columbia River dams. Due to differences in rearing conditions, sample sizes, release locations, etc., PIT tags are not typically used to make statistical comparisons between hatcheries or between raceways within a hatchery unless a specific study design exists.

7.3.2. Coded wire tags (CWT):

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

7.4. Snake River Kelt Reconditioning Project Summary

Background and Goals

As a strategy to improve survival of ESA-listed steelhead stocks in the Columbia Basin, NOAA Fisheries has identified actions to improve the productivity and abundance of Snake River B-run Steelhead. These actions include implementation of a steelhead kelt reconditioning program, with the goal of improving the steelhead productivity and research as necessary to accomplish this goal. NOAA's analysis indicates that a combination of kelt reconditioning and other actions could increase the number of returning Snake River B-run steelhead spawners to Lower Granite Dam (LGR) by about 6%, and that a kelt reconditioning program in the Snake Basin may be critical to achieving this goal (Supplemental Comprehensive Analysis Steelhead Kelt Appendix- Bellerud et al. 2007). In practice, the goal of the program is to increase returns of wild adult Snake River B-run steelhead to LGR by 180 fish.

An experimental-scale kelt reconditioning project is being conducted at Dworshak National Fish Hatchery (DNFH) and the Nez Perce Tribal Hatchery (NPTH) by the Nez Perce Tribe (NPT) and the Columbia River Inter-Tribal Fish Commission (CRITFC), in collaboration with the University of Idaho and USFWS. This project includes both implementation and research elements. The implementation element of the project involves collection, reconditioning, and release of wild B-run steelhead kelts. The research element of the project has involved air spawning and reconditioning of DNFH ladder returning hatchery-origin fish for use as an experimental model. These fish provide a unique and important research tool to address critical uncertainties and maximize the success of kelt reconditioning programs throughout the Columbia Basin.

In 2016, the Northwest Power Conservation Council's Fish & Wildlife Program approved the Snake River Basin Steelhead Kelt Reconditioning Facility Master Plan. The plan calls for the design and construction of a long-term reconditioning facility located at NPTH. This location was determined to be the most cost-effective and reliable solution. The design component began in 2020, and construction is scheduled for 2021-22. The completed facility shall be capable of reconditioning up to 750 kelts, supporting the annual release of 180 adult steelhead into the Snake River.

Operations and Research

Dworshak is cooperating with CRITFC, UI and the NPT in a Kelt Reconditioning Project. CRITFC, UI and NPT staff may air spawn 120 females for the kelt program. These fish will be retained until September and euthanized to assess egg quality. Additional kelts can be collected at LGR and Little Goose Dam (LGO) and transferred to DNFH or NPTH. Steelhead kelts migrating from tributaries of the Snake River that do not emigrate via a spillway, navigation lock, or a removable spillway weir are directed by a large bypass system to the Juvenile Fish Facility (JFF) where they can be collected. The adult fish separator is manned nearly 24 hours a day throughout the season by Army Corps of Engineers staff. Kelt collection occurs from March through June. Kelts may be collected at other Snake or Clearwater River tributary collection sites.

Kelts are diverted across each dam's separator to a temporary adult holding tank supplied with fresh river water. The tank is stainless steel with a shade/anti-jump cover and a built-in crowder system. To minimize holding time, every one or two days, fisheries technicians process all the fish in the holding tank. Fish are anesthetized, weighed, measured, examined for condition and tissue sampled. Fish are scanned for tags and untagged fish are PIT tagged. Mortalities and moribund fish do not receive a tag. Fish not selected for reconditioning are returned to the river. Tissue samples sent to Hagerman Genetics Lab and analyzed by CRITFC staff.

Fish selected for reconditioning are given a prophylactic treatment of oxytetracycline and emamectin and transferred to DNFH or NPTH. Fish destined for DNFH or DNFH are placed in a transport truck with a 400 to 450-gallon tank fitted with supplemental oxygen and an aerator. Temperature and dissolved oxygen levels are monitored during transport, and loading densities are kept to a minimum.

Kelts transferred to DNFH will be reared in conjunction with the air-spawned steelhead (Sections 1.2.1 - 1.2.4). Kelts are held in four 15' (DNFH) or two 20' (NPTH) circular tanks fitted with anti-jump containment curtains. Each tank is supplied with river water. Considerable effort is exerted to insure fish initiate feeding for both somatic growth and gonad development. In addition to providing feed, flow, temperature and dissolved gas levels are monitored. Formalin treatments are applied routinely to control fungus. Mortalities encountered during the study period receive a partial necropsy. Surviving fish are sampled during the summer for growth, condition and re-maturation level. Rematuration is assessed by measuring body lipid, plasma estradiol and plasma growth hormone levels.

