United States Department of the Interior
FISH AND WILDLIFE SERVICE
Lower Snake River Comp Plan Office
1387 S Vinnell Way, Suite 343
Boise, Idaho 83709

TAKE PRIDE IN AMERICA

January 17, 2012

Mr. Rob Jones
NOAA Fisheries Service
Salmon Recovery Division
1201 NE Lloyd Blvd., Suite 1100
Portland, Oregon 97232

Dear Mr. Jones:

Attached are the final Hatchery and Genetic Management Plans (HGMP) for the U.S. Fish and Wildlife Service's, Lower Snake River Compensation Plan (LSRCP), IDFG – Upper Salmon River A-run steelhead program, Upper Salmon River B-run steelhead program, and Clearwater River spring Chinook program as required for compliance under the Endangered Species Act (ESA). The LSRCP Office is submitting these HGMPs and requesting initiation of Section 7 consultation under the ESA for these programs.

The three attached HGMPs were completed by IDFG, reviewed by co-managers, and submitted to the LSRCP Office for submittal under Section 7. The proposed production for the Upper Salmon River A-run program and the Upper Salmon River B-run program are not included in the 2008-2017 *US v OR* Management Agreement. The proposed production for the Clearwater spring Chinook program is not consistent with the 2008-2017 *US v OR* Management Agreement. PAC has had discussions on the proposed production changes in the Clearwater River spring Chinook program but is waiting for initial NMFS review before submitting proposed changes to the *US v OR* Policy Committee to modify the current *US v OR* Agreement. The LSRCP Office has concluded that while the Upper Salmon River A-run program, Upper Salmon River B-run program, and the Clearwater River spring Chinook program may affect listed salmonid species, the effects will not threaten the survival and recovery of any listed salmonid species.

If you have any questions regarding the three IDFG HGMPs please contact Joe Krakker or me at the LSRCP Office.

Sincerely,

Scott Marshall
LSRCP Program Manager

Enclosures (6)

cc: Rich Johnson (FWS, Portland, OR)
Ed Schriever (IDFG)
Pete Hassemer (IDFG)
Sam Sharr (IDFG)
Brian Leth (IDFG)
Dave Johnson (NPT)
Becky Johnson (NPT)
Chad Colter (SBT)
Lytle Denny (SBT)
Ron Costello (BPA)

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

December 27, 2011

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

Mr. Scott Marshall
Lower Snake River Compensation Plan Office
1387 Vinnell Way, Suite 343
Boise, ID 83705

Dear Mr. Marshall,

The Idaho Department of Fish and Game is submitting three Hatchery and Genetic Management Plans to you. We request that you initiate Endangered Species Act Section 7 consultation with the National Marine Fisheries Service on these hatchery 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. The three programs for which HGMPs are submitted are: 1) Clearwater River Spring Chinook Salmon, 2) Upper Salmon A-Run Summer Steelhead and, 3) Upper Salmon River B-run 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.

Please contact Peter Hassemer or Sam Sharr 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: Peter Hassemer, Sam Sharr, Brian Leth – IDFG
Dave Johnson, Becky Johnson – Nez Perce Tribe
Chad Colter, Lytle Denny – Shoshone Bannock Tribes

HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	**Upper Salmon River, A-Run Steelhead** Sawtooth Fish Hatchery Pahsimeroi Fish Hatchery Hagerman National Fish Hatchery Magic Valley Fish Hatchery
Species or Hatchery Stock:	Summer Steelhead A-run *Oncorhynchus mykiss.*
Agency/Operator:	Idaho Department of Fish and Game
Watershed and Region:	Salmon River, Idaho.
Date Submitted:	
Date Last Updated:	November 2011

EXECUTIVE SUMMARY

The management goals for the Upper Salmon River summer steelhead population are to provide sustainable fishing opportunities and to enhance, recover and sustain the natural spawning population. The population is considered an A-run type and is listed as Threatened under the Endangered Species Act. Abundance, productivity, spatial structure and diversity of the Upper Salmon River natural population have been identified as population risks by the Interior Columbia Technical Recovery Team (ICTRT).

The purpose of the upper Salmon River A-run hatchery steelhead program is to mitigate for fish losses caused by the construction and operation of the four lower Snake River federal dams. By operating a segregated harvest program, managers are attempting to maintain the existing mitigation program while reducing risk to the natural population. This strategy is expected to provide demographic and genetic benefits to the natural population by: 1) not reducing the number of natural-origin spawners through broodstock collection and 2) limiting the opportunity of hatchery-origin fish to spawn naturally. A portion of the mitigation production is stipulated in the 2008-2017 US vs. Oregon Management Agreement and is described in separate HGMPs. The hatchery mitigation program for Magic Valley and Hagerman National fish hatcheries is a federally authorized mandate to contribute to the annual return of 25,200 steelhead (11,600 at Magic Valley and 13,600 at Hagerman) to reaches upstream of Lower Granite Dam after harvest of 50,400 adults by commercial, sport and Tribal fisheries in the ocean, Columbia River and lower Snake River. The component of the mitigation that is described in this HGMP accounts for approximately 28 percent of the total hatchery production at the Magic Valley Fish Hatchery and approximately 55 percent at Hagerman National Fish Hatchery. Fish culture is performed at the Sawtooth, Pahsimeroi, Magic Valley, and Hagerman National fish hatcheries. Mitigation for the remaining components of these hatcheries is described in separate HGMPs (Upper Salmon River B-run, East Fork Salmon River A-run, Pahsimeroi Summer Steelhead, and Little Salmon River Summer Steelhead).
All hatchery operations and monitoring activities are funded by the Bonneville Power Administration through the Lower Snake River Compensation Program and by the Idaho Power Company.

The program is operated as a segregated harvest program releasing approximately 1.3 million yearling summer steelhead each year into the Salmon River. Of the 1.3 million fish released, 790,000 are released at the Sawtooth Hatchery, and the balance is released at mainstem locations in the Upper Salmon River. Broodstock for the program is collected at the Sawtooth and Pahsimeroi fish hatcheries.

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; (2) number of smolts released; (3) in-hatchery and post-release survival rates; (4) total adult recruitment, harvest and escapement of the hatchery component; and (5) abundance and productivity of the natural steelhead population above the Sawtooth Fish hatchery weir.

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1 NAME OF HATCHERY OR PROGRAM

Hatchery: Sawtooth Fish Hatchery
Pahsimeroi Fish Hatchery
Magic Valley Fish Hatchery
Hagerman National Fish Hatchery

Program: Upper Salmon River A-Run Steelhead

1.2 SPECIES AND POPULATION (OR STOCK) UNDER PROPAGATION, AND ESA STATUS

- Summer Steelhead *Oncorhynchus mykiss*
- The hatchery population is not ESA-listed.

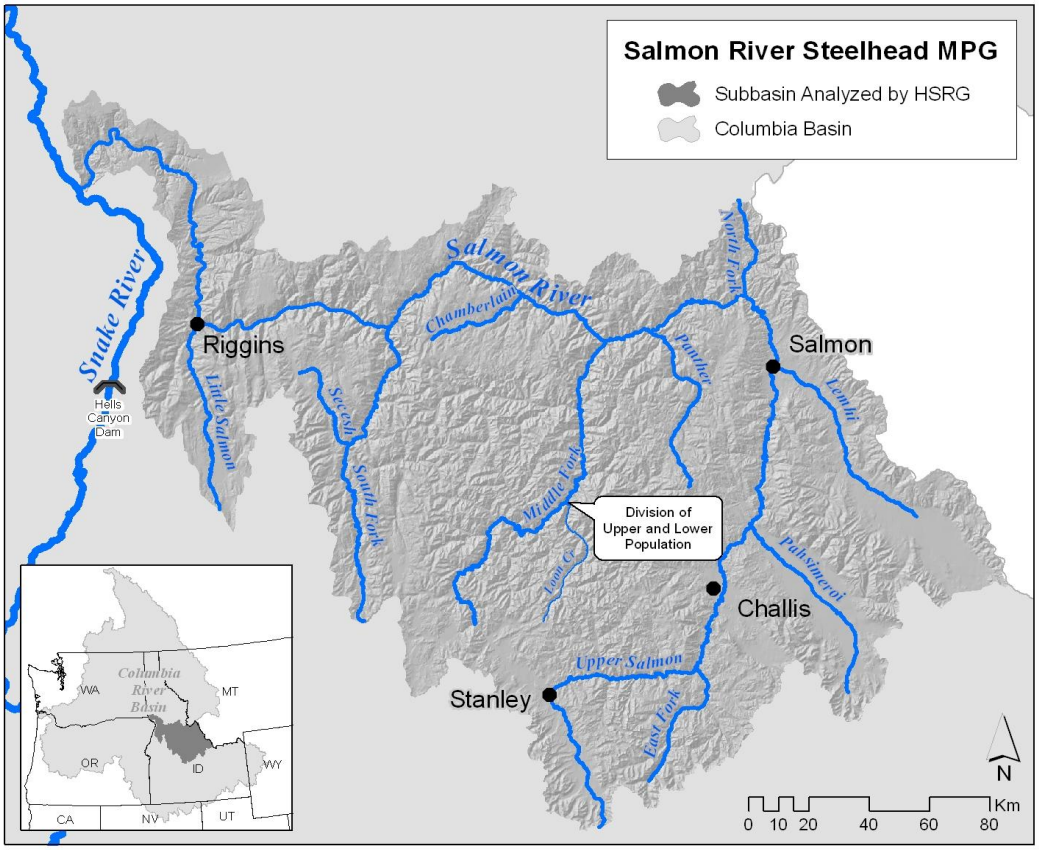

Figure 1. Salmon River Steelhead MPG (HSRG 2009).

1.3 RESPONSIBLE ORGANIZATION AND INDIVIDUALS

Lead Contact

Name (and title): Pete Hassemer, Anadromous Fish Manager
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Fax: (208) 334-2114
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On-site Operations Lead

Name (and title): Brent Snider, Fish Hatchery Manager II, Sawtooth Fish Hatchery
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Name (and title): Todd Garlie, Fish Hatchery Manager II, Pahsimeroi Fish Hatchery
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Name (and title): Rick Lowell, Fish Hatchery Manager II, Magic Valley Fish Hatchery
Agency or Tribe: Idaho Department of Fish and Game
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Telephone: (208) 326-3230
Fax: (208) 326-3354
Email: richard.lowell@idfg.idaho.gov

Name (and title): Bryan Kenworthy, Hatchery Manager, Hagerman Nat. Fish Hatchery
Agency or Tribe: U.S. Fish and Wildlife Service
Address: 3059-D National Fish Hatchery Rd., Hagerman, ID
Telephone: (208) 837-4896
Fax: (208) 837-6225
Email: bryan_kenworthy@fws.gov

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 mitigation goals and productions goals outlined in the U.S. vs. OR 2008-2017 Management Plan. The same agencies meet collaboratively to co-author Annual Operating Plans for the Clearwater River Spring/Summer Chinook Salmon programs at

Clearwater Hatchery and they work collaboratively in –season to meet shared broodstock needs for the Clearwater Hatchery Dworshak Hatchery, Kooskia Hatchery, and Nez Perce Tribal 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.

- 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.

- U.S v. Oregon Parties – The Sawtooth Fish Hatchery may incubate A-run steelhead eggs for streamside and or instream incubation programs as identified in interim management agreements associated with the development of the Columbia River Fish Management Plan under the U.S. V. Oregon process.

1.4 FUNDING SOURCE, STAFFING LEVEL, AND ANNUAL HATCHERY PROGRAM OPERATIONAL COSTS

- **Sawtooth Fish Hatchery-** (Broodstock collection, spawning, egg incubation)
  U.S. Fish and Wildlife Service – Lower Snake River Compensation Plan funded
  Staffing level: 5 FTE and 80 month of temporary staff
  Annual budget: $827,000

- **Pahsimeroi Fish Hatchery** (Broodstock collection, spawning, and early incubation)
  Funded by Idaho Power Company
  Staffing level: 3 FTE plus 35 month of seasonal labor
  Annual budget: $476,000 as of FY10

- **Magic Valley Fish Hatchery** (Incubation, rearing and release)
  U.S. Fish and Wildlife Service – Lower Snake River Compensation Plan funded.
  Staffing level: 4 FTE and 27 month of temporary staff.
  Annual budget: $750,000.

- **Hagerman National Fish Hatchery** (Incubation, rearing and release)
  U.S. Fish and Wildlife Service – Lower Snake River Compensation Plan funded.
  Staffing level: 8 FTEs and 6 months of temporary staff
  Annual budget: $970,000 (FY10)

1.5 LOCATION(S) OF HATCHERY AND ASSOCIATED FACILITIES

This program is a segregated harvest program. Broodstock are collected at the Sawtooth and Pahsimeroi fish hatcheries. No natural-origin fish are used as broodstock for this program. Eggs are incubated at the Sawtooth and Pahsimeroi fish hatcheries until the eyed stage and then are transferred to the Hagerman National Hatchery and Magic Valley Hatchery for final incubation and rearing. Juveniles are transported to release sites in mid-April. Figure 2 identifies hatchery

locations and steelhead release sites. Some releases shown in Figure 2 are described in separate HGMPs.

Sawtooth Fish Hatchery – The Sawtooth Fish Hatchery is located on the upper Salmon River approximately 8.0 kilometers south of Stanley, Idaho. The river kilometer code for the facility is 503.303.617. The hydrologic unit code for the facility is 17060201.

Magic Valley Fish Hatchery – The Magic Valley Fish Hatchery is adjacent to the Snake River approximately 11.2 kilometers northwest of Filer, Idaho. There is no river kilometer code for the facility. The hydrologic unit code for the facility is 17040212.

Hagerman National Fish Hatchery - The Hagerman National Fish Hatchery is approximately 4.8 kilometers south and 3.2 kilometers east of Hagerman, Idaho. There is no river kilometer code for the facility. The hydrologic unit code for the facility is 17040212.

Pahsimeroi Fish Hatchery – Pahsimeroi Fish Hatchery (PFH) is comprised of two separate facilities – the lower Pahsimeroi Fish Hatchery (lower PFH) and the upper Pahsimeroi Fish Hatchery (upper PFH). The lower PFH is on the Pahsimeroi River approximately 1.6 kilometers above its confluence with the main Salmon River near Ellis, Idaho. The Upper PFH is approximately 11.3 kilometers further upstream from the lower facility on the Pahsimeroi River. The river kilometer codes for the upper and lower facilities are 522.303.489.011 and 522.303.489.002 respectively. The hydrologic unit code for both facilities is 17060202.

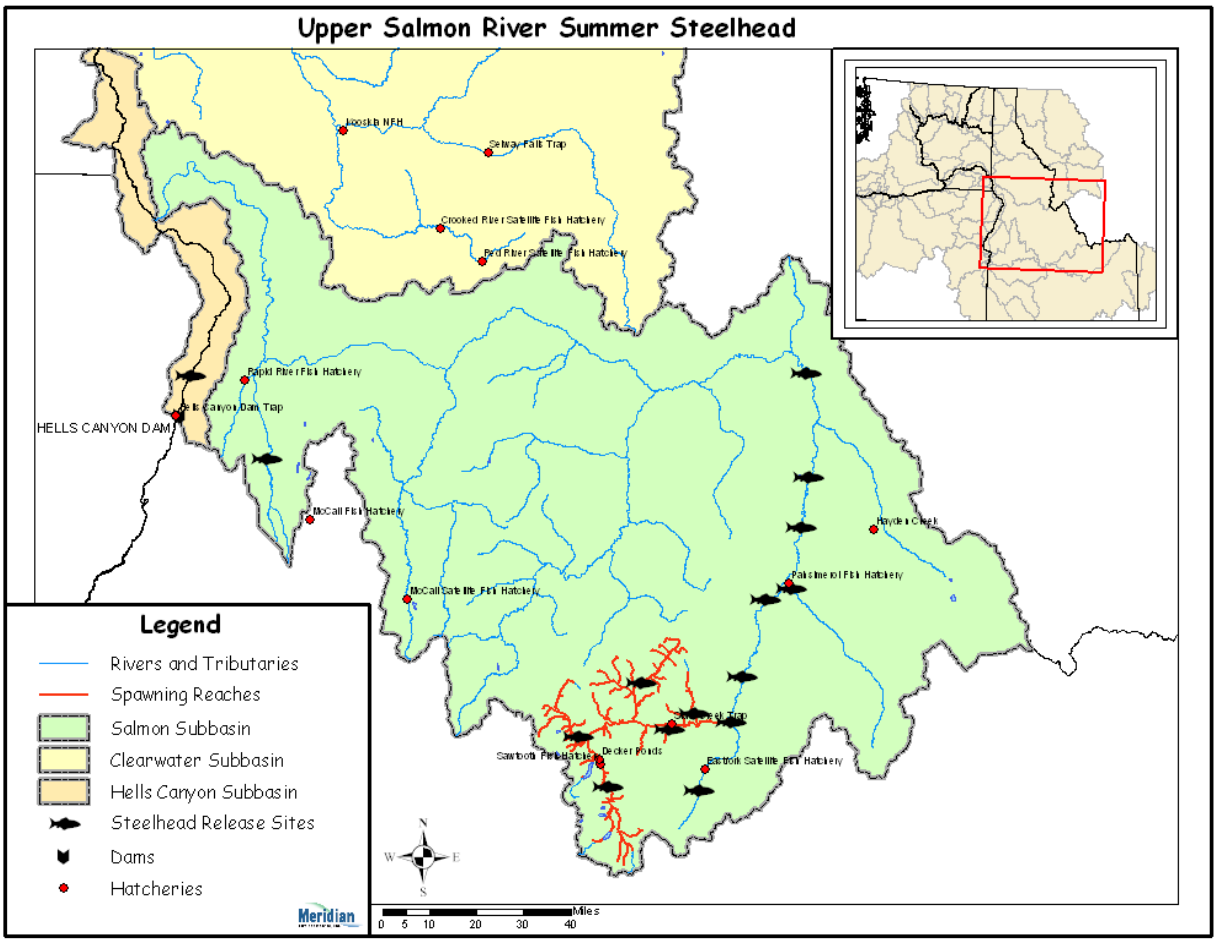

Figure 2. Upper Salmon River Summer Steelhead Population (HSRG 2009).

