IDAHO DEPARTMENT OF FISH AND GAME
600 S. Walnut/P.O. Box 25
Boise, Idaho 83707

December 21, 2011

C.L. "Butch" Otter/Governor
Virgil Moore/Director

Mr. Robert P. Jones
Salmon Management Division
National Marine Fisheries Service
1201 NE Lloyd Blvd., Suite 1100
Portland, OR 97232

Dear Mr. Jones,

The Idaho Department of Fish and Game submits these three (3) Hatchery and Genetic Management Plans (HGMP) for Snake River spring/summer Chinook salmon and summer steelhead programs. These HGMPs address artificial production programs the Idaho Department of Fish and Game manages associated with the federally funded Lower Snake River Compensation Plan. Consistent with the mitigation goals of the Lower Snake River Compensation Plan, IDFG completed these HGMPs in consultation and coordination with other state, tribal and federal parties in the Snake River basin and they are consistent with provisions of the 2008-2017 U.S. v Oregon Management Agreement.

These HGMPs are submitted consistent with the National Marine Fisheries Service's (NMFS) Endangered and Threatened Species: Final Listing Determinations for 16 ESUs of West Coast Salmon, and Final 4(d) Protective Regulations for Threatened Salmonid ESUs (70 Federal Register 37160-37204). We are requesting NMFS approval of these Hatchery and Genetic Management plans and limits on the Endangered Species Act (ESA) Section 9(a)(1) take prohibitions as allowed under NMFS 4(d) Rule Limit 5.

The three programs for which HGMPs are submitted are: 1) South Fork Salmon River Summer Chinook Salmon, 2) Upper Salmon River Spring Chinook Salmon and, 3) East Fork Salmon River Summer Steelhead. Each of the programs is designed to enhance the survival of ESA-listed Snake River salmon and steelhead and provide continued mitigation for anadromous fish losses that resulted from federal hydropower development in the Snake River basin. The East Fork Salmon River Summer Steelhead program also is a specific action in the Federal Columbia River Hydropower System Biological Opinion. Reasonable and Prudent Alternative (RPA) 42 in that biological opinion identifies a small-scale program for East Fork Salmon River steelhead that should be funded by the Action Agencies.

Please contact Peter Hassemer at (208) 334-3791 if you have any questions regarding this request. The HGMPs that are the subject of this request are being submitted only as electronic files; hard copies will be provided if requested. We appreciate you assistance and prompt attention to this request.

Sincerely,

Edward B. Schriever
Chief of Fisheries

cc: Craig Busack, Brett Farman
Jeff Yanke, Colleen Fagan – Oregon Department of Fish and Wildlife
Dave Johnson, Becky Johnson – Nez Perce Tribe
Chad Colter, Lytle Denny – Shoshone Bannock Tribes
Heather Bartlett, John Whalen – Washington Department of Fish and Wildlife
Jim Chandler, Paul Abbott, Stuart Rosenberger – Idaho Power Company
Scott Marshall, Joe Krakker – USFWS
Peter Hassemer, Sam Sharr, Brian Leth - IDFG

HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	South Fork Salmon River Summer Chinook
Species or Hatchery Stock:	Summer Chinook Salmon *Oncorhynchus tshawytscha.* South Fork stock
Agency/Operator:	Idaho Department of Fish and Game
Watershed and Region:	South Fork Salmon River, Idaho.
Date Submitted:	December 21, 2011
Date Last Updated:	November 2011

Executive Summary

The management goals for the South Fork (SF) Salmon River summer Chinook salmon population are to provide sustainable fishing opportunities and to enhance, recover and sustain the natural spawning population. Low abundance and productivity of the SF Salmon River natural population has been identified as a population risk by the Interior Columbia Technical Review Team (ICTRT).

The purpose of the SF Salmon River summer Chinook salmon hatchery program is to mitigate for fish losses caused by the construction and operation of the four lower Snake River federal dams. This program, located at the McCall Fish Hatchery, also includes a conservation component intended to increase the abundance of naturally spawning fish through an integrated supplementation effort. By integrating the hatchery broodstock, managers are attempting to let the natural environment drive selection in the hatchery population and therefore reduce risks associated with hatchery-origin fish spawning naturally. This strategy is expected to provide demographic and genetic benefits by: 1) increasing the abundance of fish spawning naturally, 2) increasing the extent of available spawning habitat that is utilized, and 3) providing a genetic repository for natural fish in the hatchery environment. This strategy will be particularly advantageous during years of very low natural-origin abundance.

The hatchery mitigation program is a federally authorized mandate to annually return 8,000 adult summer Chinook salmon to stream reaches upstream of Lower Granite Dam and 32,000 adults to commercial and sport fisheries. Hatchery production plans, including integration and supplementation efforts are consistent with the 2008-2017 US vs. Oregon Management Agreement. However, mark plans are not consistent with the agreement. All hatchery operations and monitoring activities are funded by the Bonneville Power Administration through the Lower Snake River Compensation Program.

Adult trapping facilities on the South Fork Salmon River are located approximately 71 miles upstream from the mouth. Managers have identified a strategy for South Fork Salmon summer Chinook that emphasizes the protection and enhancement of natural spawning populations as well as maintaining the current hatchery mitigation program. The program will release approximately 1.0 million yearling summer-run Chinook salmon each year into the SF Salmon River. Of these releases, 250,000 juveniles will be from an integrated conservation component and the remaining 750,000 will be produced from the segregated component of the broodstock.

Broodstock for the harvest component of the program will be developed using hatchery-origin adults from the segregated component of the program. Adults from the integrated conservation component will also be used if they return in excess of what is needed to 1) maintain the 250,000 integrated component and (2) meet escapement objectives above the weir. This approach, referred to as a two-stage stepping stone program, was recommended by the Hatchery Scientific Review Group during their independent review of the program in 2008. The stepping stone program is a risk aversion action that affords the hatchery population a degree of genetic continuity with the naturally spawning population, thereby reducing adverse effects from interactions on the spawning grounds. This is important because the ability to control spawning composition is limited to the portion of the habitat upstream of the weir used to collect

broodstock; however a significant amount of spawning also occurs downstream of the weir. All releases from both hatchery program components will occur upstream of the weir.

Broodstock for the integrated conservation component will also be collected at the SF Salmon River weir. The number of natural-origin adults used each year for broodstock and the number of hatchery origin fish released above the weir will be based on a sliding scale broodstock management schedule designed to maintain the existing harvest mitigation program while reducing risks to the natural population. Targeting a high Proportionate Natural Influence (PNI) is expected to encourage local adaptation and potentially increase the productivity of the naturally spawning population.

This mitigation program has achieved the escapement goal of 8,000 adults to Lower Granite Dam only six times since the inception of the program in 1979. Based on the average (1980-2009) escapement to Lower Granite Dam of 4,400 adults, the production capacity at this facility needs to be increased from one million to 1.82 million yearling smolts to return 8,000 adults to the project area. By implementing management changes needed to achieve ESA related objectives associated with developing an integrated broodstock, managers expect the total number of hatchery-origin adults produced by this program for harvest mitigation to be significantly reduced. To offset this loss, a significant increase in hatchery production capacity is needed.

Key performance standards for the program will be tracked in a targeted monitoring and evaluation program. These standards include: (1) abundance and composition of natural spawners and hatchery broodstock (pHOS, pNOB, and PNI); (2) number of smolts released; (3) in-hatchery and post-release survival rates; (4) total adult recruitment, harvest and escapement of the natural and hatchery components; and (5) abundance, productivity, diversity and spatial structure of the naturally spawning Chinook population in the SF Salmon River.

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1 Name of hatchery or program.

Hatchery: McCall Fish Hatchery
Program: Summer Chinook Salmon

1.2 Species and population (or stock) under propagation, and ESA status.

The South Fork Salmon River Chinook Salmon MPG (Figure 1) is in the Snake River Spring/Summer Chinook Salmon ESU which was listed as threatened under the Endangered Species Act in 1992 (57 FR 14,653; April 22, 1992). The MPG includes four populations: the Little Salmon River, Secesh River, East Fork of the South Fork Salmon River and the South Fork Salmon River mainstem populations.

The hatchery-origin Chinook salmon "reserve group", which is derived from hatchery x hatchery crosses, was listed as threatened under the ESA effective August 29, 2005 (70 FR 37160; June 28, 2005).

1.3 Responsible organization and individuals

Lead Contact
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On-site Operations Lead
Name (and title): Gene McPherson, Fish Hatchery Manager II.
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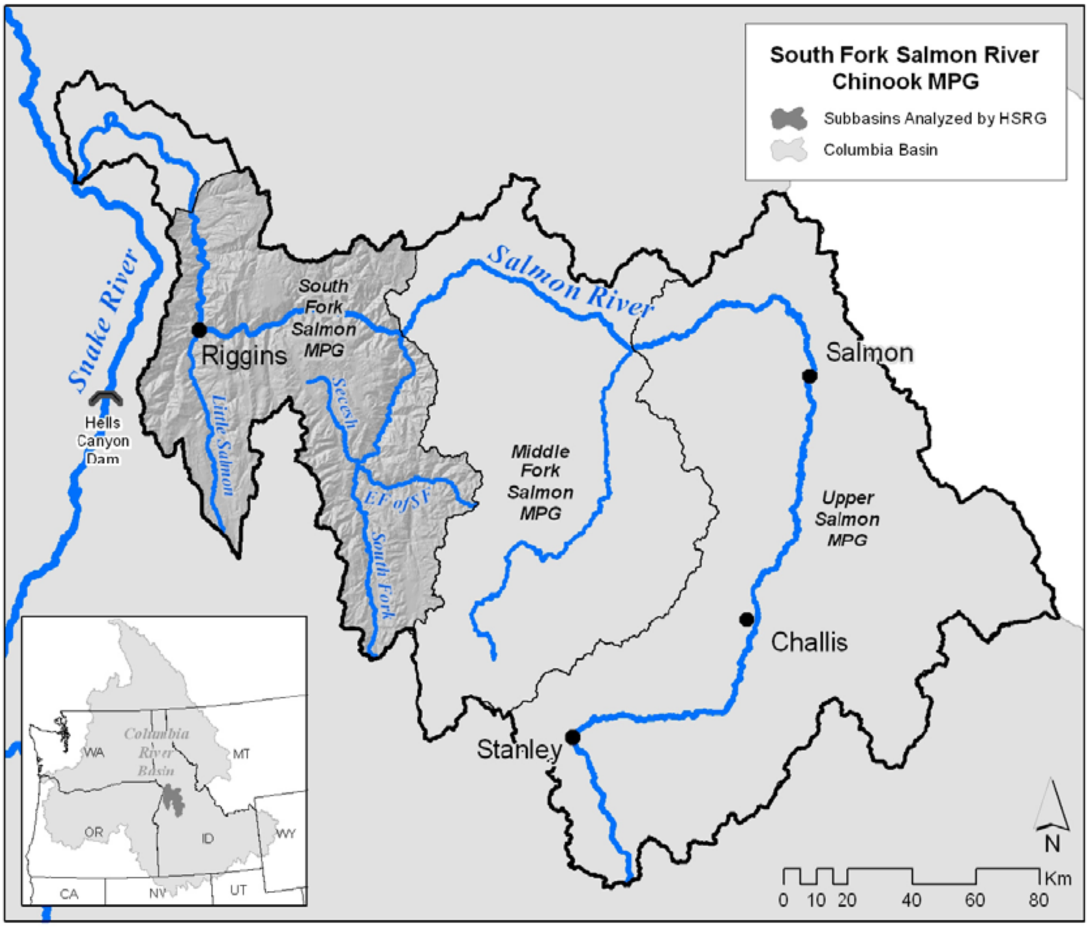
Email: gene.mcpherson@idfg.idaho.gov



Source: HSRG 2009

Figure 1. South Fork Salmon River Chinook MGP

Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program: IDFG, the Nez Perce Tribe, the Shoshone/Bannock Tribe, the Lower Snake River Compensation Plan office and the U.S. Fish and Wildlife Service collaboratively develop and implement production plans to meet production goals outlined in the U.S. v Oregon 2008-2017 Management Agreement, mitigation goals contained in settlement agreements or federal acts and agency/tribal fishery objectives. The same entities meet collaboratively to co-author Annual Operating Plans for LSRCP-funded hatchery programs and they work collaboratively in-season to meet shared brood stock needs for Clearwater River and Salmon River hatchery programs. IDFG coordinates with the Nez Perce and Shoshone/ Bannock tribes, Oregon Department of Fish and Wildlife and Washington Department of Fish and Wildlife to manage state and tribal fisheries for harvest shares and ESA take. Harvest and hatchery management coordination includes pre-season planning, scheduled weekly meetings and post-season summary meetings to share information and identify management actions required to meet tribal and state fishery objectives.

Specific relationships and coordinated efforts with other agencies are as follows:

U.S. Fish and Wildlife Service – Lower Snake River Compensation Plan Office: Administers the Lower Snake River Compensation Plan as authorized by the Water Resources Development Act of 1976.

Nez Perce Tribe – The Idaho Department of Fish and Game (IDFG) coordinates with the Nez Perce Tribe to hold and spawn adult summer Chinook salmon for the Tribe's Johnson Creek supplementation program. Juvenile Chinook salmon from the Johnson Creek brood are reared at the McCall Fish Hatchery and generally released as smolts as part of the current hatchery capacity.

Shoshone-Bannock Tribes – The Shoshone-Bannock Tribes may receive summer Chinook salmon eggs for an ongoing supplementation program.

IDFG Clearwater Fish Hatchery – The Clearwater Fish Hatchery receives and incubates 285,000 Chinook salmon eggs from the South Fork Salmon weir facility for a release into the South Fork Clearwater River drainage (See Clearwater Hatchery Chinook HGMP).

1.4 Funding source, staffing level, and annual hatchery program operational costs.

U.S. Fish and Wildlife Service – Lower Snake River Compensation Plan funded.
Staffing level: 3 permanent staff and 35 months of temporary worker time.
Annual budget: $516,000. (FY10)

1.5 Location(s) of hatchery and associated facilities.

Overview - Broodstock are collected at the South Fork Salmon weir located on the South Fork Salmon River approximately 113 river kilometers upstream from the mouth (Figure 2). They are held at the South Fork Salmon weir holding facility for spawning. Eggs are transferred to the McCall Fish Hatchery for incubation. The portion of production

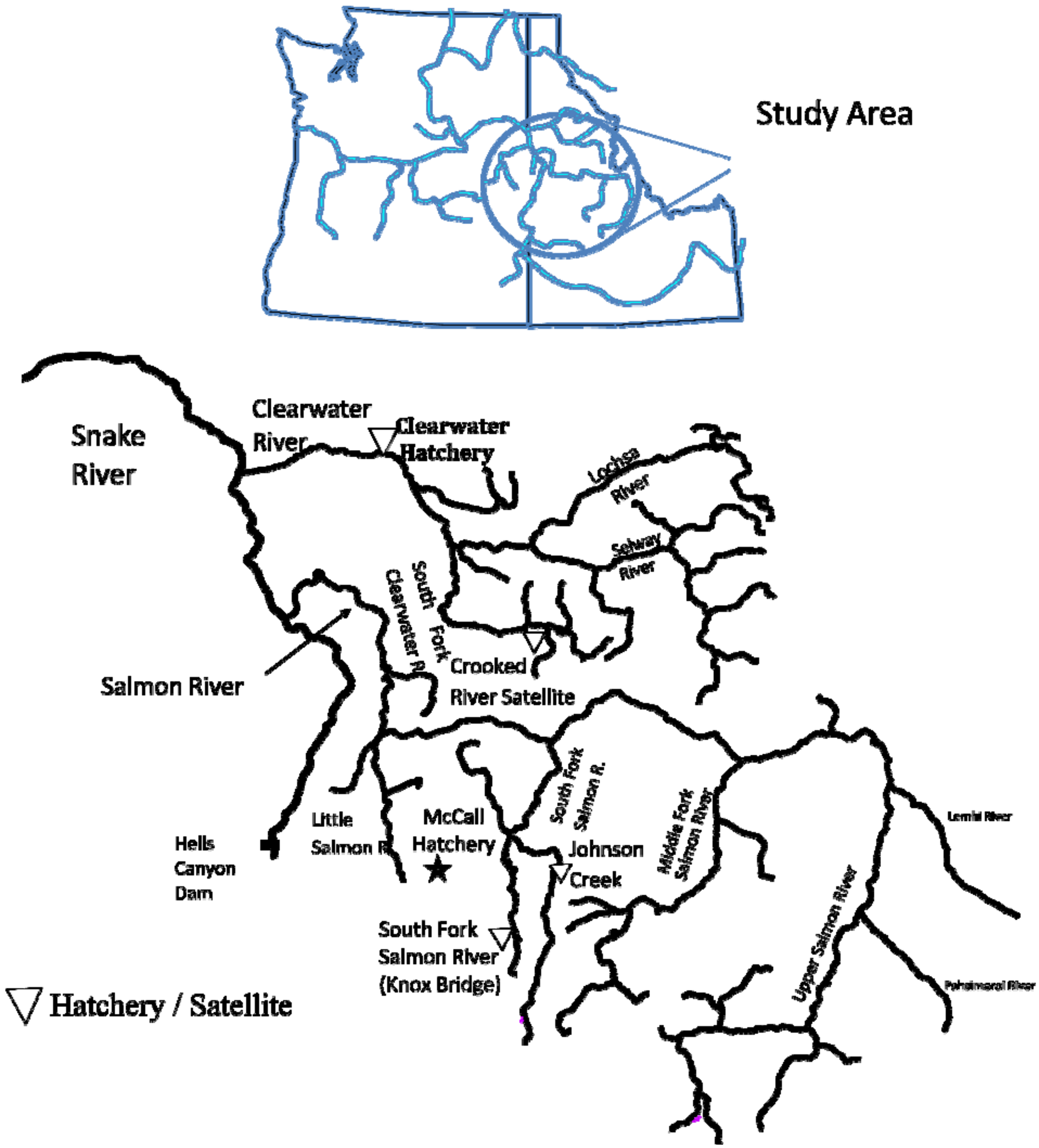


Figure 2. Map showing locations of the South Fork Salmon River satellite facility, McCall Hatchery, the Nez Perce Johnson Creek trapping and collection facility, Clearwater Hatchery and the Crooked River satellite facility.

destined for the South fork Salmon River are reared to smolts at McCall Fish Hatchery. The portion destined for the South Fork Clearwater are transferred to Clearwater Fish Hatchery as certified disease fry eyed eggs and reared at that facility. Smolts for the South Fork Salmon River program are released in the South Fork Salmon River at Knox Bridge approximately 1.6 kilometers upstream from the adult trap. A screw trap at the Knox Bridge site is used to sample, PIT tag, and estimate numbers of naturally produced smolts from spawning areas above the adult weir and hatchery smolt release site. Smolts reared at the Clearwater Fish Hatchery are released near the mouth of Crooked River in the South Fork Clearwater River drainage.

McCall Fish Hatchery – The McCall Fish Hatchery is located approximately 2.25 km south of state highway 55 at 300 Mather Road in the city limits of McCall, Idaho. The facility includes an adult weir and trap located on the South Fork Salmon River (SFSR) approximately 42 km east of Cascade, ID (Figure 2). The hydrologic unit codes for the hatchery and weir are 17050123 and 17060208, respectively.

Clearwater Fish Hatchery - The Clearwater Fish Hatchery is located at confluence of the North Fork and main Clearwater rivers, river kilometer 65 on the Clearwater River; 121 kilometers upstream from Lower Granite Dam, and 842 kilometers upstream from the mouth of the Columbia River (Figure 2). The Hydrologic Unit Code is 17060300800100.00.

1.6 Type of program.

Integrated Harvest. The South Fork Salmon River summer Chinook hatchery program is funded by the Lower Snake River Compensation Programs (LSRCP) to mitigate for lost fish production caused by construction and operation of the four lower Snake River federal dams. Managers also prioritize conservation of the natural population and a component of the hatchery production will be used to address conservation objectives through a supplementation effort. While the long term goal is to manage this program as a completely integrated program, it will include both integrated and segregated components until complete integration is possible (see Sec 1.8 and 1.11).

1.7 Purpose (Goal) of the program

The management goals for the SF Salmon River summer Chinook population are to provide sustainable fishing opportunities and to recover and to protect and enhance the viability of the natural population.

The SF Salmon River summer Chinook hatchery program is part of the Lower Snake River Compensation Plan (LSRCP), a congressionally mandated program pursuant to PL 99-662. The purpose of the LSRCP is to replace adult salmon, steelhead and rainbow trout lost by construction and operation of four hydroelectric dams on the Lower Snake River. Specifically, the stated purpose of the plan is:

"…[to]….. provide the number of salmon and steelhead trout needed in the Snake River

system to help maintain commercial and sport fisheries for anadromous species on a sustaining basis in the Columbia River system and Pacific Ocean" (NMFS & USFWS 1972 pg 14)

Specific mitigation goals for the LSRCP were established in a three step process. First the adult escapement that occurred prior to construction of the four dams was estimated. Second, an estimate was made of the reduction in adult escapement (loss) caused by construction and operation of the dams (e.g. direct mortality of smolt). Last, a catch to escapement ratio was used to estimate the future production that was forgone in commercial and recreational fisheries as result of the reduced spawning escapement and habitat loss. Assuming that the fisheries below the project area would continue to be prosecuted into the future as they had in the past, LSRCP adult return goals were expressed in terms of the adult escapement back to, or above the project area. Other than recognizing that the escapements back to the project area would be used for hatchery broodstock , no other specific priorities or goals were established in the enabling legislation or supporting documents regarding how these fish might be used.
For spring Chinook salmon the escapement above Lower Granite Dam prior to construction of these dams was estimated at 122,200 adults. Based on a 15% mortality rate for smolts transiting each of the four dams (48% total mortality) the expected reduction in adults subsequently returning to the area above Lower Granite Dam was 58,700. This number established the LSRCP escapement mitigation goal. This reduction in natural spawning escapement was estimated to result in a reduction in the coast wide commercial/tribal harvest of 176,100 adults, and a reduction in the recreational fishery harvest of 58,700 adults below the project area. In summary, the expected total number of adults that would be produced as part of the LSRCP mitigation program was 293,500.

Component	Number of Adults
Escapement above Lower Granite Dam	58,700
Commercial Harvest	176,100
Recreational Harvest	58,700
Total	293,500

Since 1976 when the LSRCP was authorized, many of the parameters and assumptions used to size the hatchery program and estimate the magnitude and flow of benefits have changed.

- The survival rate required to deliver a 4:1 catch to escapement ratio has been less than expected and this has resulted in fewer adults being produced.
- The listing of Spring Chinook under the Endangered Species Act has resulted in significant curtailment of commercial, recreational and tribal fisheries throughout the mainstem Columbia River. This has resulted in a higher percentage of the annual run returning to the project area than was expected.
- The U.S. v. Oregon court stipulated Fishery Management Plan has established specific hatchery production agreements between the states, tribes and federal government. This agreement has substantially diversified the spring Chinook hatchery program by adding new off station releases sites and stocks designed to meet short term conservation objectives.

The South Fork Salmon River summer Chinook salmon mitigation program was designed to escape 8,000 adults back to the project area after a harvest of 32,000. While recognizing the overarching purpose and goals established for the LSRCP, and realities' regarding changes since the program was authorized, the following objectives for the beneficial uses of adult returns have been established for the period through 2017:

1. To contribute to the recreational, commercial and/or tribal fisheries in the mainstem Columbia River consistent with agreed to abundance based harvest rate schedules established in the 2008 – 2017 U.S. vs. Oregon Management Agreement.
2. To collect approximately 1,250 adult broodstock to perpetuate this hatchery program (see Sections 6-8 for more detail).
3. To provide recreational and tribal fisheries annually (see Section 3.3 for more detail).
4. To utilize hatchery-origin adults for supplementing the natural population. To minimize risks to the natural population in the SFSR, managers have initiated the development of an integrated broodstock. A sliding scale for broodstock management has been established to maintain the existing harvest mitigation program while reducing risks to the natural population by allowing pHOS and pNOB to slide under variable levels of natural-origin adult escapements (see Section 1.11.1 for more detail).

To maximize the beneficial uses of fish that return to the project area that are not used for broodstock, harvest or natural spawning, managers have developed agreements to share and distribute these fish equally between tribal and non-tribal entities. Specific objectives are established annually as part of a preseason co-manager meeting between the states, tribes and federal agencies to prioritize the distribution of fish. Specific dispositions may include:

a. Tribal subsistence
b. Recycling fish back through terminal fisheries
c. Donations to food banks and charitable organizations
d. Nutrient enhancement

1.8 Justification for the program

The SF Salmon River summer Chinook hatchery program is part of the Lower Snake River Compensation Plan (LSRCP), a congressionally mandated program pursuant to PL 99-662. The purpose of the LSRCP is to replace adult salmon, steelhead and rainbow trout lost by construction and operation of four hydroelectric dams on the Lower Snake River.

The program will release approximately 1.0 million yearling summer run Chinook salmon each year into the SF Salmon River. Of these releases, 250,000 juveniles will be from an integrated conservation component and the remaining 750,000 will be produced from the segregated component of the broodstock.

Broodstock for the harvest component of the program will be developed using adults from the segregated harvest component. Adults from the integrated conservation component will also be used for the harvest component if they return in excess of what is needed to: 1) maintain the 250,000 integrated component and (2) meet escapement objectives above the weir.

This approach, referred to as a two-stage stepping stone program, was recommended by the Hatchery Scientific Review Group during their independent review of the program in 2008. The stepping stone program is a risk aversion action that affords the hatchery population a degree of genetic continuity with the naturally spawning population, thereby reducing adverse effects of interactions on the spawning grounds. This is important because the ability to control spawning composition is limited to the portion of the habitat upstream of the weir used to collect broodstock; however a significant amount of spawning also occurs downstream. The weir is located approximately 71 miles upstream of the river mouth. All releases from both hatchery program components will occur upstream of the weir.

Broodstock for the integrated component will be composed of integrated hatchery-origin and natural origin adult returns. The number of natural-origin adults used each year for broodstock and the number of integrated hatchery-origin adults released above the weir to spawn naturally will be based on a sliding scale broodstock management schedule designed to maintain the existing harvest mitigation program while reducing risks to the natural population. Targeting a high PNI is expected to encourage local adaptation and increase the productivity of the naturally spawning population.

1.9 List of program "Performance Standards".

"Performance Standards" are designed to achieve the program goal/purpose, and are generally measurable, realistic, and time specific. The NPPC "Artificial Production Review" document attached with the instructions for completing the HGMP presents a list of draft "Performance Standards" as examples of standards that could be applied for a hatchery program. If an ESU-wide hatchery plan including your hatchery program is available, use the performance standard list already compiled.

Upon review of the NPCC "Artificial Production Review" document (2001) we have determined that this document represents the common knowledge up to 2001 and that the utilization of more recent reviews on the standardized methods for evaluation of hatcheries and supplementation at a basin wide ESU scale was warranted.

A NPCC "Artificial Production Review" document (2001) provides categories of standards for evaluating the effectiveness of hatchery programs and the risks they pose to associated natural populations. The categories are as follows: 1) legal mandates, 2) harvest, 3) conservation of wild/naturally produced spawning populations, 4) life history characteristics, 5) genetic characteristics, 6) quality of research activities, 7) artificial production facilities operations, and 8) socio-economic effectiveness. The NPCC standards represent the common knowledge up to 2001.

In a report prepared for Northwest Power and Conservation Council, the Independent Scientific Review Panel (ISRP) and the Independent Scientific Advisory Board (ISAB) reviewed the nature of the demographic, genetic and ecological risks that could be associated with supplementation, and concluded that the current information available was insufficient to provide an adequate assessment of the magnitude of these effects under alternative management scenarios (ISRP and ISAB 2005). The ISRP and ISAB recommended that an interagency working group be formed to produce a design(s) for an evaluation of hatchery supplementation applicable at a basin-wide scale. Following on this recommendation, the *Ad Hoc* Supplementation Workgroup (AHSWG) was created and produced a guiding document (Galbreath et al. 2008) that describes framework for integrated hatchery research, monitoring, and evaluation to be evaluated at a basin-wide ESU scale.

The AHSWG framework is structured around three categories of research monitoring and evaluation ; 1) implementation and compliance monitoring, 2) hatchery effectiveness monitoring, and 3) uncertainty research. The hatchery effectiveness category addresses regional questions relative to both harvest augmentation and supplementation hatchery programs and defines a set of management objectives specific to supplementation projects. The framework utilizes a common set of standardized performance measures as established by the Collaborative Systemwide Monitoring and Evaluation Project (CSMEP). Adoption of this suite of performance measures and definitions across multiple study designs will facilitate coordinated analysis of findings from regional monitoring and evaluation efforts aimed at addressing management questions and critical uncertainties associated with relationships between harvest augmentation and supplementation hatchery production and ESA listed stock status/recovery.

The NPCC (2006) has called for integration of individual hatchery evaluations into a regional plan. While the RM&E framework in AHSWG document represents our current knowledge relative to monitoring hatchery programs to assess effects that they have on population and ESU productivity, it represents only a portion of the activities needed for how hatcheries are operated throughout the region. A union of the NPCC (2001) hatchery monitoring and evaluation standards and the AHSWG framework likely represents a larger scale more comprehensive set of assessment standards, legal mandates, production and harvest management processes, hatchery operations, and socio-economic standards addressed in the 2001 NPCC document (sections 3.1, 3.2, 3.7, and 3.8 respectively). These are not addressed in the AHSWG framework and should be included in this document. NPCC standards for conservation of wild/natural populations, life history characteristics, genetic characteristics and research activities (sections 3.3, 3.4, 3.5, and 3.6 respectively) are more thoroughly in the AHSWG and the later standards should apply to this document. Table 1 represents the union of performance standards described by the Northwest Power and Conservation Council (NPCC 2001), regional questions for monitoring and evaluation for harvest and supplementation programs, and performance standards and testable assumptions as described by the Ad Hoc Supplementation Work Group (2008).

Table 1. Compilation of performance standards described by the Northwest Power and Conservation Council (NPCC 2001), regional questions for monitoring and evaluation for harvest and supplementation programs, and performance standards and testable assumptions as described by the Ad Hoc Supplementation Work Group (Galbreath et al. 2008).