Fish are separated by their stage in rematuration. The release strategy for individual fish will be based on maturation status as determined by blood hormone levels. Rematuring reconditioned fish are placed in a transport truck and outplanted to the Snake River below LGR. The outplants are planned to occur in late October or early November; however, river conditions and coordination with co-managers dictate specific dates and locations. Non-rematuring fish are held for further reconditioning.

7.5. Adult Spring Chinook Salmon outplant locations and marks

7.5.1. Sites, release numbers for adult Spring Chinook Salmon, when all Clearwater Basin Production Programs are above broodstock, harvest and C&S needs.*

Release Location	Hatchery Source	Guideline Range	Proposed Max
Selway Basin			
McGruder	RR, NPTH, Clear, DNFH, KNFH	800 - 1,000	6,000
O'Hara Creek	RR, NPTH, Clear, DNFH	200	
Lower Selway	RR, NPTH, Clear, DNFH, KNFH	0 - 2,000	3,400
SF Clearwater R.			600
Mill Creek	RR, NPTH, Clear, DNFH	150	
Meadow Creek	RR, NPTH, Clear, DNFH	150 - 300	
SF Clearwater R.	RR, NPTH, Clear, DNFH	0 - 500	
Crooked River	RR, NPTH, Clear, DNFH	0 - 500	
Lochsa River			
Main Lochsa, Badger Cr., Boulder Cr.	RR, NPTH, Clear, DNFH	500	
	TOTAL	**1,800 - 4,650**	**10,000**

*Release Locations are not prioritized. If guidline range is likely to be exceeded, co-managers will discuss disposition of excess fish.

*Weekly conference calls are scheduled for Tuesdays, to keep all parties updated, informed, and coordinated on in-season run development, harvest estimates, broodstock collection, outplanting plans, etc…

7.5.2. Proposed hatchery identifying marks for adult spring Chinook salmon outplanting in the Clearwater River.

Hatchery / Location	Mark	Purpose
Dworshak	left opercle v-notch	outplant
Kooskia	1) 1 right opercle v-notches	outplant / fishery recycle
	2) if recycle returnees - additional opercle v-notch	outplant / fishery recycle
Clear Creek above weir	right opercle v-notch	natural spawners
Lochsa (Powell satellite)	left opercle punch	fishery recycle / outplant
Red River/Crooked River	1) right opercle punch	fishery recycle
	2) 2 right opercle punches	outplant (early)
Rapid River	dorsal punch	Clearwater (Selway) outplants
Lolo Cr. weir	right opercle punch	Broodstock collection for NPTH
NPTH	left opercle punch	outplant / fishery recycled to Lenore Boat Launch

7.6. Cryopreserved Milt Request Form

NEZ PERCE TRIBE
Department of Fisheries Resources Management

Administration Enforcement Harvest Production Research Resident Fish Watershed

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

Cryopreserved Semen Request Form

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

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

Signature: _____Date: _____

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

7.7. Distribution of Spawned-Out and Excess Carcasses At Anadromous Fish Hatcheries

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

- Released in specified waters while sport or treaty tribal fisheries are open.
- Released for natural spawning in specified waters consistent with planning documents.
- Distributed to Idaho Indian treaty tribes for subsistence purposes.
- Distributed to other Indian tribes and non-profit charitable food distribution organizations.
- Distributed to the general public.

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

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

Aforementioned priorities may be reordered with concurrence of all parties.

7.8. Excess Egg Planting Protocols

Kooskia Hatchery has equipment for planting excess eyed eggs. The Nez Perce Tribe Fishery Research Department in Orofino will put together a list of streams that have available spawning habitat that isn't being used by natural spawners by the first week of October, when redd count summaries are complete. This is the same timeframe when hatcheries can begin to identify surplus eggs based on eye-up rates. This will allow for notification of personnel to be ready to out-plant eggs. Coolers from the hatcheries will need to be filled with approximately 50,000 loose eyed eggs in each cooler and have them ready for pick-up by 8:00 a.m. This allows the planting teams enough time in the day to complete out-planting. We need to keep the maximum eggs to be out-planted per day to 300,000. Contact personnel for the Orofino Field Office is Mike Kosinski, 208-476-7417, Ext 3570. Mike will compile a list of available Orofino personnel, as well as reach out to the NPT Watershed division for any available personnel. Given sufficient time prior to the outplant, efforts will be made to identify quality habitat sites in the identified streams. Mike will supply stream and GPS location of the outplants to the respective hatchery personnel for their records.