1.6 TYPE OF PROGRAM

This program is operated as a Segregated Harvest program. The upper Salmon River hatchery steelhead 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.

1.7 PURPOSE (GOAL) OF PROGRAM

The management goals for the Upper Salmon River summer steelhead population are to provide sustainable fishing opportunities and to enhance, recover and sustain the natural spawning population. The population is considered an A-run and is listed as Threatened under the Endangered Species Act. Abundance, productivity, spatial structure and diversity of the Upper Salmon River natural population have been identified as population risks by the ICTRT (2005).

Fish trapping and culture is performed at the Sawtooth, Pahsimeroi, Magic Valley and Hagerman National fish hatcheries. All hatchery operations and monitoring activities are funded by the Bonneville Power Administration through the Lower Snake River Compensation Program and from the Idaho Power Company.

The upper Salmon River A-run hatchery steelhead 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.

For steelhead, the escapement above Lower Granite Dam prior to construction of these dams was estimated at 114,800. 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 55,100. This number established the LSRCP escapement mitigation goal. Based on a catch to escapement ratio of 2:1, the anticipated benefit to fisheries below Lower Granite Dam was expected to be 110,200 fish.

Component	Number
Escapement Above Lower Granite Dam	55,100
Commercial Harvest	37,000
Recreational Harvest Below Lower Granite Dam	73,200
Total	165,300

One component of the steelhead mitigation computations was accounting for the estimated loss of 130,000 recreational angler days of effort caused by transforming the free flowing Snake River into a series of reservoirs. The COE recommended purchasing land to provide access for sportsman to compensate for this loss. When computing expected benefits for this loss, the COE assumed this access would be provided, that the 130,000 anger days would be restored and that that one fish would be caught for each five hours of effort. As such, the COE expected that 26,000 of the 110,200 steelhead would be caught in the Snake River below Lower Granite Dam. Location of the hatchery facilities was a key decision and the COE recommended: " These [steelhead hatcheries] should be constructed upstream of the Lower Snake River Project to provide for the sport fisheries of eastern Oregon, Washington and Idaho as well as the downriver fisheries". While recognizing that some steelhead crossing Lower Granite Dam would be caught, and some used for hatchery broodstock, no other specific priorities or goals were established regarding how the remaining fish might be used.

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 2:1 catch to escapement ratio has been less than expected and this has resulted in fewer adults being produced in most years.
- The listing of Snake River fall Chinook and Snake River Steelhead 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 much 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 and this has diversified the hatchery program by adding new off station releases to meet short term conservation objectives.

The upper Salmon River A-run steelhead mitigation program was designed to escape 25,260 adults back to the project area after a harvest of 50,520. 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 770 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).

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. Outplanting for natural spawning
e. Nutrient enhancement

1.8 JUSTIFICATION OF PROGRAM

The upper Salmon River A-run hatchery steelhead 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 is operated as a segregated harvest program releasing approximately 1.3 million

yearling summer steelhead each year into the Salmon River. Of these releases, 790,000 are released at the Sawtooth Hatchery and the balance is released at mainstem locations in the upper Salmon River. Broodstock for the program is collected at the Sawtooth and Pahsimeroi fish hatchery weirs.

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. 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 for 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 (Galbreath et al. 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 (2008).

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)

Category	Standards	Indicators
	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.
	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.

Category	Standards	Indicators
	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.
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.

Category	Standards	Indicators
	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 Sawtooth Fish Hatchery functions as the primary broodstock collection and spawning station for the upper Salmon River A-run hatchery steelhead program. Eggs collected at the Sawtooth Fish Hatchery are incubated through the eyed stage of development on station and then transferred to the Magic Valley and Hagerman National fish hatcheries for final incubation, hatch, and rearing to release. Eggs collected at the Pahsimeroi Fish Hatchery account for approximately 25% (330,000 smolts) of the juvenile releases for this program. These eggs collected at Pahsimeroi Fish Hatchery are reared at Magic Valley Fish Hatchery.

Sawtooth Fish Hatchery – To meet the production release target of 970,000 yearling smolts,

approximately 287females (based on 72% green-egg to release survival and 4,700 eggs per female) are needed to meet current program management objectives. The ratio of males to females needed is approximately 1:1, necessitating the need to trap and spawn an equivalent number of males.

Pahsimeroi Fish Hatchery – To meet the production release target of 330,000 yearling smolts, approximately 97 females (based on 71% green-egg to release survival and 4,770 eggs per female) are needed. The ratio of males to females needed is approximately 1:1, necessitating the need to trap and spawn an equivalent number of males.

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

The targeted number of yearling hatchery-origin steelhead releases is 1,300,000 including 970,000 Sawtooth stock and 330,000 Pahsimeroi stock. Specific release sites and the number released at each location are listed in Table 2.

Table 2. Proposed annual steelhead release levels.

Broodstock Collection Site	Rearing Hatchery	Release Location	Release Target
Pahsimeroi	Magic Valley	Salmon R., Red Rock	120,000
Pahsimeroi	Magic Valley	Salmon R., Shoup Bridge	90,000
Pahsimeroi	Magic Valley	Salmon R., Colston Corner	120,000
Sawtooth	Hagerman Nat	Tunnel Rock	60,000
Sawtooth	Magic Valley	Salmon R., McNabb Pt.	120,000
Sawtooth	Hagerman Nat.	Sawtooth Hatchery weir	790,000

The Hagerman National Fish Hatchery plans to reduce production by 100,000 smolts in Brood Year 2010 to address declining water availability. This will likely be accommodated by eliminating the Tunnel Rock release from Hagerman and 40,000 smolts from the Sawtooth weir release.

1.12 CURRENT PROGRAM PERFORMANCE, INCLUDING ESTIMATED SMOLT-TO-ADULT SURVIVAL RATES, ADULT PRODUCTION LEVELS, AND ESCAPEMENT LEVELS. INDICATE THE SOURCE OF THESE DATA.

Estimated smolt-to-adult survival rates for Sawtooth A-Run steelhead reared at Hagerman National Fish Hatchery and released at the Sawtooth Fish Hatchery are listed in Table 3.

Table 3. Sawtooth Fish Hatchery A-run steelhead adult SARs for release years 1995-2005.

Release Year	Release Location	Number Released	Estimated Harvest	Hatchery Weir Return	Total Return	SAR (%)
1995	Sawtooth Weir	685,006	3,870	1,311	5,181	0.76
1996	Sawtooth Weir	726,927	2,141	690	2,831	0.39
1997	Sawtooth Weir	746,986	1,561	946	2,507	0.34
1998	Sawtooth Weir	684,937	4,197	2,483	6,680	0.98
1999	Sawtooth Weir	754,449	2,907	3,351	6,258	0.83
2000	Sawtooth Weir	727,797	7,405	6,929	14,334	1.97
2001	Sawtooth Weir	707,834	2,761	1,767	4,528	0.64
2002	Sawtooth Weir	781,137	3,681	2,462	6,143	0.79
2003	Sawtooth Weir	781,763	4,129	1,847	5,976	0.76
2004	Sawtooth Weir	783,556	2,217	1,317	3,534	0.45
2005	Sawtooth Weir	774,808	6,386	3,907	10,293	1.33
					Average	0.84
					Geometric Mean	0.74

1.13 DATE PROGRAM STARTED (YEARS IN OPERATION) OR IS EXPECTED TO START

- **Sawtooth Fish Hatchery** – In operation since 1985
- **Magic Valley Fish Hatchery** - The hatchery has been in operation since 1983. A new facility was constructed in 1986.
- **Hagerman National Fish Hatchery** – In operation since 1980

1.14 EXPECTED DURATION OF PROGRAM

This program is expected to continue indefinitely to provide mitigation under the Lower Snake River Compensation Plan and the Hells Canyon Settlement Agreement.

1.15 WATERSHEDS TARGETED BY PROGRAM

Listed by hydrologic unit code –

- Upper Salmon River (Pahsimeroi River to headwaters): 17060201
- Upper Salmon River (Lemhi River to Pahsimeroi River): 17060203

1.16 INDICATE ALTERNATIVE ACTIONS CONSIDERED FOR ATTAINING

PROGRAM GOALS

Lower Snake River Compensation Plan hatcheries were constructed to mitigate for fish losses caused by construction and operation of the four lower Snake River federal hydroelectric dams. The IDFG's objective is to ensure that harvestable components of hatchery-produced summer steelhead are available to provide fishing opportunities consistent with meeting spawning escapement and preserving the genetic integrity of natural populations (IDFG 2001).

The steelhead mitigation program in the Salmon River 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 25,260 adult summer run steelhead upstream of Lower Granite Dam after a harvest of 50,520 adults in ocean and Columbia River commercial, and recreational fisheries (see Section 1.7).

The hatchery mitigation program described in this HGMP accounts for approximately 41% of the combined LSRCP Salmon River mitigation goal of 25,260 adults above Lower Granite Dam. The 25,260 adult mitigation goal to the project area was achieved in seven out of ten years between 1997 and 2006. However, LSRCP mitigation goals were developed assuming a 2:1 catch to escapement ratio. Since ESA listing in 1997, commercial and sport harvest in the Columbia River has been reduced and observed catch to escapement ratios are less than 1:1. The geometric mean SAR to Lower Granite dam for steelhead released at the Sawtooth fish hatchery for brood years 1994-2004 is 0.74% (Table 2 in Section 1.12).

Smolt release targets that were modeled at the outset of this program are not currently achievable due to reduced water availability at both Hagerman National and Magic Valley fish hatcheries. Resources are needed to maintain current production capacity in light of diminishing water availability in the magic valley. This could be accomplished through an increased water supply or potentially through technological fixes (e.g. oxygenation or reuse systems).

While not specifically addressed in this HGMP, a component of the juveniles released from Hagerman National and Magic Valley fish hatcheries has been Dworshak Fish Hatchery B-run stock. Smolt-to-adult return rates for these fish have been lower than both Pahsimeroi A and Sawtooth A-run stocks in the upper Salmon River. Mangers have initiated a transition from the Dworshak stock to a locally adapted upper Salmon River B-run stock (see upper Salmon River B-run HGMP). Rearing for this program will reside entirely at Magic Valley Fish Hatchery and it is anticipated that this transition will increase the number of returning adults. It will also address concerns about releasing out-of –basin steelhead in the upper Salmon River.

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 upper Salmon River A-run steelhead program, the HRT preferred alternative #1 which is to maintain the current mitigation program with the implementation of all of their specific recommendations. Reponses from the managers for each of the HRT recommendations that are specific to the upper Salmon River a-run steelhead program are provided in Appendix B.

Managers are committed to maintaining the segregated hatchery mitigation program in the upper Salmon River.

1.17 Staffing, support logistics, and facility changes needed for program implementation

Resources are needed to maintain current production capacity in light of diminishing water availability in the magic valley. This could be accomplished through an increased water supply or potentially through technological fixes (e.g. oxygenation or reuse systems).

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

This section addresses species listed by the NMFS. Those listed by the USFWS are addressed in Addendum A.

2.1 LIST ALL ESA PERMITS OR AUTHORIZATIONS IN HAND FOR THE HATCHERY PROGRAM

- Section 7 Consultation with U.S. Fish and Wildlife Service (April 2, 1999) resulting in NMFS Biological Opinion for the Lower Snake River Compensation Program.
- Section 10 Permit Number 1481 annual incidental take of listed anadromous fish associated with recreation fishing programs. Expires 5/31/10.

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 Basin steelhead ESU is distributed throughout the Snake River drainage system, including tributaries in southwest Washington, eastern Oregon, and north/central Idaho. Snake River steelhead migrate a substantial distance from the ocean (up to 1,500 km) and use high-elevation tributaries (typically 1,000–2,000 meters above sea level) for spawning and juvenile rearing. Snake River steelhead occupy habitat that is considerably warmer and drier (on an annual basis) than other steelhead ESUs. Snake River steelhead are generally classified as summer run, based on their adult run-timing patterns. Summer-run steelhead enter the Columbia

River from late June to October. After holding over the winter, they spawn the following spring (March to May). Managers classify upriver summer steelhead runs into two groups based primarily on ocean age and adult size on return to the Columbia River: A-run steelhead are predominantly age-1 ocean fish, while B-run steelhead are larger, predominated by age-2 ocean fish.

With the exception of the Tucannon River and some small tributaries to the mainstem Snake River, the tributary habitat used by the Snake River Basin steelhead ESU is above Lower Granite Dam. Major groupings of populations and subpopulations can be found in 1) the Grande Ronde River system; 2) the Imnaha River drainage; 3) the Clearwater River drainages; 4) the South Fork Salmon River; 5) the smaller mainstem tributaries before the confluence of the mainstem Snake River; 6) the Middle Fork Salmon River, 7) the Lemhi and Pahsimeroi rivers, and 8) upper Salmon River tributaries.

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

Natural-origin steelhead are not incorporated into the broodstock. The operation of the hatcheries described in this HGMP is expected to have no direct affect on ESA-listed species.

Identify the NMFS ESA-listed population(s) that may be incidentally affected by the program

- Snake River Spring/Summer-run Chinook salmon ESU (T – 4/92)
- Snake River sockeye salmon ESU (E – 11/91)
- Snake River Basin steelhead ESU (T – 8/97)

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

Abundance: Maintaining a segregated broodstock will prevent the need to remove natural-origin adults for use as broodstock. There is no evidence for delays or blocking of upstream migration due to operation of the adult weir and trap. Between 1996 and 2007 no mortalities of natural-origin adult steelhead have been observed as a direct result of trapping and handling. Maintaining the locally adapted hatchery program does provide the potential to supplement natural-origin spawners during years of very low natural-origin abundance when demographic risks are high.

Productivity: Hatchery-origin fish are not passed above the hatchery weir to spawn naturally thus reducing risk associated with reduction if fitness due to interbreeding of hatchery- and natural-origin fish.

Spatial Structure: Operation of this hatchery program is not expected to negatively affect spatial distribution of natural-origin spawners. Delay or blockage of migration associated with operation of the hatchery weir and trap does not appear to be a problem at this facility. Maintaining the hatchery program does provide managers the potential to supplement natural-origin spawners during years of very low natural-origin abundance. This would likely increase the extent of habitat that would be utilized.

Diversity: Maintaining the hatchery mitigation program does provide an opportunity to supplement natural-origin spawners during years of very low natural-origin abundance when risks associated with the loss of genetic variation, due to drift, is high.

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 Salmon River upper mainstem steelhead population is part of the Snake River Steelhead Distinct Population Segment (DPS). The DPS contains both A- and B-run steelhead. This population is an "A" run and is classified as threatened under the Endangered Species Act and as "Intermediate" by the ICTRT. An "Intermediate" population is one that requires a minimum abundance of 1,000 natural spawners and an intrinsic productivity greater than 1.15 recruits per spawner (R/S) to meet the 5% extinction risk criteria established by the ICTRT (ICTRT 2005).