Category	Standards	Indicators

Category	Standards	Indicators
1. LEGAL MANDATES	1.1. Program contributes to fulfilling tribal trust responsibility mandates and treaty rights, as described in applicable agreements such as under U.S. v. OR and U.S. v. Washington.	1.1.1. Total number of fish harvested in Tribal fisheries targeting this program. 1.1.2. Total fisher days or proportion of harvestable returns taken in Tribal resident fisheries, by fishery. 1.1.3. Tribal acknowledgement regarding fulfillment of tribal treaty rights.
	1.2. Program contributes to mitigation requirements.	1.2.1. Number of fish released by program, returning, or caught , as applicable to given mitigation requirements.
	1.3. Program addresses ESA responsibilities.	1.3.1. Section 7, Section 10, 4d rule and annual consultation
2. IMPLEMENTATION AND COMPLIANCE	2.1. Program contributes to mitigation requirements.	2.1.1. Hatchery is operated as a segregated program. 2.1.2. Hatchery is operated as an integrated program 2.1.3. Hatchery is operated as a conservation program
	2.2. Program addresses ESA responsibilities.	2.2.1. Hatchery fish can be distinguished from natural fish in the hatchery broodstock and among spawners in supplemented or hatchery influenced population(s)
	2.3. Restore and maintain treaty-reserved tribal and non-treaty fisheries.	2.3.1. Hatchery and natural-origin adult returns can be adequately forecasted to guide harvest opportunities. 2.3.2. Hatchery adult returns are produced at a level of abundance adequate to support fisheries in most years with an acceptably limited impact to natural-spawner escapement.
	2.4. Fish for harvest are produced and released in a manner enabling effective harvest, as described in all applicable fisheries management plans, while avoiding over-harvest of non-target species.	2.4.1. Number of fish release by location estimated and in compliance with AOPs and US vs. OR Management Agreement. 2.4.2. Number if adult returns by release group harvested 2.4.3. Number of non-target species encountered in fisheries for targeted release group.
	2.5. Hatchery incubation, rearing, and release practices are consistent with current best management practices for the program type.	2.5.1. Juvenile rearing densities and growth rates are monitored. and reported. 2.5.2. Numbers of fish per release group are known and reported. 2.5.3. Average size, weight and condition of fish per release group are known and reported. 2.5.4. Date, acclimation period, and release location of each release group are known and reported.
	2.6. Hatchery production, harvest management, and monitoring and evaluation of hatchery production are coordinated among affected co-managers.	2.6.1. Production adheres to plans documents developed by regional co-managers (e.g. US vs. OR Management agreement, AOPs etc.). 2.6.2. Harvest management harvest, harvest sharing agreements, broodstock collection schedules, and disposition of fish trapped at hatcheries in excess of broodstock needs are coordinated among co-management agencies. 2.6.3. Co-managers react adaptively by consensus to monitoring and evaluation results. 2.6.4. Monitoring and evaluation results are reported to co-managers and regionally in a timely fashion.
3. HATCHERY EFFECTIVENESS MONITORING REGIONAL FOR AUGMENTATION AND SUPPLEMENTATION PROGRAMS	3.1. Release groups are marked in a manner consistent with information needs and protocols for monitoring impacts to natural- and hatchery-origin fish at the targeted life stage(s)(e.g. in juvenile migration corridor, in fisheries, etc.).	3.1.1. All hatchery origin fish recognizable by mark or tag and representative known fraction of each release group marked or tagged uniquely. 3.1.2. Number of unique marks recovered per monitoring stratum sufficient to estimate number of unmarked fish from each release group with desired accuracy and precision.
	3.2. The current status and trends of natural origin populations likely to be impacted by hatchery production are monitored.	3.2.1. Abundance of fish by life stage is monitored annually. 3.2.2. Adult to adult or juvenile to adult survivals are estimated. 3.2.3. Temporal and spatial distribution of adult spawners and rearing juveniles in the freshwater spawning and rearing areas are monitored. 3.2.4. Timing of juvenile outmigration from rearing areas and adult returns to spawning areas are monitored. 3.2.5. Ne and patterns of genetic variability are frequently enough to detect changes across generations.

Category	Standards	Indicators
	3.3. Fish for harvest are produced and released in a manner enabling effective harvest, as described in all applicable fisheries management plans, while avoiding over-harvest of non-target species.	3.3.1. Number of fish release by location estimated and in compliance with AOPs and US vs. OR Management Agreement. 3.3.2. Number if adult returns by release group harvested 3.3.3. Number of non-target species encountered in fisheries for targeted release group.
	3.4. Effects of strays from hatchery programs on non-target (unsupplemented and same species) populations remain within acceptable limits.	3.4.1. Strays from a hatchery program (alone, or aggregated with strays from other hatcheries) do not comprise more than 10% of the naturally spawning fish in non-target populations. 3.4.2. Hatchery strays in non-target populations are predominately from in-subbasin releases. 3.4.3. Hatchery strays do not exceed 10% of the abundance of any out-of-basin natural population.
	3.5. Habitat is not a limiting factor for the affected supplemented population at the targeted level of supplementation.	3.5.1. Temporal and spatial trends in habitat capacity relative to spawning and rearing for target population. 3.5.2. Spatial and temporal trends among adult spawners and rearing juvenile fish in the available habitat.
	3.6. Supplementation of natural population with hatchery origin production does not negatively impact the viability of the target population.	3.6.1. Pre- and post-supplementation trends in abundance of fish by life stage is monitored annually. 3.6.2. Pre- and post-supplementation trends in adult to adult or juvenile to adult survivals are estimated. 3.6.3. Temporal and spatial distribution of natural origin and hatchery origin adult spawners and rearing juveniles in the freshwater spawning and rearing areas are monitored. 3.6.4. Timing of juvenile outmigrations from rearing area and adult returns to spawning areas are monitored.
	3.7. Natural production of target population is maintained or enhanced by supplementation.	3.7.1. Adult progeny per parent (P:P) ratios for hatchery-produced fish significantly exceed those of natural-origin fish. 3.7.2. Natural spawning success of hatchery-origin fish must be similar to that of natural-origin fish. 3.7.3. Temporal and spatial distribution of hatchery-origin spawners in nature is similar to that of natural-origin fish. 3.7.4. Productivity of a supplemented population is similar to the natural productivity of the population had it not been supplemented (adjusted for density dependence). 3.7.5. Post-release life stage-specific survival is similar between hatchery and natural-origin population components.
	3.8. Life history characteristics and patterns of genetic diversity and variation within and among natural populations are similar and do not change significantly as a result of hatchery augmentation or supplementation programs.	3.8.1. Adult life history characteristics in supplemented or hatchery influenced populations remain similar to characteristics observed in the natural population prior to hatchery influence. 3.8.2. Juvenile life history characteristics in supplemented or hatchery influenced populations remain similar to characteristics in the natural population those prior to hatchery influence. 3.8.3. Genetic characteristics of the supplemented population remain similar (or improved) to the unsupplemented populations.
	3.9. Operate hatchery programs so that life history characteristics and genetic diversity of hatchery fish mimic natural fish.	3.9.1. Genetic characteristics of hatchery-origin fish are similar to natural-origin fish. 3.9.2. Life history characteristics of hatchery-origin adult fish are similar to natural-origin fish. 3.9.3. Juvenile emigration timing and survival differences between hatchery and natural-origin fish are minimized.
	3.10. The distribution and incidence of diseases, parasites and pathogens in natural populations and hatchery populations are known and releases of hatchery fish are designed to minimize potential spread or amplification of diseases, parasites, or pathogens among natural populations.	3.10. Detectable changes in rate of occurrence and spatial distribution of disease, parasite or pathogen among the affected hatchery and natural populations.

Category	Standards	Indicators
4. OPERATION OF ARTIFICIAL PRODUCTION FACILITIES	4.1. Artificial production facilities are operated in compliance with all applicable fish health guidelines and facility operation standards and protocols such as those described by IHOT, PNFHPC, the Co-Managers of Washington Fish Health Policy, INAD, and MDFWP.	4.1.1. Annual reports indicating level of compliance with applicable standards and criteria. 4.1.2. Periodic audits indicating level of compliance with applicable standards and criteria.
	4.2. Effluent from artificial production facility will not detrimentally affect natural populations.	4.2.1. Discharge water quality compared to applicable water quality standards and guidelines, such as those described or required by NPDES, IHOT, PNFHPC, and Co-Managers of Washington Fish Health Policy tribal water quality plans, including those relating to temperature, nutrient loading, chemicals, etc.
	4.3. Water withdrawals and instream water diversion structures for artificial production facility operation will not prevent access to natural spawning areas, affect spawning behavior of natural populations, or impact juvenile rearing environment.	4.3.1. Water withdrawals compared to applicable passage criteria. 4.3.2. Water withdrawals compared to NMFS, USFWS, and WDFW juvenile screening criteria. 4.3.3. Number of adult fish aggregating and/or spawning immediately below water intake point. 4.3.4. Number of adult fish passing water intake point. 4.3.5. Proportion of diversion of total stream flow between intake and outfall.
	4.4. Releases do not introduce pathogens not already existing in the local populations, and do not significantly increase the levels of existing pathogens.	4.4.1. Certification of juvenile fish health immediately prior to release, including pathogens present and their virulence. 4.4.2. Juvenile densities during artificial rearing. 4.4.3. Samples of natural populations for disease occurrence before and after artificial production releases.
	4.5. Any distribution of carcasses or other products for nutrient enhancement is accomplished in compliance with appropriate disease control regulations and guidelines, including state, tribal, and federal carcass distribution guidelines.	4.5.1. Number and location(s) of carcasses or other products distributed for nutrient enrichment. 4.5.2. Statement of compliance with applicable regulations and guidelines.
	4.6. Adult broodstock collection operation does not significantly alter spatial and temporal distribution of any naturally produced population.	4.6.1. Spatial and temporal spawning distribution of natural population above and below weir/trap, currently and compared to historic distribution.
	4.7. Weir/trap operations do not result in significant stress, injury, or mortality in natural populations.	4.7.1. Mortality rates in trap. 4.7.2. Prespawning mortality rates of trapped fish in hatchery or after release.
	4.8. Predation by artificially produced fish on naturally produced fish does not significantly reduce numbers of natural fish.	4.8.1. Size at, and time of, release of juvenile fish, compared to size and timing of natural fish present. 4.8.2. Number of fish in stomachs of sampled artificially produced fish, with estimate of natural fish composition.
5. SOCIO-ECONOMIC EFFECTIVENESS	5.1. Cost of program operation does not exceed the net economic value of fisheries in dollars per fish for all fisheries targeting this population.	5.1.1. Total cost of program operation. 5.1.2. Sum of ex-vessel value of commercial catch adjusted appropriately, appropriate monetary value of recreational effort, and other fishery related financial benefits.
	5.2. Juvenile production costs are comparable to or less than other regional programs designed for similar objectives.	5.2.1. Total cost of program operation. 5.2.2. Average total cost of activities with similar objectives.
	5.3. Non-monetary societal benefits for which the program is designed are achieved.	5.3.1. Number of adult fish available for tribal ceremonial use. 5.3.2. Recreational fishery angler days, length of seasons, and number of licenses purchased.

1.11 Expected size of program.

1.11.1 Proposed annual broodstock collection level (maximum number of adult fish).

The approximate number of adults collected for spawning will include 612 females and 642 males. This will contribute to approximately one million smolts released in the SFSR and provide 300,000 eyed eggs to the Shoshone Bannock egg box program in the SFSR. In addition, 285,000 green eggs will be provided for transfer to the Clearwater Hatchery for development of a locally adapted run of summer Chinook salmon in the South Fork Clearwater River (SFCR).

Implementing the development of an integrated broodstock 2010-2012
Beginning in 2010, mangers will initiate the development of an integrated two-stage stepping stone program in the SFSR as recommended by the HSRG in 2008. As part of this recommendation, a goal of producing 250,000 smolts derived from natural-origin returns (NORs) was developed. As these integrated smolts return as adults, they will be: 1) used as broodstock for the next generation of integrated smolts or 2) released upstream of the weir to supplement natural spawning, or 3) used as broodstock in the segregated stepping stone component of the program (if enough integrated adults return to meet priority 1, and 2 above).

Ideally, adults spawned to create the integrated program would be derived using 100% NORs for the first generation. However, due to ongoing supplementation research (Bowles and Leitzinger, 1991) in the SFSR, managers have decided to reduce the number of NORs retained for broodstock to avoid confounding research results. All spawn crosses used to create the 250,000 integrated smolts will be hatchery-origin by natural-origin (HxN) for brood years 2010-2012. The number of male NORs collected at the weir will drive the size of the integrated component up to a maximum of 250,000 smolts. Smolts produced from HxN crosses will be marked differentially (100% CWT, no-fin clip) from the segregated harvest component (100% Ad-clip). Spawn crosses used to create the 750,000 smolt segregated harvest component for the SFSR, the Shoshone –Bannock Egg-box program, and eyed eggs for the SFCR program will be hatchery by hatchery (HxH). Beginning with brood year 2013, full implementation of the sliding scale will be initiated.

Maintaining the Integrated (Stepping Stone) broodstock 2013 and Beyond
By 2013, evaluation of adult abundance and productivity measures from the ongoing supplementation research in the SFSR will have ended. As such, managers will begin retaining both male and female NORs trapped at the SFSR weir as outlined in the sliding scale below (Table 2). Annually, the number of NORs that are either retained for broodstock or released to spawn naturally will be based on the sliding scale that was developed to maintain the existing harvest mitigation program under variable NOR escapements while reducing risks associated with domestication selection and reduce fitness of the natural population. The sliding scale allows the proportion of NORs in the broodstock (pNOB) and the proportion of naturally spawning adults that is composed of HORs (pHOS) to slide with variable NOR escapement. As the number of NORs increases, pNOB increases and pHOS decreases resulting in a higher PNI

(pNOB/(pNOB+pHOS)). Likewise, as the number of NORs and integrated hatchery-origin adults increase, there will be opportunity to integrate the remaining segregated component of the program. The sliding scale below describes broodstock collection and adult release objectives starting with the second generation of adult returns. Since 2010 is the first year of developing the integrated broodstock, there will not be returning integrated adults until 2014 (jacks in 2013) that will be released to spawn naturally. For the period 2010-2013 only the broodstock development component of the stepping stone program will be implemented.

Table 2. Sliding scale broodstock management for the integrated Chinook salmon broodstock program in South Fork Salmon River. CRIT= ICTRT minimum abundance threshold for a 25% risk of extinction in 100 years. VIAB= ICTRT minimum abundance threshold for a 5% risk of extinction in 100 years.

Number of NORs relative to Interior Columbia River Technical Recovery Team (ICTRT) minimum abundance thresholds[a]	Escapement of NORs to SFSR Weir	Number of NORs Released Above Weir	Max % of NORs Retained for Broodstock	Minimum fraction of Integrated Broodstock made of NORs (pNOB)	Maximum pHOS
0 - 0.33(CRIT)	0-49	0	NA	NA	1.00
0.33(CRIT) - 0.67(CRIT)	50-99	25-50	50%	30%	0.90
0.67(CRIT)-CRIT	100-149	60-89	40%	30%	0.80
CRIT - 0.5(VIAB)	150-299	105-209	30%	40%	0.50
0.5(VIAB) - VIAB	300-599	210-419	30%	50%	0.50
VIAB - 1.5(VIAB)	600-899	480-719	20%	60%	0.40
1.5(VIAB)-2(VIAB)	900-1199	720-1009	20%	70%	0.35
2(VIAB) - CAP	1200-1999	1010-1809	20%	80%	0.25
CAP- 1.5 CAP	2000-3000	1810-2810	10%	90%	0.10

[a]Between 1996 and 2008, 55-65% of the natural-origin adults accounted for the in the SFSR mainstem have been above the weir (IDFG and NPT unpublished data). The ICTRT estimates that the upper mainstem area accounts for approximately 35% of the available spawning habitat in the South Fork Salmon River population. As a conservative approach, CRIT and VIAB are based on 60% of ICTRT abundance thresholds for the SFSR mainstem population.

This sliding scale represents a management philosophy that is intended to maintain the existing hatchery mitigation program while reducing risk to the natural population. When NOR escapements are at very low levels, guidelines are relaxed to allow a larger hatchery influence in both the hatchery and natural environments. As the number of NORs increase, the proportional influence from the natural population in both environments will also increase. It is important to note that this sliding scale is a “guideline” and managers recognize that developing this integrated hatchery program will require an adaptive management approach. This sliding scale is driven by the number of natural-origin returns which is difficult, at best, to forecast. This will require that broodstock and weir management remain somewhat flexible as runs develop.

1.11.2 Proposed annual fish release levels (maximum number) by life stage and location.

Since 2002, eyed eggs from adults trapped at the South Fork Salmon River trap have been transferred to the Shoshone-Bannock tribe annually as part of an egg-box program for the South

Fork Salmon River. This program is authorized through the 2008-2017 Management Agreement (Table 3), pursuant to United States vs. Oregon. Proposed releases in the table below reflect all of the mitigation and supplementation releases. The mark plan for the integrated smolts is inconsistent with the 2008-2017 USvs.OR Management Agreement.

Table 3. Proposed releases of South Fork Salmon River Hatchery Chinook Salmon.

Life Stage	Release Location	Annual Release Level
Eyed Eggs	SBT[1] (Dollar Creek; SF Salmon River)	300,000
Unfed Fry		NA
Fry		NA
Fingerling		NA
Yearling	South Fork Salmon River – Knox Bridge –Segregated Harvest-Stepping Stone South Fork Salmon River –Knox Bridge – Integrated Conservation	750,000, 100% adipose fin-clipped, evaluation CWT and PIT groups 250,000 100% CWT only and PIT

[1] SBT = Shoshone-Bannock egg box program

1.12 Current program performance, including estimated smolt-to-adult survival rates, adult production levels, and escapement levels. Indicate the source of these data.

The most recent Idaho Department of Fish and Game performance data for the South Fork Salmon River hatchery program is presented below (Tables 2a. and 2b. and Figure 3.).

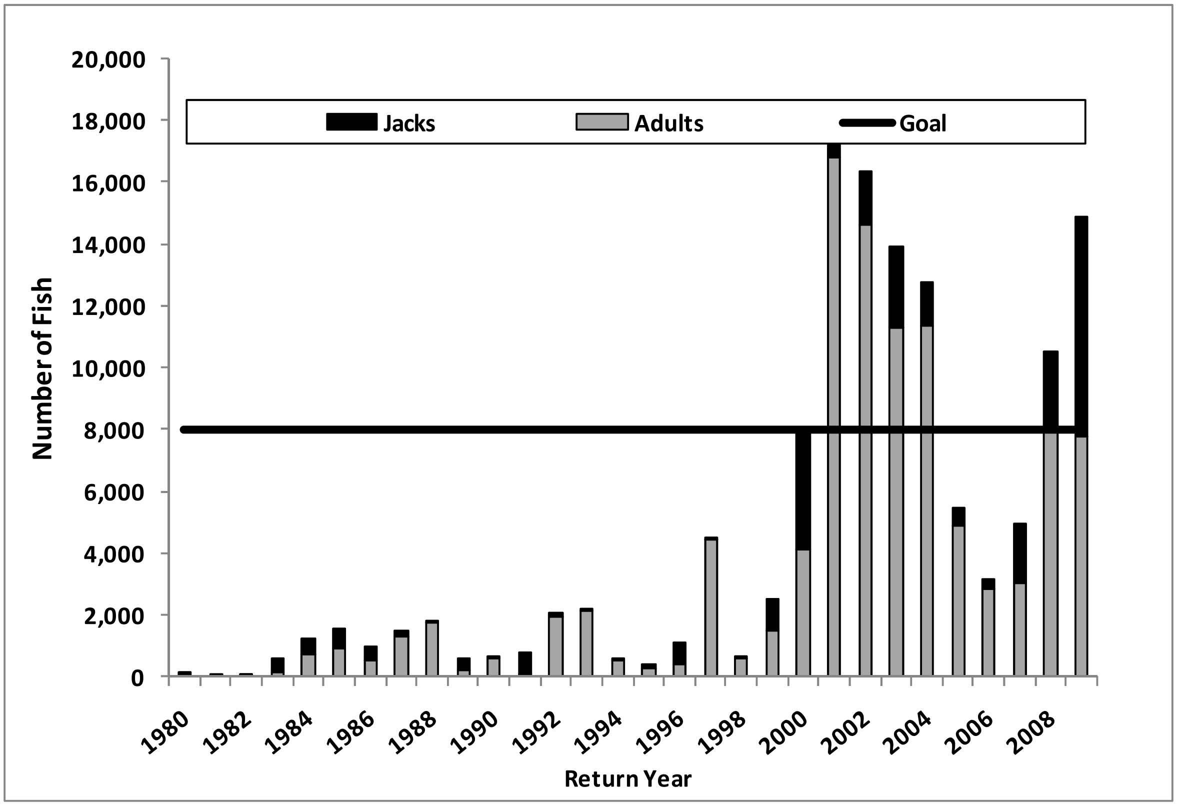
Table 2a. McCall Fish Hatchery Chinook salmon smolt-to-adult return (SAR) and smolt-to-adult survival (SAS) rates and escapement data for segregated yearling smolt production fish released into the South Fork Salmon River 1995-2006. Total SAS includes fish harvested or recovered below Lower Granite Dam (LGD)

Release Year	Return Year	Number of Smolts Released	Escapement To LGD	SAR to LGD	Total Fish Produced	Total SAS
2006	07-09	1,094,264	9,889	0.90%	10,684	0.98%
2005	06-08	1,047,530	3,390	0.32%	3,856	0.37%
2004	05-07	914,060	3,026	0.33%	3,866	0.42%
2003	04-06	1,054,242	5,918	0.56%	6,331	0.60%
2002	03-05	1,062,870	13,474	1.27%	15,024	1.41%
2001	02-04	1,077,077	8,575	0.80%	8,859	0.82%
2000	01-03	845,244	16,341	1.93%	16,846	1.99%
1999	00-02	1,055,673	21,591	2.05%	22,901	2.17%
1998	99-01	393,872	5,304	1.35%	5,419	1.38%
1997	98-00	122,766	1,254	1.02%	1,254	1.02%
1996	97-99	351,340	506	0.14%	526	0.15%
1995	96-98	763,705	4,690	0.61%	4,755	0.62%
Geometric Mean				**0.74%**		**0.79%**

Table 2b. McCall Fish Hatchery Chinook salmon smolt-to-adult return (SAR) and smolt-to-adult survival (SAS) rates and escapement data for non-adipose clipped integrated yearling smolts released into the South Fork Salmon River 1993-2004. Total SAS includes fish harvested or recovered below Lower Granite Dam (LGD)

Release Year	Return Years	Number of Smolts Released	Escapement to LGD	SAR to LGD	Total Fish Produced	Total SAS
2004	05-07	174,150	624	0.36%	685	0.39%
2002	03-05	41,700	294	0.71%	363	0.87%
2001	02-04	88,154	386	0.44%	479	0.54%
2000	01-03	194,686	1,717	0.88%	2,023	1.04%
1999	00-02	126,937	1,279	1.01%	1,533	1.21%
1997	98-00	115,881	80	0.07%	80	0.07%
1996	97-99	234,314	216	0.09%	224	0.10%
1995	96-98	310,893	1,124	0.36%	1,215	0.39%
1994	95-97	235,937	117	0.05%	117	0.05%
1993	94-96	297,500	116	0.04%	116	0.04%
Geometric Mean				**0.23%**		**0.26%**

Figure 3. Estimated escapement of McCall Fish Hatchery Chinook salmon at Lower Granite Dam 1980-2009.



1.13 Date program started (years in operation), or is expected to start.

Adult collection and broodstock development began in 1974 and the McCall Fish Hatchery was completed in 1979. Since 1981, all adult broodstock collection has occurred at the SF Salmon River satellite facility.

Implementation of the integrated and stepping stone segregated harvest programs as recommended by the HSRG will begin in 2010 using a sliding scale approach.

1.14) Expected duration of program.

This program is expected to continue indefinitely to provide mitigation under the Lower Snake River Compensation Plan.

1.15 Watersheds targeted by program.

South Fork Salmon River: HUC- 17060208

1.16 Indicate alternative actions considered for attaining program goals

The South Fork Salmon River hatchery program was initiated to mitigate for fish losses caused by construction and operation of the four lower Snake River federal dams. The program has a federally authorized goal to return 8,000 adult summer Chinook salmon to stream reaches upstream of Lower Granite Dam after a harvest of 32,000 adults in ocean and Columbia River commercial, and recreational fisheries (see Section 1.7). It is the goal of this hatchery program to ensure hatchery-produced Chinook salmon are available to provide fisheries that are consistent with meeting spawning escapement and preserving the genetic integrity of natural populations. The 8,000 adult mitigation goal to the project area has been reached six times since the inception of the program. All six of these years have occurred in the last nine years (Figure 2). The most recent 12 year (BY 93-04) geometric mean SAR to Lower Granite Dam (LGD) is 0.74% (Table 2a) and is similar to the modeled SAR of 0.8%. However, the total smolt to adult survival of 0.79% is far less than the 4.0% SAS needed to achieve the total mitigation goal of 40,000.

Managers have considered four alternatives to the current mitigation program to achieve mitigation and conservation goals.

1. The 8,000 adult mitigation goal to Lower Granite Dam has been reached six times since the inception of the program in 1979 all of which have occurred in the past nine years (Figure 2). The mitigation goal of 8,000 adults back to the project area is underachieved in most years indicating that the original SAR that was used to model the size of the program was overestimated. Based on the average annual escapement of 4,400 adult and jacks at Lower Granite Dam (1980-2009), production capacity at McCall Fish Hatchery needs to be increased from 1.0 million to 1.82 million yearling smolts (8,000/0.44% = 1.82M) to result in 8,000 adults at Lower Granite Dam.

2. Developing an integrated broodstock to meet ESA objectives will result in a smaller number of harvestable adipose fin clipped fish released. For this program, the integrated component will consist of 250,000 yearling smolts. This represents 25% of the current hatchery capacity. In order offset this lost harvest opportunity in mark selective fisheries, the hatchery capacity needs to be increased by 250,000 yearling smolts [total capacity= 1,820,000 (from #1 above) + 250,000 = 2,070,000].

3. The long term goal of this program is to fully integrate the hatchery broodstock. The ability to fully integrate the program is dependent on having sufficient natural-origin adults returning to the South Fork Salmon River (see sliding scale in Section 1.11.1). If full integration is achieved, managers expect the SARs of hatchery produced fish to decrease 25-50% relative to operating with a segregated broodstock. To offset this loss, coupled with the loss outlined above, hatchery capacity would need to be increased to 2.7-3.9 million yearling smolts [(1.82M/(1-.25)+250,000 =2.7M)and (1.82/(1-0.5)+250,000=3.9M)].

4. LSRCP mitigation goals were developed assuming a 4:1 catch to escapement ratio. Since ESA listing in 1992, commercial and sport harvest in the Columbia River has been reduced and observed catch to escapement ratios are far less than 1:1. To meet the full mitigation goal of 40,000 adults (see Section 1.7 for detail), the hatchery capacity needs to be increased to approximately 5.06M yearling smolts based on the most recent 12 year pre-harvest geometric mean SAS (40,000/0.0079) (Table 2c).

Conclusions: While alternative #1 addresses some of the unrealized harvest mitigation, it does not address ESA and conservation responsibilities. Alternative #2 addresses both mitigation and conservation aspects, but does not take into account the anticipated decrease in SARs that would result from fully integrating the hatchery program. Managers feel that alternative #4 is not logistically feasible at this point in time due to the extraordinarily large increase in production that would be necessary and an insufficient number of NORs needed to integrate a hatchery program this large. Alternative #3 is the preferred choice by managers as it addresses ESA needs while not reducing mitigation responsibilities. This HGMP does not reflect the facility and personnel needs that are required to fully implement alternative #3. Facility and personnel needs to fully implement alternative #3 will be discussed and negotiated outside of this HGMP. Instead, this HGMP addresses needs to operate the program under status quo as described in the Executive Summary. This includes maintaining hatchery capacity at 1.0 million and dedicating approximately 25% of the hatchery rearing capacity for the integrated conservation component of the program.

Protocols are in place to monitor abundance and productivity of the hatchery and natural populations in response to the integrated supplementation efforts described in this HGMP. If these supplementation efforts do not convey a measurable benefit to the natural population, managers will reevaluate options to achieve conservation and mitigation objectives in the South Fork Salmon River.

1.17 Staffing, support logistics, and facility changes needed to implement best management practices and the associated monitoring and evaluation.

The following section identifies needs for the program as described in this HGMP but does not include needs necessary to fully implement alternative #3 in Section 1.16 above.

a. Facilities
    a. Managers feel that expanded/modified adult holding facilities at SFSR adult trap site will be necessary to manage an integrated broodstock in order minimize handling and stress associated with collecting, holding, and spawning three groups of adults (integrated, segregated, and natural). Adult broodstock for the Nez Perce Tribe- Johnson Creek Chinook Salmon Supplementation Program are also held and spawned at this facility.
    b. Facility needs to expand production capacity to 1.25M smolts to offset mitigation production lost to implementing the integrated conservation program
b. M&E
    a. Parental Based Tagged (PBT) has been identified as a priority to evaluate the integrated broodstock program (See Section 11.1). Currently, insufficient funds are available to fully fund this program.
    b. Most of the natural production monitoring conducted by IDFG that occurs in the SFSR is funded through an ongoing BPA funded supplementation research

project (Bowles and Leitzinger 1991). This project is expected to sunset in 2014 and in order to continue monitoring the natural population in the SFSR, additional funds will be required.

USFWS Hatchery Review Team (HRT) Programmatic Recommendations

The HRT provided several potential programmatic alternatives to the current hatchery program along with their recommendation for the preferred alternative. For the South Fork Salmon River summer Chinook salmon hatchery program the HRT preferred alternative is for the managers to develop an integrated stepping-stone program. The team felt this alternative would provide the best chance for preserving the native stock while still meeting the mitigation goals and supporting recreational and tribal fisheries. Managers have committed to initiate development of the stepping stone program beginning in 2010 (see Section 1.11.1 for details)

In addition to the programmatic recommendations, the review team also provided specific recommendations across eight categories: Program Goals and Objectives; Broodstock Choice and Collection; Hatchery and Natural Spawning; Incubation and Rearing; Release and Outmigration; Facilities and Operations; Research, Monitoring and Accountability; and Education and Outreach. Reponses from the managers for each of the recommendations that are applicable to this HGMP are provided in Appendix B.

SECTION 2. PROGRAM EFFECTS ON NMFS ESA-LISTED SALMONID POPULATIONS.

USFWS ESA-listed salmonid species and non-salmonid species are addressed in Addendum A.

2.1 List all ESA permits or authorizations in hand for the hatchery program.

- Section 7 consultation with the USFWS (April 2, 1999) resulted in NMFS Biological Opinion for the Lower Snake River Compensation Program (now expired). In 2003, consultation was initiated to develop a new Snake River Hatchery Biological Opinion. Consultation has not been completed.

- Section 10 Permit Number 921 – McCall Fish Hatchery, authorized direct and indirect take of listed Snake River salmon associated with hatchery operations and broodstock collection at Lower Snake River Compensation Program hatcheries operated by Idaho Department of Fish and Game. Expired 12/31/98; reapplication (to consolidate all programs under permit 1179) in process.

- Section 10 Permit Number 1481 annual incidental take listed anadromous fish associated with recreational fishing programs. Expires 5/31/10

- Section 10 Permit Number 1124 authorizing annual take of ESA listed salmonids associated with research/management activities: Permit expires December 31, 2012.

2.2 Provide descriptions, status, and projected take actions and levels for NMFS ESA-listed natural populations in the target area.

2.2.1 Description of NMFS ESA-listed salmonid population(s) affected by the program.

Populations affected by this program are described in a report prepared by the ICTRT (2005). This section is summarized from that publication.

The Snake River Spring/Summer Chinook Salmon ESU includes those fish that spawn in the Snake River drainage and its major tributaries, including the Grande Ronde River and the Salmon River. This ESU includes production areas characterized by spring- and summer-timed returns, and combinations from the two adult timing patterns. Runs classified as spring-run Chinook salmon are counted at Bonneville Dam beginning in early March and ending the first week of June; runs classified as summer-run Chinook salmon return to the Columbia River from June through August. Returning fish hold in deep mainstem and tributary pools until late summer, when they emigrate up into tributary areas and spawn. In general, spring-run type Chinook salmon tend to spawn in higher-elevation reaches of major Snake River tributaries from mid- through late August, and summer-run Snake River Chinook salmon spawn approximately one month later than spring-run fish. Summer-run Chinook salmon tend to spawn lower in the Snake River drainages, although their spawning areas often overlap with spring-run spawners.

Spring/summer-run Chinook salmon from the Snake River Basin exhibit stream-type life history characteristics (Healey 1983). Eggs are deposited in late summer and early fall, incubate over the winter, and hatch in late winter and early spring of the following year. Juveniles rear through the summer, overwinter, and migrate to sea in the spring of their second year of life. Depending on the tributary and the specific habitat conditions, juveniles may migrate extensively from natal reaches into alternative summer-rearing or overwintering areas. Snake River spring/summer-run Chinook salmon return from the ocean to spawn primarily as 4- and 5-year-old fish, after 2 to 3 years in the ocean. A small fraction of the fish (predominantly males) return as 3-year old “jacks”.

The Snake River spring/summer Chinook salmon ESU has five major population groupings (MPGs): Lower Snake River, Grande Ronde/Imnaha, South Fork Salmon River, Middle Fork Salmon River, and the Upper Salmon River group. The ESU contains both spring and summer run Chinook. The South Fork Salmon River population is a summer run and is one of four extant populations in the South Fork Salmon MPG. The program will not affect the Little Salmon River population. The Secesh River and East Fork South Fork populations potentially could be affected.

Adult Run Timing –Run timing of natural-origin Chinook salmon at the South Fork Salmon River weir generally occurs between late June and early September and resembles a bimodal distribution. The first mode occurs between late-June and the first week of August. A second smaller mode generally occurs between mid-August and the first week of September. Arrival dates for the 25th, 50th and 75th percentile of natural-origin returning adults from 1998-2008 are displayed in Table 3.

Table 3. Arrival timing of natural-origin Chinook at the SF Salmon River

Hatchery	Return Year	Number of Natural Origin Returns	Proportion of Returning Adults 25%	50%	75%
S.F. Salmon R. Weir	1997	288	7/16	7/21	7/30
S.F. Salmon R. Weir	1998	152	7/12	7/16	7/24
S.F. Salmon R. Weir	1999	291	7/16	7/20	7/28
S.F. Salmon R. Weir	2000	719	7/3	7/11	7/20
S.F. Salmon R. Weir	2001	1,778	6/24	7/5	8/21
S.F. Salmon R. Weir	2002	1,281	7/2	7/10	7/26
S.F. Salmon R. Weir	2003	1,495	7/5	7/9	7/30
S.F. Salmon R. Weir	2004	595	7/2	7/12	8/20
S.F. Salmon R. Weir	2005	254	6/27	7/7	8/21
S.F. Salmon R. Weir	2006	262	7/5	7/11	8/4
S.F. Salmon R. Weir	2007	280	6/24	7/13	7/31
S.F. Salmon R. Weir	2008	594	7/6	7/16	8/17

Source: Weir data from McCall Fish Hatchery run and brood year reports.

Arrival timing of hatchery-origin fish at the South Fork Salmon River weir substantially overlaps with the arrival timing of natural-origin Chinook salmon. Figure 4 below displays the average cumulative proportion of hatchery- and natural-origin Chinook arriving at the South Fork Salmon River weir from 1997 through 2008.

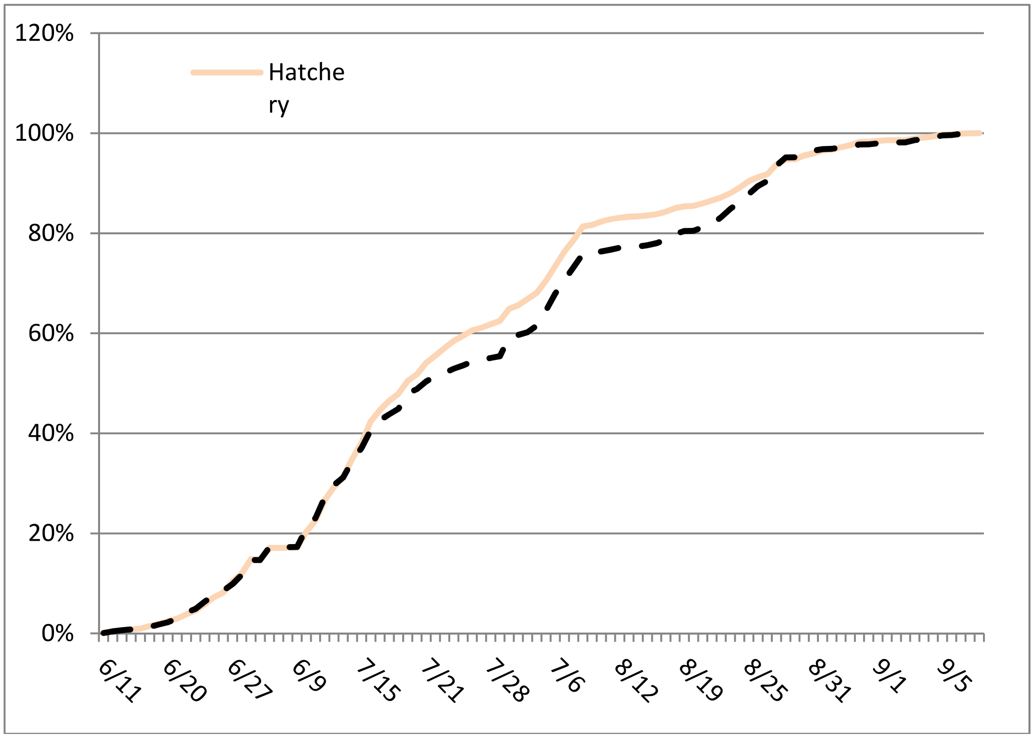


Figure 4. Average cumulative proportion of hatchery- and natural-origin Chinook arriving at the South Fork Salmon River weir 1997 through 2008 (IDFG unpublished data).

Adult Age Structure – Spring- and summer-run Chinook salmon in the Snake River ESU are comprised of four age classes (1, 2, 3, and 4 ocean) with the majority returning after two or three years in the ocean (Table 4). Using dorsal fin ray aging techniques, Keifer et al. (2002, 2004) and Copeland et al. (2008) estimated the ocean age proportions of natural-origin spring/summer run Chinook salmon passing upstream of Lower Granite Dam from 1998 through 2007. They found that, while age structure was variable from year to year, the majority of returning adults were composed of two-ocean adults.

Table 4. Estimated percent by age class of wild Chinook salmon passing Lower Granite Dam 2002-2007

Return Year	1-Ocean	2-Ocean	3-Ocean	4-Ocean
2002	1.2	52.8	45.0	1.0
2003	7.0	19.9	70.7	1.9
2004	5.9	84.2	9.7	0.2
2005	7.0	66.3	25.7	1.0
2006	3.5	79.5	17.0	0.0
2007	14.1	45.4	38.7	1.7

Source: Copeland et al. 2008

Ages of natural-origin Chinook salmon returning to the South Fork Salmon River weir are determined based on length frequency and consist of three age classes (1, 2, and 3 ocean)(Table 5). While it is likely that a few four-ocean adults return to the SF Salmon River, overlapping length frequencies of three- and four-ocean adults precludes being able to distinguish the two age classes based on length frequency alone. From 1998 through 2008, the average (unweighted) age structure for natural-origin Chinook salmon returning to the South Fork Salmon River weir was 19.9% one-ocean, 52.8% two-ocean, and 27.3% three-ocean (see table below).

Table 5. Age class structure (percent in each age class) of natural-origin Chinook salmon captured at the South Fork Salmon River weir.

Return Year	No. of Natural Adults	1-Ocean	2-Ocean	3-Ocean
1998	152	4.61	12.50	82.89
1999	291	16.84	66.67	16.49
2000	693	58.14	35.05	6.82
2001	1,580	5.23	86.33	8.44
2002	1,281	2.50	67.99	29.51
2003	1,495	4.08	32.31	63.61
2004	595	3.70	82.69	13.61
2005	254	12.21	52.36	35.43
2006	262	10.69	67.56	21.75
2007	280	19.29	46.07	34.64
2008	594	15.32	75.08	9.60
Average		**19.92**	**52.79**	**27.29**

Note: Ocean-age is displayed as a percent of the return (IDFG, unpublished data).

Size Range of Returning Adults- Natural-origin adults returning to the SF Salmon River trap generally range in size from 50-110 cm fork length (Table 6). The majority of adult returns are in the 70-90 cm size class but vary depending on year class strength. Typically, one-ocean adults are less than 63cm fork length, two-ocean fish are 63-85 cm and three-ocean fish are greater than 85 cm (IDFG, unpublished data). Table 6 displays the number, in each ten millimeter size class, of natural-origin Chinook salmon captured at the South Fork Salmon River weir from 2001 through 2008.

Table 6. Number of natural-origin Chinook salmon adults returning to the South Fork Salmon River weir 2001-2008.

	Adult Return Year							
Fork Length (cm)	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
<50	5	1	9	0	3	1	13	4
50-59	57	23	49	19	13	6	33	53
60-69	61	71	32	72	33	45	26	65
70-79	779	557	274	353	86	122	86	285
80-89	641	413	375	102	75	75	90	147
90-99	32	185	565	39	40	14	37	37
100-109	5	31	189	5	3	0	4	6
110-119	0	0	2	0	0	0	0	0
Total	**1,580**	**1,281**	**1,495**	**595**	**254**	**263**	**289**	**597**

Source: McCall Fish Hatchery run and brood year reports and the IDFG hatchery database.

Adult Sex Ratio – The sex ratio of natural-origin adults in the SF Salmon River varies from year to year, but generally is skewed towards males (Table 7). From 1996-2008, natural-origin males averaged 63.8% of the return including one-ocean jacks and 58.9% of the return excluding jacks.

Table 7. Percent of natural-origin Chinook salmon returns to South Fork Salmon River weir that were composed of males 1996-2008.

	Percent of natural-origin return	
Return Year	**Jacks Included**	**Jacks Excluded**
1996	80.3	72.6
1997	61.1	59.6
1998	40.8	35.7
1999	64.9	57.5
2000	82.5	57.9
2001	65.0	62.9
2002	59.5	58.2
2003	56.5	54.4
2004	64.7	63.5
2005	53.9	47.5
2006	64.9	60.7
2007	62.5	53.5
2008	70.2	64.8
Average	**63.6**	**57.6**

Source: IDFG unpublished data

Spawn Timing and Distribution – Natural-origin Chinook salmon adults in the South Fork Salmon River are classified as summer-run, but exhibit spawn timing that is more typical of spring-run Chinook salmon and generally occurs from mid-August through mid-September. The majority of spawning activity occurs from the Poverty Flat reach (RKm 87) to the Stolle Meadows area (RKm 127). Significant numbers of Chinook salmon spawn in three tributaries upstream of the weir and include Rice Creek, Cabin Creek and Curtis Creek. Use of tributaries downstream of the weir is minor in comparison and generally occurs at or near the mouths of most accessible tributaries

(Kim Apperson, IDFG, personal communication).

Juvenile Life History and Migration Timing – Naturally produced juvenile Chinook salmon in the South Fork Salmon River emerge from their redds during the late winter and early spring months. Some juveniles begin downstream movements shortly after emergence while others over-winter near the spawning area. Juvenile trapping data collected from the upper South Fork Salmon River screw trap (RKm 115) indicates that juvenile Chinook emigrate from the spawning area in the upper South Fork Salmon River area in two main pulses (subyearling parr and pre-smolt) and a much smaller third pulse of yearling smolts the following spring. Figure 5 displays the emigration timing of natural-origin Chinook salmon from the upper South Fork Salmon River that originated from spawners in 2002 and is typical of other brood years

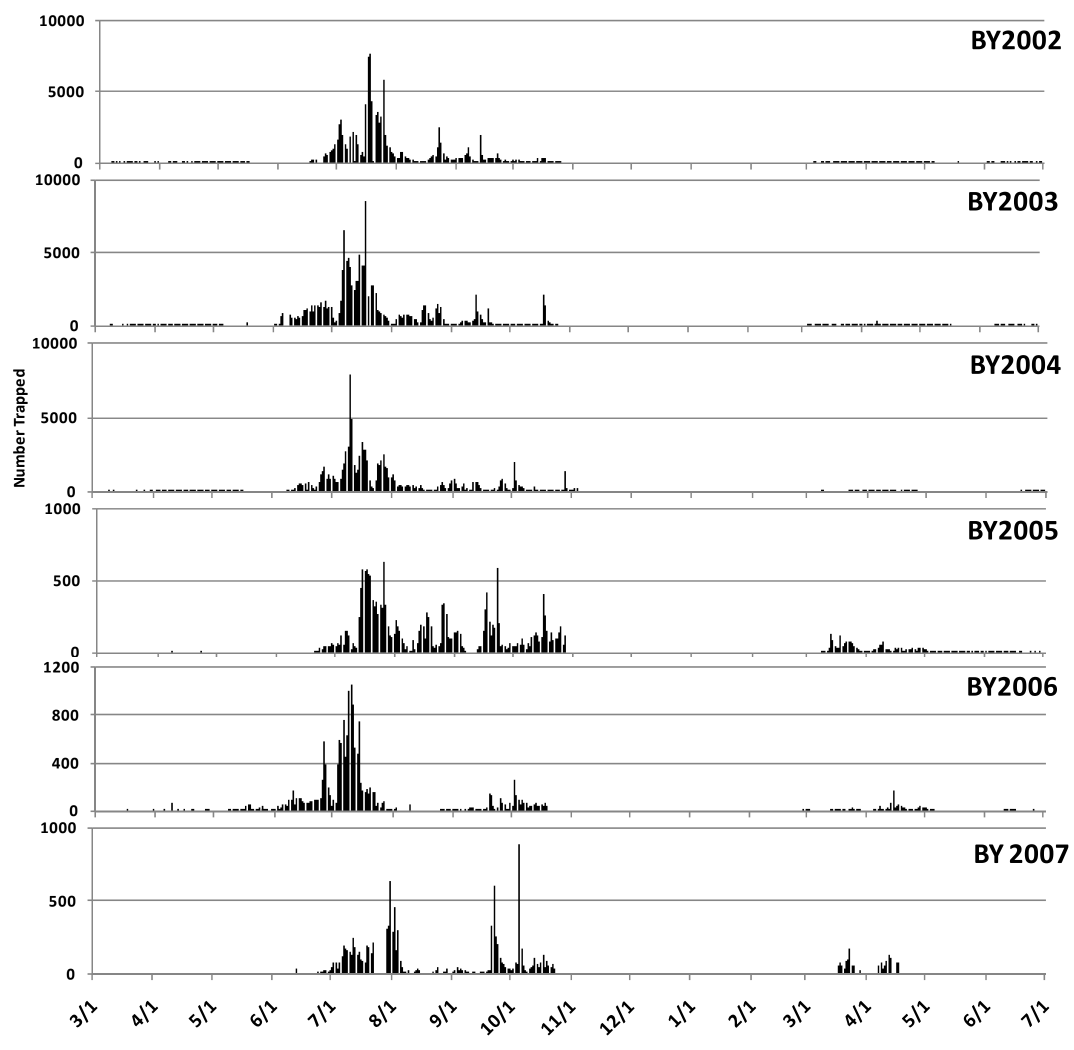


Figure 5. Emigration timing of natural-origin juvenile Chinook salmon at South Fork Salmon River screw trap BY2002-2007 (IDFG unpublished data).

The first pulse (subyearling parr) generally occurs from mid-June to mid-August, the second pulse (subyearling pre-smolt) occurs from mid-August through October. The final pulse (yearling smolt) occurs from mid-March through mid-April of the following year. The trap is typically operated from mid-March through late-October, so fish emigrating between November and mid-March are not accounted for. Also, for most years, the trap is not operated for a three to four week period during spring high flows in May and June.

Regardless of when juveniles emigrate from the spawning areas in upper SF Salmon River, they rear in fresh water for one full year after emergence and subsequently migrate to the ocean as yearling smolts from April through June. The table below shows the seaward migration timing of natural-origin Chinook salmon from the upper South Fork Salmon River based on PIT-tag interrogation data from Lower Snake River dams for brood years 1995-1998 and 2002. Fish were PIT-tagged as both subyearling parr and pre-smolts and as yearling smolts. Juveniles PIT-tagged as subyearlings typically arrive at Lower Granite Dam three to four weeks prior to juveniles tagged as yearling smolts (Table 8).

Table 8. Number of PIT-tagged natural-origin juvenile Chinook salmon detected at Lower Snake River dams and the dates at which 10%, 50%, and 90% were detected.

Brood Year	Lifestage Tagged	No. of Detections	10% Detected	50% Detected	90% Detected
1995	presmolt	73	4/16	4/23	5/17
	smolt	74	5/11	5/17	6/23
1996	presmolt	265	4/18	5/4	5/26
	smolt	85	5/13	5/27	7/4
1997	presmolt	121	4/20	4/27	5/31
	smolt	172	5/7	6/4	6/18
1998	presmolt	299	4/15	5/2	5/28
	smolt	203	5/6	6/28	7/8
2002	subyearling	310	4/21	5/6	5/16
	yearling	507	5/4	5/23	6/12

Source: Lutch et al. (2003) and Venditti et al. (2005)

Identify the NMFS ESA-listed population(s) that will be <u>directly</u> affected by the program

Natural-origin Chinook salmon from the South Fork mainstem summer Chinook salmon (SFMAI) population will be used to develop the integrated component of this hatchery program. Approximately 1380 adults will be collected for broodstock each year. The number of natural-origin adults (NOR) used in the broodstock (NOB) will depend on the sliding scale broodstock management implemented each year (see section 1.11.1 above).

Identify the NMFS ESA-listed population(s) that may be <u>incidentally</u> affected by the program.

All juvenile Chinook salmon releases, adult trapping and broodstock collection for this program occur within the SFMAI population area. However, populations that could be affected by adult strays from this program include the remaining two Chinook salmon populations within the South Fork Salmon River MPG. To a lesser extent, Chinook salmon in MPGs downstream of the South Fork Salmon River MPG potentially could also be affected by the McCall Fish Hatchery program.

Assessment of the level of risk that the hatchery program has on the viability of the natural population (criteria based on Appendix C of the NOAA Fisheries-Supplemental Comprehensive Analysis (SCA)).

Abundance: Managers have initiated the development of a integrated two stage stepping-stone program to reduce the risks associated with hatchery fish spawning in the wild. As such, a component of the natural-origin return will be incorporated into the hatchery broodstock annually. A sliding scale was developed to reduce the risk associated with removing natural-origin fish from the spawning grounds.

Approximately 25% of the total hatchery production will be used to maintain an integrated broodstock that will be used to supplement the natural population above the weir thus increasing the abundance of natural spawners. This will be particularly advantageous in years of very low natural-origin abundance.

Incidental mortality associated with the operation of the adult trapping facility is considered a low risk by managers. During the time period between 1997 and 2008, the average mortality rate of natural-origin fish that were documented as being killed as a direct result of trapping and handling operations was 0.4% (range 0.0-1.1%).

Productivity: The hatchery weir in the SFSR is located approximately 71 miles upstream from the mouth and a significant component of the spawning habitat is located below the weir. This situation makes it impossible to control the composition of hatchery- and natural-origin spawners below the weir. Managers have initiated an integrated steeping-stone broodstock program to reduce the impacts associated with hatchery-origin fish spawning with natural-origin fish. Additionally, the integrated supplementation program will provide a conservation benefit for years when natural-origin numbers are very low by providing short term protection against demographic risks. The sliding scale for broodstock management is designed to maintain the harvest mitigation program while reducing risks to the natural population.

Spatial Structure: The ICTRT rated all metrics for spatial structure for the SFSR population as either low or very low. It is not expected that the hatchery program poses risk to the spatial structure of the SFSR population. For years of very low natural-origin abundance, the integrated hatchery program will provide an opportunity to increase the extent of available habitat that is used.

Diversity: The original broodstock for the SFSR program was composed of summer run adults collected at Little Goose Dam from 1974 to 1978, from Lower Granite Dam (LGD) in 1979, and from LGD and the SFSR trap in 1980. Since 1981, broodstock collection has come exclusively from adults captured at the adult trap site on the SFSR.

The ICTRT rated most of the metrics for diversity in the SFSR Mainstem population as low or very low. Genetic variation, due to lack of inter-annual variation, was rated as a moderate risk. The metric for "Spawner composition" was rated as a high risk due to the high proportion of within-population hatchery-origin spawners spawning naturally. By integrating the hatchery broodstock, managers are attempting to let the natural environment drive selection in the hatchery population and therefore reduce risks associated with hatchery-origin fish spawning naturally.

2.2.2 Status of NMFS ESA-listed salmonid population(s) affected by the program.

Describe the status of the listed natural population(s) relative to "critical" and "viable" population thresholds.

The ICTRT classified the SF Salmon River population as a "large" population based on historical habitat potential (ICTRT 2005). A Chinook population classified as large has a mean minimum abundance threshold of 1,000 naturally produced spawners with sufficient intrinsic productivity to achieve a 5% or less risk of extinction over a 100-year timeframe.

Current (1957 to 2001) natural abundance (number of adults spawning in natural production areas) has ranged from 224 (in 1995) to 5,290 fish in 1960 (HSRG 2009). Abundance in recent years has been variable. The most recent 10-year geometric mean number of natural spawners was 556 (NOAA Draft Recovery Plan (HSRG 2009). The ICTRT status assessment indicates that the SF Salmon River population is at high risk based on low abundance and productively. The current program management is attempting to address these deficiencies in two ways: (1) initiate an integrated stepping stone program to reduce the effects of domestication when hatchery fish spawn with natural-origin fish in the wild (modeled increase in productivity); and (2) use a segment of the returning integrated adults to supplement natural spawners above the hatchery weir to increase the abundance of natural spawners.

Provide the most recent 12 year (e.g., 1988-present) progeny-to-parent ratios, survival data by life-stage, or other measures of productivity for the listed population. Indicate the source of these data.

Estimates of Upper Salmon River abundance and productivity were developed by the ICTRT and are presented in Table 9.

Table 9. Abundance and productivity measures for the South Fork Salmon River summer Chinook population.

10-year geomean natural abundance	556
20-year return/spawner productivity	0.67
20-year return/spawner productivity, SAR adj. and delimited*	0.90
20-year Beverton-Holt fit productivity, SAR adjusted	1.2
20-year Lambda productivity estimate	1.11
Average proportion natural-origin spawners (recent 10 years)	0.56
Reproductive success adjusted for hatchery-origin spawners	n/a

Source: ICTRT 2005, Table 2

Provide the most recent 12 year (e.g., 1988-1999) annual spawning abundance estimates, or any other abundance information. Indicate the source of these data. Annual spawner abundance and other key population metrics developed by the ICTRT for the South Fork Salmon River summer Chinook population are shown in Table 10 (ICTRT 2005).

Table 10. South Fork Salmon River mainstem summer Chinook population metrics for brood years (1979-2003)

Brood Year	Spawners	%Wild	Natural Run	Nat. Rtns	R/S	Rel. SAR	Adj. Rtns	Adj. R/S
1979	**266**	**1.00**	**266**	**158**	**0.60**	**0.87**	**137**	**0.52**
1980	**268**	**1.00**	**268**	**277**	**1.03**	**0.58**	**161**	**0.60**
1981	**291**	**1.00**	**291**	**458**	**1.57**	**0.63**	**288**	**0.99**
1982	**256**	**1.00**	**256**	**374**	**1.46**	**0.51**	**191**	**0.75**
1983	**427**	**0.56**	**239**	**1461**	**3.42**	**0.58**	**842**	**1.97**
1984	**381**	**0.56**	**213**	**350**	**0.92**	**1.65**	**579**	**1.52**
1985	**746**	**0.56**	**418**	**275**	**0.37**	**1.57**	**431**	**0.58**
1986	**668**	**0.56**	**374**	**726**	**1.09**	**1.41**	**1025**	**1.54**
1987	1,737	0.56	973	444	0.26	1.83	811	0.47
1988	1,659	0.56	929	1508	0.91	0.75	1127	0.68
1989	**501**	**0.56**	**281**	**570**	**1.14**	**1.79**	**1022**	**2.04**
1990	892	0.56	499	139	0.16	4.65	646	0.72
1991	908	0.56	508	139	0.15	3.01	418	0.46
1992	1,582	0.56	886	358	0.23	1.65	592	0.37
1993	2,169	0.56	1215	958	0.44	1.61	1542	0.71
1994	**552**	**0.56**	**309**	**130**	**0.24**	**1.04**	**136**	**0.25**
1995	**224**	**0.56**	**125**	**597**	**2.66**	**0.60**	**358**	**1.60**
1996	**367**	**0.77**	**281**	**672**	**1.83**	**0.54**	**365**	**0.99**
1997	1257	0.36	454	2095	1.67	0.30	620	0.49
1998	1204	0.60	722	1382	1.15	0.30	411	0.34
1999	926	0.75	695					
2000	1,511	0.49	740					
2001	2,529	0.56	1416					
2002	3,021	0.56	1692					
2003	3,130	0.37	1158					

Source: ICTRT 2005, Table 6

Provide the most recent 12 year (e.g., 1988-1999) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.

Estimated numbers and proportions of natural-origin summer Chinook salmon on the spawning grounds in the SFSR mainstem are presented above in Table 10.

2.2.3 Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of NMFS listed fish in the target area, and provide estimated annual levels of take.

Estimated take by activity for hatchery operations, programmatic maintenance, and research and monitoring are provided in Appendix A; Tables 1a-c. Take for juvenile trapping and adult carcass sampling is covered under annually renewed 4d Research permits for the Idaho Chinook Supplementation Study (2010- 14706) and the Idaho Natural Production Monitoring and Evaluation Project (2010-15763).

Describe hatchery activities that may lead to the take of listed salmonid populations in the target area, including how, where and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take.

Hatchery Operational Activities- ESA-listed summer Chinook salmon are trapped during broodstock collection periods at the SF Salmon River trap. Adult trapping and broodstock collection that occurs from mid-June through mid-August includes capture/handle and release of listed natural-origin Chinook salmon. The number of NOR adults retained for use as broodstock will vary depending on the abundance of NORs (see sliding scale in Section 1.11.1)

Hatchery Programmatic Maintenance Activities

Maintenance Activities at McCall Fish Hatchery- No take of NMFS listed species is anticipated for any of the maintenance activities at McCall Fish Hatchery.

1. Main Intake Water Supply Lines & Control Valves: Water supply for MCFH enters the hatchery by means of a 3-ft diameter pipeline that travels from Payette Lake to the Hatcheries head-box and is gravity fed. Two intakes are available, deep and surface, which are connected to a mixing box located at Lardo Dam which allows for limited temperature control during the summer. During the fall and winter months, lake levels are lowered which effectively dewater the surface intake and all hatchery water flow is derived from the deep intake. The deep intake structure is located approximately ¼ mile into Payette Lake at a depth of 50-feet. Control valves for these two intakes are located at Lardo Dam. Annual maintenance involves inspection of water control valves, applying grease as needed to ensure smooth operation and visual inspection of the surface intake. Woody debris and other materials may need to be removed prior to opening the surface intake valve. Periodic inspection of the deep intake, by professional divers, and video

inspection of water pipelines should be performed on a 25-30 year cycle. The last such inspection took place in August 2004. No take of ESA listed species is anticipated.

2. Hatchery Head-box: Water enters the hatchery from Lardo Dam to the hatcheries head-box. Prior to being divided for single pass use through the facility water flows through a wedge wire grate to remove debris. This screen is brushed clean daily and should be pressure washed annually to ensure efficient operation. No take of ESA listed species is anticipated.

3. Hatchery Building Water flow Pipelines: Sand and silt is transported into the facility and the main indoor water supply line needs to be flushed on an annual to biannual basis to help remove accumulations of this material and usually takes 15-minutes. This action typically takes place in the early spring after flow to incubation stacks is no longer required. No take of ESA listed species is anticipated.

4. Hatchery Building Incubation: Incubation stacks/ trays are pressure washed, hand washed then disinfected in a chlorine solution (100 ppm) between uses. Individual screens are inspected and repaired as needed. Prior to turning on water for salmon egg incubation, ultra violet sterilizer bulbs need to be inspected and replaced as needed and any accumulated silt deposits need to be flushed from the uv-boxes. Also, the main incubation line needs to be flushed for approximately 15-minutes to remove accumulated silt and stagnant water. No take of ESA listed species, due to this maintenance activity, is expected.

5. Hatchery Building Indoor Early Rearing Vats: Between brood year cycles of salmon fry, individual vats are hand washed then disinfected with a chlorine solution (1,000 ppm) spray and allowed to well dry, neutralizing the chlorine. In season fish movements only allow for hand cleaning. At set up, bushing holes for baffles are inspected and any missing metal bushings are replaced. Wall integrity and keyways are inspected and patched as needed. Paint needs to be periodically applied to the vat interiors on a 25-30 year schedule. This action has been identified as needed maintenance to be preformed. No take of ESA listed species is anticipated.