For Snake River steelhead A-run populations lacking in direct abundance and productivity data, the ICTRT developed preliminary estimates representing an average population of this run type using Lower Granite Dam natural-origin fish counts. Abundance for the average "A" run steelhead in recent years has been moderately variable. The most recent 10-year geometric mean number of natural spawners was 456 fish. The most recent 13-year SAR adjusted and delimited geometric mean of returns per spawner was 1.69 (HSRG 2009).

Hatchery-origin A-run steelhead at Sawtooth Fish Hatchery are excluded from the ESU. No wild/natural, ESA-listed steelhead adults or juveniles are collected or directly affected as part of the hatchery mitigation programs described in this HGMP (see Section 2.2.1). The NMFS has identified interim abundance and productivity targets for Columbia Basin salmon and steelhead listed under the ESA.

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

This data is not available.

Provide the most recent 12 year annual spawning abundance estimates, or any other abundance information. Indicate the source of these data.

The number of natural-origin steelhead trapped at the Sawtooth Fish Hatchery weir is displayed in Table 4. All natural-origin fish were released upstream to spawn naturally.

Table 4. Natural-origin steelhead trapped at the Sawtooth and Pahsimeroi fish hatchery weirs, 1998-2009.

Trap year	Natural-origin adult steelhead trapped at the Sawtooth Fish Hatchery weir	Natural-origin adult steelhead trapped at the Pahsimeroi Fish Hatchery weir
1998	6	49
1999	10	38

2000	15	58
2001	37	133
2002	95	378
2003	30	181
2004	18	67
2005	29	42
2006	22	68
2007	21	22
2008	23	45
2009	34	30

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

The number of natural-origin steelhead released above the Sawtooth Fish Hatchery weir is listed in Table 4 above.

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.

Anticipated take due to hatchery operations, programmatic maintenance, and monitoring and evaluation activities is presented in Appendix A; Tables 1

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.

Take Associated with Hatchery Operational Activities

ESA-listed, natural-origin A-run steelhead are trapped and handled during broodstock collections at Sawtooth Fish Hatchery. All natural-origin adults are passed upstream with a minimum of delay and handling. Incidental take of ESA- listed Snake River Chinook or sockeye salmon is unlikely during steelhead broodstock collection. Steelhead broodstock collection occurs in the upper Salmon River from March through early May. Fall Chinook salmon are not present in the upper Salmon River (Mendel et al. 1992). Neither adult spring/summer Chinook nor sockeye salmon are usually present in the upper Salmon River until mid-May or later (Sankovich and Bjornn 1992). Therefore, we believe there will be no adverse effects from broodstock collection at current hatchery weirs, or weirs developed in the future to accommodate additional hatchery steelhead broodstock collection.

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

Known take (capture, handle and release) of ESA-listed Snake River steelhead at Sawtooth Fish Hatchery is listed in Table 5. All natural-origin fish were released to spawn naturally.

Table 5. Known take of ESA-listed Snake River steelhead at Sawtooth Fish Hatchery, 1992-2009.

Trap year	Natural fish trapped at Sawtooth Hatchery
1992	44
1993	7
1994	6
1995	4
1996	8
1997	14
1998	6
1999	10
2000	15
2001	37
2002	95
2003	30
2004	18
2005	29
2006	22
2007	21
2008	23
2009	34

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 adult steelhead (hatchery- and natural-origin) are trapped and handled at the Sawtooth Fish Hatchery weir. The number of natural-origin adults varies annually (Table 4). Currently, all natural-origin adults are passed upstream for spawning. Following capture, natural-origin fish may be marked and tissue sampled before release. Anticipated tasks associated with broodstock collection is in Appendix A; Table 1.

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 A-run steelhead will exceed projected take levels

presented in Appendix A, Table 1. However, in the unlikely event that this occurs, 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 hatchery-origin, steelhead trapping activities.

Take associated with Hatchery Programmatic Maintenance Activities.

These activities are described below but because take associated with these activities is not associated with a particular program at Sawtooth Fish Hatchery, the anticipated take for these activities is reported in Appendix A; Table 1 of the Upper Salmon River Chinook salmon HGMP.

Hatchery diversion dam and water source intake*:* The various wooden, steel and concrete structures which constitute the diversion dam and water source intake at the Sawtooth Hatchery site may become compromised simply from age and exposure to changing weather conditions. Hatchery personnel must periodically complete a visual inspection of the structures by entering the river channel with hip boots or waders. Minor repairs such as dam board replacement may be completed in place by workers using hand tools, while more extensive repairs may require portions of these structures to be temporarily removed for repair or replacement. Should removal of these structures be necessary, a crane or similar lifting device operated from the stream bank would be employed. Heavy equipment will need to enter the stream channel under a special use permit. In some instances it may be necessary to construct a small cofferdam to isolate the work area from the river to facilitate repair work. Cofferdams would be constructed from sheet piling or ecology blocks lined with heavy mil plastic sheeting, thereby reducing the potential for sediment to escape and be transported downstream.

Throughout the year, gravel, sediment and small woody debris is deposited in the vicinity of the hatchery diversion dams and water supply intake structures at the Sawtooth Hatchery intake site. The accumulation of sediment and debris has the potential to restrict the volume of water that can be diverted to the hatchery. Materials must be removed annually to ensure an uninterrupted supply of water for fish culture operation. The diversion dams and water source intake structures may become damaged by the seasonal movement and deposition of sediment and large woody debris. These structures may need to be temporarily removed for repair or replacement.

Removal of accumulated sediment or woody debris may be accomplished using a variety of techniques ranging from a clam shell type excavation bucket mounted to a crane, to a tracked or rubber tired excavator. In all cases, excavation equipment will need to enter the stream channel. Access within the wetted perimeter of the stream will be limited to workers using hand tools or guiding the operation of the heavy equipment. In some instances it may be desirable to construct small cofferdams using ecology blocks lined with heavy mil plastic sheeting to isolate the work area from the river channel.

The diversion dams and water source intakes are located within the migration and spawning habitat of ESA listed spring Chinook salmon and steelhead. A small number of listed bull trout have also been observed migrating through this section of the Salmon River. Direct effects to individual adult or juvenile spring Chinook salmon, steelhead and bull trout are a concern during

all in-river maintenance activities. Effects could include disturbance and displacement of fish as a result of personnel or heavy equipment working near the river channel. A small sediment plume will likely be created as a result of substrate disturbance. This plume will persist for a short distance downstream and could affect embryonic life stages of Chinook salmon and steelhead. To minimize impacts to incubating Chinook salmon or steelhead, all work will be completed within a work window of July 1 (post-steelhead fry emergence) to August 15 (pre-Chinook salmon spawning. All excavated material will be removed from the river and loaded into a truck for offsite disposal.

Water source intake canal and fish bypass screen*:* Just as gravel, sediment and small woody debris is deposited in the vicinity of river water intake structures, similar material is deposited within the canal that delivers surface water to the irrigation ditch. This accumulation of sediment and debris has the potential to restrict the flow of water diverted to the hatchery ditch. Materials must be removed annually to ensure an uninterrupted supply of water for irrigation. Removal of accumulated sediment or woody debris is accomplished using a bulldozer to move material to an excavator positioned on the canal bank. The excavator can remove material from the canal and deposit it on site or in transport vehicles for offsite disposal.

The fish bypass screen and associated pipes located at control box require occasional maintenance. This involves daily brushing the screens for removal of small woody debris.

Both of the maintenance activities described here can be completed when the hatchery facility is out of operation. Therefore, to limit potential impact to listed species, slide gates can be closed and the intake canal dewatered and isolated from the river channel before any maintenance work commences. As such, Chinook salmon, steelhead or bull trout that may be present in the vicinity of the hatchery are not disturbed as a result of this action. Further, sediment generated from this activity cannot be discharged to the river where it could impact embryonic life stages.

Should the bypass pipes which return entrained fish to the river become plugged with sediment or woody debris, they may require cleaning with high pressure water nozzles. Unlike other maintenance activities described in this section, this activity does result in some sediment and woody debris being flushed directly into the river channel. A small sediment plume will likely be created. The volume of material flushed from the pipe is expected to be less than ¼ cubic yard of material. A sediment plume will persist for a short distance downstream and could affect embryonic life stages of Chinook salmon and steelhead. By necessity, work will be completed in the spring (during steelhead egg incubation) and in the fall (during Chinook salmon egg incubation). While the actions described here have potential to affect embryonic life stages of Chinook salmon and steelhead, the frequency (once every 5-10 years), duration (1hour) and magnitude (less than ¼ cubic yard of material moved, sediment plume persisting for less that 50 yards downstream) of the action is likely insignificant.

Adult fish weir, Sawtooth Hatchery*:* Following periods of high flow, sand and gravel accumulates in front of the adult fish weir and entrance to the fish ladder and trap used for capturing adult spring Chinook salmon and steelhead returning to the hatchery. This gravel accumulation restricts river flow and may encourage bank erosion, resulting in further sedimentation or damage to hatchery structures and equipment.

Removal of accumulated sediment or woody debris may be accomplished using a variety of techniques ranging from a clamshell type excavation bucket mounted to a crane, to a tracked or

rubber tired excavator. In most cases, excavation equipment will need to enter the stream channel. Access within the wetted perimeter of the stream will be limited to workers guiding the operation of the crane or excavator. Excavated material will be loaded into a truck and hauled off site for disposal. A small, short duration, sediment plume is anticipated during the excavation process. The adult fish trap and fish ladder is located within the migration corridor of spring Chinook salmon, steelhead and bull trout.

Aside from damages or loss of functionality related to high water events, the integrity of the adult weir may be compromised simply by age and exposure to changing weather conditions. Hatchery personnel must periodically complete a visual inspection of the structures by entering the river channel with hip boots or waders. Minor repairs may be completed in place by workers using hand tools, while more extensive repairs may require individual weir panels to be temporarily removed for repair or replacement. Should removal of these structures exceed the lifting capability of hatchery personnel, a crane or similar device operated from the stream bank would be employed. Heavy equipment will not enter the stream channel. In some instances it may be necessary to construct a small cofferdam to isolate the work area from the river to facilitate repair work. Cofferdams would be constructed from sheet piling or ecology blocks lined with heavy mil plastic sheeting, thereby reducing the potential for sediment to escape and be transported downstream.

Direct effects to individual adult or juvenile spring Chinook salmon, steelhead and bull trout are a concern during these maintenance activities. Effects could include disturbance and displacement of fish as a result of personnel or heavy equipment working near the river channel. To minimize potential impacts to embryonic life stages of Chinook salmon or steelhead, all work will be completed within a work window of July 1 (post steelhead fry emergence) to August 15 (pre Chinook salmon spawning) previously established by NOAA Fisheries for similar construction projects within the vicinity of the Sawtooth Hatchery (HDR/Fishpro 2005). No machinery is placed in the river channel thus eliminating any risk of fuel or oil contamination. The removal of materials as described herein may occur as frequently as once each year depending upon the magnitude of spring runoff.

Take Associated with Monitoring and Evaluation Activities

Research/Monitoring- Monitoring activities are conducted in the vicinity of the hatchery facility and contribute to the take of listed summer steelhead.

Juvenile Trapping. A smolt monitoring trap is operated near the Sawtooth Fish Hatchery 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 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. 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)

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

3.1 DESCRIBE ALIGNMENT OF THE HATCHERY PROGRAM WITH ANY ESU-WIDE HATCHERY PLAN OR OTHER REGIONALLY ACCEPTED POLICIES. EXPLAIN ANY PROPOSED DEVIATIONS FROM THE PLAN OR POLICIES.

This program conforms to 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 steelhead 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.

- Cooperative Agreement between the U.S. Fish and Wildlife Service and the Idaho Department of Fish and Game, USFWS Agreement No.: 14110-A-J008 (for Lower Snake River Compensation Plan monitoring and evaluation studies FY2010).

- Cooperative Agreement between the U.S. Fish and Wildlife Service and the Idaho Department of Fish and Game, USFWS Agreement No.: 14110-A-J007 (for Lower Snake River Compensation Plan hatchery operations FY2010).

- 2008-2017 Management Agreement for upper Columbia River Fall Chinook, Steelhead and Coho pursuant to United States of America v. State of 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 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 if available

Information presented in Table 6 includes harvest data for all A-run steelhead released at the Sawtooth Fish Hatchery.

Table 6. Harvest data for all A-run steelhead released from the Sawtooth Fish Hatchery, 1995-2007.

Run Year	Estimated Harvest	Hatchery Returns	Total Return	Harvest Rate (%)
1995/1996	2,740	545	3,285	83
1996/1997	2,716	1,229	3,945	69
1997/1998	3,138	762	3,900	80
1998/1999	1,627	923	2,550	64
1999/2000	3,852	2,046	5,898	65
2000/2001	2,690	3,018	5,708	47

2001/2002	7,235	7,009	14,244	51
2002/2003	3,823	2,431	6,254	61
2003/2004	2,966	2,406	5,372	55
2004/2005	3,184	1,494	4,678	68
2005/2006	3,574	1,920	5,494	65
2006/2007	6,845	4,028	10,873	63

Information presented in Table 7 includes combined harvest data for A-run steelhead released at the offsite locations in the upper Salmon River (Red Rock, Shoup Bridge, Tunnel Rock, Colston Corner, and McNabb Point).

Table 7. Harvest data for A-run steelhead released at offsite locations in the Upper Salmon River.

Run Year	Estimated Harvest	Estimated Number of Unharvested In-River Returns[a]	Total Return	Harvest Rate (percent)
1995/1996	1,193	507	1,700	70
1996/1997	3,032	1,438	4,470	68
1997/1998	4,786	1,939	6,725	71
1998/1999	1,840	1,289	3,129	59
1999/2000	3,390	1,161	4,551	74
2000/2001	3,517	3,447	6,964	51
2001/2002	7,204	11,263	18,467	39
2002/2003	7,144	6,951	14,095	51
2003/2004	5,858	7,697	13,555	43
2004/2005	6,414	6,644	13,058	49
2005/2006	6,409	7,773	14,182	45
2006/2007	4,319	3,794	8,113	53

[a] The estimated number of unharvested in-river returns based on the SAR of fish released from and returning to the Sawtooth Fish Hatchery weir, adjusted for observed harvest (from CWT analysis).

3.4 RELATIONSHIP TO HABITAT PROTECTION AND RECOVERY STRATEGIES

Hatchery production for harvest mitigation is influenced but not specifically linked to habitat protection strategies in the Salmon subbasin or other areas. The NMFS has not developed a recovery plan specific to Snake River steelhead, but the Salmon River A-run steelhead program is operated consistent with existing Biological Opinions.

3.5 ECOLOGICAL INTERACTIONS

We assume potential adverse effects to listed salmon and steelhead could occur from the release of hatchery-origin steelhead smolts in the Salmon and Pahsimeroi rivers through the following interactions: predation, competition, behavior modification, and disease transmission.

We have evaluated potential interactions between listed steelhead and salmon and hatchery steelhead and their effect in the migration corridor of the Salmon River and downstream. Timing of hatchery-origin steelhead in the migration corridor overlaps with listed spring/summer

Chinook salmon, steelhead, and to a lesser degree with listed sockeye salmon. Steelhead from the LSRCP program are more temporally separated from listed fall Chinook salmon in the Snake River and Lower Granite Reservoir based on different migration periods. The NMFS has identified potential competition for food and space and behavioral interactions in the migration corridor as a concern (M. Delarm, NMFS, pers. comm.).

Because of their size and timing, Chinook salmon fry are probably the most vulnerable to predation. Hillman and Mullan (1989) observed substantial predation of newly emerged Chinook salmon by hatchery and wild steelhead in the Wenatchee River. Cannamela (1992) used existing literature to evaluate potential predation of Chinook salmon fry by hatchery steelhead smolts. He evaluated a 1-1.3 million steelhead smolt release in the upper Salmon River primary production area, where steelhead were released in the vicinity of redds and migrated over redds for several miles. He assumed steelhead smolts at least 105 mm could consume Chinook salmon fry, 35-37 mm in length. Cannamela estimated potential predation by using various percentages of fry in the diet, residualism, and predator size. Using ranges of assumptions, he calculated estimated fry losses to predation by steelhead smolts and residuals for up to a 70-day period from smolt release to June 25. According to his calculations, his scenario of 500,000 steelhead predators using fish as 1 percent of their diet for 40 days resulted in potential consumption of 34,500 fry. Empirical information collected in 1992 infers that this may be an overestimate. IDFG biologists attempted to quantify Chinook salmon fry predation by hatchery steelhead in the upper Salmon River. Their samples were collected from a release of 774,000 hatchery steelhead in the upper Salmon River primary production area where steelhead would migrate directly over redds. The fish were released in early April. The biologists sampled 6,762 steelhead and found that 20 contained fish parts in the cardiac stomach. Of these, three contained 10 Chinook salmon fry. The biologists estimated that the proportion of hatchery steelhead that consumed fry was 0.000444. The estimated predation rate of steelhead smolts on

Chinook salmon fry was 1.48 x 10-3 (95% CI 0.55 x 10-3 to 2.41 x 10-3) for the 6,762 hatchery steelhead smolts examined that consumed the ten Chinook fry. Biologists used this consumption rate to estimate that the total number of Chinook fry consumed during the sample period, April 3-June 3, was 24,000 fry (IDFG 1993). We believe that the potential consumption for steelhead released in the lower Salmon River would be much lower because steelhead are not released in the immediate vicinity of redds and emerging fry.