6. Outdoor Rearing Ponds & Collection Basin: Between brood year cycles (annually), grates covering up-wells are removed and any debris is removed. Screens and dam boards are removed and pressure washed. All walls and floors are pressure washed. Backpack sprayers are used to apply a disinfecting solution of chlorine (1,000 ppm) to all wall, floors, screens and boards. Grates are reattached to up-wells and sealed using silicone around its gasket. Any defects are noted to provide basis for budgeting in the event that significant repairs may be needed. No take of ESA listed species is anticipated.

7. Outdoor Settling Basin: All water, used for fish culture, passes through the hatcheries outdoor settling basin to removed settable solids prior to being discharged into the North Fork Payette River. The settling basin is an earthen depression with a clay bottom; a concrete outflow structure is in place with piping extending to the river at river bottom grade. Annually, the fence surrounding the settling basin needs to be retightened as a documented safety measure to discourage access by hatchery visitors. Muskrats must be

periodically trapped/ removed to prevent bank degradation. Periodically, hatchery flow needs to be diverted and water removed from the settling basin to allow for the removal of accumulated waste materials and should be done on a 25-30 year cycle. The last such cleaning took place in January 1999. No take of ESA listed species is anticipated.

<u>Maintenance Activities at the South Fork Salmon River Satellite/ Trap</u>

1. Access Road & General Grounds: The SFSR Trap is located approximately 26-miles east of Cascade, Idaho and is only manned/operated during the late spring – summer months for the collection of summer Chinook salmon. In the spring the access road leading down to the trap must be inspected and any fallen rocks/ trees removed. An inspection of the immediate grounds is undertaken to identify any winter damage and to identify potential hazard trees that need to be removed prior to summer activities. At the end of the season, water-bars on the access road need to be cleared/deepened to help prevent erosion in the spring. No take of ESA listed species is anticipated.

2. Buildings & Crew Quarters: During the winter personnel need to snowmobile into the trap compound periodically to shovel off snow from the crew quarters and from the outhouse/power room. Typically this must be done 3-5 times each winter. At the end of each trapping/ spawning season, domestic water is turned off, all lines are drained/ blown out and the gas to the crew quarters is turned off. No take of ESA listed species is anticipated.

3. Intake Water Supply Line: Water is provided to the holding ponds/ trap by way of a 30-inch pipe that extends approximately 200-yards from a concrete intake structure upstream of the compound. Prior to opening the control valve, boards in the intake structure are removed and any woody debris is cleared from grating in the river. When initially opened, water is first by-passed from entering the holding ponds back into the river below the trap's bridge/weir. This is done to help remove sand in the pipeline and sand that had accumulated in front of the water intake structure and water should be allowed to flow in this manner for 12-24 hours before being channeled through the ponds. When shutting down in the fall grease should be applied to the water control valve and boards replaced. No take of ESA listed species is anticipated.

4. Holding Ponds and Adult Trap: While the ponds are dry, heavier sand accumulations should be shoveled out of the ponds. Afterward remaining sand deposits are flushed out of the ponds/ trap with the aid personnel sweeping. Once cleaned, dam boards are added to the holding ponds/ trap and wedged into place. Prior to passing water through the holding ponds, ladder boards need to be inspected and wedged into place as needed. At the end of the season boards in the holding ponds/ trap are removed and walls are inspected for any damage/ concrete erosion. Water lines are blown out to prevent damage due to freezing; including those leading to the sorting areas in the spawn area. Occasionally juvenile Chinook salmon are collected when the adult holding ponds are dewatered at the end of the season. Hatchery staff net any stranded fish and release them back to the river. At the end of the trapping season (mid-august)

the adult trap is dewatered and occasionally a few juvenile Chinook salmon are left in the trap. Hatchery staff net the stranded fish and return them to the river.

5. Permanent Bridge and Weir Panels: The permanent bridge holding individual weir panels (completed 2005) is inspected for damage each spring. Prior to pivoting weir panels into place silt and rocks that settled behind the concrete lip of the sill extending across the river must be removed. Most of this material can be removed by pivoting the weir panel close to the lip causing water turbulence to lift the sand away. Rocks and woody debris must be removed by hand by means of staff personnel in the river. Once clear, individual panels can be pivoted then locked into place; beginning from the compound side of the bridge. This maneuver requires the use of a come-along that is under high load and extreme care must be exercised. Replacement signage and covers along the downstream side of the weir panels must be inspected to ensure they are in place. At the end of the season, weir panels are unlocked and pivoted to under the bridge, for storage, and locked into place. No take of ESA listed species is anticipated.

Research/Monitoring - Research activities are conducted in the vicinity of the SFSR trapping and spawning facility and contribute to the take of listed Chinook salmon.

Juvenile Trapping. A smolt monitoring trap is operated approximately 2 km upstream of the SF Salmon River weir from March-October each year by research staff to estimate juvenile production above the hatchery weir as part of the ISS research project. At a minimum, all fish captured are identified and enumerated. Most fish captured are either counted and released or anesthetized, measured, weighed and then released. Smaller groups of fish are PIT-tagged and then released in order to estimate survival to Lower Granite Dam and to monitor migration timing. This trap is operated as part of the ISS Supplementation Evaluation Research project. Anticipated take for this research activity is listed in Appendix A; Table 1c. However this take is also reported through 4d coverage under annually renewed permits (ID2008-4242).

Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality levels for listed fish.

Table 11 The number of natural-origin adult spring Chinook salmon retained ("ponded") in the hatchery and incorporated in annual spawning designs for supplementation research.

Return Year	McCall Fish Hatchery Trapping History (Hatchery-Produced/Natural)	Total Spawned (H/N)	Total Males Spawned (H/N)	Total Females Spawned (H/N)
1995	305 (267/38)	171 (159/12)	114 (106/8)	57 (53/4)
1996	1,199 (1,042/157)	333 (303/30)	222 (202/20)	111 (101/10)
1997	3,659 (3,371/288)	1,689 (1,587/102)	1,126 (1,058/68)	563 (529/34)
1998	977 (825/152)	897 (807/90)	598 (538/60)	299 (269/30)
1999	1,961 (1,670/291)	1,281 (1,212/69)	854 (808/46)	427 (404/23)

2000	6,786 (6,093/693)	1,083 (1,032/51)	722 (688/34)	361 (344/17)
2001	10,922 (9,342/1,580)	1,251 (1,221/30)	834 (814/20)	417 (407/10)
2002	8,603 (7,322/1,281)	1,143 (1,029/114)	762 (686/76)	381 (343/38)
2003	8,098 (6,603/1,495)	1,443 (1,443/0)	962 (962/0)	481 (481/0)
2004	6,189 (5,594/595)	1,392 (1,392/0)	928 (929/0)	464 (464/0)
2005	3,214 (2,960/254)	1,305 (1,305/0)	870 (870/0)	435 (435/0)
2006	2,151 (1,889/262)	1,296 (1,296/0)	864 (864/0)	432 (432/0)
2007	3,994 (3,714/280)	1,005 (1,005/0)	670 (670/0)	335 (335/0)
2008	6,571 (5,977/594)	1,287 (1,287/0)	858 (858/0)	429 (429/0)

Source: McCall Fish Hatchery brood year and run year reports.
Note: All natural fish not spawned were released above the weir to spawn naturally.

Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take).

All natural origin adults intercepted at the hatchery trap are handled and either released upstream to spawn naturally or held for spawning. A tissue sample from all natural fish released upstream is taken to maintain a genetic baseline. From 1998 through 2008, the number of natural origin adults trapped at the South Fork Salmon River trapped has ranged from 152-1,778. Estimated take by activity for hatchery operations, programmatic maintenance, and research and monitoring are provided in Appendix A; Tables 1a-c. Take for juvenile trapping and adult carcass sampling is covered under annually renewed 4d Research permits for the Idaho Chinook Supplementation Study (2010- 14706) and the Idaho Natural Production Monitoring and Evaluation Project (2010-15763).

Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this plan for the program.

It is unlikely that take levels for natural-origin summer Chinook salmon will exceed projected take levels presented in Appendix A. However, in the unlikely event that stated levels of take are exceeded, the IDFG will consult with NMFS Sustainable Fisheries Division or Protected Resource Division staff and agree to an action plan. We assume that any contingency plan will include a provision to discontinue trapping activities.

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

3.1 Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (e.g., the NPPC *Annual Production Review* Report and Recommendations - NPPC document 99-15). Explain any proposed deviations from the plan or policies.

This program conforms with the plans and policies of the Lower Snake River Compensation Program administered by the U.S. Fish and Wildlife Service to mitigate for the loss of Chinook salmon production caused by the construction and operation of the four dams on the lower Snake River.

The IDFG participated in the development of the Artificial Production Review and Evaluation (APRE) and Hatchery Scientific Review Group (HSRG) documents and is familiar with concepts and principals contained therein. This program is largely consistent with recommendations from these documents.

3.2 List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates.

This HGMP is consistent with the following cooperative agreements:

- Cooperative Agreement between the U.S. Fish and Wildlife Service and the Idaho Department of Fish and Game, USFWS Agreement No.: 14110-A-J008 (2010 cooperative agreement number for Lower Snake River Compensation Plan monitoring and evaluation studies)
- Cooperative Agreement between the U.S. Fish and Wildlife Service and the Idaho Department of Fish and Game, USFWS Agreement No.: 14110-A-J007 (2010) cooperative agreement number for Lower Snake River Compensation Plan hatchery operation and maintenance)
- 2008-2017 Management Agreement pursuant to US vs. Oregon, U.S. District Court, District of Oregon

3.3 Relationship to harvest objectives.

The Lower Snake River Compensation Plan defined replacement of adults “in place” and “in kind” for appropriate state management purposes. Juvenile production and adult escapement targets were established at the outset of the LSRCP. State, tribal and federal co-managers work co-operatively to develop annual production and mark plans that are consistent with original LSRCP and Hells Canyon Settlement Agreement, the US vs. OR Management Agreement, and recommendations of the HSRG and HRT relative to ESA impact constraints, genetics, fish health and fish culture concerns.

In the Snake River basin, mitigation hatchery returns are harvested in both mainstem and tributary terminal fisheries. Fish that return in excess to broodstock needs for the hatchery programs are shared equally between sport and Tribal fisheries. State and Tribal co-managers cooperatively manage fisheries to maximize harvest of hatchery returns that are in excess of broodstock and escapement needs. Fisheries are managed temporally and spatially to: minimize impacts to non-target natural returns and comply with ESA incidental take limits; achieve hatchery broodstock goals; achieve sharing objectives among Tribal and recreational fisheries; optimize the quantity and quality of fish harvested that are in excess of what is needed to meet broodstock needs; maximize temporal and spatial extent of fishing opportunities; and minimize conflicts between different gear types and user groups

State and Tribal co-managers confer pre-season relative to assessing forecasted levels of abundance of both hatchery and natural fish in the fisheries. Forecasts are used to project likely non-tribal and tribal harvest shares. Incidental take rates applicable to fisheries are projected based on forecasted natural populations addressed in the 2000 Biological Opinion. As part of the in-season harvest management and monitoring program, the IDFG and Tribal cooperators conduct annual angler surveys to assess the contribution program fish make toward meeting program harvest mitigation objectives. The surveys are also used for in-season assessments of recreational and Tribal harvest shares and to determine ESA take relative to allowable levels based on the sliding scales of natural spawner abundance. In-season, state, tribal, and federal co-managers conduct weekly teleconferences in concert with web-based data sharing tools to confer about harvest and incidental take levels and the disposition of fish captured at the hatchery traps in excess of broodstock needs. Co-managers also conduct meetings after fisheries conclude to assess the success of the management actions taken during the season.

3.3.1 Describe fisheries benefiting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years (1988-99), if available.

Harvest information for the South Fork Salmon River hatchery releases is presented in Table 13a and 13b below.

Table 13a. Estimated fishing effort and harvest of hatchery-origin summer Chinook salmon from the South Fork Salmon River 1996-2009.

Year	Estimated Number of Angler Visits	Estimated Angler Effort (hours)	Estimated Sport Angler Harvest
1996	no fishery held	n/a	n/a
1997	2,217	10,876	433
1998	no fishery held	n/a	n/a
1999	no fishery held	n/a	n/a
2000	1,773	9,400	867
2001	9,963	53,208	6,084
2002	13,660	75,946	6,843
2003	14,966	80,948	5,456
2004	7,037	37,856	3,591
2005	5,553	24,165	1,131
2006	4,029	15,172	364
2007	3,422	16,759	723
2008	8,078	41,726	3,712

Between 1968 and 1997, no fisheries targeting Chinook salmon occurred in the South Fork Salmon River.
Source: Apperson (2003, 2004, 2005, 2006); IDFG (unpublished data)

Table 13b. Estimated harvest of hatchery-origin McCall Fish Hatchery summer Chinook salmon 1997-2009.

Return Year	Production Rack Return	SF Salmon R. Harvest (Sport)	SF Salmon R. Harvest (Tribal)	Lower Salmon (SF Salmon stock)	Columbia and Snake River Harvest	Total	Harvest Rate
1997	2,589	433	195	0	3	3,220	19.60%
1998	582	No Fishery	0	0	0	582	0.00%
1999	1,583	No Fishery	0	0	20	1,603	1.25%
2000	5,766	867	430	0	78	7,141	19.26%
2001	8,337	6,084	1,633	63	1,117	17,234	51.62%
2002	6,230	6,843	1,138	4	432	14,647	57.47%
2003	5,701	5,456	1,250	63	569	13,039	56.28%
2004	5,341	3,591	941	514	1,386	11,773	54.63%
2005	2,829	1,131	661	49	291	4,961	42.98%
2006	1,568	364	188	15	739	2,874	44.92%
2007	3,396	723	322	0	714	5,155	34.12%
2008	5,977	3,712	318	254	Unaval.	10,261	39.27%
2009	9,190	4,149	1,071	497	Unaval.	14,907	35.02%

3.4 Relationship to habitat protection and recovery strategies.

Hatchery production for harvest mitigation is influenced but not linked to habitat protection strategies in the Salmon River subbasin and other areas. The NMFS has not developed a recovery plan specific to Snake River Chinook salmon, but the Salmon River spring/summer Chinook program is operated consistent with existing Biological Opinions. The program purpose is to mitigate for the construction of the four lower Snake River federal projects, which reduce the survival rates for juvenile and adult fish migrating to and from the ocean. Thus facility or operational changes that improve salmon survival at these four projects and others located in the Columbia River will affect Upper Salmon River summer Chinook abundance and diversity.

3.5 Ecological interactions. [Please review Addendum A before completing this section. If it is necessary to complete Addendum A, then limit this section to NMFS jurisdictional species. Otherwise complete this section as is.]

Fish are reared in an out-of-basin hatchery that does not affect listed anadromous populations. Potential adverse effects to listed salmon could occur from the release of hatchery-produced summer Chinook juveniles through the following interactions: predation, competition, behavior modification, and disease transmission.

There are potential adverse effects to listed adult summer Chinook salmon and their progeny from the release of hatchery summer Chinook salmon upstream of the SR Salmon River weir for natural spawning. None will result in direct mortality of adults. The potential effects include changes in fitness, growth, survival and disease resistance of the listed population. The effects may result in decreased productivity or long-term adaptability (Kapuscinski and Jacobson 1987; Bowles and Leitzinger 1991). These changes are more likely when the hatchery and natural stocks are not genetically similar or locally adapted. However, some increase in natural production can be expected when hatchery-reared fish are sufficiently similar to wild fish and natural rearing habitats are not at capacity (Reisenbichler 1983). IDFG believes this is the case with the SF Salmon River, recognizing that releasing hatchery summer Chinook salmon to spawn naturally can increase natural production, but not necessarily productivity.

From the work of Sankovich and Bjornn (1992), it appears that hatchery adults released upstream of the SF Salmon River weir spawn with listed summer Chinook salmon. They concluded that the native SF Salmon River run has been integrated into the hatchery, with most fish having some hatchery lineage influence. They also determined that spawning times for hatchery and natural fish were similar. Their work suggested that neither hatchery nor natural adults were restrictive in mate selection, although they did not witness many spawning acts. Sankovich and Bjornn (1992) also concluded that though hatchery adults appeared slightly longer at a given age than natural adults (1 to 2 cm difference), the differences were not such that hatchery fish would have a reproductive advantage in terms of fecundity or competition for mates. Waples et al. (1991a) found little evidence of genetic change in brood years 1981 – 1982 and brood year 1988 summer Chinook salmon tissue samples from the McCall Fish Hatchery. Their interpretations, applied to the combined hatchery/wild population, was that effective population size was not too small and that straying and transfers of genetically distinct stocks into the hatchery were not an important factor during the 1981 – 1988 period. The hatchery has not been managed as a closed population because broodstock have been developed from a mixture of hatchery and naturally produced adults since the inception of the program. Genetically, the McCall Fish Hatchery summer Chinook salmon clustered closely with wild salmon in the SFSR. Our assumption is that both production components of the SF Salmon River summer Chinook salmon run are genetically similar.

There is potential that returning hatchery-produced adults pose a genetic risk to listed salmon by straying. Strays or wandering adults may spawn with natural adults. This is most likely to occur just below the SF Salmon River weir. The primary risk associated with straying is loss of genetic diversity due to genetic drift (Bowles and Leitzinger 1991). In the SF Salmon River, this risk is minimized because broodstock for this program were sourced from locally adapted wild fish (Waples et al. 1991a).

Idaho Department of Fish and Game information collected from PIT- and coded-wire tags indicate that hatchery-produced adults of McCall Fish Hatchery origin rarely, if at all, are identified at other stream or hatchery locations.

The IDFG does not believe that the release of juvenile summer Chinook salmon in the SF Salmon River will affect listed sockeye salmon in the free-flowing migration corridor. Adults and juveniles of these two runs of salmon are temporally and spatially separated, with juvenile sockeye having a later outmigration timing than summer Chinook salmon released in April. The NMFS (1994) agreed that there appeared to be some separation in run timing in the migration corridor, which would minimize effects to listed sockeye salmon.

Although it is possible that both hatchery-produced summer Chinook salmon smolts and fall Chinook salmon fry could be present in the Snake River at the same time, IDFG believes that hatchery smolts released in late March and April will be out of the Snake River production area when fall Chinook salmon emerge in late April and early May (IFRO 1992). Because of their larger size, summer Chinook salmon smolts migrating through the lower Salmon and Snake rivers will probably be using different habitat than emerging fall Chinook salmon fry (Everest 1969). Thus, we assume that there is no effect to fall Chinook salmon juveniles in the production area or free-flowing migration corridor from the LSRCP summer Chinook salmon releases in the SF Salmon River. Fall Chinook salmon adults would be temporally and spatially separated from summer Chinook salmon adults returning from the release as well.

Juvenile hatchery-origin Chinook salmon are spatially separated from listed species during early rearing. Therefore, effects are possible only in the migration corridor, primarily with listed spring/summer Chinook salmon and steelhead. Wild Chinook salmon fry are just beginning to emerge from the gravel during the release period and few would be available as food to hatchery Chinook salmon smolts.

Hatchery-produced smolts are spatially separated from listed species during early rearing, so effects are likely to occur only in the migration corridor after release. Perry and Bjornn (1992) documented that natural Chinook salmon fry movement in the upper Salmon river began in early March, peaked in late April and early May, and then decreased into the early summer as the fish grew to parr size. Average length of spring Chinook salmon fry ranged from 32.9 – 34.9 mm through late April in the upper Salmon River. Mean fry size increased to 39.8 mm by mid-June (Perry and Bjornn 1992). Assuming that hatchery-produced Chinook salmon smolts could feed on prey up to 1/3 of their body length, natural fry would be in a size range to be potential prey. However, emigration from release sites generally occurs within a few days and the IDFG does not believe that hatchery-produced smolts would convert from a hatchery diet to a natural diet in such a short time (USFWS 1992, 1993). Buettner and Nelson (1990, 1991) reported travel times for freeze-branded hatchery-produced summer Chinook salmon juveniles released in the SF Salmon River to their Snake River smolt trap. They reported migration times ranging from 5 to 18 miles per day (8 to 29 km per day). At these migration rates, hatchery-produced smolts would quickly leave the SF Salmon River production area. Additionally, the IDFG is unaware of any literature that suggests that juvenile Chinook salmon are piscivorous.

The release of a large number of prey items, which may concentrate predators, has been identified as a potential effect on listed salmon and steelhead. Hillman and Mullan (1989) reported that predaceous rainbow trout (>200 mm) concentrated on wild salmon within a moving group of hatchery-produced age-0 Chinook salmon juveniles. Releasing fish over a number of days is expected to minimize the risk associated with this situation.

The literature suggests that the effects of behavioral or competitive interactions between hatchery-produced and natural Chinook salmon juveniles would be difficult to evaluate or quantify (USFWS 1992, 1993). There is limited information describing adverse behavioral effects of summer releases of hatchery-produced Chinook salmon fingerlings (age 0) on natural Chinook salmon fingerlings. Hillman and Mullan (1989) reported that larger hatchery-produced fingerlings apparently "pulled" smaller Chinook salmon from their stream margin stations as the hatchery fish drifted downstream. The hatchery-produced fish were approximately twice as large as the natural juveniles. In this study, spring releases of steelhead smolts had no observable effect on natural Chinook salmon fry or smolts. However, effects of emigrating yearling, hatchery-produced Chinook salmon on natural Chinook salmon fry or yearlings is unknown. There may be potential for the larger hatchery-produced fish, presumably migrating in large schools, to "pull" natural Chinook salmon juveniles with them as they migrate. If this occurs, effects of large, single-site releases on natural survival may be adverse. The IDFG does not know if this occurs, or the magnitude of the potential effect.

The IDFG believes that competition for food, space, and habitat between hatchery-produced Chinook salmon smolts and natural fry and smolts should be minimal due to: (1) spatial segregation, (2) foraging efficiency of hatchery-produced fish,(3) rapid emigration in free flowing river sections, and (4) differences in migration timing. If competition occurs, it would be localized at sites of large group releases (Petrosky 1984).

Chinook salmon habitat preference criteria studies have illustrated that spatial habitat segregation occurs (Hampton 1988). Larger juveniles (hatchery-produced) select deeper water and faster velocities than smaller juveniles (natural fish). This mechanism should help minimize competition between emigrating hatchery-produced Chinook salmon and natural fry in free-flowing river sections.

The time taken for hatchery-produced juvenile Chinook salmon to adjust to the natural environment reduces the effect of hatchery-produced fish on natural fish. Foraging and habitat selection deficiencies of hatchery-produced fish have been noted (Ware 1971; Bachman 1984; Marnell 1986). Various behavior studies have noted the inefficiency of hatchery-produced fish when placed in the natural environment (including food selection). Because of this, and the time it takes for hatchery-produced fish to adapt to their new environment, the IDFG believes competition between hatchery-produced and natural-origin Chinook salmon is minimal; particularly soon after release.

The IDFG does not believe that the combined release of hatchery mitigation and supplementation Chinook salmon in the South Fork Salmon River exceeds the carrying capacity of the free-flowing migration corridor. Food, space, and habitat should not be limiting factors in the Salmon River and free-flowing Snake River.

The spring smolt outmigration of naturally produced Chinook salmon is generally more protracted than the hatchery produced smolt outmigration. Data illustrating arrival timing at Lower Granite Dam support this observation (Kiefer 1993). This factor may lessen the potential for competition in the river.

Summer Chinook salmon reared at the McCall Fish Hatchery have a history of bacterial kidney disease (BKD) incidence. Current control measures at the McCall Fish Hatchery include: (1) adult antibiotic injections, (2) egg disinfection, (3) egg culling based on BKD ELISA value, (4) egg segregation incubation, (5) juvenile segregation rearing, and (6) if needed, juvenile antibiotic feedings.

Bacterial kidney disease and other diseases can be horizontally transmitted from hatchery fish to natural, listed species. In a review of the literature, Steward and Bjornn (1990) stated that there was little evidence to suggest that horizontal transmission of disease from hatchery-produced smolts to natural fish is widespread in the production area or free-flowing migration corridor. However, little additional research has occurred in this area. Hauck and Munson (IDFG, unpublished) stated that hatcheries with open water supplies (river water) may derive pathogen problems from natural populations. The hatchery often promotes environmental conditions favorable for the spread of specific pathogens. When liberated, infected hatchery-produced fish have the potential to perpetuate and carry pathogens into the wild population.

The IDFG monitors the health status of hatchery-produced summer Chinook salmon from the time adults are ponded at the SF Salmon River weir until juveniles are released as pre-smolts or smolts. Sampling protocols follow those established by the PNFHPC and AFS Fish Health Section.

All pathogens require a critical level of challenge dose to establish an infection in their host. Factors of dilution and low water temperature in the SF Salmon River minimize the potential for disease transmission to naturally-produced Chinook salmon; however, none of these factors preclude the risk of transmission (Pilcher and Fryer 1980; LaPatra et al. 1990; Lee and Evelyn 1989). Even with consistent monitoring, it is difficult to attribute a particular occurrence of disease to actions of the LSRCP hatchery summer Chinook salmon program in the South Fork Salmon River.

SECTION 4. WATER SOURCE

4.1 Provide a quantitative and narrative description of the water source (spring, well, surface), water quality profile, and natural limitations to production attributable to the water source.

McCall Fish Hatchery **–** The hatchery receives water through an underground 36 inch gravity line from Payette Lake. Water may be withdrawn from the surface or up to a depth of 50 ft. The IDFG has an agreement with the Payette Lake Reservoir Company to withdraw up to 20 cfs.

South Fork Salmon River Weir – The weir receives water directly from the South Fork Salmon River. Water is supplied through a 33 inch underground pipeline.

4.2) Indicate risk aversion measures that will be applied to minimize the likelihood for the take of listed natural fish as a result of hatchery water withdrawal, screening, or effluent discharge.

The intake screens are in compliance with NMFS screen criteria by design of the Corp of Engineers.

SECTION 5. FACILITIES

5.1 Broodstock collection facilities (or methods).

Adult summer Chinook salmon, used for the McCall Summer Chinook Hatchery program, are collected at the South Fork Salmon River Trap/ weir. A new permanent bridge/ weir, including a concrete sill across the river bottom, was completed for the 2007 adult return year. The satellite facility consists of the bridge/ weir, fish ladder, trap, two adult holding ponds (10-ft x 90-ft) each, a covered spawning area and a crew dormitory trailer. Holding capacity for the trap is 400-adults. Holding capacity for the holding ponds is 500-adults each (1000-adults total). Adults are collected, held and spawned at the satellite facility. Fertilized eggs are transported to McCall Summer Chinook Hatchery for incubation, hatching and rearing (through smolt stage) and then are transported back to the South Fork Salmon River, Knox Bridge, for release.

The Nez Perce Tribe has provided a separate 16-foot diameter circular tank, located within the trap compound, for holding males trapped in Johnson Creek following primary sort. This tank has a holding capacity of approximately 150-adult chinook salmon. Johnson Creek females are maintained with the SFSR females throughout the holding/ spawning period.

5.2 Fish transportation equipment (description of pen, tank truck, or container used).

The following transportation equipment is available for use by the McCall Fish Hatchery:

1. One 10 wheel smolt transport truck fitted with three 700 gallon compartments supplied with oxygen and fresh flow agitator systems.

2. One two-ton, transportation truck (for resident program) fitted with one 1,000 gallon tank with oxygen and fresh flows.

5.3 Broodstock holding and spawning facilities.

McCall Fish Hatchery – No adult holding occurs at the main hatchery facility.

Adult summer Chinook salmon, used for the McCall Summer Chinook Hatchery program, are collected at the South Fork Salmon River Trap/weir. A new permanent bridge/weir, including a concrete sill across the river bottom, was completed for the 2007 adult return year. The satellite facility consists of the bridge/ weir, fish ladder, trap, two adult holding ponds (10-ft x 90-ft) each, a covered spawning area and a crew dormitory trailer. Holding capacity for the trap is 400-adults. Holding capacity for the holding ponds is 500-adults each (1000-adults total). Adults are collected, held and spawned at the satellite facility. Fertilized eggs are transported to McCall Summer Chinook Hatchery for incubation, hatching and rearing (through smolt stage) and then are transported back to the South Fork Salmon River, Knox Bridge, for release.

The Nez Perce Tribe has provided a separate 16-foot diameter circular tank, located within the trap compound, for holding males trapped in Johnson Creek following primary sort. This tank has a holding capacity of approximately 150-adult chinook salmon. Johnson Creek females are maintained with the SFSR females throughout the holding/ spawning period.

5.4 Incubation facilities.

McCall Summer Chinook Fish Hatchery incubation plumbing allows for the placement of 26-eight tray vertical incubation stacks (Heath type) along the South wall of the hatchery building and removable pipes between 3-sets of early rearing vats may be lowered into place to provide additional incubation capacity allowing for the placement of 3-eight tray vertical incubation stacks per vat (18-incubators total; however plumbing for 6 of these stacks has never been tested). Combined this would allow for a maximum incubation capacity of 44 incubation stacks.

5.5 Rearing facilities.

Rearing facilities at the McCall Fish Hatchery include 14 concrete vats (4 ft wide x 40 ft long x 2 ft deep) used for early rearing, two concrete ponds (40.5 ft wide x 196 ft long x 4 ft deep) used for intermediate rearing, and one concrete collection basin (101 ft wide x 15 ft long x 4 ft deep).

5.6 Acclimation/release facilities.

Smolts are transported and released into the South Fork Salmon River at Knox Bridge. Releases occur in late March to early April. River water is pumped into transport vehicles where fish acclimate for a short period of time. Smolt releases take place over a period of four to five days.

5.7 Describe operational difficulties or disasters that led to significant fish mortality.

No significant mortality associated with this program has occurred.

5.8 Indicate available back-up systems, and risk aversion measures that will be applied, that minimize the likelihood for the take of listed natural fish that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.

McCall Fish Hatchery – The McCall Fish Hatchery water supply operates on a gravity flow principal from Payette Lake. The hatchery has a high/low level water alarm installed in each outdoor rearing pond and main incubation line that automatically dials an emergency provider that notifies hatchery personnel when flow is interrupted. An emergency generator in installed to accommodate periods of power interruption.

South Fork Salmon River Weir – No flow alarms are installed at this adult collection and holding facility. During periods of the year when adult Chinook salmon are being held, the facility is permanently staffed.

SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

Describe the origin and identity of broodstock used in the program, its ESA-listing status, annual collection goals, and relationship to wild fish of the same species/population.

6.1 Source.

The program was founded with adult summer Chinook salmon collected from 1978 to 1980 at Ice Harbor, Little Goose, and Lower Granite dams. Adults were collected from the summer run period at the dams to collect fish that were presumed to be locally adapted to the South Fork Salmon River. Early collections established an egg bank program prior to the completion of the hatchery. Between 1980 and 1982, smolts produced from these early collections were released into the South Fork Salmon River upstream of the present location of the weir. Beginning in 1981, all adults used for broodstock purposes have been collected at the South Fork Salmon River weir.

6.2 Supporting information.

6.2.1 History.

See Section 6.1 above.

6.2.2 Annual size.

Approximately 612-female and 742-male (including 31-jacks) reserve summer Chinook salmon are needed annually to meet 285,000-green egg requests (Clearwater Fish Hatchery for Selway River re-introduction), 300,000-eyed egg requests (Shoshone Bannock Tribe for Dollar Creek in-stream incubator boxes) and 1,000,000-smolts for MCFH production (SFSR release at Knox Bridge).

6.2.3 Past and proposed level of natural fish in broodstock.

Summer Chinook salmon adult return numbers (natural-origin and hatchery-origin) for the McCall Fish Hatchery are presented in Table 14. Beginning in 1996, all hatchery-origin and natural-origin adults were identifiable based on marks. Since 2002, all naturally produced adults have been passed upstream of the weir to spawn naturally. Beginning in brood year 2010, managers will incorporate natural-origin adults into the broodstock as part of the two stage stepping stone broodstock program. The specific number of natural-origin fish brought into the hatchery will be determined using a sliding scale that is based on the abundance of NORs (see Section 1.11.1).

Table 14. Number of hatchery- and natural-origin summer Chinook salmon that returned to the South Fork Salmon River weir and were subsequently spawned 1995-2008.

Return Year	McCall Fish Hatchery Trapping History (Hatchery-Produced/Natural)	Total Spawned (H/N)	Total Males Spawned (H/N)	Total Females Spawned (H/N)
1995	305 (267/38)	171 (159/12)	114 (106/8)	57 (53/4)
1996	1,199 (1,042/157)	333 (303/30)	222 (202/20)	111 (101/10)
1997	3,659 (3,371/288)	1,689 (1,587/102)	1,126 (1,058/68)	563 (529/34)
1998	974 (822/152)	897 (807/90)	598 (538/60)	299 (269/30)
1999	1,961 (1,670/291)	1,281 (1,212/69)	854 (808/46)	427 (404/23)
2000	6,812 (6,093/719)	1,083 (1,032/51)	722 (688/34)	361 (344/17)
2001	10,922 (9,144/1,778)	1,251 (1,221/30)	834 (814/20)	417 (407/10)
2002	8,603 (7,322/1,281)	1,143 (1,029/114)	762 (686/76)	381 (343/38)
2003	8,098 (6,603/1,495)	1,443 (1,443/0)	962 (962/0)	481 (481/0)
2004	6,189 (5,594/595)	1,371 (1,371/0)	914 (914/0)	464 (464/0)
2005	3,214 (2,960/254)	1,305 (1,305/0)	870 (870/0)	435 (435/0)
2006	2,151 (1,889/262)	1,210 (1,296/0)	778 (778/0)	432 (432/0)
2007	3,745 (3,465/280)	1,005 (1,005/0)	670 (670/0)	335 (335/0)
2008	6,571 (5,977/594)	1,209 (1,209/0)	858 (858/0)	429 (429/0)

Source: McCall Fish Hatchery Run and Brood Year report

6.2.4 Genetic or ecological differences.

Genetic analyses using 34 single nucleotide polymorphic indicate low overall genetic structure (global F_{ST} = 0.005) of Chinook salmon populations throughout the South Fork Salmon River drainage (Matala et al. 2008.) The low genetic differentiation observed between the McCall hatchery stock and samples of natural origin adults collected below an adult weir in the upper SFSR is believed to be due to the homogenizing affect of introgression from hatchery adults. Hatchery carcasses have been found above the adult weir in the upper SFSR, and pairwise comparisons of McCall hatchery stock to the natural population above the weir, also indicates low (although in some years significant) genetic differentiation. Despite the apparent genetic influence (introgression) of the McCall hatchery stock throughout the drainage, the three main wild Chinook salmon spawning aggregations in the SFSR drainage (Johnson Creek, Secesh River, and upper SFSR-above the weir) still appear genetically distinct (Matala et al. 2008). Narum et al. (2007) examined the genetic diversity and structure of Chinook Salmon populations throughout the Snake River basin using 13 microsatellite loci and observed that samples of wild and hatchery adults from Johnson Creek and wild adults from the Secesh River (both SFSR tributaries) clustered together with high bootstrap support (92%).

6.2.5 Reasons for choosing.

The South Fork Salmon River hatchery broodstock was founded with adults collected at Little Goose and Lower Granite dam during 1974-80 and was assumed to represent summer-run fish in the South Fork Salmon River. Since 1981 all broodstock for the hatchery program has been sourced from adults returning to the South Fork Salmon River. These adults still maintain a summer-run migration timing profile and are locally adapted to the South Fork Salmon River.

6.3 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish that may occur as a result of broodstock selection practices.

Managers are implementing an integrated stepping stone broodstock program in the SFSR. This will reduce risk associated with hatchery fish spawning in the natural environment. Likewise, it will also maintain a genetic repository for wild fish within the hatchery that will allow managers more flexibility with regards to supplementing natural spawners with hatchery fish when the abundance of NORs is low. Broodstock management is based on a sliding scale (see Section 1.11.1) that will enable managers to maintain the existing mitigation program while reducing risks to the natural population.

SECTION 7. BROODSTOCK COLLECTION

7.1 Life-history stage to be collected (adults, eggs, or juveniles).

Adult Chinook salmon are collected to develop broodstock for this program.

7.2 Collection or sampling design.

A weir that spans the SFSR at River Mile 71 is used to collect broodstock. The weir is put into operation in the later part of June depending on spring flows and remains in operation until the middle of September. Broodstock are collected throughout the entire adult migration. Since the temporary weir was replaced with a permanent structure in 2007, weir efficiencies are nearly 100%. Adults collected for broodstock are representative of the entire run. Starting in 2010, managers are implementing an integrated steeping stone broodstock program in the SFSR . See section 1.11.1 for broodstock collection protocols. The number of hatchery and natural adults that are either retained for broodstock or released to spawn naturally will be based on a sliding scale. The abundance of NORs will determine the proportions of natural-origin fish retained for broodstock and the numbers of hatchery-origin adults released to spawn naturally.

7.3 Identity.

Beginning in 1991, all harvest mitigation hatchery-produced fish have been marked with an adipose fin clip and are progeny of hatchery x hatchery crosses. During the development of the integrated broodstock, integrated and segregated fish will be differentially marked to allow for their identification and use in subsequent broodstocks.

7.4 Proposed number to be collected:

7.4.1 Program goal (assuming 1:1 sex ratio for adults):

Approximately 612 female and 642 male Chinook salmon are needed annually to meet state and federal production objectives for the McCall Fish Hatchery. Of these, approximately 70 pairs are needed to develop the integrated component of the broodstock (250,000 smolts). The number of NORs retained for the integrated broodstock will be based on a sliding scale (see Section 1.11.1)

7.4.2 Broodstock collection levels for the last twelve years (e.g. 1988-99), or for most recent years available:

Information for 1995 through 2004 is presented in Table 15. Since 1996, all adult Chinook salmon of hatchery origin were identifiable based on marks. Prior to 1996, the hatchery broodstock contained an unknown proportion of naturally produced fish.

Table 15. McCall Fish Hatchery broodstock collection history. Data from McCall Fish Hatchery Run and Brood Year Reports.

Return Year	McCall Fish Hatchery Trapping History (Hatchery-Produced/Natural)	Total Spawned (H/N)	Total Males Spawned (H/N)	Total Females Spawned (H/N)
1995	305 (267/38)	171 (159/12)	114 (106/8)	57 (53/4)
1996	1,199 (1,042/157)	333 (303/30)	222 (202/20)	111 (101/10)
1997	3,659 (3,371/288)	1,689 (1,587/102)	1,126 (1,058/68)	563 (529/34)
1998	974 (822/152)	897 (807/90)	598 (538/60)	299 (269/30)
1999	1,961 (1,670/291)	1,281 (1,212/69)	854 (808/46)	427 (404/23)
2000	6,812 (6,093/719)	1,083 (1,032/51)	722 (688/34)	361 (344/17)
2001	10,922 (9,144/1,778)	1,251 (1,221/30)	834 (814/20)	417 (407/10)
2002	8,603 (7,322/1,281)	1,143 (1,029/114)	762 (686/76)	381 (343/38)
2003	8,098 (6,603/1,495)	1,443 (1,443/0)	962 (962/0)	481 (481/0)
2004	6,189 (5,594/595)	1,371 (1,371/0)	914 (914/0)	464 (464/0)
2005	3,214 (2,960/254)	1,305 (1,305/0)	870 (870/0)	435 (435/0)
2006	2,151 (1,889/262)	1,210 (1,296/0)	778 (778/0)	432 (432/0)

2007	3,745 (3,465/280)	1,005 (1,005/0)	670 (670/0)	335 (335/0)
2008	6,571 (5,977/594)	1,209 (1,209/0)	858 (858/0)	429 (429/0)

7.5 Disposition of hatchery-origin fish collected in surplus of broodstock needs.

The disposition of surplus, hatchery-origin Chinook salmon could include the sacrifice of fish and the distribution of carcasses to the tribes or to human assistance organizations for subsistence. In addition, surplus fish may be released in South Fork Salmon River tributary locations where potential interaction with natural spawners is expected to be minimal to non-existent (e.g., East Fork of the South Fork Salmon River)

7.6 Fish transportation and holding methods.

Adult summer Chinook salmon are trapped and spawned at the South Fork Salmon River trap site. Fish are held in two 10 ft wide x 90 ft long holding ponds. Trapped adults are sorted, checked for mark types, and separated by sex. Trapping typically starts in late June and fish are on station until mid-September. Spawning starts in mid-August and is finished by mid-September.

7.7 Describe fish health maintenance and sanitation procedures applied.

Beginning in 2009, none of the natural summer Chinook processed through the trap will be injected with Erythromycin prior to being released to spawn naturally and a study was initiated to assess the need to inject future intended brood stock with this antibiotic. When used adults are injected with Erythromycin-100 at a rate of 20 mg/kg. Reserve Chinook recycled through fisheries or dispatched for subsistence are never injected with Erythromycin.

Reserve summer Chinook, held as brood stock for spawning, typically are spawned within 2-months of arrival. One hour Formalin treatments, used to help control the spread of fungus and external parasites, are applied 5-days per week (167 ppm). Fish health monitoring samples are collected during spawning. Kidney samples are collected from each female spawned for analysis using Enzyme-Linked Immunosorbent Assay (ELISA) testing. Established fish health protocols require culling of eggs from any female whose ELISA optical density results are 0.250 or greater (High Positive for Bacterial Kidney Disease). Additionally, Ovarian fluid and head-wedges are collected from a representative sub-sample of spawned females to assay the presence of viral pathogens and whirling disease producing parasites, respectively. Tissue samples collected from females spawned are assayed at the Eagle Fish Health Laboratory (EFHL).

Following fertilization/ sperm activation, eggs are water-hardened in an Iodophor (100 ppm) solution for 1-hour to disinfect the surface coat of the eggs prior to return to McCall Summer Chinook Hatchery for incubation.

7.8 Disposition of carcasses.

Carcasses that result from pre-spawning mortalities or spawn taking activities are returned to the SFSR immediately downstream from the trap's water intake structure or transported further upstream for use as nutrient supplement. Carcasses that exhibit gross clinical signs consistent with BKD will be frozen then disposed of in a public landfill.

7.9) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the broodstock collection program.

Broodstock selection criteria has been established to comply with ESA Section 10 permit and 7 consultation language in addition to meeting IDFG and cooperator mitigation and supplementation objectives. See also section 6.3.

SECTION 8. MATING

Describe fish mating procedures that will be used, including those applied to meet performance indicators identified previously.

8.1 Selection method.

Spawning protocols at the McCall Fish Hatchery follow plans developed based on a sliding scale for pHOS and pNOB that are driven by escapement of natural-origin adults. Female summer Chinook salmon are sorted two times per week and selected randomly from ripe individuals. Generally, two spawn days occur each week.

For the segregated production program each female is spawned with one male and males are generally not reused. For the smaller integrated program, each female's eggs will be fertilized by one male. In situations where the number of natural origin adults is low, a factorial design will be implemented to increase the effective population size of the integrated component of the program.

8.2 Males.

Males are randomly selected for spawning on each spawning day. For the segregated production program each male is spawned with one female and not reused unless there is a shortage of males in which case males may be used more than once. If reusing males is necessary each male receives an opercle punch after being used once and is placed back into the holding pond. Every effort is made to use all returning fish for spawning during the spawning year. Jacks do not make up more than five percent of the total males used. .

8.3 Fertilization.

A spawning ratio of one male to one female is used with males not used more than one time during the spawn year. Following fertilization, eggs are placed into a numbered mesh bag and disinfected in a 100 ppm Iodophor solution for a minimum of 1-hour. Disinfected eggs are then rinsed, using well water, and placed into a well-water filled cooler for transport to McCall Summer Chinook Hatchery for incubation.

8.4 Cryopreserved gametes.

Milt is not cryopreserved as part of this program and no cryopreserved gametes are used in this program. However, the Nez Perce Tribe has harvest milt in the past as part of their Salmonid Gamete Preservation Program funded under the Bonneville Power Administration's Fish and Wildlife Program (Project# 199703800).

8.5 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the mating scheme.

Prior to spawning, adults may receive an antibiotic treatment to control the presence of the bacterium responsible for causing bacterial kidney disease. In addition, adults will receive formalin treatments to control the spread of fungus and fungus-related pre-spawn mortality. At spawning, ELISA optical density values for female spawners are used to establish criteria for egg culling and isolation incubation needs.

SECTION 9. INCUBATION AND REARING –

Specify any management *goals* (e.g. "egg to smolt survival") that the hatchery is currently operating under for the hatchery stock in the appropriate sections below. Provide data on the success of meeting the desired hatchery goals.

9.1 Incubation:

9.1.1 Number of eggs taken and survival rates to eye-up and/or ponding.

The original Lower Snake River Compensation Program production target of 8,000 adults back to the project area upstream of Lower Granite Dam was based on an SAR of 0.8%. For years when adult returns failed to meet escapement objectives, it was not likely due to lower than expected "in-hatchery" performance. Typically, egg survival to the eyed stage of development averages 86% for the McCall Fish Hatchery. Survival from ponding to release is typically greater than 90%. Egg survival information is presented in Table 16.

Table 16. McCall Fish Hatchery summer Chinook salmon egg take and survival information. Data taken from McCall Fish Hatchery Brood Year and Run Year reports.

Spawn Year	Green Eggs Taken	Eyed-eggs	Eggs Culled*	Survival to Eyed Stage (%)[a]
1997	2,368,202	1,877,865	141,013	85.3
1998	1,462,258	1,082,038	104,978	81.2
1999	1,933,908	1,521,609	103,741	84.0
2000	1,553,171	1,136,740	230,804	88.1

2001	1,823,558	1,169,276	270,015	78.9
2002	1,815,862	1,337,177	249,999	87.4
2003	2,378,849	1,630,249	382,050	84.6
2004	2,038,553	1,457,046	306,640	86.5
2005	2,027,867	1,462,070	341,667	88.9
2006	1,913,189	1,426,032	239,793	87.1
2007	1,527,720	1,143,607	152,366	84.8
2008	2,107,537	1,587,227	279,800	88.6

*To reduce the risk of vertical transmission of the causative agent of Bacterial Kidney Disease, egg lots from females with ELISA optical density values in excess of stated annual objectives were culled.

[a] Number of eggs culled for BKD prevention is included in the percent survival to eyed egg (i.e., survival to eye = [eyed eggs + eggs culled]/Green eggs taken*100).

9.1.2 Cause for, and disposition of surplus egg takes.

Surplus eggs may be generated (~ 10% above need) to provide a buffer against culling associated with the presence of bacterial kidney disease.

9.1.3 Loading densities applied during incubation.

Fertilized reserve summer Chinook salmon eggs are loaded in incubation trays as eggs generated from 2-females per tray. After eggs are "picked" and enumerated, eyed eggs are transferred to the Shoshone-Bannock Tribe for Dollar Creek in-stream incubator boxes, and ELISA optical based culling takes place then those egg trays exceeding 9,000 eyed-eggs per tray are divided into second trays to reduce loading densities prior to hatch. This procedure has been established to accommodate BKD culling criteria as well as utilizing limited incubation space limitations effectively.

9.1.4 Incubation conditions.

In years where hatchery spawn targets are met (number of females spawned to meet current program objectives) eyed-eggs retained for MCFH smolt production will hatched at tray loading densities not to exceed 9,000 eyed-eggs per tray. In years where spawn targets are not met, eggs from individual females are loaded into trays to reduce the losses associated with ELISA based BKD culling protocols. Individual incubator stack flows are set at 5-6 gpm. Eggs will reach a hard eye stage at 600 Fahrenheit temperature units (FTU's).

9.1.5 Ponding.

Fry are ponded into indoor early rearing vats once the yolk-sac has been absorbed (approximately 1,750 FTU's) with no more than 50,000 fry being set out into a vat at one time to prevent potential smothering. Feeding is initiated once ½ of the fry have risen from the bottom of the vat and typically occurs within 2-days of setout. Initially vat screens are placed at ½ vat length and flows are set to 80 gpm. Twelve vats, reserved for use by SFSR summer Chinook, are initially loaded with approximately 90,0000 fry each. Vats are extended to full length when density indices (DI) reach 0.50-0.55.

9.1.6 Fish health maintenance and monitoring.

Following fertilization eggs are water-hardened in a 100 ppm Iodophor solution for a minimum of 60 minutes. Formalin treatments (1,667 ppm) are scheduled to begin on the 3rd day following egg collection and continue daily until approximately 900 FTU's, or when the first emergent alevin of a spawn take Lot is observed. This is done to retard fungal development during incubation. Primary egg-pick (removal of dead eggs) takes place at a hard-eye stage of development (600 FTU's) and enumeration of eggs is performed. Within a week of primary pick each egg tray undergoes a second hand-pick to remove any dead eggs. Following complete hatch (approximately 1,000-1,050 FTU's) egg shells are floated out of the trays and any dead eggs are hand-picked out. Typically, no further hand-picks need to be conducted with minimal to no further losses observed through set-out.

9.1.7 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish during incubation.

No adverse or ecological effects to listed fish are anticipated. Eggs destined for current hatchery reserve production/ programs, the integrated program and those for Johnson Creek supplementation SU production are maintained in separate incubation trays. To offset the potential loss due to ELISA based BKD high positive culling, eggs from both the integrated and Johnson Creek program are loaded in incubation trays as 1 female per tray. The movement of Johnson Creek parr into the outdoor collection basin (second use water) for final rearing is delayed until the end of October when SFSR SU production are being fed less and so less waste will be passing through the Johnson Creek population.

9.2 Rearing:

9.2.1 Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent twelve years (1988-99), or for years dependable data are available.

Only eyed eggs retained for hatchery production are included in the Table below. Eyed eggs culled, based on ELISA optical densities, and eyed eggs transferred to the Shoshone-Bannock Tribe as part of a continuing in-stream egg box program are not included and as such, the number of eyed eggs listed in Table 17 may not match the number of eyed eggs in Table 9.1.1 above.

The number of juvenile Chinook released may include a small proportion (5-10%) that were released as subyearling parr or presmolts. Therefore, because they were released six to eight months earlier than the yearling smolts, they were not susceptible to mortality in the hatchery as long as the smolts and the survival estimate may be biased slightly high. However, typical survival from the parr to smolt life stage within the hatchery usually exceeds 95%.

Table 17. McCall Fish Hatchery summer Chinook salmon egg and juvenile survival information for brood years 1997-2008. Data taken from McCall Fish Hatchery Brood Year and Run Year reports and hatchery . Does not include viable eggs that were culled.

Brood Year	Eyed-Eggs	Number of Fry Ponded to Vats (% survival from eye)	Number of Fingerlings Transferred From Vats to Raceways (% survival from eye)	Number of Juvenile Chinook Released	Percent Survival From Eyed-Egg to Release
1997	1,543,838	1,528,016 (99.0)	1,454,077 (94.2)	1,446,089	93.7
1998	1,082,038	1,072,226(99.1)	1,048,081 (96.9)	1,039,930	96.1
1999	1,401,270	1,384,817(98.8)	1,350,157 (96.4)	1,343,945	95.9
2000	1,136,740	1,126,228 (99.1)	1,115,803 (98.2)	1,111,225	97.8
2001	1,169,276	1,156,346 (98.9)	1,121,738 (95.9)	1,115,460	95.4
2002	1,216,786	1,200,406 (98.7)	1,176,480 (96.7)	1,169,150	96.1
2003	1,311,149	1,294,855 (98.8)	1,275,007 (97.2)	1,267,530	96.7
2004	1,143,670	1,123,941 (98.3)	1,104,943 (96.6)	1,096,130	95.8
2005	1,123,040	1,109,948 (98.8)	1,091,036 (97.2)	1,087,170	96.8
2006	1,091,042	1,080,143 (99.0)	1,069,522 (98.0)	1,060,540	97.2
2007	1,143,607	1,128,239 (98.7)	1,111,385 (97.2)	1,106,700	96.8
2008	1,263,517	1,247,992 (98.8)	1,223,060 (96.8)	n/a	n/a

9.2.2 Density and loading criteria (goals and actual levels).

At the swim-up stage of development, unfed fry are moved from incubation trays into indoor early rearing vats with tail-screens placed at ½ vat length. Fry are distributed as evenly as possible between rearing vats (typically 90,000 fish per vat at ponding). Density (DI) and flow (FI) indices are monitored and maintained to not exceed 0.55 and 1.5, respectively.

9.2.3 Fish rearing conditions

Early rearing space consists of 14 indoor concrete vats. However, due to Johnson Creek SU supplementation production only 12 of these vats are available to use for SFSR SU production. Each vat measures 40 ft long x 4 ft wide x 2 ft deep and contains 320 cubic feet of rearing space. During early rearing, vats are cleaned daily and dead fish removed.

Summer Chinook parr are transferred into outdoor rearing ponds (two ponds 196 ft long x 40.5 ft wide x 4 ft deep) in June and July. Transfer of the SFSR SU parr occurs concurrently with fish adipose fin-clipping and CWT tagging. Design capacity for the outdoor ponds is 521,000 fish at 18.0fpp in each pond. Density and flow indices, at time of smolt release, typically average less than 0.25 and 1.80, respectively. During final rearing, the outdoor ponds are swept, full length, at least once a month (more frequently when feed rates are higher) and the bottom 2-sections (approximately 30-feet) are swept daily. Dead fish are also removed daily.

9.2.4 Indicate biweekly or monthly fish growth information (*average program performance*), including length, weight, and condition factor data collected during rearing, if available.

Summer Chinook growth information is collected on a monthly basis. Random sub-samples from each rearing container are collected and recorded. Monthly growth and conversion rates are calculated at this time. Within two-weeks of release additional sub-samples are collected to include fish length, weight and mark quality to allow for the calculation of final condition factor. See Table in Section 9.2.5 below.

9.2.5 Indicate monthly fish growth rate and energy reserve data (*average program performance*), if available.

Average brood year growth information (monthly length increase) for summer Chinook salmon reared at McCall Summer Chinook Hatchery is presented in Table 18.

Table 18. McCall Fish Hatchery summer Chinook salmon monthly growth rates. Data represents typical growth rates observed at McCall Fish Hatchery (IDFG, Unpublished data)

Month in Culture	Growth Increase Per Month (mm)
January	0.7
February	2.3
March	4.6
April	7.1
May	10.7
June	10.4
July	15.2
August	18.1
September	12.9
October	7.4
November	4.3
December	1.5
January	1.6
February	0.7
March	1.3

9.2.6 Indicate food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow), and estimates of total

food conversion efficiency during rearing (*average program performance*).

During early rearing, summer Chinook salmon fry are fed a BioVita starter diet produced by BioOregon. During final rearing in outdoor ponds, summer Chinook salmon are fed BioDry-1000 LP, an advanced Low-Phosphorus diet that is also produced by BioOregon. Specific hatchery variables are presented in Table 19.

Table 19. McCall Fish Hatchery summer Chinook salmon feeding schedule and food conversion rate for BY06 ongoing using most current feed type fed (IDFG, unpublished data)

Month	Water Temp (ºC)	Fish Length (mm TL)	Percent Body Weight Fed Per Day	Conversion Rate
December	4.2	36.6	0.7	0.77
January	3.3	37.3	0.7	0.89
February	3.3	39.6	0.9	0.81
March	3.3	44.2	0.9	0.81
April	3.8	51.3	1.1	0.72
May	5.7	62.0	1.1	0.62
June	8.9	72.4	1.3	0.77
July	11.4	87.6	1.5	0.73
August	11.1	105.7	1.5	0.76
September	9.6	118.6	0.9	0.82
October	7.8	126.0	0.7	1.02
November	6.5	130.3	0.4	1.06
December	4.2	131.8	0.3	0.89
January	3.3	133.4	0.2	0.64
February	3.3	134.1	0.2	1.13
March	3.3	135.4	0.4	0.85

9.2.7 Fish health monitoring, disease treatment, and sanitation procedures.

During rearing at the McCall Fish Hatchery, regular fish health inspections are conducted. If disease agents are suspected or identified, more frequent inspections will be conducted. Recommendations for treating specific disease agents comes from the Idaho Department of Fish and Game Fish Health Laboratory in Eagle, ID.

Prior to release, the Eagle Fish Health Laboratory conducts a final pre-release fish health inspection.

9.2.8 Smolt development indices (e.g. gill ATPase activity), if applicable.

No smolt development indices are developed in this program.

9.2.9 Indicate the use of "natural" rearing methods as applied in the program.

No semi-natural or natural rearing objectives are applied during Chinook salmon incubation or rearing at the McCall Fish Hatchery.

9.2.10 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish under propagation.

At spawning, ELISA optical density values, for female spawners, are used to establish criteria for egg culling. If a disease agent is identified during the fish rearing cycle antibiotic treatments may be employed, based on Fish Health Pathologist recommendations, to control the spread of the infectious disease agent. Proper disinfection protocols are in place for equipment used during rearing and indoor rearing vats/ outdoor ponds are disinfected following use before a different brood year is added. Fish are fed by hand (2-9 times per day depending on stage of development). Indoor vats are cleaned daily and any dead fish are removed. Outdoor ponds are swept at least once per month (full length) and the bottom 30-feet of each pond are swept and any dead fish are removed daily.

SECTION 10. RELEASE

Describe fish release levels, and release practices applied through the hatchery program.

10.1 Proposed fish release levels.

Current McCall Fish Hatchery proposed fish release includes 1,000,000 yearling smolts. All fish to be released directly into the South Fork Salmon River at Knox Bridge (RKm 115) .

Table 20. Proposed fish releases.

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Eggs-Eyed	300,000			Dollar Creek. Shoshone-Bannock tribal egg-box program
Eggs-Green	285,000			Transfer to Clearwater Fish Hatchery for summer run program in the South Fork Clearwater River

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Unfed Fry				
Fry				
Fingerling				
	750,000	20	Mar/Apr	SF Salmon R. Knox Bridge-Segregated Mitigation
Yearling	250,000	20	Mar/Apr	SF Salmon R. Knox Bridge-Integrated Supplementation

10.2 Specific location(s) of proposed release(s) by stream, river, or watercourse:

Release point: (*river kilometer location, or latitude/longitude*)
Major watershed: (e.g. "Skagit River")
Basin or Region: *(e.g. "Puget Sound")*

Stream: South Fork Salmon River (Knox Bridge)
Release Point (EPA Number): 17060208; RKM 115
Major Watershed: South Fork Salmon River
Basin or Region: Snake River

10.3 Actual numbers and sizes of fish released by age class through the program.

Table 21. McCall Fish Hatchery summer Chinook salmon release information. Data taken from McCall Fish Hatchery Run and Brood Year Reports.

Brood Year	Number Released	Month Released	Year Released	Average Size (#fish/pound)
1980	122,247	April	1982	25.5
1981	183,896	April	1983	22.3
1982	269,880	April	1984	28.7
1983	564,405	April	1985	20.1
1984	100,149	August	1985	86
	970,348	March	1986	21.3
1985	177,606	May	1986	644
	958,300	March	1987	20.2
1986	90,000	May	1987	670
	28,400	June	1987	312
	1,060,400	March	1988	18.7
1987	757,582	May	1988	439

1988	975,000	March	1989	20.8
	501,900	May	1989	370.4
	290,000	August	1989	64.5
	1,032,500	March	1990	21.0
1989	708,600	March	1991	23.8
1990	901,500	March	1992	23.8
1991	607,298	April	1993	17.9
1992	1,060,163	April	1994	25.6
1993	36,259	July	1994	107.0
	59,903	August	1994	89.0
	140,172	October	1994	36.4
	1,074,598	April	1995	21.8
1994	585,654	April	1996	17.9
1995	238,367	March	1997	18.7
1996	24,990	July	1997	194
	393,872	March	1998	17.5
1997	55,367	July	1998	141.2
	49,872	August	1998	149.8
	158,240	October	1998	53.9
	1,182,611	April	1999	23.9
1998	1,039,930	April	2000	22.6
1999	54,234	August	2000	75.9
	124,480	September	2000	43.6
	1,165,231	March	2001	19.4
2000	46,975	July	2001	101
	1,064,250	March	2002	23.0
2001	61,800	July	2002	125
	1,053,660	March	2003	21.1
2002	80,340	July	2003	112
	1,088,810	March	2004	20.9
2003	220,000	September	2004	32.5
	1,047,530	March	2005	20.9
2004	1,096,130	March	2006	18.1
2005	1,087,170	March	2007	19.1
2006	1,060,540	March	2008	18.4
2007	1,106,700	March	2009	21.3

10.4 Actual dates of release and description of release protocols.

Release data information by life stage is presented for the most recent eight-year period in Table 22.

Table 22. McCall Fish Hatchery summer Chinook salmon release data and life stage for BY1995-2006. Data taken from McCall Fish Hatchery Run, Brood Year Reports and hatchery records.