By using Cannamela's calculations and scenarios of 0.05-1.0 percent fish in the diet and 10-25 percent residualism, we predict a range of potential loss of 2,300-51,000 Chinook fry for a 1.25 million smolt release in the Salmon River primary production area. Cannamela (1992) estimated fry losses would occur for up to a 70-day period from smolt release to June 25. He noted that there is an assumed mechanism for Chinook salmon fry to avoid predation by steelhead since they are coevolved populations. However, literature references were scant about this theory although Peery and Bjornn (1992) documented that Chinook fry tend to move at night. Cannamela concluded that only assumptions could be made about the availability and vulnerability of fry to steelhead predators.

Martin et al. (1993) collected 1,713 steelhead stomachs from the Tucannon River and three contained juvenile spring Chinook salmon. They estimated that 456-465 juvenile spring Chinook salmon were consumed by hatchery steelhead in the Tucannon River from a total release of 119,082 steelhead smolts. Biologists found that rate of predation increased from the

time of steelhead release through September 31. Predation rates increased from 9.4 x 10-3 to 4.3 x 10-2. Martin et al. (1993) theorized that although numbers of steelhead decreased, remaining fish may have learned predatory behavior. By October, juvenile salmon were too large to be prey, and stream temperature had dropped.

No precise data are available to estimate the importance of Chinook salmon fry in a steelhead smolt's diet (USFWS 1992). The USFWS cited several studies where the contents of steelhead stomachs had been examined. Few, if any, salmonids were found. They concluded that the limited empirical data suggested that the number of Chinook salmon fry/fingerlings consumed by steelhead is low. Schriever (IDFG, pers. comm.) sampled 52 hatchery steelhead in the lower Salmon and Clearwater rivers in 1991 and 1992 and found no fish in their stomach contents.

Steelhead residualism in the upper Salmon River appeared to be about 4 percent in 1992 (IDFG 1993). We do not know the rate of residualism for steelhead released in the lower Salmon River. In 1992, the steelhead smolt migration in the Salmon River primary production area began around May 10 and about 95% of the hatchery steelhead had left the upper Salmon River study area by May 21. IDFG biologists found that after one week, hatchery steelhead smolts were consuming natural prey items such as insects and appeared to be effectively making the transition to natural food (IDFG 1993). It is unknown if smolts continued to feed as they actively migrated. Biologists observed that the environmental conditions during the 1992 study were atypical. Water velocity was much lower, while water temperature and clarity were higher than normal for the study period. Furthermore, about 637,500 of the smolts had been acclimated for up to three weeks at Sawtooth Fish Hatchery prior to release, but these fish were not fed during acclimation. It is unknown if acclimation reduced residualism. Biologists concluded that within the framework of 1992 conditions, Chinook fry consumption by hatchery steelhead smolts and residuals was very low.

Kiefer and Forster (1992) were concerned that predation on natural Chinook salmon smolts by hatchery steelhead smolts released into the Salmon River at Sawtooth Fish Hatchery could be causing mortality. They compared PIT-tag detection rates of upper Salmon River natural Chinook salmon emigrating before and after the steelhead smolt releases for the previous three years. They found no significant difference and concluded that the hatchery steelhead smolts were not preying upon the natural Chinook smolts to any significant degree.

The release of a large number of prey items which may concentrate predators has been identified as a potential effect on listed salmon. Hillman and Mullan (1989) reported that predaceous rainbow trout (>200 mm) concentrated on wild salmon within a moving group of hatchery age-0 Chinook salmon. The wild salmon were being "pulled" downstream from their stream margin stations as the hatchery fish moved by. It is unknown if the wild fish would have been less vulnerable had they remained in their normal habitat. Hillman and Mullan (1989) also observed that the release of hatchery age-0 steelhead did not pull wild salmon from their normal habitat. During their sampling in 1992, IDFG biologists did not observe predator concentration. We have no further information that supports or disproves the concern that predators may concentrate and affect salmon because of the release of large numbers of hatchery steelhead.

There is potential for hatchery steelhead smolts and residuals to compete with Chinook salmon and natural steelhead juveniles for food and space, and to potentially modify their behavior. The literature suggests that the effects of behavioral or competitive interactions would be difficult to

evaluate or quantify (Cannamela 1992, USFWS 1993). Cannamela (1992) concluded that existing information was not sufficient to determine if competitive or behavioral effects occur to salmon juveniles from hatchery steelhead smolt releases. Our strategy of acclimation and releases over several days should reduce release densities at a single site.

Cannamela's (1992) literature search indicated that there were different habitat preferences between steelhead and Chinook salmon that would minimize competition and predation. Spatial segregation appeared to hinge upon fish size. Distance from shore and surface as well as bottom velocity and depth preferences increased with fish size. Thus, Chinook salmon fry and steelhead smolts and residuals are probably not occupying the same space. Cannamela theorized that if interactions occur, they are probably restricted to a localized area because steelhead, which do not emigrate, do not move far from the release site. Within the localized area, spatial segregation based on size differences would place Chinook salmon fry and fingerlings away from steelhead smolts and residuals. This would further reduce the likelihood of interactions. Martin et al. (1993) reported that in the Tucannon River, spring Chinook salmon and steelhead did exhibit temporal and spatial overlap, but they discuss that the micro-habitats of the two species were likely very different.

The USFWS (1992) theorized that the presence of a large concentration of steelhead at and near release sites could modify the behavior of Chinook. However, they cited Hillman and Mullan (1989) who found no evidence that April releases of steelhead altered normal movement and habitat use of age-0 Chinook. Throughout their study, IDFG biologists (IDFG 1993) noted concentrations of fry in typical habitat areas, whether steelhead were present or not.

Cannamela (1992) also described the potential for effects resulting from the release of a large number of steelhead smolts in a small area over a short period of time. He theorized that high concentrations of steelhead smolts could limit Chinook salmon foraging opportunities or limit available food. However, the effect would be of limited duration because most steelhead smolts emigrate or are harvested within two months of release. He found no studies to support or refute his hypothesis. Cannamela also discussed threat of predation as a potentially important factor causing behavioral changes by stream salmonids. The literature was not specific to interactions of steelhead smolts and Chinook fry. It is assumed that coevolved populations would have some mechanism to minimize this interaction.

There is a potential effect to listed salmon from diseases transmitted from hatchery-origin steelhead adults. Pathogens that could be transmitted from adult hatchery steelhead to naturally produced Chinook salmon include Infectious Hematopoietic Necrosis Virus (IHNV) and Bacterial Kidney Disease (BKD) (P. Mamer, IDFG, pers. comm.). Although adult hatchery-origin steelhead may carry pathogens of Chinook, such as BKD and Whirling Disease, which could be shed into the drainage, these diseases are already present in the Salmon River headwaters in naturally produced Chinook and steelhead populations. The prevalence of BKD is less in hatchery-origin steelhead than in naturally produced Chinook salmon. Idaho Chinook salmon are rarely affected by IHNV (D. Munson, IDFG, pers. comm.). Idaho Department of Fish and Game disease monitoring will continue as part of the IDFG fish health program. We do not believe that the release of hatchery-origin steelhead adults above the Sawtooth and East Fork weirs will increase the prevalence of disease in naturally produced Chinook salmon or steelhead.

Hauck and Munson (IDFG, unpublished) provide a thorough review of the epidemiology of

major Chinook pathogens in the Salmon River drainage. The possibility exists for horizontal transmission of diseases to listed Chinook salmon or natural steelhead from hatchery-origin steelhead in the migration corridor. Current hatchery practices include measures to control pathogens at all life stages in the hatchery. Factors of dilution, low water temperature, and low population density of listed anadromous species in the production area reduce the potential of disease transmission. However, none of these factors preclude the existence of disease risk (Pilcher and Fryer 1980, LaPatra et al. 1990, Lee and Evelyn 1989). In a review of the literature, Steward and Bjornn (1990) stated there was little evidence to suggest that horizontal transmission of disease from hatchery smolts to naturally produced fish is widespread in the production area or free-flowing migration corridor. However, little research has been done in this area.

Transfers of hatchery steelhead between any facility and the receiving location conforms to PNFHPC guidelines. IDFG and USFWS personnel monitor the health status of hatchery steelhead using protocols approved by the Fish Health Section, AFS. Disease sampling protocol, in accordance to the PNFHPC and AFS Bluebook is followed. IDFG hatchery and fish health personnel sample the steelhead throughout the rearing cycle and a pre-release sample is analyzed for pathogens and condition. Baseline disease monitoring of naturally produced Chinook salmon has been implemented in the upper Salmon River. At this time, we have no evidence that horizontal transmission of disease from the hatchery steelhead release in the upper Salmon River has an adverse effect on listed species. Even with consistent monitoring, it would be difficult to attribute a particular incidence or presence of disease to actions of the LSRCP steelhead program.

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.

Sawtooth Fish Hatchery – The Sawtooth Fish Hatchery receives water from the Salmon River and from five wells. River water enters an intake structure approximately 0.8 km upstream of the hatchery facility where intake screens comply with NMFS criteria. River waters flow from the collection site to a control box in the hatchery building, where it is screened to remove fine debris. River water can be distributed to indoor vats, outside raceways, or adult holding raceways. The hatchery water right for surface water use is approximately 60 cfs. Incubation and early rearing water needs are met by three primary wells. A fourth well provides tempering water to control the build-up of ice on the river water intake during winter months. A fifth well provides domestic water for the facility. The hatchery water right for groundwater is approximately 9 cfs. River water temperatures range from 32ºF in the winter to 68ºF in the summer. Well water temperatures range from 39ºF in the winter to 52ºF in the summer.

Magic Valley Fish Hatchery – The Magic Valley Fish Hatchery receives water from a spring on the north wall of the Snake River canyon. The spring (Crystal Springs) is covered to prevent contamination. Water is delivered to the hatchery (87.2 cfs maximum in 2009) through a 42 inch

pipe that crosses the Snake River. Water temperature remains a constant 59ºF year-round.

Hagerman National Fish Hatchery – The Hagerman National Fish Hatchery receives water from several springs emanating from the Snake River aquifer. Approximately 70 cfs are available to supply the hatchery. Water temperature remains a constant 59ºF year-round.

Lower Pahsimeroi Fish Hatchery – Water from the Pahsimeroi River is supplied to the adult trap and holding ponds through a 0.25-mile earthen intake canal. Water from the canal is also used to supply the four early rearing raceways (not currently used for steelhead production). The intake canal is equipped with NMFS- approved rotating drum screens designed to prevent entrainment of wild Chinook salmon and steelhead. The IPC holds a water right to divert 40 cfs from the Pahsimeroi River for operations at the lower hatchery. Pahsimeroi River water temperatures at this site vary throughout the year from seasonal lows of 33°F in the winter to seasonal highs of 72°F in the summer. Daily fluctuations can be as much as 12°F.

A small pathogen free spring-water source supplies water to the spawning building and hatchery building for rinsing and water hardening green eggs. This water is pumped to a 10,000 gallon holding tank and gravity-fed to the two locations. The spring source can produce up to 200 gpm of 52-56° F water.

Upper Pahsimeroi Fish Hatchery – The upper PFH operates on a combination of well water and river water. Summer steelhead eggs are incubated solely on water pumped from three on-site wells. Up to 14 cfs of well water is pumped to an elevated aeration tank for gas abatement before flowing via gravitational force to egg incubators and rearing vats located within the hatchery building. Well water temperature is a constant 50°F.

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.

Intake screens at all facilities are in compliance with NMFS screen criteria by design of the Corp of Engineers.

SECTION 5. FACILITIES

5.1 BROODSTOCK COLLECTION FACILITIES (OR METHODS)

The Sawtooth Fish Hatchery functions as primary broodstock collection facility for the upper Salmon River A-run steelhead program. The Pahsimeroi Fish Hatchery collects broodstock and spawns adults to provide approximately 180,000 yearling smolts for release into the upper Salmon River.

Sawtooth Fish Hatchery – Adult collection at the Sawtooth Fish Hatchery is facilitated by a permanent weir that spans the Salmon River. Weir panels are installed to prevent the upstream migration of adult steelhead. Fish are allowed to volitionally migrate into the adult trap where

they are manually sorted into adult holding raceways. The hatchery has three 167-feet-long x 16-feet-wide x 5-feet-deep holding raceways and an enclosed spawning building. Each raceway has the capacity to hold approximately 1,300 adults.

Pahsimeroi Fish Hatchery(PFH) – Adult summer steelhead collection occurs at the lower PFH and is facilitated by a removable barrier weir that spans the Pahsimeroi River. This structure diverts adults through an attraction canal and a fish ladder supplied with up to 40 cfs of river water. The adult trap consists of a concrete pond measuring 70 feet long x 16 feet wide x 6 feet deep. The trap is situated between two additional concrete ponds (each measuring 70 feet long x 16 feet wide x 6 feet deep) that are used as the adult holding ponds. Summer steelhead return to PFH from late February through late May. Fish volitionally migrate into the adult trap where they are manually sorted into the adult holding ponds. The trap is checked daily and all fish are handled in accordance with protocols established by NOAA Fisheries. Fish are examined for fin clips, measured to the nearest centimeter for fork length, and identified by sex. Adults retained for artificial propagation are placed in the holding pond to await spawning.

5.2 FISH TRANSPORTATION EQUIPMENT (DESCRIPTION OF PEN, TANK TRUCK, OR CONTAINER USED)

A variety of transportation vehicles and equipment are available at the various facilities. Generally, adult transportation at both facilities is unnecessary as hatchery-produced adults are trapped on site. However, in the event that adult steelhead return to either facility in excess of specific program needs, adult transportation vehicles (equipped with oxygen and fresh flow agitator systems) may be used to transfer fish to a variety of locations to maximize sport fishing opportunities.

5.3 BROODSTOCK HOLDING AND SPAWNING FACILITIES

See Section 5.1 above for a review of broodstock holding and spawning facilities.

5.4 INCUBATION FACILITIES

Sawtooth Fish Hatchery – Incubation facilities at the Sawtooth Fish Hatchery consist of a well water supplied system of 100 stacks of incubator frames containing 800 incubation trays. The maximum incubation capacity at the Sawtooth Fish Hatchery is 7 million steelhead eggs.

Magic Valley Fish Hatchery – Incubation facilities at the Magic Valley Fish Hatchery consist primarily of forty 12 gallon upwelling incubators. Each incubator is capable of incubating and hatching 50,000 to 75,000 eyed steelhead eggs. Two incubators are placed on 8 inch aluminum square tubes that sit on the floor of a vat. A total of 20 vats are available. Vats measure 40 feet long x 4 feet wide x 3 feet deep. Each vat has the capacity to rear 100,000 to 115,000 steelhead to <200 fish per pound.

Hagerman National Fish Hatchery – Eyed-eggs are incubated in 60 upwelling incubators. Each incubator is capable of incubating and hatching 20,000 to 30,000 steelhead eggs. One incubator is placed over each of the 60 vats. The 40 Hatchery Building #1 fiberglass vats have overall dimensions of 16 feet long x 4 feet wide x 2 feet deep and have the capacity to rear 25,000 to 30,000 steelhead to a size of 100 to 200 fish per pound. The 20 Hatchery Building #2

concrete vats have overall dimensions of 15 feet long x 3 feet wide x 2 feet deep and have the capacity to rear 20,000 to 25,000 steelhead to a size of 100 to 200 fish per pound.

Pahsimeroi Fish Hatchery – PFH's incubation room is located at the upper facility. The incubation room consists of twenty 16-try stacks of Marisource vertical flow incubators supplied with 120 gpm of chilled (40°F) and unchilled (50°F) pumped well water (240 gpm total). Summer steelhead eggs are incubated to eyed-up at this location and then transferred for final incubation and rearing.