Brood Year	Release Year	Life Stage	Release Dates
1995	1997	Smolt	3/19 – 3/21/97
1996	1997	Parr	7/7 – 7/10/97
1996	1998	Smolt	3/29 – 4/6/98
1997	1998	Parr	no data
1997	1999	Smolt	4/5 – 4/8/99
1998	2000	Smolt	4/3 – 4/6/00
1999	2000	Parr	7/23 – 7/31/00
1999	2001	Smolt	3/27 – 3/29/01
2000	2001	Parr	7/20/01
2000	2002	Smolt	3/25 – 3/28/02
2001	2002	Parr	7/17/02
2001	2003	Smolt	3/31-4/3/03
2002	2002	Eyed-Egg	10/17/02
2002	2003	Parr	7/16/03
2002	2004	Smolt	3/22-3/25/04
2003	2003	Eyed-Egg	10/1-16/03
2003	2004	Parr	9/23-24/04
2003	2005	Smolt	3/18-21/05
2004	2004	Eyed-Egg	10/2-20/04
2004	2006	Smolt	3/20-23/06
2005	2005	Eyed-Egg	10/5-12/05
2005	2007	Smolt	3/19-22/07
2006	2006	Eyed-Egg	9/27-10/5/06
2006	2008	Smolt	3/17-20/08
2007	2009	Smolt	3/23-25/09

10.5 Fish transportation procedures, if applicable.

All of the SFSR summer Chinook reared at McCall Summer Chinook Hatchery are transported off station for release in the South Fork Salmon River at Knox Bridge. Smolts are loaded into transportation trucks using a Magic Valley Heli-Arc fish pump. Fish are loaded into the transport tanks at a density of 1.0 pounds of fish per gallon of water. Each tank is equipped with an oxygen system and fresh-flow agitators. The maximum time that fish are on the trucks, including loading and transport time, is approximately 2 ½ hours.

10.6 Acclimation procedures (methods applied and length of time).

All fish are released directly into the SFSR at Knox Bridge.

10.7 Marks applied, and proportions of the total hatchery population marked, to identify hatchery adults.

Since brood year 1991, all hatchery produced juveniles have been marked and/or tagged enabling differentiation between hatchery- and natural-origin adults. Additionally, hatchery-origin fish intended for supplementation are marked differentially from hatchery-origin fish intend for harvest mitigation.

The proportion of fish marked to meet IDFG and LSRCP mitigation and supplementation objectives from 1996-2002 is presented in Table 23.

Table 23 Proportion of total summer Chinook salmon smolt production dedicated for supplementation and mitigation purposes at the McCall Fish Hatchery 1996-2006. Data from McCall Fish Hatchery Run and Brood Year Reports

Brood year	Proportion of annual production dedicated to IDFG supplementation programs	Proportion of annual production dedicated to IDFG and LSRCP harvest mitigation programs (100% ad fin-clipped)
2008	0.0%	100.0%
2007	0.0%	100.0%
2006	0.0%	100.0%
2005	0.0%	100.0%
2004	0.0%	100.0%
2003	0.0	100.0%
2002	21.8%	78.2%
2001	5.6%	94.4%
2000	8.0%	92.0%
1999	10.6%	89.4%
1998	18.7%	81.3%
1997	24.8%	75.2%
1996	11.5%	88.5%

10.8 Disposition plans for fish identified at the time of release as surplus to programmed or approved levels.

Rearing capacity at McCall Fish hatchery does not allow for the release of yearling smolts that are in excess of programmed levels. There have been situations where fish in excess of rearing capacity have been released at Knox Bridge as sub-yearlings in the fall. All fish released at this life stage were adipose clipped to allow identification as hatchery-origin fish.

10.9 Fish health certification procedures applied pre-release.

A 60-fish pre-liberation sample is taken from each rearing group to assess the prevalence of viral replicating agents and to detect the presence of pathogens responsible for bacterial kidney disease and whirling disease between 30 and 45-days prior to release. In addition, an organosomatic index is developed for each release group. Diagnostic services are provided by the IDFG Eagle Fish health Laboratory.

10.10 Emergency release procedures in response to flooding or water system failure.

Emergency procedures are in place at the South Fork Salmon River Trap to guide activities in a potential catastrophic event. When in use, the circular holding tank for Johnson Creek summer Chinook males is equipped with a low level alarm that will alert crews of a problem. In the event of a power failure occurs, a back-up propane generator is available to generate power for water pumps. In the event that this equipment also fails, plans are in place to move Johnson Creek males into the female holding pond which is supported by gravity water flow. Established procedures allow for blocking fish access into the fish ladder/ trap during periods of heavy fish movement or during times of very poor water quality to prevent mortalities. The final emergency action is to release adults back into the South Fork Salmon River below the weir.

McCall Summer Chinook Hatchery is supported by gravity flow water from Payette Lake. High/ low level water alarms are in place in both outdoor ponds and for the main incubation water supply line. This system is connected to a alarm system at the hatchery and to a dialer alarm which will contact a monitoring service who will call all permanent fish hatchery personnel automatically. Trouble-shooting and ability to make minor repairs may minimize the effects of a limited water interruption. However, any catastrophic failure of this waterline is likely to result in a catastrophic fish loss at this facility.

10.11 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from fish releases.

Actions taken to minimize adverse effects on listed fish include:

1. Continuing fish health practices to minimize the incidence of infectious disease 0
2. Marking hatchery-produced summer Chinook salmon for broodstock management. Smolts released for supplementation will be marked differentially from other hatchery production fish.
3. Not releasing summer Chinook salmon for supplementation in the South Fork Salmon River in excess of estimated carrying capacity.
4. Continuing to reduce effect of the release of large numbers of hatchery Chinook salmon at a single site by spreading the release over a number of days by trucking strategy.
5. Attempting to program time of release to mimic natural fish for South Fork Salmon hatchery reserve releases.
6 Implement integrated stepping stone program to decrease the risks associated with

domestication if program fish spawn with natural-origin fish.

7 Continuing to segregate, or cull, eggs from summer Chinook brood stock based on BKD ELISA optical densities. Eggs from ELISA BKD high positive (>0.250) will only be reared if a brood years egg take falls critically short of hatchery production needs. In this event, progeny will be reared as a segregated population until released. The development guidelines and practices, relative to BKD, will continue.

8. Monitoring hatchery effluent to ensure compliance with National Pollutant Discharge Elimination System permit.
9. Continuing Hatchery Evaluation Studies (HES) to provide comprehensive monitoring and evaluation for LSRCP Chinook.

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

11.1.1 Describe plans and methods proposed to collect data necessary to respond to each Performance Indicator identified for the program

In section 11.1.1 below, a series of tables, each followed by narrative, is provided for the purpose of adding detail with regards to plans and methods used to collect data necessary to assess indicators listed in Section 1.10. The narrative provided reflects the overall IDFG monitoring and evaluation program and is not specific to this HGMP. This narrative is intended to provide an overview of the statewide monitoring plan and to show the linkage between programs from multiple HGMPs. The two columns on the right hand side of the table are provided to indicate whether each indicator is:

1. Applicable to the hatchery program/s described in this HGMP (yes “Y” or no “N”).
2. Currently being monitored.
    a. For cells with a “Y”, the indicator is being monitored with funding provided by the hatchery mitigation program.
    b. For cells with a “C”, the indicator is being monitored, but is tied to a separately funded program (e.g. Idaho Supplementation Studies (ISS), Idaho Natural Production Monitoring Program (INPM), General Parr Monitoring (GPM) program etc.). Without continued funding for these programs, many of the M&E components will not occur. For example, the ISS program is scheduled to end in 2014 with some components ending in 2012. Funding to offset this loss needs to be identified to avoid significant M&E data gaps.
    c. For cells with a “Y/C”, the indicator is being monitored and is partially funded through the hatchery mitigation program. Other programs such as those listed in 2b above provide the remaining funding.
    d. For cells with an “N”, the indicator is not currently being monitored. For all indicators applicable to this HGMP that are not being addressed (N), a brief

narrative is provided in Section 11.1.2 describing why the particular indicator is not being monitored.

Table 24, at the end of Section 11.1.1, provides a more detailed description of methodologies used in the basin that are more specific to VSP parameters.

11.1.1) Monitoring and evaluation of "Performance Indicators" presented in Section 1.10.

Category	Standards	Indicators	Applicable	Monitored
1. LEGAL MANDATES	1.1. Program contributes to fulfilling tribal trust responsibility mandates and treaty rights, as described in applicable agreements such as under U.S. v. OR and U.S. v. Washington.	1.1.1. Total number of fish harvested in Tribal fisheries targeting this program.	Y	C
		1.1.2. Total fisher days or proportion of harvestable returns taken in Tribal resident fisheries, by fishery.	Y	C
		1.1.3. Tribal acknowledgement regarding fulfillment of tribal treaty rights.	Y	C
	1.2. Program contributes to mitigation requirements.	1.2.1. Number of fish released by program, returning, or caught , as applicable to given mitigation requirements.	Y	Y
	1.3. Program addresses ESA responsibilities.	1.3.1. Section 7, Section 10, 4d rule and annual consultation	Y	Y

1.1.1 – 1.1.2 The Nez Perce Tribe (NPT) and the Shoshone/Bannock Tribe (SBT) each authorize and manage fisheries. Both are non-selective fisheries that harvest both hatchery and natural returns. Each tribe conducts statistically based inseason fishery interview programs to estimate fishing effort, numbers of hatchery and natural origin Chinook salmon harvested and other species harvested, IDFG conducts similar statistically based harvest monitoring programs for non-Treaty recreational fisheries. For Chinook salmon fisheries IDFG and Tribal co-managers confer through scheduled inseason conferences to assess current ESA take and harvest shares. Steelhead fisheries are more protracted then Chinook salmon fisheries and require less inseason consultation. IDFG and Tribal co-managers share pre-season fisheries management plans and post-season estimates of harvest and ESA take.

1.1.3 – 1.2.1 Numbers of spring/summer Chinook salmon marked, tagged and total numbers released are in accordance with the production schedule in the 2008-2017 US vs.OR Management Agreement. Fisheries harvests in Idaho are not governed by terms of the US vs. OR agreement but Idaho and the respective Treaty Tribes manage in accordance with the principal of 50% Tribal and 50% non-tribal sharing of fish available for harvest in Idaho fisheries.

The mitigation objectives for the hatchery programs in Idaho are stipulated in the LSRCP and in the 1980 Hells Canyon Settlement Agreement. Each hatchery reports numbers of fish released by life stage in annual run or brood year reports. Representative sub-samples of fish released are code-wire tagged and PIT tagged to assess harvest contribution by release group and survival to the project area upstream of Lower Granite Dam. The majority of fish PIT tagged are representative of the run at large though the FCRPS. PIT tags detected among subsequent adult returns in the fish ladder at Lower Granite Dam are used to estimate inseason total facility specific returns to Lower Granite Dam. An independent estimate of the adult return over Lower Granite Dam is also complete post-season based on summed tribal and non-tribal harvest estimates and hatchery trapping data.

1.3.1

- Section 7 consultation with USFWS (April 2, 199) resulted in NMFS Biological Opinion for the Lower Snake River Compensation Program (now expired). In 2003, consultation was initiated to develop a new Snake River Hatchery Biological Opinion. Consultation has not been completed.
- Section 10 Permit Numbers 919 – East Fork Salmon River Satellite Facility, 920 – Sawtooth Fish Hatchery, and 921 – McCall Fish Hatchery, authorized direct and indirect take of listed Snake River salmon associated with hatchery operations and broodstock collection at Lower Snake River Compensation Program hatcheries operated by Idaho Department of Fish and Game. Expired 12/31/98; reapplication (to consolidate all programs under permit 1179) in process.
- Section 10 Permit Number 922 authorized direct take of listed Snake River salmon associated with hatchery operations and broodstock collection at the Idaho Power Company Pahsimeroi Hatchery operated by Idaho Department of Fish and Game. Expired 12/31/98; reapplication in process.
- Section 10 Permit Number 903 authorized indirect take of listed Snake River salmon associated with hatchery operations and broodstock collection at Idaho Power Company mitigation hatcheries operated by Idaho Department of Fish and Game, including Rapid River hatchery, Oxbow Fish Hatchery/Hell's Canyon Trap and Pahsimeroi Hatchery. Expired 12/31/98; reapplication in process.
- Section 10 Permit Number 1120 authorized annual take of listed sockeye salmon associated continuation of a sockeye salmon captive broodstock program. Expired 12/31/2002; reapplication (under Permit 1454) in process.

Anadromous hatchery programs managed by IDFG have operated based on annual acknowledgement from NOAA Fisheries that the programs are in compliance with the provisions of Section 10 (# 1179) that expired in 1999. Newly developed program specific HGMPs are currently under review.

Category	Standards	Indicators	Applicable	Monitored
2. IMPLEMENTATION AND COMPLIANCE	2.1. Confirmation of hatchery type	2.1.1. Hatchery is operated as a segregated program. 2.1.2. Hatchery is operated as an integrated program 2.1.3. Hatchery is operated as a conservation program	 Y Y	 Y Y
	2.2. Hatchery - natural composition of hatchery broodstock and natural spawners are known and consistent with hatchery type.	2.2.1. Hatchery fish can be distinguished from natural fish in the hatchery broodstock and among spawners in supplemented or hatchery influenced population(s)	Y	Y
	2.3. Restore and maintain treaty-reserved tribal and non-treaty fisheries.	2.3.1. Hatchery and natural-origin adult returns can be adequately forecasted to guide harvest opportunities. 2.3.2. Hatchery adult returns are produced at a level of abundance adequate to support fisheries in most years with an acceptably limited impact to natural-spawner escapement.	Y Y	Y/C Y
	2.4. Fish for harvest are produced and released in a manner enabling effective harvest, as described in all applicable fisheries management plans, while avoiding over-harvest of non-target species.	2.4.1. Number of fish release by location estimated and in compliance with AOPs and US vs. OR Management Agreement. 2.4.2. Number of adult returns by release group harvested 2.4.3. Number of non-target species encountered in fisheries for targeted release group.	Y Y Y	Y Y Y
	2.5. Hatchery incubation, rearing, and release practices are consistent with current best management practices for the program type.	2.5.1. Juvenile rearing densities and growth rates are monitored and reported. 2.5.2. Numbers of fish per release group are known and reported. 2.5.3. Average size, weight and condition of fish per release group are known and reported. 2.5.4. Date, acclimation period, and release location of each release group are known and reported.	Y Y Y Y	Y Y Y Y
	2.6. Hatchery production, harvest management, and monitoring and evaluation of hatchery production are coordinated among affected co-managers.	2.6.1. Production adheres to plans documents developed by regional co-managers (e.g. US vs. OR Management agreement, AOPs etc.). 2.6.2. Harvest management, harvest sharing agreements, broodstock collection schedules, and disposition of fish trapped at hatcheries in excess of broodstock needs are coordinated among co-management agencies. 2.6.3. Co-managers react adaptively by consensus to monitoring and evaluation results. 2.6.4. Monitoring and evaluation results are reported to co-managers and regionally in a timely fashion.	Y Y Y Y	Y Y Y Y

2.1.1 – 2.1.3 Each hatchery program has a defined purpose relative to mitigation and conservation.

2.2.1- 2.6.4 The adipose fin-clip is the primary mark that we use distinguish hatchery origin from natural origin fish in harvests and escapement . All hatchery releases for harvest mitigation are adipose fin-clipped and representative portions of those releases are coded-wire tagged. Relatively small numbers of releases of Chinook salmon intended to supplement natural populations are released with intact adipose fins but are coded-wire tagged. Steelhead intended to supplement natural populations are also released un-clipped. Few of these releases are coded-wire tagged. The marking rate by mark type for each release group of Chinook salmon and steelhead are inventories and reported annually.

Representative sub-samples of fish released from anadromous fish hatcheries in Idaho are code-wire tagged and PIT tagged to assess harvest contribution by release group. Coded-wire tag recovery data indicate that harvest of Snake River spring/summer Chinook salmon and steelhead are negligible in ocean fisheries. ODFW, WDFW, and CRITFC conduct statistically based fishery, interview biological sampling, and tag recovery programs in Tribal and non-Tribal fisheries in the mainstem and tributaries of the Columbia River in zones 1 through 6 and in the lower Snake River below Lower Granite Dam. Data from these sampling programs are used to estimate fishing effort, numbers of hatchery and natural origin fish harvested and released and in many cases contributions of specific mitigation hatchery releases to harvest. Results from these program are available inseason to assist harvest and hatchery managers and are reported in summary jointly by ODFW and WDFW.

IDFG, Nez Perce Tribe (NPT) and the Shoshone/Bannock Tribe (SBT) each authorize and manage fisheries in the boundary waters of the Snake River mainstem and tributaries of the Snake, Clearwater and Salmon Rivers. ODFW and WDFW also conduct recreational fisheries in the boundary waters of the Snake River shared by Idaho. Non-Tribal recreational fisheries are selective for adipose fin-clipped hatchery origin fish. Tribal fisheries are largely non-selective fisheries that harvest both hatchery and natural returns. IDFG, ODFW, WDFW and Tribes conducts statistically based inseason and post season fishery interview programs to estimate fishing effort, numbers of hatchery and natural origin fish harvested and released and other species encountered. Coded-wire tag recovery data from these programs are used to estimate hatchery specific contributions to age specific harvests by fishery.

IDFG and the Tribes estimate annual escapements of natural populations that are affected by fisheries targeting program fish through weirs operated in conjunction with hatchery programs. Statewide index counts of Chinook salmon redds are conducted to estimate numbers of spawners by population. IDFG and the Tribes have developed genetic stock identification standard and a sampling program at Lower Granite Dam to estimate escapement above the dam at the level of major spawning population groups for both Chinook salmon and steelhead.

Hatchery release numbers, mark rates among releases and sampling rates in Snake River and Columbia River mainstem and tributary fisheries downstream of Lower Granite Dam are reported by ODFW, WDFW, and CRITFC co-managers in the RMIS database maintained by the Pacific Sates Marine Fisheries Commission. IDFG, Nez Perce Tribe (NPT) and the Shoshone/Bannock Tribe (SBT) each authorize and manage fisheries in the boundary waters of the Snake River mainstem and tributaries of the Snake, Clearwater and Salmon Rivers. ODFW and WDFW also conduct recreational fisheries in the boundary waters of the Snake River shared by Idaho. Non-Tribal recreational fisheries are selective for adipose fin-clipped hatchery origin fish. Tribal fisheries are largely non-selective fisheries that harvest both hatchery and natural returns. IDFG, ODFW, WDFW and Tribes conducts statistically based inseason and post season fishery interview programs to estimate fishing effort, numbers of hatchery and natural origin fish harvested and released and other species encountered. Sampling rate by mark type, number of marks by program observed in fishery samples, and estimated total contribution of each population to by fishery are estimated and reported annually.

For hatchery Chinook salmon populations, IDFG completed annual run reconstructions based on population and age specific harvest estimates in Columbia River, Snake River and Snake River tributary fisheries and age specific rack returns. Run reconstruction data for each hatchery are used to develop hatchery specific pre-season run forecasts. Natural returns to Idaho are forecasted using similar run reconstructions of aggregate Snake River natural returns to Lower Granite Dam. IDFG and Tribal co-managers in the Snake Basin plan fisheries based on these forecasts. IDFG and Tribal co-managers confer through scheduled inseason conferences to assess accuracy of the preseason forecast based on inseason estimates of the actual hatchery returns from real-time PIT tag detections in the Columbia River hydro-system. Co-managers also assess inseason estimates of ESA take, harvest shares, and the disposition of hatchery returns to racks in excess of broodstock needs.

Steelhead fisheries are more protracted then Chinook salmon fisheries and require less inseason consultation. IDFG and Tribal co-managers share pre-season fisheries management plans and post-season estimates of harvest and ESA take.

Category	Standards	Indicators	Applicable	Monitored
3. HATCHERY EFFECTIVENESS MONITORING FOR AUGMENTATION AND SUPPLEMENTATION PROGRAMS	3.1. Release groups are marked in a manner consistent with information needs and protocols for monitoring impacts to natural- and hatchery-origin fish at the targeted life stage(s)(e.g. in juvenile migration corridor, in fisheries, etc.).	3.1.1. All hatchery origin fish recognizable by mark or tag and representative known fraction of each release group marked or tagged uniquely.	Y	Y
		3.1.2. Number of unique marks recovered per monitoring stratum sufficient to estimate number of unmarked fish from each release group with desired accuracy and precision.	Y	Y
	3.2. The current status and trends of natural origin populations likely to be impacted by hatchery production are monitored.	3.2.1. Abundance of fish by life stage is monitored annually.	Y	C
		3.2.2. Adult to adult or juvenile to adult survivals are estimated.	Y	C
		3.2.3. Temporal and spatial distribution of adult spawners and rearing juveniles in the freshwater spawning and rearing areas are monitored.	Y	C
		3.2.4. Timing of juvenile outmigration from rearing areas and adult returns to spawning areas are monitored.	Y	C
		3.2.5. Ne and patterns of genetic variability are frequently enough to detect changes across generations.	Y	C
	3.3. Fish for harvest are produced and released in a manner enabling effective harvest, as described in all applicable fisheries management plans, while avoiding over-harvest of non-target species.	3.3.1. Number of fish release by location estimated and in compliance with AOPs and US vs. OR Management Agreement.	Y	Y
		3.3.2. Number of adult returns by release group harvested	Y	Y
		3.3.3. Number of non-target species encountered in fisheries for targeted release group.	Y	Y
	3.4. Effects of strays from hatchery programs on non-target (unsupplemented and same species) populations remain within acceptable limits.	3.4.1. Fraction of strays among the naturally spawning fish in non-target populations.	Y	C
		3.4.2. Fraction of strays in non-target populations that originate from in-subbasin releases.	Y	C
		3.4.3. Fraction of hatchery strays in out-of-basin natural population.	Y	C
	3.5. Habitat is not a limiting factor for the affected supplemented population at the targeted level of supplementation.	3.5.1. Temporal and spatial trends in habitat capacity relative to spawning and rearing for target population.	Y	N
		3.5.2. Spatial and temporal trends among adult spawners and rearing juvenile fish in the available habitat.	Y	C

Category	Standards	Indicators	Applicable	Monitored
	3.6. Supplementation of natural population with hatchery origin production does not negatively impact the viability of the target population.	3.6.1. Pre- and post-supplementation trends in abundance of fish by life stage is monitored annually.	Y	C
		3.6.2. Pre- and post-supplementation trends in adult to adult or juvenile to adult survivals are estimated.	Y	C
		3.6.3. Temporal and spatial distribution of natural origin and hatchery origin adult spawners and rearing juveniles in the freshwater spawning and rearing areas are monitored.	Y	C
		3.6.4. Timing of juvenile outmigrations from rearing area and adult returns to spawning areas are monitored.	Y	C
	3.7. Natural production of target population is maintained or enhanced by supplementation.	3.7.1. Adult progeny per parent (P:P) ratios for hatchery-produced fish significantly exceed those of natural-origin fish.	Y	Y/C
		3.7.2. Natural spawning success of hatchery-origin fish must be similar to that of natural-origin fish.	Y	N
		3.7.3. Temporal and spatial distribution of hatchery-origin spawners in nature is similar to that of natural-origin fish.	Y	C
		3.7.4. Productivity of a supplemented population is similar to the natural productivity of the population had it not been supplemented (adjusted for density dependence).	Y	C
		3.7.5. Post-release life stage-specific survival is similar between hatchery and natural-origin population components.	Y	Y/C
	3.8. Life history characteristics and patterns of genetic diversity and variation within and among natural populations are similar and do not change significantly as a result of hatchery augmentation or supplementation programs.	3.8.1. Adult life history characteristics in supplemented or hatchery influenced populations remain similar to characteristics observed in the natural population prior to hatchery influence.	Y	C
		3.8.2. Juvenile life history characteristics in supplemented or hatchery influenced populations remain similar to characteristics in the natural population those prior to hatchery influence.	Y	C
		3.8.3. Genetic characteristics of the supplemented population remain similar (or improved) to the unsupplemented populations.	Y	C
	3.9. Operate hatchery programs so that life history characteristics and genetic diversity of hatchery fish mimic natural fish.	3.9.1. Genetic characteristics of hatchery-origin fish are similar to natural-origin fish.	Y	Y/C
		3.9.2. Life history characteristics of hatchery-origin adult fish are similar to natural-origin fish.	Y	Y/C
		3.9.3. Juvenile emigration timing and survival differences between hatchery and natural-origin fish are minimized.	Y	Y/C

Category	Standards	Indicators	Applicable	Monitored
	3.10. The distribution and incidence of diseases, parasites and pathogens in natural populations and hatchery populations are known and releases of hatchery fish are designed to minimize potential spread or amplification of diseases, parasites, or pathogens among natural populations.	3.10.1 Detectable changes in rate of occurrence and spatial distribution of disease, parasite or pathogen among the affected hatchery and natural populations.	Y	N

3.1.1 – 3.9.3 The adipose fin-clip is the primary mark that we use distinguish hatchery origin from natural origin fish in harvests and escapement. All hatchery releases for harvest mitigation are adipose fin-clipped and representative portions of those releases are coded-wire tagged. Relatively small numbers of releases of Chinook salmon intended to supplement natural populations are released un-clipped but are coded-wire tagged. Steelhead intended to supplement natural populations are also released un-clipped. Few of these releases are coded-wire tagged. The marking rate by mark type for each release group of Chinook salmon and steelhead are inventories and reported annually.

Hatchery release numbers, mark rates among releases and sampling rates in Snake River and Columbia River mainstem and tributary fisheries downstream of Lower granite Dam are reported by ODFW, WDFW, and CRITFC co-managers in the RMIS database maintained by the Pacific Sates Marine Fisheries Commission. IDFG, Nez Perce Tribe (NPT) and the Shoshone/Bannock Tribe (SBT) each authorize and manage fisheries in the boundary waters of the Snake River mainstem and tributaries of the Snake, Clearwater and Salmon Rivers. ODFW and WDFW also conduct recreational fisheries in the boundary waters of the Snake River shared by Idaho. Non-Tribal recreational fisheries are selective for adipose fin-clipped hatchery origin fish. Tribal fisheries are largely non-selective fisheries that harvest both hatchery and natural returns. IDFG, ODFW, WDFW and Tribes conducts statistically based inseason and post season fishery interview programs to estimate fishing effort, numbers of hatchery and natural origin fish harvested and released and other species encountered. Sampling rate by mark type, number of marks by program observed in fishery samples, and estimated total contribution of each population to by fishery are estimated and reported annually

Numbers of spawners by age are estimated annually by weir counts, spawning ground surveys or a combination of both methods for all Chinook salmon conservation programs. All fish passed upstream of weirs are identified by marks or tags as hatchery or natural origin and are sampled for age, sex, and size. Index redd counts are conducted on all natural spawning areas affected by supplementation programs and representative portions of carcasses on spawning grounds are sampled for marks, or tags and for age, sex, and size information. Annual estimated of spawners by age are used to monitor inter-annual spawner-recruit trends.

Because steelhead migration into spawning areas in Idaho coincides with high flows it is not possible to accurately estimate total spawning escapement in supplemented streams using weir counts or spawning ground surveys. Partial escapement estimated from weirs on the upper reaches of spawning areas are available for each supplemented system but escapements to lower reaches cannot be measured. Additional funding will be required to build permanent weirs below spawning areas on supplemented systems. Additional funding is also required to implement parental based tagging programs to distinguish progeny from hatchery origin from natural origin spawners in these systems.

Releases of fish from supplementation programs are marked or tagged to differentiate them from fish released for harvest mitigation and from natural origin fish. Mark rate by mark type for all releases are inventoried and reported. Screw traps are used to estimate numbers natural origin out-migrants from the supplemented population. All fish passed upstream of weirs are identified by marks or tags as hatchery or natural origin and are sampled for age, sex, and size. Index redd counts are conducted on all spring/summer Chinook salmon natural spawning areas affected by supplementation programs and representative portions of carcasses on spawning grounds are sampled for marks, or tags and for age, sex, and size information. Annual estimates of spawners by age are used to monitor inter-annual spawner-recruit trends.

While the above methods allow us to estimate numbers of natural origin and hatchery origin spawners on the spawning grounds, they do not allow us to estimate the relative contribution of hatchery and natural spawners to natural production. IDFG, Tribal and federal co-managers in the Snake basin are currently collecting genetic samples from all fish spawned in anadromous hatcheries and all natural and hatchery fish passed above weirs associated with hatchery programs. IDFG has worked in conjunction with CRITFC to build a library of genetic markers that can be used to identify individual parents of juveniles produced by adults sampled in hatchery broodstocks or from adults passed above weirs to spawn. Parental based analysis of juvenile production can be used to assess the relative contributions of individual spawning crosses (i.e. hat x hat, hat x nat, or nat x nat). While we currently have the samples in hand to do this analysis and will continue to collect those samples, we have no funding to process the samples for parental analysis.

Hatcheries or hatchery satellite facilities where broodstocks are collected are typically located on the tributary where the parent natural population for the hatchery broodstock reside. Hatchery and natural returns at those locations are trapped and enumerated at weirs run throughout the adult migration. Long time series of historic daily migration data are available at all facilities for both hatchery and natural returns. Managers use historic data to construct timing curves of average daily proportion of the run by date. These timing curves are used to project the numbers of natural fish returning to the weir and the numbers of the proportion of the annual broodstock need that should be collected by day. All hatchery and natural fish captured at the weirs are sampled for age, sex, and size data. Age is typically determined by length frequency analysis using age length relationships from known age coded-wire tagged fish.

All natural fish intercepted at hatchery facilities where broodstocks are maintained as a segregated population are released to spawn naturally in the available habitat upstream of the weir. At hatchery programs where integrated broodstock are maintained or are being developed, the natural and hatchery composition of the broodstock and the affected natural populations are carefully monitored and controlled based on sliding scales specific to each program. The proportions of natural fish into the hatchery broodstock and hatchery fish into the natural spawning population are based on a sliding scale of natural abundance. Success of the program is predicated on an average measure of percent natural influence in the hatchery and natural environments across generations.

The overwhelming majority of hatchery produced spring/summer Chinook salmon and all steelhead in Idaho are released as smolts. Representative portions of all smolt releases are PIT tagged and migratory timing of these fish is known. Hatchery smolts quickly exit terminal tributary rearing areas. While mainstem migration among hatchery smolts corresponds with typical timing observed among natural origin fish no significant competitive interactions during their brief seaward migratory period have been documented.

A few parr and presmolt release programs and egg box programs are implemented in some areas where natural production is severely depressed. The size of these programs are small and metered by best available estimates of the abundance of natural fish and habitat capacity.

At all broodstock collection sites for spring/summer Chinook salmon hatcheries and steelhead hatcheries operated by Idaho Department of Fish and Game, daily records of adult fish trapped and their disposition (i.e. held for brood, passed above weir to spawn, etc.) are maintained. Representative fractions of all natural origin and hatchery fish trapped are sampled for age, sex and size. Daily spawning records are maintained for each hatchery as are incubator loading densities, survival at various stages of development, and fry emergence timing are documented. Juvenile growth and survival are monitored by life stage, all production fish are adipose fin-clipped and or coded-wire tagged. A representative sample of all smolt release groups are PIT tagged. All data relative to hatchery adult collection, spawning, incubation, and rearing data are stored in a standardized relational data base that is maintained collaboratively with Tribal, Federal and state co-managers in the Snake River Basin. All coded wire tagging, PIT tagging and release data are entered into RMIS and PITAGIS databases maintained by the Pacific States Marine Fisheries Commission. PIT tag detections at key points in the seaward migration of juvenile releases from hatcheries are used to estimate migration timing and survival.