5.5 REARING FACILITIES

The Magic Valley Fish Hatchery and the Hagerman National Fish Hatchery function as juvenile rearing facilities for the upper Salmon River A-run hatchery steelhead program.

Magic Valley Fish Hatchery – The Magic Valley Fish Hatchery has 32 outside raceways available for juvenile steelhead rearing. Each raceway measures 200 feet long x 10 feet wide x 3 feet deep. Each raceway has the capacity to rear approximately 62,000 fish to release size. Raceways may be subdivided to create 64 rearing sections. A movable bridge, equipped with 16 automatic Neilsen fish feeders, spans the raceway complex. Two bulk feed bins (30,000 pound capacity each) equipped with fish feed fines shakers and a feed conveyor complete the outside feeding system.

Hagerman National Fish Hatchery - Early rearing occurs in fiberglass troughs inside the hatchery building. As fish outgrow fiberglass troughs, they are transferred to a series of outside raceways where they remain until transfer for release. Raceways measure 100 feet long by 10 feet wide.

5.6 ACCLIMATION/RELEASE FACILITIES

All fish are released directly to receiving waters.

5.7 DESCRIBE OPERATIONAL DIFFICULTIES OR DISASTERS THAT LED TO SIGNIFICANT FISH MORTALITY

No operational difficulties or disasters have led to significant fish mortality at any of the facilities addressed in this HGMP.

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.

Sawtooth Fish Hatchery - The Sawtooth Fish Hatchery is staffed around the clock and equipped with an alarm system. The hatchery well water supply system is backed up by

generator power. The inside vat room can be switched to gravity flow with river water in the event of a generator failure. Protocols are in place to guide emergency situations when the hatchery well water supply is interrupted. Protocols are also in place to guide the disinfection of equipment and gear to minimize risks associated with the transfer of potential disease agents.

Magic Valley Fish Hatchery – The Magic Valley Fish Hatchery is staffed around the clock. The hatchery receives only gravity flow water, and as such, no generator backup system is in place or needed. Hatchery staff perform routine maintenance checks on gravity lines that supply the hatchery with water. Proper disinfection protocols are in place to prevent the transfer of disease agents.

Hagerman National Fish Hatchery – The hatchery is staffed around the clock. The hatchery receives only gravity flow water, and as such, no generator backup system is in place or needed. No water alarms are installed at the facility. Hatchery staff perform nightly maintenance checks of water intakes and rearing facilities. Disinfection protocols are in place to reduce the potential for the transfer of fish pathogens.

Lower Pahsimeroi Fish Hatchery – The lower PFH has two full-time employees residing at the facility for security purposes. The adult trap and holding ponds are gravity fed from the Pahsimeroi River and are therefore not subject to water supply interruption. Protocols are in place to guide the disinfection of equipment and gear to minimize risks associated with the transfer of potential disease agents.

Upper Pahsimeroi Fish Hatchery – Upper PFH is equipped with numerous water level, temperature, flow, and power failure alarms. An audible horn and telephone dialer alert staff, both on and off site, to abnormal conditions. A 450 kW standby generator capable of powering all critical life support equipment has been installed to compensate for interruptions in utility power lasting more than 7 seconds. Protocols are established by IDFG to guide their response to emergency situations and a full-time hatchery employee resides less than one mile from the hatchery site. Additional protocols guide the disinfection of equipment and gear to minimize risks associated with the transfer of potential disease agents.

SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

This section describes 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

Snake River steelhead and indigenous Salmon River steelhead were used to found all hatchery A-run programs in Idaho. The Pahsimeroi Hatchery program was initiated with progeny of adult steelhead trapped at Oxbow and Hells Canyon dams from 1966 through 1968. Beginning in 1967, juvenile steelhead produced from spawning events that resulted from these collections were released in the Pahsimeroi River. However, Oxbow-origin smolts were released into the Pahsimeroi River and the upper Salmon River intermittently through 1970. Adult broodstock collections were initiated at the Pahsimeroi Hatchery in 1969. Returning Snake River stock and some indigenous Salmon River stock were trapped and used as broodstocks. The Sawtooth Fish

Hatchery broodstock was established with adults that returned from hatchery-produced smolt releases and from natural steelhead adults trapped at the facility. Naturally-produced steelhead adults were integrated into the hatchery broodstock until the early 1990s. It is likely that the natural component of the upper Salmon River is hatchery influenced.

Additionally, B-run steelhead smolts of Dworshak National Fish Hatchery-origin were released into the Pahsimeroi River in 1974 and 1978.

6.2 SUPPORTING INFORMATION

6.2.1 History

See Section 6.1 above.

6.2.2 Annual size

No natural-origin ESA-listed summer steelhead are used as broodstock for this program. Annual guidelines for broodstock size are listed below.

6.2.3 Past and proposed level of natural fish in broodstock

See Section 6.1 above.

6.2.4 Genetic or ecological differences

Previous genetic analyses indicate that introgression from stocked hatchery steelhead (Pahsimeroi and Sawtooth) has occurred throughout the upper Salmon River and that many wild populations in these area exhibit little to no genetic differentiation from these hatchery populations (Nielsen et al. 2009). Microsatellite analyses (13 loci) of samples of wild and hatchery steelhead captured at the Sawtooth weir on the upper mainstem Salmon River indicate low genetic differentiation ($F_{ST} < 0.01$); IDFG unpublished data).
Previous genetic analyses using 11 microsatellite loci found no significant differences in allelic structure among hatchery steelhead populations from the Oxbow, Pahsimeroi, and Sawtooth hatcheries (Nielsen et al. 2009). This is not surprising given that the Pahsimeroi and Oxbow stocks were derived primarily from wild adults trapped at Hells Canyon Dam in the mid 1960s, and the Sawtooth stock was founded from the Pahsimeroi stock.

6.2.5 Reasons for choosing

Naturally-produced steelhead in the upper Salmon River steadily declined during the late 1960s through the mid 1970s, leading to sport fishery closures between 1973 and 1975. Translocation of native Snake River steelhead, which were losing native habitat due to the Idaho Power Company's Hells Canyon dam complex, was considered an appropriate and feasible alternative to initiate harvest mitigation programs rather than mining a declining wild steelhead resource in the upper 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.

No adverse impacts or effects to the listed population are expected as wild/natural adults are not currently trapped and used for broodstock purposes.

SECTION 7. BROODSTOCK COLLECTION

7.1 LIFE-HISTORY STAGE TO BE COLLECTED (ADULTS, EGGS, OR JUVENILES)

Only hatchery-origin adults are collected for broodstock purposes.

7.2 COLLECTION OR SAMPLING DESIGN

At this time no unmarked (natural origin) fish are incorporated into the hatchery broodstock. All adult fish collected for broodstock at all locations are of hatchery origin.

For Sawtooth and Pahsimeroi fish hatchery programs, all adults that return to racks are generally handled. Hatchery-origin fish incorporated into the spawning design are selected at random from ripe fish to represent the entire run.

7.3 Identity

All harvest mitigation hatchery produced fish are marked with an adipose fin clip. Unmarked and untagged fish captured at weirs are released above weirs with a minimum of handling and delay.

7.4 PROPOSED NUMBER TO BE COLLECTED

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

No ESA-listed summer steelhead are collected as part of this program. Annual guidelines for broodstock size are listed below.

Sawtooth Fish Hatchery – To meet the production target of 1,120,000 yearling smolts for release into the upper Salmon River, approximately 331 females are needed (based on a 73% green-egg to smolt survival and 4,700 eggs per female). With a spawning ratio of 1:1, an equivalent number of adult males are also needed. Table 8 shows the total number of females spawned at Sawtooth Fish Hatchery since 1997. This includes fish that are spawned for other programs (e.g., Yankee Fork supplementation and Shoshone Bannock egg-box program) that are described in separate HGMPs.

Pahsimeroi Fish Hatchery – To meet the current production target of 180,000 yearling smolts for release into the upper Salmon River (above the Lemhi River), approximately 53 females are

needed (based on a 71% green-egg to smolt survival and 4,770 eggs per female). With a spawning ratio of 1:1, an equivalent number of adult males are also needed.

7.4.2 Broodstock collection levels for the last twelve years or for most recent years available

Table 8. Sawtooth Hatchery adult steelhead spawn history (hatchery-origin fish) 1997-2008.

Brood Year	Adults			Green Eggs	Juveniles
	Females	Males	Jacks		
1997	429	429	n/a	1,994,076	n/a
1998	246	246	n/a	1,116,350	n/a
1999	364	364	n/a	1,526,046	n/a
2000	870	870	n/a	3,950,103	n/a
2001	633	633	n/a	2,867,634	n/a
2002	542	542	n/a	2,858,525	n/a
2003	508	508	n/a	2,363,746	n/a
2004	576	576	n/a	2,639,117	n/a
2005	542	542	n/a	2,458,137	n/a
2006	452	452	n/a	2,338,443	n/a
2007	526	526	n/a	2,472,200	n/a
2008	567	567	n/a	2,823,300	n/a

7.5 DISPOSITION OF HATCHERY-ORIGIN FISH COLLECTED IN SURPLUS OF BROODSTOCK NEEDS

The disposition of surplus hatchery-origin steelhead could include: the sacrifice of fish and distribution of carcasses to the public, tribe, or human assistance organizations; the outplanting of adults for natural production; the recycling of fish downstream through the fishery; or the planting of fish in local fishing ponds.

7.6 FISH TRANSPORTATION AND HOLDING METHODS

Generally, adult steelhead arrive ripe or very close to spawning. No anesthetics or medications are used during handling or holding procedures. Fish are held in adult holding facilities (described above) until they are spawned. An opercle or caudal fin punch may be used to track time of arrival or to indicate previously spawned males.

In the event that fish are transported to different locations to meet other objectives (see Section 7.5), trucks fitted with transport tanks are used. Tanks support both oxygen and fresh flow agitation systems.

7.7 DESCRIBE FISH HEALTH MAINTENANCE AND SANITATION

PROCEDURES APPLIED

Adult steelhead held for spawning are typically spawned within two weeks of arrival. No chemicals or drugs are used prior to spawning. Fish health monitoring at spawning includes sampling for viral, bacterial and parasitic disease agents. Ovarian fluid is sampled from females and used in viral assays. Kidney samples are taken from a representative number of females spawned and used in bacterial assays. Head wedges are taken from a representative number of fish spawned and used to assay for presence/absence of the parasite responsible for whirling disease.

Eggs are rinsed with pathogen free well water after fertilization, and disinfected with a 100 ppm buffered iodophor solution for one-half hour before being placed in incubation trays. Necropsies are performed on pre-spawn mortalities as dictated by the Idaho Department of Fish and Game Fish Health Laboratory.

7.8 DISPOSITION OF CARCASSES

Typically, adult steelhead carcasses generated during spawning events are distributed to the general public, charitable organizations, and to the Shoshone-Bannock Tribes. Additionally, carcasses may be transported to sanitary landfills or to rendering facilities.

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.

Only hatchery-origin, non ESA-listed adults are collected for broodstock purposes.

SECTION 8. MATING

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

8.1 SELECTION METHOD

Adult steelhead are chosen at random but with regard to run timing. Male steelhead may be marked with an opercle or caudal punch and used more than once if needed. Generally a 1:1 spawn design is followed. Fish are typically checked twice weekly for maturity level.

8.2 MALES

Generally, males are used only once for spawning. Only in those cases where skewed sex ratios exist (fewer males than females), or in situations where males mature late, would males be used twice. Males are chosen at random but with regard to run timing.

8.3 FERTILIZATION

Spawning ratios of 1 male to 1 female will be used unless the broodstock population contains less than 100 females. If the spawning population contains less than 100 females, then eggs from each female are split into two equal sub-families. Each sub-family is fertilized by a different male. One cup of well water is added to each bucket and set aside for 30 seconds to one minute. The two buckets are then combined.

8.4 CRYOPRESERVED GAMETES

Milt is not cryopreserved as part of this program and no cryopreserved gametes are used.

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.

No natural-origin fish are incorporated into the spawning operation.

SECTION 9. INCUBATION AND REARING

This section describes management goals (e.g., egg to smolt survival) that the hatchery is currently operating under for the hatchery stock. Data is provided 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

Survival of steelhead eggs from green to eyed-up stages at Sawtooth Fish Hatchery has averaged 87% over the last 12 years. Table 9 lists the egg take and survival to the eyed stage since 1997. The number of eggs taken includes those taken for other programs (e.g., Yankee Fork supplementation and Shoshone Bannock egg-box program) that are described in separate HGMPs.

Table 9. Sawtooth Fish Hatchery egg take and survival information, 1997-2008.

Brood Year	Number of Green Eggs	Number of Eyed-eggs	Survival to Eyed-Egg (%)
1997	1,994,076	1,805,200	91.0
1998	1,116,350	984,600	88.2
1999	1,526,046	1,338,178	87.7
2000	3,950,103	3,516,250	89.0
2001	2,867,634	2,300,978	80.0
2002	2,858,525	2,526,935	88.4
2003	2,807,840	2,363,746	84.2
2004	2,639,117	2,251,142	85.3
2005	2,458,137	2,129,319	86.6
2006	2,338,443	2,049,530	87.6
2007	2,472,200	2,104,531	83.2
2008	2,614,775	2,333,978	89.3

Source: Sawtooth Fish Hatchery annual reports

Survival of steelhead eggs from green to eye-up stages at Pahsimeroi Fish Hatchery has averaged 81.4% over the last 12 years. Table 9 lists the egg take and survival to the eyed-stage since 1997. The number of eggs taken includes those taken for other programs (e.g., Pahsimeroi River and Shoshone Bannock egg-box program) that are described in separate HGMPs.

Table 9. Pahsimeroi Fish Hatchery egg take and survival information, 1997-2008.

Brood Year	Number of Green Eggs	Number of Eyed Eggs	Survival to Eyed Egg (%)
1997	1,839,134	1,472,030	80.00%
1998	1,707,808	1,416,800	83.00%
1999	2,013,205	1,717,897	85.30%
2000	1,670,914	1,438,458	86.10%
2001	1,831,147	1,364,602	74.50%
2002	1,297,179	1,153,722	88.90%
2003	1,367,068	1,142,848	83.60%
2004	1,521,492	1,134,017	74.50%
2005	1,405,447	1,146,929	81.60%
2006	1,858,369	1,230,110	66.20%
2007	1,340,207	1,124,513	83.90%
2008	1,487,863	1,333,125	89.60%

9.1.2 Cause for, and disposition of surplus egg takes

Surplus eggs are not intentionally generated at Sawtooth or Pahsimeroi fish hatcheries but may

result from efforts to collect eggs from across the full run spectrum or to account for anticipated hatchery mortality. Disposition of surplus eggs include either landfill disposal or eyed-egg transfer to resident fish hatchery for introduction to local non-anadromous reservoirs.

9.1.3 Loading densities applied during incubation

Sawtooth Fish Hatchery – Incubation flows are set at 5 to 6 gpm per eight tray incubation stack. Typically, eggs from two females are incubated per tray (approximately 8,500 to 10,000 eggs per tray).

Pahsimeroi Fish Hatchery – Eggs are transported from the lower PFH to the upper PFH in 75 quart coolers and loaded into Marisource vertical flow incubator trays. Each incubator tray is loaded with eggs from two females. Depending on fecundity, loading densities in the incubators can range from 9,000 to 12,000 eggs.

9.1.4 Incubation conditions

Sawtooth Fish Hatchery – Pathogen-free well water is used for all incubation at the Sawtooth Fish Hatchery. Incubation stacks use catch basins to prevent silt and fine sand from circulating through incubation trays. Following 48 hours of incubation, eggs are treated three times per week with formalin (1,667 ppm) to control the spread of fungus. Formalin treatments are discontinued at the eyed-up. Once eggs reach the eyed stage of development (approximately 360 FTU), they are shocked to identify dead and unfertilized eggs. Dead and undeveloped eggs are then removed with the assistance of an automatic egg picking machine. During this process, the number of eyed and dead eggs is tabulated. Eyed eggs are generally shipped to receiving hatcheries when they have accumulated approximately 450 Fahrenheit Temperature Units (FTUs).

Pahsimeroi Fish Hatchery – All summer steelhead egg incubation occurs at the upper PFH facility. The incubation room includes twenty 16-tray stacks of Marisource vertical flow incubators supplied with 120 gpm of chilled (40°F) and unchilled (50°F) pathogen-free well water (240 gpm total). A 200-gallon head tank provides thermal buffering for any temperature fluctuation. Each incubator stack uses a catch basin to prevent silt and fine sand from circulating through the incubation trays. Incubator flows are initially set at 5 gpm and are eventually increased to 6 gpm. Summer steelhead eggs are incubated to eye-up and swim-up in the incubation room and then transported for final incubation and rearing.

Magic Valley, Niagara Springs, and Hagerman National fish hatcheries – Water flow to incubation jars is adjusted so eggs gently roll. Temperature is tracked daily to monitor the accumulation of temperature units. Water temperature at both facilities is a constant 59.0ºF.

9.1.5 Ponding

Magic Valley Fish Hatchery – Fry are allowed to volitionally exit upwelling incubators and move directly into early rearing vats through approximately 1,000 FTUs. After that time, fry remaining in incubators are gently poured into vats. Fry are generally ponded between late May and early July.

Hagerman National Fish Hatchery – Fry are allowed to volitionally exit upwelling incubators

and move directly into early rearing vats through approximately 650-750 FTUs. Remaining fry are gently poured into the hatchery rearing tanks through a minnow grader. Dead eggs are captured by the grader and enumerated to calculate hatch success. Fish are typically fed when 80% of the population has reached the swim-up stage.

9.1.6 Fish health maintenance and monitoring

Following fertilization, eggs are typically water-hardened in a 100 ppm Iodophor solution for a minimum of 30 minutes. During incubation, eggs routinely receive scheduled formalin treatments to control the growth of fungus. Treatments are typically administered three times per week at a concentration of 1667 ppm active ingredient. Dead eggs are removed following shocking. Additional egg picks are performed as needed to remove additional eggs not identified immediately after shocking.

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 genetic or ecological effects to listed fish are anticipated as only hatchery-origin adults are spawned.

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 or for years dependable data are available.

Survival data for A-run steelhead reared at Magic Valley Fish Hatchery is listed in Table 10. Data is from Magic Valley Fish Hatchery annual reports.

Table 10. Magic Valley Fish Hatchery survival information by hatchery for A-run steelhead, 1997-2008.

Brood Year	Spawn Hatchery	Eyed-egg to Smolt Survival
1997	Sawtooth	77.40%
1999	Sawtooth	91.80%
2000	Sawtooth	88.30%
2001	Sawtooth	82.41%
2002	Sawtooth	73.52%
2003	Sawtooth	72.52%
2004	Sawtooth	75.46%
2005	Sawtooth	89.91%
2006	Sawtooth	87.54%
2007	Sawtooth	83.29%

2008	Sawtooth	85.34%
1997	Pahsimeroi	89.30%
1998	Pahsimeroi	92.40%
1999	Pahsimeroi	93.50%
2000	Pahsimeroi	83.50%
2001	Pahsimeroi	94.98%
2002	Pahsimeroi	84.95%
2003	Pahsimeroi	80.54%
2004	Pahsimeroi	76.44%
2005	Pahsimeroi	71.48%
2006	Pahsimeroi	71.76%
2007	Pahsimeroi	75.00%
2008	Pahsimeroi	88.63%

Survival data for A-run steelhead reared at Hagerman National Fish Hatchery is listed in Table 11. Data is from Hagerman National Fish Hatchery annual reports.

Table 11. Hagerman National Fish Hatchery egg survival information by hatchery for A-run steelhead, 1997-2008.

Brood Year	Spawn Hatchery	Eyed-egg to Smolt Survival
1997	Sawtooth	77.40%
1999	Sawtooth	91.80%
2000	Sawtooth	88.30%
2001	Sawtooth	82.41%
2002	Sawtooth	73.52%
2003	Sawtooth	72.52%
2004	Sawtooth	75.46%
2005	Sawtooth	89.91%
2006	Sawtooth	87.54%
2007	Sawtooth	94.57%
2008	Sawtooth	91.69%

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

Magic Valley Fish Hatchery - Density (DI) and flow (FI) indices are targeted to not exceed 0.30 and 1.2, respectively (Piper et al. 1982).

Hagerman National Fish Hatchery – Raceway density and flow indices are maintained to not

exceed 0.2, and 1.2, respectively. Hatchery vat density and flow indices are maintained to not exceed 0.8 and 1.2, respectively.

The Hagerman National Fish Hatchery is conducting several experiments in BY2009 to address Hatchery Review Team (HRT) recommendations to reduce early rearing densities below 0.5. The results of these studies will guide future rearing hatchery vat rearing densities.

The HRT also identified actual Flow Indexes that exceeded 1.2. The Hagerman National Fish Hatchery completed a Production Capacity Report in 2007 that suggested a Flow Index of 1.5 was detrimental to fish growth. The Hagerman National Fish Hatchery will continue to monitor Smolt to Adult Return (SAR) rates between raceway decks and corresponding Flow Indexes to determine what Flow Index level is detrimental to SAR's.

9.2.3 Fish rearing conditions

Magic Valley Fish Hatchery – Fish rear on constant 59°F water in single pass raceways. Dissolved oxygen, flows, total suspended solids, settable solids, phosphorus, and water temperature are recorded monthly. Density and flow indices are monitored on a regular basis. Rearing groups are split or moved as needed to adhere to these indices. Fish are fed in outside raceways from a traveling bridge fitted with 16 Nielson automatic feeders. Raceway cleaning takes place on an as needed basis; raceways are swept manually with brooms. Sample counts are conducted monthly and dead fish are removed daily.

Hagerman National Fish Hatchery – Fish are reared in three banks of raceways (three pass serial reuse). All fish are fed dry extruded floating diets which are placed into demand feeders twice weekly. Previous FCR rates are used to project fish sizes over the grow-out period. This avoids the need to crowd and stress fish for periodic sample counts. Oxygen and ammonia are monitored bi-weekly during periods of peak loading. Gas saturation, total suspended solids, settable solids, phosphorus, nitrates, pH, and water temperatures are monitored quarterly or more frequently as needed. Raceway cleaning occurs once to twice per week; raceways are manually swept with brooms. Excessive weed growth is removed one to two times per rearing season with a motorized pond scrubber. Mortalities are 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.

Magic Valley and Hagerman National fish hatcheries rear juvenile steelhead under constant water temperature (59°F) conditions. As such, both facilities experience similar growth rates and design feeding schedules to produce fish between 180 and 250 mm to the pound at release. Length gained per month for the first three months of culture at both facilities is typically between 0.8 and 1.0 inches (20.3 to 25.4 mm). Fish gain approximately 0.65 to 0.75 inches per month (16.5 to 19.1 mm) thereafter. To meet the release size target, fish may be fed on an intermittent schedule beginning in their fourth month of culture.

9.2.5 Indicate monthly fish growth rate and energy reserve data

(average program performance), if available.

See Section 9.2.4 above.

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).

Magic Valley Fish Hatchery – Dry and semi-moist diets have been used at the Magic Valley Fish Hatchery in the past. Currently, fish are fed the Rangen 470 extruded salmon dry diet. First feeding fry are fed at a rate of approximately 5% body weight per day. As fish grow, the percent body weight fed per day decreases. Fry are fed with Loudon solenoid activated feeders while located in early rearing vats. Following transfer to outside raceways, fish are fed by hand and with the assistance of the traveling bridge. First feeding fry are typically fed up to eight times per day. Prior to release, pre-smolts are typically fed four times per day. Feed conversion averages 1.00 pound of feed fed for every pound of weight gain (from first feeding through release).

Hagerman National Fish Hatchery – Fry receive their first feeding when approximately 80% of the population has reached the swim-up stage of development. First feedings are generally light. Starter diets are typically sifted prior to feeding. Fry are fed a dry diet equivalent to approximately 5% of their body weight per day at a rate of eight to ten times per day until they reach approximately 300 fish per pound. Steelhead are transferred to outside raceways at approximately 100 to 200 fish per pound. At this time, fish are fed a specialized Hagerman Steelhead Diet made either by Rangen® and Nelsons Silver Cup® at approximately 3.7 percent body weight per day. When fish reach approximately 20 to the pound, demand feeders are used.

9.2.7 Fish health monitoring, disease treatment, and sanitation procedures

Magic Valley Fish Hatchery – Routine fish health inspections are conducted by staff from the IDFG Eagle Fish Health Laboratory on a monthly basis. More frequent inspections occur if needed. Therapeutics may be used to treat specific disease agents (e.g., Oxytetracycline). Foot baths with disinfectant are used at the entrance of the hatchery early rearing building. Disinfection protocols are in place for equipment, trucks and nets. All raceways are thoroughly chlorinated after fish have been transferred for release.

Hagerman National Fish Hatchery – Fish health monitoring is periodically conducted on site by the Idaho Fish Health Center (U.S. Fish and Wildlife Service). Fish samples are sent to the Idaho Fish Health Center via Fed-Ex on an as needed basis. Disinfection protocols and an aquatic nuisance species HACCP plan for management of the New Zealand mudsnail (*Potamopyrgus antipodarum*) are in place for equipment, nets, and fish transport units. Raceways are allowed to desiccate for a period no shorter than 30 days for disinfection between brood years.

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 methods are applied.

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.

ESA-listed, natural-origin steelhead are not propagated as part of the Salmon River A-run steelhead program.

SECTION 10. RELEASE

This section describes fish release levels, and release practices applied through the hatchery program.

10.1 PROPOSED FISH RELEASE LEVELS

Release targets for the upper Salmon River A-run steelhead reared at Magic Valley and Hagerman National fish hatcheries are listed in Table 12 below.

Table 12. Magic Valley and Hagerman National fish hatcheries proposed fish release targets.

Target Release Number	Size (fpp)	Release Date	Location	Stock	Rearing Hatchery
120,000	4.5	March-May	Salmon R. @ Red Rock	Pahsimeroi	Magic Valley
150,000	4.5	March-May	Salmon R. @ Colston Corner	Sawtooth	Magic Valley
120,000	4.5	March-May	Salmon R. @ McNabb Point	Sawtooth	Magic Valley
60,000	4.5	March-May	Salmon R. @ Shoup Bridge	Pahsimeroi	Magic Valley
60,000	4.5	March-May	Salmon R. @ Tunnel Rock	Sawtooth	Hagerman NFH
790,000	4.5	March-May	Sawtooth Hatchery Weir	Sawtooth	Hagerman NFH

10.2 SPECIFIC LOCATION(S) OF PROPOSED RELEASE(S)

Table 13. A-run summer steelhead release locations.

Stream	Rearing Hatchery	Release Point	HUC	Major Watershed & Basin
Salmon River	Magic Valley	Salmon R., Red Rock	17060203	Salmon River
Salmon River	Magic Valley	Salmon R., Shoup Bridge	17060203	Salmon River
Salmon River	Magic Valley	Salmon R., Colston Corner	17060203	Salmon River
Salmon River	Hagerman	Salmon R., Tunnel Rock	17060203	Salmon River
Salmon River	Magic Valley	Salmon R., McNabb Pt.	17060203	Salmon River
Salmon River	Hagerman	Sawtooth Hatchery weir	17060201	Salmon River

10.3 ACTUAL NUMBERS AND SIZES OF FISH RELEASED BY AGE CLASS THROUGH THE PROGRAM

The size and number of yearling smolts released from Magic Valley Fish Hatchery that are part of the upper Salmon River A-run steelhead program are listed in Table 14. Since 2009, the number of offsite release locations has been reduced (see Table 13). Currently, Magic Valley Fish Hatchery releases 450,000 yearling smolts that are part of the upper Salmon River A-run hatchery steelhead program.

Table 14. Number and size of steelhead smolts released from the Magic Valley Fish Hatchery 1991-2009.

Release Year	Rearing Hatchery	Life Stage Released	Avg. Size (fish/pound)	Number Released
1991	Magic Valley	Yearling	3.8	1,094,200
1992	Magic Valley	Yearling	4.1	1,148,200
1993	Magic Valley	Yearling	5.5	915,900
1994	Magic Valley	Yearling	4.6	951,990
1995	Magic Valley	Yearling	4.7	684,035
1996	Magic Valley	Yearling	4.6	738,133
1997	Magic Valley	Yearling	4.7	765,286
1998	Magic Valley	Yearling	4.5	701,850
1999	Magic Valley	Yearling	3.9	838,112
2000	Magic Valley	Yearling	4.2	776,617
2001	Magic Valley	Yearling	4.8	962,125
2002	Magic Valley	Yearling	4.1	863,066
2003	Magic Valley	Yearling	4.6	682,327
2004	Magic Valley	Yearling	4.0	642,773

2005	Magic Valley	Yearling	4.4	706,645
2006	Magic Valley	Yearling	4.2	623,220
2007	Magic Valley	Yearling	4.2	710,584
2008	Magic Valley	Yearling	4.6	682,395
2009	Magic Valley	Yearling	4.8	688,126

The size and number of yearling smolts released from Hagerman National Fish Hatchery that are part of the upper Salmon River A-run steelhead program are listed in Table 15. Since 2009, the number of offsite release locations has been reduced (see Table 13). Currently, Hagerman National Fish Hatchery releases 850,000 yearling smolts that are part of the upper Salmon River A-run hatchery steelhead program.

Table 15. Number and size of steelhead smolts released from Hagerman National Fish Hatchery, 1991-2009.

Release Year	Rearing Hatchery	Life Stage Released	Avg. Size (fish/pound)	Number Released
1991	Hagerman National	Yearling	4.4	850,189
1992	Hagerman National	Yearling	4.5	1,487,842
1993	Hagerman National	Yearling	4.8	1,519,168
1994	Hagerman National	Yearling	4.6	1,151,544
1995	Hagerman National	Yearling	5.3	749,173
1996	Hagerman National	Yearling	5.6	772,387
1997	Hagerman National	Yearling	4.7	803,637
1998	Hagerman National	Yearling	4.4	684,937
1999	Hagerman National	Yearling	5.1	714,789
2000	Hagerman National	Yearling	4.2	727,797
2001	Hagerman National	Yearling	4.5	707,834
2002	Hagerman National	Yearling	4.4	781,137
2003	Hagerman National	Yearling	4.2	747,901
2004	Hagerman National	Yearling	4.4	770,050
2005	Hagerman National	Yearling	4.3	747,466
2006	Hagerman National	Yearling	5.0	760,015
2007	Hagerman National	Yearling	4.2	821,373
2008	Hagerman National	Yearling	3.9	767,523
2009	Hagerman National	Yearling	4.3	754,876

10.4 ACTUAL DATES OF RELEASE AND DESCRIPTION OF RELEASE PROTOCOLS

See Sections 10.5 and 10.6 for a description of release protocols. Actual dates of release for the

past 14 years at Magic Valley and Hagerman National fish hatcheries are presented in Table 16.

Table 16. Dates of release of steelhead from Magic Valley and Hagerman National fish hatcheries, 1996-2009.

Release Year	Rearing Hatchery	Life Stage	Date Released
1996	Magic Valley	Yearling	4/1– 5/26
1997	Magic Valley	Yearling	4/11– 4/21
1998	Magic Valley	Yearling	4/16 – 4/24
1999	Magic Valley	Yearling	4/16– 5/5
2000	Magic Valley	Yearling	4/1– 4/24
2001	Magic Valley	Yearling	4/17 – 5/7
2002	Magic Valley	Yearling	4/12-5/7
2003	Magic Valley	Yearling	4/7-4/25
2004	Magic Valley	Yearling	4/12-4/28
2005	Magic Valley	Yearling	4/7-4/26
2006	Magic Valley	Yearling	4/14-5/2
2007	Magic Valley	Yearling	4/12-5/2
2008	Magic Valley	Yearling	4/7-5/1
2009	Magic Valley	Yearling	4/9-5/1
1996	Hagerman National	Yearling	4/16 – 4/24
1997	Hagerman National	Yearling	4/14 – 4/28
1998	Hagerman National	Yearling	4/21– 4/26
1999	Hagerman National	Yearling	4/21 – 4/26
2000	Hagerman National	Yearling	4/26 – 4/26
2001	Hagerman National	Yearling	3/30 – 4/26
2002	Hagerman National	Yearling	4/3-4/29
2003	Hagerman National	Yearling	4/9-4/29
2004	Hagerman National	Yearling	4/16-5/6
2005	Hagerman National	Yearling	4/11-4/29
2006	Hagerman National	Yearling	3/27-5/4
2007	Hagerman National	Yearling	4/6-4/30
2008	Hagerman National	Yearling	4/16-5/7
2009	Hagerman National	Yearling	4/16-5/5

10.5 FISH TRANSPORTATION PROCEDURES, IF APPLICABLE

Loading and transportation procedures are similar among rearing hatcheries. Generally, yearlings are crowded in raceways and pumped into 5,000 gallon transport trucks using an eight-inch fish pump and dewatering tower. Transport water temperature is chilled to approximately 7.2ºC. Approximately 4,000-5,000 pounds of fish are loaded into each truck. Transport duration

to release sites is ranges from 4 to 9 hours. Trucks are equipped with oxygen and fresh flow agitator systems. Fish are not fed for up to four days prior to loading and transporting.