The Idaho Supplementation Studies is a large scale effectiveness monitoring program that is designed to track production and productivity in supplemented (treated) verses unsupplemented (control) streams. It is a long term program that is designed to last approximately 20 years and assess production and productivity prior to, during and after treatment in approximately 15 streams. The study is conducted collaboratively by IDFG, the Nez Perce Tribe, the Shoshone/ Bannock Tribes, and the USFWS. The study collects comparative production and productivity measures in approximately 15 control streams that have been paired with treatment sites and monitored across the duration of the study. Tributaries where Sawtooth, Pahsimeroi, McCall, Clearwater, and Kooskia hatcheries release spring/summer Chinook salmon are among the study sites. At each site, juvenile screw traps assess hatchery and natural juvenile outmigration timing, abundance, age structure, condition and survival. Representative portions of the natural outmigration are PIT tagged to assess timing and survival to Lower Granite Dam. ISS also monitors adult return in treatment streams at weirs and in treatment and control streams by systematic red counts in natural spawning areas through spawning. Weir and redd count data provide data on adult spawn timing, age structure, genetic composition, and spatial distribution.

The Idaho Natural Production Monitoring Program and the Idaho Steelhead Monitoring and Evaluation Study monitor adult and juvenile segments of natural Chinook salmon and steelhead populations in addition to those specifically monitored for effectiveness monitoring in the ISS project. Snorkel surveys have historically been conducted in representative standardized index sections of streams where natural populations of Chinook and steelhead spawn and rear. Snorkel surveys provide estimates of relative annual abundance, temporal, and spatial distribution of juvenile salmon and steelhead. Systematic sampling of juveniles encounters for age and tissues for genetic analyses provide estimates of age composition and genetic structure and diversity in each population.

The Idaho Natural Production Monitoring program also oversees the systematic redd count survey program for natural populations of Chinook salmon throughout Idaho. Data from this program are available from the 1950's through the present and proved historic estimates of spawner abundance and distribution in all extant natural populations of Chinook salmon in Idaho. During systematic spawning ground surveys, carcasses of adult spawners are also sampled for scales, sex and size information and for tissues analyzed to characterize the genetic structure of the populations.

Category	Standards	Indicators	Applicable	Monitored
4. OPERATION OF ARTIFICIAL PRODUCTION FACILITIES	4.1. Artificial production facilities are operated in compliance with all applicable fish health guidelines and facility operation standards and protocols such as those described by IHOT, PNFHPC, the Co-Managers of Washington Fish Health Policy, INAD, and MDFWP.	i. Annual reports indicating level of compliance with applicable standards and criteria. ii. Periodic audits indicating level of compliance with applicable standards and criteria.	Y Y	Y Y
	4.2. Effluent from artificial production facility will not detrimentally affect natural populations.	4.2.1 Discharge water quality compared to applicable water quality standards and guidelines, such as those described or required by NPDES, IHOT, PNFHPC, and Co-Managers of Washington Fish Health Policy tribal water quality plans, including those relating to temperature, nutrient loading, chemicals, etc.	Y	Y
	4.3. Water withdrawals and instream water diversion structures for artificial production facility operation will not prevent access to natural spawning areas, affect spawning behavior of natural populations, or impact juvenile rearing environment.	4.3.1. Water withdrawals compared to applicable passage criteria. 4.3.2. Water withdrawals compared to NMFS, USFWS, and WDFW juvenile screening criteria. 4.3.3. Number of adult fish aggregating and/or spawning immediately below water intake point. 4.3.4. Number of adult fish passing water intake point. 4.3.5. Proportion of diversion of total stream flow between intake and outfall.	Y Y Y Y Y	Y Y Y Y Y
	4.4. Releases do not introduce pathogens not already existing in the local populations, and do not significantly increase the levels of existing pathogens.	4.4.1. Certification of juvenile fish health immediately prior to release, including pathogens present and their virulence. 4.4.2. Juvenile densities during artificial rearing. 4.4.3. Samples of natural populations for disease occurrence before and after artificial production releases.	Y Y Y	Y Y N
	4.5. Any distribution of carcasses or other products for nutrient enhancement is accomplished in compliance with appropriate disease control regulations and guidelines, including state, tribal, and federal carcass distribution guidelines.	4.5.1. Number and location(s) of carcasses or other products distributed for nutrient enrichment. 4.5.2. Statement of compliance with applicable regulations and guidelines.	Y Y	Y Y
	4.6. Adult broodstock collection operation does not significantly alter spatial and temporal distribution of any naturally produced population.	4.6.1. Spatial and temporal spawning distribution of natural population above and below weir/trap, currently and compared to historic distribution.	Y	C
	4.7. Weir/trap operations do not result in significant stress, injury, or mortality in natural populations.	4.7.1. Mortality rates in trap. 4.7.2. Prespawning mortality rates of trapped fish in hatchery or after release.	Y Y	Y Y
	4.8. Predation by artificially produced fish on naturally produced fish does not significantly reduce numbers of natural fish.	4.8.1. Size at, and time of, release of juvenile fish, compared to size and timing of natural fish present. 4.8.2. Number of fish in stomachs of sampled artificially produced fish, with estimate of natural fish composition.	Y N	Y/C

4.1.1 – 4.1.2
https://research.idfg.idaho.gov/Fisheries%20Research%20Reports/Forms/Show%20All%20Reports.aspx for annual reporting. Reports are available upon request.

4.2.1
https://research.idfg.idaho.gov/Fisheries%20Research%20Reports/Forms/Show%20All%20Reports.aspx for annual reporting. Permits and compliance reports are available upon request.

4.3.1 – 4.3.5 Water withdrawal permits have been obtained to establish water rights for each hatchery facility. Intake system designed to deliver permitted flows. Operators monitor and report as required. Hatcheries participating in the programs will maintain all screens associated with water intakes in surface water areas to prevent impingement, injury, or mortality to listed salmonids.

4.4.1 – 4.4.3 Certification of fish health conducted prior to release (major bacterial, viral, parasitic pathogens); IDFG fish health professionals sample and certify all release and/or transfer groups.

4.5.1 – 4.5.2 Nutrient enhancement projects, where/when applicable, are outlined in IDFG research, management, and/or hatchery permits and annual reports; see https://research.idfg.idaho.gov/Fisheries%20Research%20Reports/Forms/Show%20All%20Reports.aspx for annual reporting.

4.6.1 Hatchery and research elements monitor the following characteristics annually: juvenile migration timing, adult return timing, adult return age and sex composition, spawn timing and distribution.

4.7.1 – 4.7.2 Facility will maintain all weirs/traps associated with program to either reduce or eliminate stress, injury, or mortality to listed salmonids. Mortality rates are documented

4.8.1 – 4.8.2 Facility will maintain all weirs/traps associated with program to either reduce or eliminate stress, injury, or mortality to listed salmonids. Mortality rates are documented

Category	Standards	Indicators	Applicable	Monitored
5. SOCIO-ECONOMIC EFFECTIVENESS	5.1. Cost of program operation does not exceed the net economic value of fisheries in dollars per fish for all fisheries targeting this population.	5.1.1. Total cost of program operation. 5.1.2. Sum of ex-vessel value of commercial catch adjusted appropriately, appropriate monetary value of recreational effort, and other fishery related financial benefits.	Y Y	Y Y
	5.2. Juvenile production costs are comparable to or less than other regional programs designed for similar objectives.	5.2.1. Total cost of program operation. 5.2.2. Average total cost of activities with similar objectives.	Y Y	Y Y

5.1.1 – 5.2.2 Based on surveys completed by the U.S. Fish and Wildlife service within the last decade, anglers in Idaho expend more than $200 million dollars annually on salmon and steelhead fisheries. This is more than an order of magnitude greater than the cost of the program. Production costs per juvenile released in Idaho's anadromous fish hatcheries are comparable to other programs of similar size and intent in the Columbia River Basin.

Table 24. Standardized performance indicators and definitions for status and trends and hatchery effectiveness monitoring (Galbreath et al. 2008; appendix C).

Performance Measure		Definition
Abundance	Adult Escapement to Tributary	Number of adults (including jacks) that have escaped to a certain point (i.e. - mouth of stream). Population based measure. Calculated with mark recapture methods from weir data adjusted for redds located downstream of weirs and in tributaries, and maximum net upstream approach for DIDSON and underwater video monitoring. Provides total escapement and wild only escapement. [Assumes tributary harvest is accounted for]. Uses TRT population definition where available
	Fish per Redd	Number of fish divided by the total number of redds. Applied by: The population estimate at a weir site, minus broodstock and mortalities and harvest, divided by the total number of redds located upstream of the weir.
	Female Spawner per Redd	Number of female spawners divided by the total number of redds above weir. Applied in 2 ways: 1) The population estimate at a weir site multiplied by the weir derived proportion of females, minus the number of female prespawn mortalities, divided by the total number of redds located upstream of the weir, and 2) DIDSON application calculated as in 1 above but with proportion females from carcass recoveries. Correct for mis-sexed fish at weir for 1 above.
	Index of Spawner Abundance - redd counts	Counts of redds in spawning areas in index area(s) (trend), extensive areas, and supplemental areas. Reported as redds and/or redds/km.
	Spawner Abundance	In-river: Estimated number of total spawners on the spawning ground. Calculated as the number of fish that return to an adult monitoring site, minus broodstock removals and weir mortalities and harvest if any, subtracts the number of female prespawning mortalities and expanded for redds located below weirs. Calculated in two ways: 1) total spawner abundance, and 2) wild spawner abundance which multiplies by the proportion of natural origin (wild) fish. Calculations include jack salmon. In-hatchery: Total number of fish actually used in hatchery production. Partitioned by gender and origin.
	Hatchery Fraction	Percent of fish on the spawning ground that originated from a hatchery. Applied in two ways: 1) Number of hatchery carcasses divided by the total number of known origin carcasses sampled. Uses carcasses above and below weirs, 2) Uses weir data to determine number of fish released above weir and calculate as in 1 above, and 3) Use 2 above and carcasses above and below weir.
	Ocean/Mainstem Harvest	Number of fish caught in ocean and mainstem (tribal, sport, or commercial) by hatchery and natural origin.
	Harvest Abundance in Tributary	Number of fish caught in ocean and mainstem (tribal, sport, or commercial) by hatchery and natural origin.
	Index of Juvenile Abundance (Density)	Parr abundance estimates using underwater survey methodology are made at pre-established transects. Densities (number per 100 m2) are recorded using protocol described in Thurow (1994). Hanken & Reeves estimator.
	Juvenile Emigrant Abundance	Gauss software is (Aptech Systems, Maple Valley, Washington) is used to estimate emigration estimates. Estimates are given for parr pre-smolts, smolts and the entire migration year. Calculations are completed using the Bailey Method and bootstrapping for 95% CIs. Gauss program developed by the University of Idaho (Steinhorst 2000).
	Smolts	Smolt estimates, which result from juvenile emigrant trapping and PIT tagging, are derived by estimating the proportion of the total juvenile abundance estimate at the tributary comprised of each juvenile life stage (parr, presmolt, smolt) that survive to first mainstem dam. It is calculated by multiplying the life stage specific abundance estimate (with standard error) by the life stage specific survival estimate to first mainstem dam (with standard error). The standard error around the smolt equivalent estimate is calculated using the following formula; where X = life stage specific juvenile abundance estimate and Y = life stage specific juvenile survival estimate: $Var(X \cdot Y)$ $= E(X)^2 \cdot Var(Y) + E(Y)^2 \cdot Var(X) + Var(X) \cdot Var(Y)$
	Run Prediction	This will not be in the raw or summarized performance database.

Survival – Productivity	Smolt-to-Adult Return Rate	The number of adult returns from a given brood year returning to a point (stream mouth, weir) divided by the number of smolts that left this point 1-5 years prior. Calculated for wild and hatchery origin conventional and captive brood fish separately. Adult data applied in two ways: 1) SAR estimate to stream using population estimate to stream, 2) adult PIT tag SAR estimate to escapement monitoring site (weirs, LGR), and 3) SAR estimate with harvest. Accounts for all harvest below stream. *Smolt-to-adult return rates* are generated for four performance periods; tributary to tributary, tributary to tributary, tributary to first mainstem dam, first mainstem dam to first mainstem dam, and first mainstem dam to tributary. *First mainstem dam to first mainstem dam S*AR estimates are calculated by dividing the number of PIT tagged adults returning to first mainstem dam by the estimated number of PIT tagged juveniles at first mainstem dam. Variances around the point estimates are calculated as described above. *Tributary to tributary SAR* estimates for natural and hatchery origin fish are calculated using PIT tag technology as well as direct counts of fish returning to the drainage. PIT tag SAR estimates are calculated by dividing the number of PIT tag adults returning to the tributary (by life stage and origin type) by the number of PIT tagged juvenile fish migrating from the tributary (by life stage and origin type). Overall PIT tag SAR estimates for natural fish are then calculated by averaging the individual life stage specific SAR's. Direct counts are calculated by dividing the estimated number of natural and hatchery-origin adults returning to the tributary (by length break-out for natural fish) by the estimated number of natural-origin fish and the known number of hatchery-origin fish leaving the tributary. *Tributary to* first mainstem dam SAR estimates are calculated by dividing the number of PIT tagged adults returning to first mainstem dam by the number of PIT tagged juveniles tagged in the tributary. There is no associated variance around this estimate. The adult detection probabilities at first mainstem dam are near 100 percent. First mainstem dam *to tributary* SAR estimates are calculated by dividing the number of PIT tagged adults returning to the tributary by the estimated number of PIT tagged juveniles at first mainstem dam. The estimated number of PIT tagged juveniles at first mainstem dam is calculated by multiplying lifestage specific survival estimates (with standard errors) by the number of juveniles PIT tagged in the tributary. The variance for the estimated number of PIT tagged juveniles at first mainstem dam is calculated as follows, where X = the number of PIT tagged fish in the tributary and Y = the variance of the lifestage specific survival estimate: $Var(X \cdot Y) = X^2 \cdot Var(Y)$ The variance around the SAR estimate is calculated as follows, where X = the number of adult PIT tagged fish returning to the tributary and Y = the estimated number of juvenile PIT tagged fish at first mainstem dam : $Var\left(\frac{X}{Y}\right) = \left(\frac{EX}{EY}\right)^2 \cdot \left(\frac{Var(Y)}{(EY)^2}\right)$
	Progeny-per- Parent Ratio	Adult to adult calculated for naturally spawning fish and hatchery fish separately as the brood year ratio of return adult to parent spawner abundance using data above weir. Two variants calculated: 1) escapement, and 2) spawners.
	Recruit/spawner (R/S)(Smolt Equivalents per Redd or female)	Juvenile production to some life stage divided by adult spawner abundance. Derive adult escapement above juvenile trap multiplied by the prespawning mortality estimate. Adjusted for redds above juv. Trap. *Recruit per spawner* estimates, or *juvenile abundance (can be various life stages or locations) per redd/female*, is used to index population productivity, since it represents the quantity of juvenile fish resulting from an average redd (total smolts divided by total redds) or female. Several forms of juvenile life stages are applicable. We utilize two measures: 1) juvenile abundance (parr, presmolt, smolt, total abundance) at the tributary mouth, and 2) smolt abundance at first mainstem dam.
	Pre-spawn Mortality	Percent of female adults that die after reaching the spawning grounds but before spawning. Calculated as the proportion of "25% spawned" females among the total number of female carcasses sampled. ("25% spawned" = a female that contains 75% of her egg compliment].

	Juvenile Survival to first mainstem dam	Life stage survival (parr, presmolt, smolt, subyearling) calculated by CJS Estimate (SURPH) produced by PITPRO 4.8+ (recapture file included), CI estimated as 1.96*SE. Apply survival by life stage to first mainstem dam to estimate of abundance by life stage at the tributary and the sum of those is total smolt abundance surviving to first mainstem dam . Juvenile survival to first mainstem dam = total estimated smolts surviving to first mainstem dam divided by the total estimated juveniles leaving tributary.
	Juvenile Survival to all Mainstem Dams	*Juvenile survival to first mainstem dam and subsequent Mainstem Dam(s)*, which is estimated using PIT tag technology. Survival by life stage to and through the hydrosystem is possible if enough PIT tags are available from the stream. Using tags from all life stages combined we will calculate (SURPH) the survival to all mainstem dams.
	Post-release Survival	Post-release survival of natural and hatchery-origin fish are calculated as described above in the performance measure "Survival to first mainstem dam and Mainstem Dams". No additional points of detection (i.e screwtraps) are used to calculate survival estimates.
Distribution	Adult Spawner Spatial Distribution	Extensive area tributary spawner distribution. Target GPS red locations or reach specific summaries, with information from carcass recoveries to identify hatchery-origin vs. natural-origin spawners across spawning areas within populations.
	Stray Rate (percentage)	Estimate of the number and percent of hatchery origin fish on the spawning grounds, as the percent within MPG, and percent out of ESU. Calculated from 1) total known origin carcasses, and 2) uses fish released above weir. Data adjusted for unmarked carcasses above and below weir.
	Juvenile Rearing Distribution	Chinook rearing distribution observations are recorded using multiple divers who follow protocol described in Thurow (1994).
	Disease Frequency	Natural fish mortalities are provided to certified fish health lab for routine disease testing protocols. Hatcheries routinely samples fish for disease and will defer to then for sampling numbers and periodicity
Genetic	Genetic Diversity	Indices of genetic diversity – measured within a tributary) heterozygosity – allozymes, microsatellites), or among tributaries across population aggregates (e.g., FST).
	Reproductive Success (Nb/N)	Derived measure: determining hatchery:wild proportions, effective population size is modeled.
	Relative Reproductive Success (Parentage)	Derived measure: the relative production of offspring by a particular genotype. Parentage analyses using multilocus genotypes are used to assess reproductive success, mating patterns, kinship, and fitness in natural pop8ulations and are gaining widespread use of with the development of highly polymorphic molecular markers.
	Effective Population Size (Ne)	Derived measure: the number of breeding individuals in an idealized population that would show the same amount of dispersion of allele frequencies under random genetic drift or the same amount of inbreeding as the population under consideration.
Life History	Age Structure	Proportion of escapement composed of adult individuals of different brood years. Calculated for wild and hatchery origin conventional and captive brood adult returns. Accessed via scale method, dorsal fin ray ageing, or mark recoveries. Juvenile Age is determined by brood year (year when eggs are placed in the gravel) Then Age is determined by life stage of that year. Methods to age Chinook captured in screwtrap are by dates; fry – prior to July 1; parr – July 1-August 31; presmolt – September 1 – December 31; smolt – January 1 – June 30; yearlings – July 1 – with no migration until following spring. The age class structure of juveniles is determined using length frequency breakouts for natural-origin fish. Scales have been collected from natural-origin juveniles, however, analysis of the scales have never been completed. The age of hatchery-origin fish is determined through a VIE marking program which identifies fish by brood year. For steelhead we attempt to use length frequency but typically age of juvenile steelhead is not calculated.
	Age–at–Return	Age distribution of spawners on spawning ground. Calculated for wild and hatchery conventional and captive brood adult returns. Accessed via scale method, dorsal fin ray ageing, or mark recoveries.
	Age–at-Emigration	Juvenile Age is determined by brood year (year when eggs are placed in the gravel) Then Age is determined by life stage of that year. Methods to age Chinook captured in screwtrap are by dates; fry – prior to July 1; parr – July 1-August 31; presmolt – September 1 – December 31; smolt – January 1 – June 30; yearlings – July 1 – with no migration until following spring. The age class structure of juveniles is determined using length frequency breakouts for natural-origin fish. Scales have been collected from natural-origin juveniles, however, analysis of the scales have never been completed. The age of hatchery-origin fish is determined through a VIE marking program which identifies fish by brood year. For steelhead we attempt to use length frequency but typically age of juvenile steelhead is not calculated.
	Size-at-Return	Size distribution of spawners using fork length and mid-eye hypural length. Raw database measure only.

	Size-at-Emigration	Fork length (mm) and weight (g) are representatively collected weekly from natural juveniles captured in emigration traps. Mean fork length and variance for all samples within a lifestage-specific emigration period are generated (mean length by week then averaged by lifestage). For entire juvenile abundance leaving a weighted mean (by lifestage) is calculated. Size-at-emigration for hatchery production is generated from pre release sampling of juveniles at the hatchery.
	Condition of Juveniles at Emigration	Condition factor by life stage of juveniles is generated using the formula: $K = (w/l^3)(10^4)$ where K is the condition factor, w is the weight in grams (g), and l is the length in millimeters (Everhart and Youngs 1992).
	Percent Females (adults)	The percentage of females in the spawning population. Calculated using 1) weir data, 2) total known origin carcass recoveries, and 3) weir data and unmarked carcasses above and below weir. Calculated for wild, hatchery, and total fish.
	Adult Run-timing	Arrival timing of adults at adult monitoring sites (weir, DIDSON, video) calculated as range, 10%, median, 90% percentiles. Calculated for wild and hatchery origin fish separately, and total.
	Spawn-timing	This will be a raw database measure only.
	Juvenile Emigration Timing	Juvenile emigration timing is characterized by individual life stages at the rotary screw trap and Lower Granite Dam. Emigration timing at the rotary screw trap is expressed as the percent of total abundance over time while the median, 0%, 10, 50%, 90% and 100% detection dates are calculated for fish at first mainstem dam.
	Mainstem Arrival Timing (Lower Granite)	Unique detections of juvenile PIT-tagged fish at first mainstem dam are used to estimate migration timing for natural and hatchery origin tag groups by lifestage. The actual Median, 0, 10%, 50%, 90% and 100% detection dates are reported for each tag group. Weighted detection dates are also calculated by multiplying unique PIT tag detection by a life stage specific correction factor (number fish PIT tagged by lifestage divided by tributary abundance estimate by lifestage). Daily products are added and rounded to the nearest integer to determine weighted median, 0%, 50%, 90% and 100% detection dates.
Habitat	Physical Habitat	TBD
	Stream Network	TBD
	Passage Barriers/Diversions	TBD
	Instream Flow	USGS gauges and also staff gauges
	Water Temperature	Various, mainly Hobo and other temp loggers at screw trap sights and spread out throughout the streams
	Chemical Water Quality	TBD
	Macroinvertebrate Assemblage	TBD
	Fish and Amphibian Assemblage	Observations through rotary screwtrap catch and while conducting snorkel surveys.
In-Hatchery Measures	Hatchery Production Abundance	The number of hatchery juveniles of one cohort released into the receiving stream per year. Derived from census count minus prerelease mortalities or from sample fish- per-pound calculations minus mortalities. Method dependent upon marking program (census obtained when 100% are marked).
	In-hatchery Life Stage Survival	In-hatchery survival is calculated during early life history stages of hatchery-origin juvenile Chinook. Enumeration of individual female's live and dead eggs occurs when the eggs are picked. These numbers create the inventory with subsequent mortality subtracted. This inventory can be changed to the physical count of fish obtained during CWT or VIE tagging. These physical fish counts are the most accurate inventory method available. The inventory is checked throughout the year using 'fish-per-pound' counts. Estimated survival of various in-hatchery juvenile stages (green egg to eyed egg, eyed egg to ponded fry, fry to parr, parr to smolt and overall green egg to release) Derived from census count minus prerelease mortalities or from sample fish- per-pound calculations minus mortalities. Life stage at release varies (smolt, presmolt, parr, etc.).
	Size-at-Release	Mean fork length measured in millimeters and mean weight measured in grams of a hatchery release group. Measured during prerelease sampling. Sample size determined by individual facility and M&E staff. Life stage at release varies (smolt, presmolt, parr, etc.).
	Juvenile Condition Factor	Condition Factor (K) relating length to weight expressed as a ratio. Condition factor by life stage of juveniles is generated using the formula: $K = (w/l^3)(10^4)$ where K is the condition factor, w is the weight in grams (g), and l is the length in millimeters (Everhart and Youngs 1992).

	Fecundity by Age	The reproductive potential of an individual female. Estimated as the number of eggs in the ovaries of the individual female. Measured as the number of eggs per female calculated by weight or enumerated by egg counter.
	Spawn Timing	Spawn date of broodstock spawners by age, sex and origin, Also reported as cumulative timing and median dates.
	Hatchery Broodstock Fraction	Percent of hatchery broodstock actually used to spawn the next generation of hatchery F1s. Does not include prespawn mortality.
	Hatchery Broodstock Prespawn Mortality	Percent of adults that die while retained in the hatchery, but before spawning.
	Female Spawner ELISA Values	Screening procedure for diagnosis and detection of BKD in adult female ovarian fluids. The enzyme linked immunosorbent assay (ELISA) detects antigen of *R. salmoninarum.*
	In-Hatchery Juvenile Disease Monitoring	Screening procedure for bacterial, viral and other diseases common to juvenile salmonids. Gill/skin/ kidney /spleen/skin/blood culture smears conducted monthly on 10 mortalities per stock
	Length of Broodstock Spawner	Mean fork length by age measured in millimeters of male and female broodstock spawners. Measured at spawning and/or at weir collection. Is used in conjunction with scale reading for aging.
	Prerelease Mark Retention	Percentage of a hatchery group that have retained a mark up until release from the hatchery. Estimated from a sample of fish visually calculated as either “present” or “absent”
	Prerelease Tag Retention	Percentage of a hatchery group that have retained a tag up until release from the hatchery - estimated from a sample of fish passed as either “present” or “absent”. (“Marks” refer to adipose fin clips or VIE batch marks).
	Hatchery Release Timing	Date and time of volitional or forced departure from the hatchery. Normally determined through PIT tag detections at facility exit (not all programs monitor volitional releases).
	Chemical Water Quality	Hatchery operational measures included: dissolved oxygen (DO) - measured with DO meters, continuously at the hatchery, and manually 3 times daily at acclimation facilities; ammonia (NH_3) nitrite (NO_2), -measured weekly only at reuse facilities (Kooskia Fish Hatchery).
	Water Temperature	Hatchery operational measure (Celsius) - measured continuously at the hatchery with thermographs and 3 times daily at acclimation facilities with hand-held devices.

11.1.2 Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program

Section 11.1.1 describes the methods and plans to address the standards and indicators listed in Section 1.10. The table includes a field indicating whether or not the indicator is being monitored.

For cells with a “Y”, the indicator is being monitored with funding provided by the hatchery mitigation program.

For cells with a “C”, the indicator is being monitored, but is tied to a separately funded program (e.g. Idaho Supplementation Studies (ISS), Idaho Natural Production Monitoring Program (INPM), General Parr Monitoring (GPM) program etc.). Without continued funding for these programs, many of the M&E components will not occur. For example, The ISS program is scheduled to end in 2014 with some components ending in 2012. Funding to offset this loss needs to be identified to avoid significant M&E data gaps.

For cells with a “Y/C”, the indicator is being monitored and is partially funded through the hatchery mitigation program. Other programs such as those listed in 2b above provide the remaining funding.

For cells with an "N", the indicator is not currently being monitored. For all applicable indicators that are not being addressed (N), a brief narrative is provided below describing why that particular indicator is not being monitored.

Indicator

3.7.2 *Natural spawning success of hatchery-origin fish must be similar to that of natural-origin fish*- Tissue samples are, and will continue to be, collected from all natural- and hatchery-origin fish released above the hatchery weir that will enable the analysis of relative reproductive success of hatchery and natural parents. However, evaluation of the relative reproductive success of hatchery- and natural-origin Chinook salmon spawning naturally above the hatchery weir has not been initiated. Until such time that this evaluation is initiated, the combined productivity of hatchery- and natural-origin spawners will be monitored using data that is currently being collected and analyzed under existing M&E contracts. Funding for evaluating the relative reproductive success of hatchery and natural fish in this population would be a useful tool for validating assumptions in models that project outcomes from integrated hatchery programs. This type of effectiveness monitoring has population specific and regional applications.

3.10.1 *Detectable changes in rate of occurrence and spatial distribution of disease, parasite or pathogen among the affected hatchery and natural populations* - IDFG maintains a formalized fish health monitoring program for stocks propagated and reared at the hatchery facilities. IDFG has not prioritized the need to develop a formalized monitoring program for natural populations adjacent to the hatchery program. However, if mortalities occur or are observed during routine field operations and data collection events, samples are collected and delivered to the IDFG Fish Health Lab for analysis. Additionally, fish health samples collected by the USFWS as part of the National Wild Fish Heath Survey Database (www.esg.montana.edu/nfhdb/) are collected throughout Idaho.

For hatchery-origin releases, between 45 and 30 d prior to release, a 60 fish pre-liberation sample is taken from each rearing lot to assess the prevalence of viral replicating agents and to detect the pathogens responsible for bacterial kidney disease and whirling disease. In addition, an organosomatic index is developed for each release lot. Diagnostic services are provided by the IDFG Fish Health Laboratory.

4.4.3 *Samples of natural populations for disease occurrence before and after artificial production releases* See 3.10.1 above

11.2) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from monitoring and evaluation activities.

Risk aversion measures for monitoring and evaluation activities associated with the evaluation of the Lower Snake River Compensation Program are specified in our ESA Section 7 Consultation and Section 10 Permit 1124. A brief summary of the kinds of actions taken is provided.

Adult handling activities are conducted to minimize impacts to ESA-listed, non-target species. Adult and juvenile weirs and screw traps are engineered properly and installed in locations that minimize adverse impacts to both target and non-target species. All trapping facilities are constantly monitored to minimize a variety of risks (e.g., high water periods, high emigration or escapement periods, security).

Adult spawner and redd surveys are conducted to minimize potential risks to all life stages of ESA-listed species. The IDFG conducts formal redd count training annually. During surveys, care is taken to not disturb ESA-listed species and to not walk in the vicinity of completed redds.

Snorkel surveys conducted primarily to assess juvenile abundance and density are conducted in index sections only to minimize disturbance to ESA-listed species. Displacement of fish is kept to a minimum.

Marking and tagging activities are designed to protect ESA-listed species and allow mitigation harvest objectives to be pursued/met. Hatchery produced fish are visibly marked to differentiate them from their wild/natural counterpart.