10.6 ACCLIMATION PROCEDURES (METHODS APPLIED AND LENGTH OF TIME)

Smolts are released directly from the tankers into the Salmon River; no acclimation occurs.

10.7 MARKS APPLIED, AND PROPORTIONS OF THE TOTAL HATCHERY POPULATION MARKED, TO IDENTIFY HATCHERY ADULTS.

All yearling smolts released (1,300,000) as part of the upper Salmon River A-run hatchery steelhead program are marked with an adipose fin clip.

Table 17 presents the mark and tag management plan for brood year 2009 yearling smolts that are part of the upper Salmon River A-run hatchery steelhead program. All smolts are marked with an adipose fin clip.

Table 17. IDFG brood year 2009 steelhead mark and tag management plan.

Rearing Hatchery	Adipose Clip	Adipose Clip w/ CWT	Total Release
Magic Valley	230,000	220,000	450,000
Hagerman National	750,000	100,000	850,000

10.8 DISPOSITION PLANS FOR FISH IDENTIFIED AT THE TIME OF RELEASE AS SURPLUS TO PROGRAMMED OR APPROVED LEVELS

If the surplus is within 10% of the programmed level, it is included in the programmed release. Additional surplus may be transferred as appropriate to the IDFG resident fish stocking program.

10.9 FISH HEALTH CERTIFICATION PROCEDURES APPLIED PRE-RELEASE

Between 45 and 30 days 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 Eagle Fish Health Laboratory and the Idaho Fish Health Center (U.S. Fish and Wildlife Service).

10.10 EMERGENCY RELEASE PROCEDURES IN RESPONSE TO FLOODING OR WATER SYSTEM FAILURE

Emergency procedures are in place to guide activities in the event of potential catastrophic event.

Plans include a trouble shooting and repair process followed by the implementation of an emergency action plan if the problem cannot be resolved. Emergency actions include fish consolidations, transfers to other rearing hatcheries in the Hagerman Valley, and supplemental oxygenation.

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:

- Continuing fish health practices to minimize the incidence of infectious disease agents. Follow IHOT, AFS, and PNFHPC guidelines.
- Reducing the number of steelhead released in the primary upper Salmon River salmon production area. The primary upper Salmon River production area includes the Salmon River from Warm Springs Creek upstream to the headwaters of the Salmon and East Fork Salmon rivers.
- Moving release sites for steelhead not released at Sawtooth Fish Hatchery downstream to reduce potential for predation on Chinook fry emerging or migrating from mainstem Salmon River and East Fork Salmon River redds.
- Continuing to release steelhead in the lower Salmon River where natural Chinook production is minimal or nonexistent
- Minimizing the number of smolts in the release population which are larger than 225 mm (or about 4 fpp)
- Not releasing adult steelhead into Chinook production areas, such as above weirs, in excess of estimated carrying capacity
- Continuing to reduce effects of the release of large numbers of juvenile steelhead at a single site by spreading the release over a number of days
- Programming time of release to mimic natural fish for releases, given the constraints of transportation
- Continuing research to improve post-release survival of steelhead to potentially reduce numbers released to meet management objectives
- Monitoring hatchery effluent to ensure compliance with National Pollutant Discharge Elimination System permit
- Continuing to externally mark hatchery steelhead released for harvest purposes with an adipose fin clip

- Continuing Hatchery Evaluation Studies (HES) to provide comprehensive monitoring and evaluation for LSRCP steelhead

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, are provided for the purpose of adding detail with regards to plans and methods used to collect data necessary to respond to indicators listed in Section 1.10. Additionally, two columns are provided in the tables 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 18, 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. 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.	Y Y Y	C C 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

- ESA consultation(s) under Section 7 have been completed, Section 10 permits have been issued, or HGMP has been determined sufficient under Section 4(d), as applicable.
- 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 N N	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)	N	
	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 and in mainstems 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 and mainstems 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	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	N
		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	N
		3.4.2. Fraction of strays in non-target populations that originate from in-subbasin releases.	Y	N
		3.4.3. Fraction of hatchery strays in out-of-basin natural population.	Y	N
	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.	N	
		3.5.2. Spatial and temporal trends among adult spawners and rearing juvenile fish in the available habitat.	N	
	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.	N	
		3.6.2. Pre- and post-supplementation trends in adult to adult or juvenile to adult survivals are estimated.	N	
		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.	N	
		3.6.4. Timing of juvenile outmigrations from rearing area and adult returns to spawning areas are monitored.	N	

Category	Standards	Indicators	Applicable	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.	N	
		3.7.2. Natural spawning success of hatchery-origin fish must be similar to that of natural-origin fish.	N	
		3.7.3. Temporal and spatial distribution of hatchery-origin spawners in nature is similar to that of natural-origin fish.	N	
		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).	N	
		3.7.5. Post-release life stage-specific survival is similar between hatchery and natural-origin population components.	N	
	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.	N	
		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.	N	
		3.8.3. Genetic characteristics of the supplemented population remain similar (or improved) to the unsupplemented populations.	N	
	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.	N	
		3.9.2. Life history characteristics of hatchery-origin adult fish are similar to natural-origin fish.	N	
		3.9.3. Juvenile emigration timing and survival differences between hatchery and natural-origin fish are minimized.	N	
	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 and mainstems 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 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.

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, all natural fish trapped during broodstock collection 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 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 populations 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.

Where 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.	N N	
	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	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 Y	C N

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 18. 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

3.2.3 *Temporal and spatial distribution of adult spawners and rearing juveniles in the freshwater spawning and rearing area are monitored*- Abundance and run timing of natural-origin steelhead is monitored at the Sawtooth Fish Hatchery weir. High flow

conditions during spawning preclude monitoring of the spatial distribution of steelhead spawners in the upper Salmon River.

A screw trap, near the Sawtooth hatchery, is operated March through November annually as part of the ISS study to estimate abundance of juvenile Chinook salmon. Juvenile steelhead are captured, enumerated and tagged incidental to this monitoring effort. Snorkel surveys in the upper Salon River are conducted annually to estimate abundance of juvenile salmon and steelhead as part of the GPM and INPM programs.

3.4.1-3.4.3 While IDFG does not have a formalized monitoring program to estimate stray rates from this hatchery program, releases of hatchery origin-steelhead in the upper Salmon River are representatively tagged with CWT so fish recovered at other locations can be identified. Beginning in 2008, genetic samples have been taken from 100% of the adults used for broodstock that contribute to these releases enabling us to assign any subsequent progeny collected at any point in its lifecycle back to the hatchery of origin. Funding is currently available to genotype the broodstock but funds to sample returning adults in the future will need to be identified.

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

4.8.2 *Number of fish in stomachs of sampled artificially produced fish, with estimate of natural fish composition-* IDFG has evaluated predation rates of steelhead on naturally produced salmon (See Cannamela 1992, and IDFG 1993) but has not prioritized the development of a program to routinely sample fish stomachs.

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-

No research is being conducted as part of this hatchery program.

12.2 COOPERATING AND FUNDING AGENCIES

12.3 PRINCIPLE INVESTIGATOR OR PROJECT SUPERVISOR AND STAFF

12.4 STATUS OF STOCK, PARTICULARLY THE GROUP AFFECTED BY PROJECT, IF DIFFERENT THAN THE STOCK(S) DESCRIBED IN SECTION 2.

12.5 TECHNIQUES: INCLUDE CAPTURE METHODS, DRUGS, SAMPLES COLLECTED, TAGS APPLIED

12.6 DATES OR TIME PERIOD IN WHICH RESEARCH ACTIVITY OCCURS

12.7 CARE AND MAINTENANCE OF LIVE FISH OR EGGS, HOLDING DURATION, TRANSPORT METHODS

12.8 EXPECTED TYPE AND EFFECTS OF TAKE AND POTENTIAL FOR INJURY OR MORTALITY

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).

12.10 ALTERNATIVE METHODS TO ACHIEVE PROJECT OBJECTIVES

12.11 LIST SPECIES SIMILAR OR RELATED TO THE THREATENED SPECIES; PROVIDE NUMBER AND CAUSES OF MORTALITY RELATED TO THIS RESEARCH PROJECT

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.

SECTION 13. ATTACHMENTS AND CITATIONS

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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

IDFG annually prepares a bull trout conservation program plan and take report that describes their management program for bull trout 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 resulting 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 USFWS, which then makes a determination whether this program is in accordance with the ESA. The plan/report is due to USFWS by March 31 annually. A summary of recent take in the Salmon River subbasin is 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 juvenile hatchery steelhead into the Salmon River subbasin where bull trout (threatened) are the only non-anadromous aquatic ESA-listed species present. Bull trout life history, status and habitat use in Salmon River subbasin are 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, which includes a substantial portion

of the Salmon River subbasin (5,045 stream miles proposed as critical habitat in the Salmon River subbasin).

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 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 fish) 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 subadult and adult bull trout 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). All of these life history strategies are 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; 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). Juvenile bull trout require complex rearing habitats (Dambacher and Jones 1997, Al-Chokhachy et al. 2010). Migratory adults and subadults are highly piscivorous (Lowery et al. 2009). Migrating 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 located within 10 core areas (USFWS 2002). The recovery team also identified 15 potential local populations. The Upper Salmon River A-run steelhead program releases hatchery juveniles into the upper Salmon River at the Sawtooth Hatchery and at locations along the upper mainstem upstream of the Lemhi River. Broodstock is collected at the Sawtooth Hatchery and the Pahsimeroi Hatchery traps. These activities occur primarily in one bull trout core area, the Upper Salmon River. Juvenile steelhead releases in the Upper Salmon River Core Area migrate downstream through three other Salmon River bull trout Core Areas, including the Middle Salmon-Panther River, Middle Salmon-Chamberlain River, and Little-Lower Salmon River core areas. A-run steelhead spawning occurs primarily in the Upper Salmon River Core Area. The following information on these four core areas, and local population status and habitat use within, is summarized from the bull trout Draft Recovery Plan (USFWS 2002) unless otherwise cited.

Upper Salmon River Core Area

Bull trout distribution is widespread in the Upper Salmon River with 18 known local populations and one potential local population. The Draft Recovery Plan estimated adult abundance to be greater than 5,000 individuals. Both resident and migratory bull trout are present in the Sawtooth Valley. The inlet of Alturas Lake has one of the largest local populations of adfluvial bull trout in the Sawtooth Valley. Adfluvial bull trout are also known to be present in Redfish Lake.

The bull trout 5-year status review conducted in 2006 (USFWS 2008) determined the Upper Salmon River Core Area had an unknown adult abundance level, occupied about 620-3,000 stream miles, had an unknown short-term trend, moderate/imminent threat to persistence, and a final ranking of "potential risk" to become extirpated (Table 19). More recent analysis by High et al. (2008) determined that a weakly positive rate of population change occurred pre-1994, but post-1994 was significantly positive, indicating an increasing population trend post-1994 (17-year record at 25 survey sites) (Table 20). The post-1994 increasing population trend was the highest of nine Core Areas analyzed in the Salmon River Recovery Unit during all periods analyzed.

Table 19. 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 20. 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).

Table 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). Estimates that were unavailable due to inadequate data are indicated (NA).

Middle Salmon River-Panther Core Area

Bull trout are widely distributed in this core area, including 20 local populations and 2 potential local populations. Both resident and migratory populations are present. Adult abundance was estimated to be between 500 and 5,000 individuals in the draft recovery plan.

The bull trout 5-year status review conducted in 2006 (USFWS 2008) determined the Middle Salmon River-Panther Core Area had an unknown adult abundance level, occupied from 125-620 stream miles, had an unknown short-term trend, moderate/imminent threat to persistence, and a final ranking of "at risk" to become extirpated (Table 19). More recent analysis by High et al. (2008) determined that a weakly positive rate of population change occurred pre-1994, but post-1994 was significantly negative (17-year record at 12 survey sites) (Table 20).

Middle Salmon River-Chamberlain Core Area

A substantial portion of the Middle Salmon River-Chamberlain Core Area is encompassed by the Frank Church and Gospel Hump Wilderness areas. Bull trout are found in nine local populations and one potential local population in this core area and are widely distributed.

Fluvial bull trout are fairly common, with adult abundance estimated to be between 500 and 5,000 individuals in the Draft Recovery Plan. The bull trout 5-year status review conducted in 2006 (USFWS 2008) determined the Middle Salmon River-Chamberlain Core Area had an unknown adult abundance level, occupied from 125-620 stream miles, had an unknown short-term trend, widespread/low severity threat to persistence, and a final ranking of "potential risk" to become extirpated (Table 19). More recent analysis by High et al. (2008) determined that a weakly negative rate of population change occurred pre-1994, but post-1994 was weakly positive (16-year record at 10 survey sites) (Table 20).

Little-Lower Salmon River Core Area

Local populations include 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 migration, adult and subadult foraging, rearing, and wintering habitat. 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 461 over the last 20 years (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 50-250 fish, occupied from 125-620 stream miles, had an unknown short-term trend, substantial/imminent threat to persistence, and a final ranking of "high risk" to become extirpated (Table 19). More recent analysis by High et al. (2008) determined that a weakly negative rate of population change occurred pre-1994, but post-1994 was weakly positive (19-year record at 34 survey sites, snorkel surveys) (Table 20). 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 (Table 20).

15.3 ANALYSIS OF EFFECTS

Direct Effects

Direct effects primarily arise through collection of Chinook salmon broodstock. However, operation of the adult trap for steelhead occurs before bull trout are captured in their upstream migration. Captures of bull trout typically start at the end of June while trap operations for steelhead cease in May.

A small percentage of bull trout sampled in a fish trap, 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 fish trapping management activity has occurred for many years in the Salmon River subbasin, apparently without hindering positive bull trout population growth rates since 1994, as evidenced by results of High et al. (2008), and are not expected to limit bull trout population growth rates into the future.

Competition is also possible between residualized juvenile steelhead and subadult bull trout. Efforts are ongoing to reduce and minimize residualism rates of hatchery steelhead. Release of juvenile hatchery steelhead also likely provides increased forage (a 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 population growth rates of bull trout since 1994, as evidenced by results of High et al. (2008), and are not expected to limit population growth rates into the future.

Cumulative Effects

Cumulatively, the effects of the Upper Salmon River A-run steelhead hatchery program and associated monitoring and evaluation results in increased forage for migratory adult and subadult bull trout, possible competition and predation of bull trout by residual hatchery steelhead, and contributes knowledge on bull trout population distribution and abundance through incidental captures in broodstock collection traps and in monitoring and evaluations studies. Such knowledge can be used to evaluate bull trout population trends over time.

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. Direct mortality associated with hatchery program operations has not occurred at either of the Squaw Creek or Pahsimeroi traps in recent years.

15.4 ACTIONS TAKEN TO MITIGATE FOR POTENTIAL EFFECTS

Actions taken to minimize adverse effects on bull trout include:

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

2. Continue fish health practices to minimize the incidence of infectious disease agents. Follow IHOT, AFS, and PNFHPC guidelines.

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

4. Continue Hatchery Evaluation Studies (HES) to provide comprehensive monitoring and evaluation for LSRCP steelhead, which provide valuable incidental bull trout data.

5. Conduct 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. Continue to modify broodstock collection traps to minimize bull trout mortality as necessary.

7. Prepare annual bull trout conservation program plan and take report, submitted to USFWS, to ensure compliance with the ESA.

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Appendix A

Table 1. Estimated take of ESA listed species associated with hatchery operations

Listed species affected: Summer Steelhead ESU/Population: Snake River DPS/upper Salmon R mainstem population Activity: Broodstock collection				
Location of hatchery activity:*Sawtooth Fish Hatchery Dates of activity: March-mid May Hatchery program operator: Brent Snider				
	Annual Take of Listed Fish By Life Stage (Number of Fish)			
Type of Take	**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 release d)			Entire run (see Table 3 in section 2.2.2 for range)	
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)			Less than ½ % of fish handled	
Other Take (specify) h) Tissue sampling				

* Take associated with the operation of the Pahsimeroi Fish Hatchery trap is presented in the Pahsimeroi A-run steelhead HGMP

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.