SECTION 12. RESEARCH

12.1 Objective or purpose.

Hatchery Supplementation Research

The Idaho Salmon Supplementation (ISS) research study was initiated to evaluate the benefits and risks of using a supplementation strategy to increase natural production. The ISS project has utilized existing hatchery facilities that are funded by the LSRCP program and used LSRCP program fish to create supplementation broodstocks. For obvious reasons, the LSRCP and ISS programs are tightly linked with respect to monitoring and evaluating both hatchery- and natural-origin Chinook salmon associated with and adjacent to the hatchery program. This program is scheduled to be completed in 2014.

The following excerpts were taken from the 1997-2001 ISS progress report (Lutch et al. 2003):

> The Idaho Supplementation Studies (ISS) project is a collaborative study between Idaho Department of Fish and Game (IDFG), the Nez Perce Tribe, the Shoshone Bannock Tribe, and the U.S. Fish and Wildlife Service. It was developed to determine the benefits and risks associated with hatchery supplementation of Chinook

salmon *Oncorhynchus tshawytscha* in the Snake River basin. Because the scope of study is broad, streams included were distributed among the cooperating agencies, which operate under an umbrella agreement to maintain consistency for all research activities.

The ISS study design was implemented in 1992 (Bowles and Leitzinger 1991) with the following goals in mind: 1) evaluate the efficacy of using hatchery fish to restore or augment production in natural populations of spring and summer Chinook salmon in the Salmon and Clearwater River subbasins of Idaho, 2) evaluate the long-term impacts of supplementation with hatchery-origin Chinook salmon on the survival and fitness of natural populations, and 3) evaluate hatchery releases at different life stages with respect to these same measures of production and productivity. To achieve these goals, a long-term experiment was designed to compare production and productivity measures between a group of experimentally supplemented (treatment) streams and a group of untreated (control) streams where natural production has experienced little or no hatchery influence. The following objectives were established to accomplish the goals of the ISS study:

1. Monitor and evaluate the effects of supplementation on the abundance of naturally produced juveniles and resultant adult returns,
2. Monitor and evaluate changes in natural productivity and genetic composition of target and adjacent populations following supplementation,
3. Determine which supplementation strategies (e.g., smolt versus parr release) provide the highest response in natural production without adverse affects on productivity, and
4. Develop supplementation recommendations.

Research tasks are distributed among three project phases. During Phase I, broodstock for the first generation (F_1) of supplementation treatments was developed from crosses of locally derived hatchery and wild/natural origin Chinook salmon. These F_1 fish were incubated in the hatchery and reared to parr, presmolt, or smolt life stages. They were uniquely marked prior to release in natural rearing areas to make them distinguishable from other hatchery-origin and naturally produced Chinook salmon. During Phase II of the study, adult returns from F_1 supplementation releases were crossed with adult returns from naturally produced juveniles. Natural origin adults comprise a minimum of 50% of the fish used in the crosses to produce the second generation (F_2) of supplementation fish. All remaining natural origin and supplementation recruits are allowed to spawn naturally, as long as supplementation adults do not numerically exceed the number of natural fish. In Phase III, supplementation with juvenile outplants ceases, but adult returns from supplementation juveniles are allowed to enter natural spawning areas and spawn with each other or fish of natural origin to naturally supplement the F_3 generation. Monitoring and evaluation of juvenile production and resulting adult returns are conducted on the F_1, F_2, and F_3 generations to provide a means to evaluate the effects of supplementation on natural production and productivity.

12.2) Cooperating and funding agencies.

U.S. Fish and Wildlife Service.

Nez Perce Tribe.

Shoshone Bannock Tribes.

Bonneville Power Administration

12.3 Principle investigator or project supervisor and staff.

Dan Schill – Fisheries Research Manager, Idaho Department of Fish and Game.
Dave Venditti- Sr. Fisheries Research Biologist, IDFG- ISS evaluation

12.4 Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2.

N/A

12.5 Techniques: include capture methods, drugs, samples collected, tags applied.

Idaho supplementation studies staff work to assemble annual juvenile Chinook salmon out-migration and adult return data sets. Screw traps are used to capture emigrating juvenile Chinook salmon. Generally, all target species captured are anesthetized and handled. A portion of captured juveniles may be fin clipped or PIT tagged (See Bowles and Leitzinger 1991 for Idaho supplementation studies detail). Adult information is assembled from a variety of information sources including: dam and weir counts, fishery information, coded-wire tag information, redd surveys, and spawning surveys.

Idaho Department of Fish and Game and cooperator staff may sample adult Chinook carcasses to collect tissue samples for subsequent genetic analysis. Additionally, otoliths, scales, or fins may be collected for age analysis.

12.6 Dates or time period in which research activity occurs.

Fish culture practices are monitored throughout the year by hatchery and hatchery evaluation research staff.

Adult escapement monitoring occurs May through September.

Juvenile trapping and tagging occurs February through November. Smolt out-migration through the hydro system corridor is typically monitored from March through September. Juvenile population abundance and density are monitored during late spring and summer months.

Fish health monitoring occurs year round.

12.7 Care and maintenance of live fish or eggs, holding duration, transport methods.

Research activities that involve the handling of eggs or fish apply the same protocols reviewed in Section 9 above. Hatchery staff generally assists with all cooperative activities involving the handling of eggs.

For juvenile fish that are captured and tagged using the screw trap, all are anesthetized prior to tagging and held approximately 8-10 hours, to monitor tag/handling mortality, and then released at dusk.

12.8 Expected type and effects of take and potential for injury or mortality.

See Attachment 1 Table 1b. Generally, take for research activities is defined as: “observe/harass”, and “capture, handle, mark, tissue sample, release.”

12.9 Level of take of listed fish: number or range of fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached “take table” (Table 1).

See Table 1b at the end of this document.

12.10 Alternative methods to achieve project objectives.

Alternative methods to achieve research objectives have not been developed.

12.11 List species similar or related to the threatened species; provide number and causes of mortality related to this research project.

N/A.

12.12 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the proposed research activities.

See Section 11.2 above.

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SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

"I hereby certify that the information provided is complete, true and correct to the best of my knowledge and belief. I understand that the information provided in this HGMP is submitted for the purpose of receiving limits from take prohibitions specified under the Endangered Species Act of 1973 (16 U.S.C.1531-1543) and regulations promulgated thereafter for the proposed hatchery program, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or penalties provided under the Endangered Species Act of 1973."

Name, Title, and Signature of Applicant:

Certified by_____________________________ Date:_____________

SECTION 15 PROGRAM EFFECTS ON OTHER (NON-ANADROMOUS SALMONID) ESA-LISTED POPULATIONS

Species list attached (anadromous salmonid effects are addressed in Section 2)

15.1 List all ESA permits or authorizations for all non-anadromous salmonid programs associated with the hatchery program

ESA Section 6 Cooperative Agreement for Bull Trout Take Associated with IDFG Research

Each year, IDFG prepares a bull trout conservation program plan and take report that describes the management program for bull trout designed to meet the provisions contained in Section 6 of the ESA and to comport with the spirit of Section 10(a)1(A). This plan identifies the benefits to bull trout from management and research conducted or authorized by the state, provides documentation of bull trout take conducted and authorized by IDFG and provides an estimate of take for the coming year. Each year the report is submitted to the USFWS, which then makes a determination whether this program is in accordance with the ESA. The plan/report is due to the USFWS by March 31 annually. A summary of recent take in the South Fork Salmon River watershed is further discussed in Section 15.3 of this HGMP.

ESA Section 7 Consultation and Biological Opinions

ESA Section 7 Consultation and Biological Opinion through the U.S. Fish and Wildlife Service Lower Snake Compensation Program for bull trout take associated with hatchery operations.

15.2 Description of non-anadromous salmonid species and habitat that may be affected by hatchery program

This program releases hatchery juvenile Chinook into the Salmon River subbasin where bull trout are the only listed (threatened) non-anadromous aquatic ESA-listed species present. Bull trout life history, status and habitat use in Salmon River subbasin is summarized below.

General Species Description, Status, and Habitat Requirements

Bull trout (members of the family Salmonidae) are a species of char native to Nevada, Oregon, Idaho, Washington, Montana, and western Canada. While bull trout occur widely across the western United States, they are patchily distributed at multiple spatial scales from river basin to local watershed, and individual stream reach levels. Due to widespread declines in abundance, bull trout were initially listed as threatened in Idaho in 1998, and listed throughout their coterminous range in the United States in 1999. On January 13, 2010, the USFWS proposed to revise its 2005 designation of critical habitat for bull trout to include a substantial portion of the Salmon River subbasin (where 5,045 stream miles are proposed as critical habitat).

Throughout their range, bull trout have declined due to habitat degradation and fragmentation, blockage of migratory corridors, poor water quality, past fisheries management (such as over-harvest and bounties), and the introduction of non-native species such as brown, lake and brook trout. Range-wide, several local extinctions have been documented. Many of the remaining populations are small and isolated from each other, making them more susceptible to local extinctions. However, recent work in Idaho concluded that despite declines from historical levels, Idaho bull trout are presently widely distributed, relatively abundant, and apparently stable (High et al. 2008). High et al. (2008) concluded that over half of the Idaho bull trout population estimate (0.64 million bull trout) occurred in the Salmon River Recovery Unit, although overall density was relatively low (4.4 bull trout/100 m).

Bull trout exhibit a wide variety of life history types, primarily based on general seasonal migration patterns of subadults and adults between headwater spawning and rearing streams to other habitats (usually downstream) for foraging and overwintering, including resident (residing in small headwater streams for their entire lives); fluvial (migrating to larger river systems); adfluvial (migrating to lakes or reservoirs); and anadromous (migrating to estuarine or marine waters) (Goetz et al. 2004). Each of these life history strategies is present in the Salmon River subbasin, except anadromy. Fluvial and resident bull trout populations have been commonly observed throughout the current range of bull trout in the Salmon River subbasin, and adfluvial populations are present, associated with several natural lakes (USFWS 2002).

Bull trout spawning and rearing requires cold water temperatures (generally below 16°C) during summer rearing, and less than about 10°C during spawning (Dunham et al. 2003). Juveniles require complex rearing habitats (Dambacher and Jones 1997, Al-Chokhachy et al. 2010). Migratory adults and subadults are highly piscivorous (Lowery et al. 2009), and migratory adults need unobstructed connectivity to diverse habitats where forage fish species are plentiful and where water temperatures are relatively cool (less than about 18°C maximum) during migration (Howell et al. 2009).

Population Status and Distribution by Core Area

Bull trout are well distributed throughout most of the Salmon River Recovery Unit in 125 identified local populations within 10 core areas (USFWS 2002). The recovery team also identified 15 potential local populations. The South Fork Salmon River summer Chinook program releases hatchery juveniles into the South Fork Salmon River watershed. Broodstock is collected at the South Fork Salmon River trap. These activities occur in one bull trout core area, the South Fork Salmon River. Juvenile Chinook released in this core area then migrate downstream through the Little-Lower Salmon River Core. The following information on these two core areas, and local population status and habitat use within each, is summarized from the bull trout draft recovery plan (USFWS 2002) unless otherwise cited.

South Fork Salmon River Core Area

The South Fork Salmon River Core Area supports 27 local populations and 5 potential local populations. Both resident and fluvial populations of bull trout were documented in the mainstem South Fork Salmon River and in 18 of the tributaries in the 1980s. More recent studies (summarized in the draft recovery plan) documented that bull trout from other core areas use the mainstem Salmon River core area for foraging and overwintering. Bull trout abundance numbers are the highest in the East Fork of the South Fork Salmon River and the Secesh River local populations.

Adult abundance was estimated to be greater than 5,000 individuals in the draft recovery plan. The bull trout 5-year status review conducted in 2006 (USFWS 2008) reported that the South Fork Salmon River Core Area had an unknown adult abundance level, occupying from 125 to 620 stream miles, had an unknown short-term trend, a moderate/imminent threat to persistence, and a final ranking of “at risk” to become extirpated (Table 25). More recent analysis by High et al. (2008) determined that a significantly negative rate of population change occurred before 1994, becoming significantly positive after 1994 (19-

year record at 36 survey sites) (Table 26).

Little-Lower Salmon River Core Area

Local populations occur in the Rapid River, and Slate, John Day, Boulder, Hard, Lake/Lower Salmon, and Partridge creeks. Potential local populations include Hazard, Elkhorn and French creeks. The mainstem Salmon River provides habitat for migration, and adult and subadult foraging, rearing, and wintering. Resident and migratory populations are known to be present. Annual runs of fluvial bull trout in the Rapid River drainage have been monitored since 1973, and bull trout abundance data has been collected since 1992 at the Rapid River Hatchery trap. Upstream migrant spawner counts at the trap have ranged from 91 to 420 fish from 1992 to 2009 (IDEQ 2006).

Adult abundance was estimated to be 500 to 5,000 individuals in the draft recovery plan. The bull trout 5-year status review conducted in 2006 (USFWS 2008) determined the Little-Lower Salmon River Core Area had an adult abundance level of 50 to250, occupying from 125 to 620 stream miles, had an unknown short-term trend, a substantial/imminent threat to persistence, and a final ranking of “high risk” to become extirpated (Table 25). More recent analysis by High et al. (2008) determined that a weakly negative rate of population change occurred pre-1994, and a weakly positive change occurred after 1994 (19-year record at 34 survey sites, snorkel surveys) (Table 26). High et al. (2008) also reported that trap counts of upstream migrant fluvial bull trout in the Rapid River over 32 years of record followed these same trends (see Table 26).

Table 25 Summary table of core area rankings for population abundance, distribution, trend, threat, and final rank, Salmon River Recovery Unit.

Core Area	Population Abundance Category (individuals)	Distribution Range Rank (stream length miles)	Short-term Trend Rank	Threat Rank	Final Rank
Upper Salmon River	unknown	620-3000	Unknown	Moderate, imminent	Potential Risk
Pahsimeroi River	unknown	125-620	Unknown	Substantial, imminent	At Risk
Lemhi River	250-1000	125-620	Unknown	Substantial, imminent	At Risk
Middle Salmon River / Panther	unknown	125-620	Unknown	Moderate, imminent	At Risk
Lake Creek	50-250	25-125	Unknown	Widespread, low-severity	At Risk
Opal Lake	unknown	2.5-25	Unknown	Widespread, low-severity	Potential Risk
Middle Fork Salmon R.	unknown	620-3000	Unknown	Slightly	Low Risk
Middle Salmon River / Chamberlain	unknown	125-620	Unknown	Widespread, low-severity	Potential Risk
South Fork Salmon R.	unknown	125-620	Unknown	Moderate, imminent	At Risk
Little-Lower Salmon R.	50-250	125-620	Unknown	Substantial, imminent	High Risk

Source: USFWS (2008).

Table 26. Intrinsic rates of population change (r) with 90% confidence limits (CLs) for bull trout in the core areas of the Salmon River Recovery Unit of Idaho with available data.

Drainage or core area	Starting year	Years of record	Sites	Pre-1994 *r* Estimate	Pre-1994 *r* Lower CL	Pre-1994 *r* Upper CL	Post-1994 *r* Estimate	Post-1994 *r* Lower CL	Post-1994 *r* Upper CL	*r* for all years Estimate	*r* for all years Lower CL	*r* for all years Upper CL
Little–Lower Salmon River (S)	1985	19	34	−0.010	−0.097	0.077	0.063	−0.021	0.146	0.015	−0.016	0.045
Rapid River (W)	1973	32	1	−0.013	−0.039	0.012	0.047	−0.026	0.119	−0.001	−0.015	0.014
South Fork Salmon River (S)	1985	19	36	−0.365*	−0.670	−0.060	0.305*	0.200	0.411	0.032	−0.078	0.143
Middle Fork Salmon River (S)	1985	19	77	0.035	−0.082	0.152	−0.043	−0.131	0.046	−0.007	−0.043	0.030
Middle Salmon River– Chamberlain (S)	1985	16	10	−0.007	−0.456	0.443	0.006	−0.102	0.115	0.060	−0.017	0.138
Middle Salmon River– Panther (S)	1985	17	12	0.054	−0.195	0.303	−0.309*	−0.600	−0.018	−0.202*	−0.307	−0.096
Lemhi River (S)	1985	19	10	−0.176*	−0.335	−0.016	0.064	−0.016	0.144	−0.038	−0.089	0.014
East Fork Salmon River (W)	1984	8	1	0.003	−0.115	0.121	0.075	−0.474	0.624	0.057*	0.001	0.114
Upper Salmon River (S)	1985	17	25	0.068	−0.103	0.240	0.536*	0.312	0.759	0.557*	0.453	0.660

Source: High et al. (2008).

Note: The sampling method used in each drainage or area is shown (S = snorkeling, R = redd count). Trends in r were evaluated for the period before 1994, the period after 1994, and all years; asterisks indicate trends that were significant (i.e., confidence intervals did not include zero).

15.3 Analysis of effects

Direct Effects

Direct effects primarily arise through collection of Chinook broodstock. Migratory bull trout are captured in the South Fork Salmon River trap. From 2005-2009 eleven bull trout were captured in the South Fork Salmon River adult trap with one was incidental mortality. Traps may also have a short-term effect by altering migration routes or delaying movement.

A small percentage of bull trout sampled in a fish trap, and by electrofishing or seining (or similar capture methods) may be injured or killed (generally less than 1%) as evidenced by the very small level of mortality reported in IDFG (2006, 2007, 2008, 2009, 2010). This trapping activity has occurred for many years in the Salmon River subbasin, and as evidenced by High et al. (2008), apparently without hindering positive bull trout population growth rates since 1994. Continuing trapping activities are not expected to limit bull trout population growth rates.

Competition is possible between subadult bull trout and hatchery summer Chinook juveniles, if some residualize. Because these species evolved sympatrically in the Salmon River subbasin, some form of resource partitioning would be expected. The incidence of Chinook salmon residualism is suspected to be an uncommon life history strategy. Therefore, competition is not expected to be a primary limiting factor for bull trout. On the contrary, release of juvenile hatchery Chinook likely provides an increased forage base (beneficial effect) for migratory adult and subadult bull trout, which are highly piscivorous.

Indirect Effects

Indirect effects may arise through hatchery operations such as water withdrawals, effluent discharge, routine operations and maintenance activities, non-routine operations and maintenance activities (e.g., intake excavation, construction, emergency operations, etc.). Hatchery operations are not expected to affect bull trout population productivity. These activities have occurred for many years in the Salmon River subbasin, apparently without hindering positive bull trout population growth rates since 1994 (High et al. 2008), and are not expected to limit future population growth.

Cumulative Effects

Cumulatively, the South Fork Salmon River summer Chinook hatchery program and associated monitoring and evaluation results in increased forage for migratory adult and subadult bull trout, possible competition with juvenile bull trout, and a contribution to knowledge on bull trout population distribution and abundance through incidental captures in broodstock collection traps and during monitoring and evaluations studies. Such knowledge can be used to evaluate bull trout population trends over time. For example, the analysis conducted by High et al. 2008 was based largely on incidental bull trout capture data from the Salmon River subbasin analysis, and derived largely from snorkel surveys conducted under the general parr monitoring program.

Take

Annual bull trout take in the form of observation, capture, handling, and bio-sampling occurs each year at various broodstock collection traps and through associated monitoring and evaluation studies. At the end of each year, bull trout take is quantified and projected for the upcoming year's operations and monitoring in a report prepared by IDFG (the Idaho Bull Trout Conservation Plan and Take Report). Take is derived from observing, or capture and handling of bull trout through a variety of survey methods, including snorkeling, redd surveys, electrofishing, hook-and-line, weir trapping, screw trapping, and seining. Although some small level of bull trout mortality usually occurs at upstream migrant traps, none occurred at the South Fork trap from 2005 to 2007 (IDFG 2006, 2007, 2008).

15.4 Actions taken to mitigate for potential effects.

Actions taken to minimize adverse effects on bull trout include:

1. Continuing to reduce effect of releasing large numbers of juvenile Chinook at a single site by spreading the release over a number of days.

2. Continuing fish health practices to minimize the incidence of infectious disease agents by following IHOT, AFS, and PNFHPC guidelines.

3. Monitoring hatchery effluent to ensure compliance with the National Pollutant Discharge Elimination System permit.

4. Continuing Hatchery Evaluation Studies to provide comprehensive monitoring and evaluation for LSRCP Chinook, which provides valuable incidental bull trout data.

5. Conducting adult and juvenile salmon trapping activities to minimize impacts to bull trout and other non-target species. Trapping provide valuable incidental bull trout data.

6. Conducting Chinook redd surveys to minimize potential risk to all life stages of target and non-target species.

7. Preparing an annual bull trout conservation program plan and take report and submitting it to the USFWS to ensure compliance with the ESA.

15.5 References

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Appendix A. Estimated take of ESA listed species by activity.

Table 1a. Estimated take of listed salmonid species by hatchery activity.

Listed species affected: Summer Chinook Salmon; ESU/Population: Snake River ESU/S.F. Salmon River Population; Activity: Broodstock collection				
Location of hatchery activity: Hatchery trap/weir Dates of activity: June-August Hatchery program operator: Gene McPherson				
Type of Take	Annual Take of Listed Fish By Life Stage (*Number of Fish*)			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass (a)				
Collect for transport (b)				
Capture, handle, and release (c)				
Capture, handle, tag/mark/tissue sample, and released (d)			Entire run (see Table 11 in Sec 2.2.3 for range)	
Removal (e.g., broodstock) (e)			See Section 1.11.1. Fish removed for broodstock are killed as a result of spawning	
Intentional lethal take (f)				
Unintentional lethal take (g)			Pre-spawn mortality of broodstock varies and may be as high as 15%. Tapping and handling mortality is less than ½ % of fish handled	
Other Take (specify): Carcass sampling (h)				

a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migrational delay at weirs.
b. Take associated with weir or trapping operations where listed fish are captured and transported for release.
c. Take associated with weir or trapping operations where listed fish are captured, handled and released upstream or downstream.
d. Take occurring due to tagging and/or bio-sampling of fish collected through trapping operations prior to upstream or downstream release, or through carcass recovery programs.
e. Listed fish removed from the wild and collected for use as broodstock.
f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.
g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.
h. Other takes not identified above as a category.

Table 1b. Estimated take of listed salmonid species from hatchery programmatic maintenance. Estimated take for both Chinook salmon and steelhead are presented. Ck= Chinook salmon, Sthd= steelhead

Listed species affected: Chinook salmon and summer Steelhead ESU/Population: Snake River/SF Salmon River Mainstem Activity: Programmatic Maintenance (see section 2.2.3 for description of maintenance activities) Location of research activity: SF Salmon River Adult trapping facility Dates of activity: June-September annually					
Maintenance Activity	Type of Take	Annual Take of Listed Fish By Life Stage (Number of Fish)			
		Ck/Sthd Egg & Fry	Ck/Sthd Juvenile & Smolt	Ck/Sthd Adult	Ck/Sthd Carcass
Dewatering Holding ponds and adult trap	Observe or harass a)				
	Capture, handle, and release c)		20/10		
	Unintentional lethal take g)				
	Other Take (specify) h)				

Table 1c. Estimated take of listed salmonid species by research/monitoring activity. Take for juvenile trapping and adult carcass sampling is covered under annually renewed 4d Research permits for the Idaho Chinook Supplementation Study (2010- 14706) and the Idaho Natural Production Monitoring and Evaluation Project (2010-15763).

Listed species affected: Summer Chinook Salmon ESU/Population: Snake River ESU/S.F. Salmon River Population Activity: research/monitoring-Redd counts and Juvenile Trapping				
Location of hatchery activity: Knox Bridge juvenile trap and redd counts Dates of activity: March-October				
Type of Take	**Annual Take of Listed Fish By Life Stage (*Number of Fish*)**			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)		20,000		
Capture, handle, tag/mark/tissue sample, and release d)		10,000		
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)		300		
Other Take (specify) h) Carcass sampling			400	

Listed species affected: Summer Steelhead DPS/Population: Snake River DPS/S.F. Salmon River Population Activity: research/monitoring-Juvenile Trapping				
Location of hatchery activity: Knox Bridge juvenile trap Dates of activity: March-October				
Type of Take	**Annual Take of Listed Fish By Life Stage (*Number of Fish*)**			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)		9,000		
Capture, handle, tag/mark/tissue sample, and release d)		5,000		
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)		150		
Other Take (specify) h) Carcass sampling				

Appendix B. Responses to the issues and recommendations made by the US Fish and Wildlife Service (USFWS) Hatchery Review Team (HRT) specific to the South Fork Salmon River summer Chinook Salmon Hatchery program.

Category	HRT #	Issue / Recommendation	Response from IDFG
Program Goals and Objectives	ML01	Establish harvest and conservation goals. Quantify harvest and escapement goals.	This issue is addressed in this HGMP
	ML02	Develop conservation and escapement goals. Integrate with ESA and co-manager goals. Integrate with LSRCP mitigation responsibility	This issue is addressed in this HGMP
	ML03	Work with Regional processes to improve migration survival	IDFG currently participates in these types of regional processes. This regional activity is not funded by LSRCP.
	ML04	Continue planning for production of the Johnson Creek program at McCall FH annually at the Salmon River Annual Operation Plan Meeting.	Managers will continue to plan for the Johnson Creek program through the Salmon R AOP.
	ML05a	Continued management of McCall FH summer Chinook as a segregated program reduces the value of the McCall FH summer Chinook stock as a genetic repository for reestablishing natural populations in the South Fork Salmon River Basin	This issue is addressed in this HGMP
	ML05b	Continued management of McCall FH summer Chinook as a segregated program poses a genetic risk to the natural-origin South Fork Salmon River Summer Chinook population, especially those downstream of the South Fork Salmon River weir	This issue is addressed in this HGMP
Hatchery and Natural Spawning	ML06	Do not pass segregated hatchery salmon above the South Fork Salmon River weir. Monitor to determine if weir is excluding hatchery origin spawners.	The new integrated broodstock protocols that are consistent with NOAA criteria stipulated passage of hatchery origin adults. (outlined in this HGMP). Co-managers conduct extensive multiple pass spawning ground and carcass sampling surveys in natural spawning areas above and below the weir to assess the hatchery/natural fraction and estimate the number of fish that escaped above the hatchery weir.

Hatchery and Natural Spawning	ML07a	Maximize selective harvest to minimize impact of hatchery adults spawning in nature on Poverty Flats.	Harvest seasons are established to maximize harvest of hatchery returns in excess of broodstock and escapement needs and to be consistent with harvest sharing between sport and Tribal fisheries.
	ML07b	discontinue recycling adults through the fishery	Hatchery returns to the basin are specifically intended for harvest mitigation. Some recycling of fish through the fishery is required to insure harvest share equity and full utilization of the available hatchery fish in excess of broodstock needs. Recycled fish are released at locations selected to minimize effects of hatchery fish on natural spawning.
	ML08	Modify spawning protocol to better describe how the males spawned are managed and improve record keeping so that it describes the number of males used more than once	This recommendation is being addressed by IDFG and through the Integrated Brood Stock program in development by IDFG research personnel.
	ML09	Discontinue practice of injecting adults to be released above the weir with erythromycin. Develop alternatives for anesthetizing adults that do not require a 21 day withdrawal period.	IDFG has discontinued injecting adults released above the weir at the South Fork Trap, anesthetics are not used on adults at this facility.
	ML10	Investigate causes for prespawning mortality and work to reduce.	Managers are constantly assessing water quality issues associated with pre-spawning mortality. As number of spawners required for integrated boodstock and the Johnson Creek programs increase additional adult holding facilities at the trap site will be required. These new facilities will require additional funding.
Incubation and Rearing	ML11	Reduce number of females spawned if BKD remains low.	Number of fish spawned annually is managed in-season based on average cull rates.
	ML11	Incubate each female's eggs separately	For the integrated broodstock portion of the program eggs from each female will be incubated separately. For the balance of the production cull rates have not been an issue and eggs from two females will be incubated together.
Release and Outmigration	ML12	Sample 60 fish for preliberation samples.	Sample size of 60 fish is now standard at IDFG facilities.

Facilities and Operations	ML13	Establish and document standard procedures for transportation of eggs from South Fork Trap to McCall Hatchery, and for fish from McCall hatchery to release locations.	Standard IHOT and other procedures have been adopted for transporting eggs and fish from either South Fork Fish Trap to incubation facilities or fish from McCall Fish Hatchery to release locations.
	ML14	construct an isolated chemical storage facility	A Chemical Storage container has been installed at McCall Fish Hatchery
	ML15	Prevent unguided visitor access to hatchery.	This recommendation is being considered.
	ML16	update light control in nursery building	This recommendation is being addressed by the LSRCP office.
	ML17	Resurface pavement	This recommendation has been accomplished.
	ML18	Eliminate hazard created by build-up of snow on roof above ponds	IDFG and LSRCP have not developed a solution to this recommendation. It will be addressed in future capital outlay needs.
	ML19	Ensure water use at McCall hatchery is appropriately documented with Idaho Department of Water Resources and FWS division of Water Resources.	Water flow measurements are taken monthly and reported through the NPDES permit. This information is available as needed.
Research Monitoring and Accountability	ML20	Ensure annual CWT and Pit tagging strategy represents entire population to be released.	Funding is required to investigate the utility of Parental Based Tagging; that technology may replace CWTs. The issue of CWT and PIT tags representation has been addressed.
	ML21	Establish data reporting requirements and include in cooperative agreements.	Coded-wire tagging goals and objectives are described in the annual AOP document. For this facility. Reporting to tagged juvenile releases and tag recoveries among returning adults are submitted to RMIS within the specified reporting periods.
	ML22	Eliminate the backlog of reports. Ensure timely reporting of information.	Hatchery production reports are current, M&E reports have been reformatted and IDFG is working with the LSRCP office to bring all reporting requirements up to date.
Research Monitoring and Accountability	ML23	Develop a method to deal with annual operating contingencies that are not addressed in AOP's or other forums. Develop a more formal process to discuss, evaluate, and document issues as they arise.	Tribal, state and federal co-managers meet via teleconference weekly to report and discuss in-season run strength estimates, harvest allocations, and hatchery returns. Co-managers discuss in-season harvest management, broodstock management and distribution of fish in excess of brood needs. Co-managers also conduct a pre-season planning meeting and post season de-briefing meetings.
	ML24	Implement hazard analysis and Critical Control Point (HACCP) plan addressing disinfection of sampling equipment (including rotary screw traps) prior to moving between drainages.	IDFG is moving in this direction. HACCP plans are being reviewed to include screw trap operations.

Education and Outreach	ML25	Update visitor center displays.	This recommendation is being accomplished through coordination with the LSRCP office.
	ML26	Develop means to document and disseminate harvest and conservation benefits of LSRCP program.	Issue is currently being addressed through an annual statement of work negotiated between IDFG and LSRCP and coordinated through Annual Operating Plan process. Requires maintenance of funding for M&E tasks.