Appendix B

Responses to the issues and recommendations made by the USFWS Hatchery Review Team (HRT) specific to the upper Salmon River A-run steelhead hatchery program.

Category	HRT #	Issue / Recommendation	Managers Response to Comment
Program Goals and Objectives	HA02	Continue to work through various regional processes such as (a) implementation of the mainstem Federal Columbia River Power System Biological Opinion to improve migration survival, (b) US vs. OR discussions to address harvest issues, (c) NOAA Fisheries to complete ESA consultations on hatchery mitigation programs, and (d) local watershed groups to continue improving habitat, to allow the Service and cooperators meet Army Corps of Engineers and LSRCP mitigation goals on a consistent basis	IDFG will continue to participate in these types of regional processes.
	HA25	Restate program goals to include goals for A-run steelhead adults from HNFH for the Salmon River basin.	Program goals are stated in this HGMP
	HA26	Participate in local watershed groups to improve habitat	IDFG activity involved with all local watershed groups in the Upper Salmon Basin and is aggressively pursuing habitat project to increase fish production in the basin.
	HA26	Complete ESA hatchery consultations for hatchery mitigation programs	This HGMP fulfills the consultation function
	HA26	Participate in US v. OR to resolve harvest issues.	IDFG is a US vs. OR participant in TAC , PAC and in the Policy Committee
	HA26	Participate in regional processes to increase migration survival.	IDFG currently participates in these types of regional processes.

Goals and Objectives	HA37	Establish an MOA with the Army Corps of Engineers and IDFG that defines the rearing arrangement and responsibilities for Hagerman NFH for rearing rainbow trout.	This program may be discontinued. The Hatchery continues to work with the PL at the Dworshak NFH and IDFG to coordinate this program
	MV38	Assess post release survival and fish health physiological response to transportation from hatchery to Salmon River release.	Post release mortality is assessed through the use of PIT tags. Survival from release to Lower Granite Dam is estimated with 95% CIs. Estimated survival of fish released after transport is similar to survival of fish released directly from other rearing facilities.
	MV39	Establish numeric conservation objectives that are measurable and develop HGMP for program.	The Upper salmon A-run steelhead program is operated as a segregated harvest mitigation program.
	MV49	Identify the role of the hatchery in achieving specific conservation and harvest goals. Also indentify the role of hatchery in achieving TRT's abundance threshold of 1,000 adults	Program goals are stated in this HGMP
Broodstock Choice and Collection	HA27	Do not backfill SawA stock shortages with PahA or OxbA stock for releases in to Salmon River upstream of East Fork Salmon River	Managers have not released Oxbow A stock into the mainstem Salmon River since 1999. While managers prioritize using the locally adapted Sawtooth A stock in the upper Salmon River, meeting the mitigation production goal is prioritized over the perceived risks associated with releasing Pahsimeroi A stock above the East Fork Salmon River. The Sawtooth A stock was founded with broodstock from Pahsimeroi Fish Hatchery and Pahsimeroi Fish Hatchery was founded with broodstock from Hells Canyon in the Snake River (same as the Oxbow A stock).
	HA27	Reexamine current LSRCP goal for HNFH to return 13,600 adult steelhead on a consistent basis. Determine need to change goal.	The return goal is part of the existing LSRCP mitigation agreement.

Broodstock Choice and Collection	HA27	Discontinue rearing SawA steelhead at MVFH and transfer to HNFH	Managers are trying to most efficiently utilize available rearing space among Magic Valley hatchery facilities to insure that defined mitigation goals are met. This may require splitting production of one program among two or more rearing facilities. Distributing production also minimizes the impacts to one population as a result of a catastrophic disease outbreaks or facility failures at one rearing facility.
	HA28	Manage SawA, PahA, and OxbA stocks separately. Don't backfill stock/egg shortages by backfilling with stocks from other locations. Or mark non-local stocks and preclude from brood upon adult return.	These stocks are managed separately. See HA27. When backfilling is necessary managers back fill from sites from within the upper Salmon River.
	HA38b	To minimize conflict over water use between this program and steelhead production, purchase eyed triploid eggs from a commercial vendor later in late March or early April, after the hatchery has begun transporting steelhead yearlings off-station to their release sites.	The rainbow trout program may be discontinued
	MV40	Discontinue rearing PahA stock at MVFH; transfer to HNFH.	See HA 27
	MV41	Manage OxbA, PahA, and SawA stocks as separate stocks. Do not backfill when egg shortages occur.	See HA 28
Hatchery and Natural Spawning	HA29	Transfer eggs from all spawn takes at Sawtooth weir to HNFH for subsequent release at Sawtooth.	Managers have implemented this protocol.

Hatchery and Natural Spawning, Adult Returns	MV42	Ensure that representative samples of eyed eggs from all spawn takes at Pahsimeroi FH are allocated to Niagara Springs FH for hatch and rearing before eggs are allocated to Magic Valley FH. All smolts released at Pahsimeroi FH should accurately represent the adults spawned for all spawn takes.	Eggs from all spawn takes that represent the entire adult return to Pahsimeroi Fish Hatchery are sent to Niagara Springs Fish Hatchery to perpetuate the Pahsimeroi steelhead program.
Incubation and Rearing	HA05a	Implement a study to determine the epizootiology of Nucleospora salmonis, including the source of infection, alternate hosts and salmonid stock resistance.	The Idaho Fish Health Center is conducting research to determine the epizootiology of this organism since it is found in both the A strain and B strain steelhead
	HA06	Develop alternative rearing strategies for meeting targeted release sizes without limiting feeding (e.g., chilling eggs)	Managers agree that alternative rearing strategies should be explored. Alternatives may require infra-structure changes.
	HA07	Reduce rearing densities in indoor nursery tanks to maximum D.I. of 0.5 by reducing the number of DworB steelhead, increasing the number of rearing tanks, or moving fish outside earlier.	The Hagerman National Fish Hatchery is conducting several experiments in BY2009 to assess early rearing densities. The results of these studies will guide future rearing hatchery vat rearing densities
	HA08	Flow index for individual raceways should not exceed 30% of the total system flow index when three banks are in use or 50% if only two banks are used.	This recommendation has been incorporated in the Hatchery's SOP
	MV07	Increase testing for Nucleospora salmonis.	Pathology has incorporated increased testing for Nucleospora salmonis in their protocol.
	MV08	Develop chilling capacity to delay development and reduce need to withhold feed later	Managers agree that alternative rearing strategies should be explored. Chilling water may be one alternative to address this issue but will require infra-structure changes.
	MV09	Modify nursery drain system to accommodate additional rearing vats	This recommendation has not been proven to be needed
	MV10	reduce rearing densities in nursery vats. Densities currently exceed recommended fish health guidelines.	Rearing results have not indicated the need for this recommendation.

Incubation and Rearing	MV11	Investigate the source of IHNV. Disinfect water coming into the incubation building. As a precautionary measure, enclose Crystal Springs to reduce the potential for horizontal transmission by birds or small mammals from the nearby trout hatcheries, trout fishing pond, and Snake River.	IHNV is currently being investigated through our pathology lab with strict biosecurity protocols in place. Enclosing Crystal Springs is nearly impossible with the various spring outlets and prolific vegetation found on the site. MVFH ponds are already secured from bird predation through existing netting. Current biosecurity protocols should be sufficient to meet this recommendation. We will continue to monitor results.
	MV12a	Increase fish health examinations of MVFH reared steelhead	Rearing results have not indicated the need for this recommendation.
	MV12b	Increase biosecurity to reduce pathogen transmission	Biosecurity has been increased to accommodate this recommendation. Also smaller screen mesh has been installed on outside raceways to prevent predation and contamination.
	MV43	Rear fewer stocks with fewer release locations at MVFH	Managers are trying to most efficiently utilize available rearing space among Magic Valley hatchery facilities to insure that defined mitigation goals are met. This may require splitting production of one program among two or more rearing facilities. Distributing production also minimizes the impacts to one population as a result of a catastrophic disease outbreaks or facility failures at one rearing facility. Multiple release locations have been implemented to improve angler opportunity. Managers continue to evaluate hatchery releases relative to achieving that goal.
Release and Outmigration	HA09	Continue Pit tagging to assess survival through hydrosystem, assess Nucleospora salmonis impacts,	Representative PIT tagging is ongoing to assess juvenile in river passage survival and smolt to adult return rates. Issues relevant to NS at HNFH will be addressed in HA5a

Release and Outmigration	HA30	Restrict the release of SawA steelhead to Salmon River upstream from East Fork to minimize opportunities to stray into Yankee Fork and East Fork drainages.	The proposed weir in the East Fork Salmon River will eliminate the issue of stray hatchery fish into natural spawning areas in that system. Steelhead supplementation smolt releases originate from Sawtooth hatchery therefore adverse effects from stray Sawtooth hatchery adults in that system are likely minimal. Remote releases of hatchery steelhead are designed to provide maximum angler opportunity and location of those releases must be balanced against possible negative effects associated with straying of hatchery fish into natural spawning areas. Managers have confined remote releases of Sawtooth origin hatchery steelhead are release in mainstem areas upstream of Pahsimeroi river to minimize detrimental effect of strays into that river and other tributaries downstream.
	HA31	Establish Sawtooth Weir as first priority for releases of SawA stock. When adult return does not meet brood need, release some fish without ad clip, with CWT to increase escapement through fisheries. Re	Releasing enough smolts at Sawtooth to achieve annual broodstock needs is the first priority. Achieving broodstock goals at Sawtooth Hatchery has not been a problem however the practice of not marking releasing a portion of the release to improve passage through fisheries has been adopted for Chinook releases at Sawtooth Fish Hatchery and could be adopted for steelhead if needed.
	HA32	Mark all hatchery fish (including supplementation releases) released in Salmon River with ad clip, CWT or other mark to determine origin upon adult return.	All steelhead released into the mainstem salmon River are adipose fin-clipped. Marking protocols for supplementation releases into the Yankee Fork Salmon River are stipulated in the 2008-17 US vs. OR Management agreement and include unmarked/untagged fish. Even without marks applied, hatchery-origin steelhead are generally recognizable based on visible fin erosion.

Release and Outmigration	MV44	Discontinue off-site releases of PahA steelhead in the Salmon River	Managers implemented offsite releases to improve angler access to hatchery returns. They have confined remote releases of Pahsimeroi origin hatchery steelhead releases in mainstem areas downstream of Pahsimeroi river to minimize detrimental effect of strays into that river and tributaries further upstream. There is ongoing monitoring to assess the extent of hatchery fish straying into upper Salmon River tributaries.
	MV45	Discontinue release of 30,000 smolts at Pahsimeroi weir, release elsewhere.	The releases at the weir have been discontinued.
	SA02	Evaluate the impact of harvesting post release juvenile steelhead on meeting LSRCP mitigation goals.	The harvest of juveniles during the brief smolt outmigration period in the spring is very small and presumed to be inconsequential. Generally, anglers are targeting adult steelhead during the timeframe that smolts are released.
Facilities and Operations	HA10	Construct shade covers over raceways; quantify fish health benefits.	This recommendation has been prioritized by the Hagerman Hatchery Evaluation team and will put on the LSRCP Capital Outlay database
	HA11a	Repair degraded pipelines, replumb spring 17 to main spring to increase water management flexibility.	This recommendation has been prioritized by the Hagerman Hatchery Evaluation Team and will be addressed in priority order as soon as funding becomes available.
	HA11b	Actively monitor spring flow. Prioritize strains and stocks at HNFH as water flow declines.	The hatchery continues to collect and report water flow data and monitor trends. The hatchery recently reduced (BY09) by 100K Sawtooth A strain fish
	HA11c	Develop contingency plans for modifying existing water delivery infrastructure and technological enhancements to compensate for declining water quantity.	The Hatchery has submitted projects to the LSRCP Capitol Improvement for infrastructure modifications. Projects will be implemented as funding becomes available. The Hatchery is evaluating the use of a LOH to improve O2 levels in the rearing ponds

Facilities and Operations	HA11d	USFWS should seek opportunities to negotiate a mitigation settlement for loss of water at HNFH	The Hatchery continues to monitor the CAMP process and will work with IDWR and water users to stabilize the ESPA
	HA12	Investigate alternative methods to clean raceways that allow more efficient use of water.	The Hatchery is currently evaluating a pump and pond broom system as an option to clean ponds.
	HA13	Replace electric control valve to steelhead raceways mixing chamber immediately.	Project complete June 2009
	HA14	Determine if a weir is needed to prevent fish from swimming up Riley Creek. Decommission existing weir, it's not needed	The weir has been shut off and will be removed by the Hatchery staff as time permits.
	HA15	Implement HAACp plan for hatchery. Investigate methods to prevent snails from accessing hatchery facility	The Hatchery has implemented a HACCP plan and provides support to the University of Idaho on studies related to the control of the NZ mud snail.
	HA16	The Team supports the current improvement of access and safety in the visitor's area so that it is ADA compliant	This is not a recommendation
	HA38a	Service should establish a flow target which triggers a reduction in the number, time, and/or size at release of rainbow trout produced if the Hagerman NFH's if water supply continues to decline.;	The hatchery has developed a water management/production contingency plan based on water supply volume
	SA16	Design easier and less hazardous weir cleaning mechanism for Sawtooth weir.	IDFG will work with LSRCP to rectify this hazard issue. Additional funding is required to fully resolve the issue.
	SA17	Implement long term maintenance plan to maintain the integrity of the intake structure and stabilize the river channel.	This recommendation has been or is being accomplished.
	SA18	Implement program to stabilize undercutting of the Sawtooth weir apron; maintain the integrity of the weir.	This recommendation has been or is being accomplished.

Facilities and Operations	SA20	Increase backup generator fuel storage capacity.	This recommendation has been determined to not be needed at this time.
	SA21	Provide backup (emergency) power to adult trap, spawning shed, and housing.	This recommendation is being considered through the LSRCP office.
	SA27	Ensure that water diverted for fish production is measured and reported correctly to Idaho Department of Water Resources and Water FWS division of Water Resources.	This recommendation is accomplished through NPDES permits. This information is available as needed.
Research Monitoring and Accountability	HA17a	Increase interactive communication of fish health issues among the Service, IDFG, the Idaho Aquaculture Industry, and the University of Idaho. Ensure that written records of all fish health exams are kept on station at Hagerman NFH	The Hatchery and the Idaho Fish Health Center have developed a fish health plan for the hatchery. In addition the Hatchery manager attends regular board meetings of the Idaho Aquaculture Association
	HA17b	To reduce disease transmission risks between facilities, the Memorandum of Understanding (MOU) between the University of Idaho's Hagerman Fish Culture Experiment Station (sited adjacent to Hagerman NFH) and the U.S. Fish & Wildlife Service should be reviewed by both parties to facilitate the 1999 agreements and to clarify the responsibilities of each party.	The Hatchery managers meet on an as needed basis. The Hatchery notifies the University if disease outbreak occurs in fish on station.
	HA18	Continue to improve coordination of monitoring activities among the Service, Idaho Department of Fish and Game, and appropriate tribes.	The IDFG and FWS staff will continue to improve coordination with M&E activities and IDFG will continue to participate in FWS Hatchery Evaluation Team (HET) process in an effort to facilitate coordination.
	HA19	The Service should continue to assess, in collaboration with the tribes and IDFG, post-release survival of transported fish in the Salmon River via PIT tags.	Representative PIT tagging to assess post-release survival will continue into the foreseeable future.

Research Monitoring and Accountability	HA20	The Service should work with IDFG and appropriate tribes to develop protocols (sampling, marking, etc.) for estimating and monitoring the abundance and productivity of natural populations of steelhead in the Salmon River basin.	Efforts to estimate abundance and productivity of natural populations of steelhead in the Salmon River Basin are underway. Funding for this effort is through several BPA projects.
	HA21	Idaho Department of Fish and Game should ensure that the CWT tagging strategy at Hagerman NFH accurately represents the entire population of progeny from all spawn groups for each brood year.	IDFG and staff from HNFH work cooperatively to develop marking plans in an effort to ensure fish marked with CWT and PITs represent the unmarked/tagged population.
	HA22b	The Service should continue to work with IDFG to implement PIT tag protocols initiated with brood year 2007 that will allow annual estimates of total adult returns to the Columbia and Snake rivers for fish reared at different hatcheries	Representative PIT tagging to assess post-release survival will continue into the foreseeable future.
	HA23	Work with LSRCP cooperators to develop a data management plan that incorporates tagging goals and objectives, data management, and annual reporting requirements of CWT data at program and regional levels.	Coded-wire tagging goals and objectives are described in the annual AOP document for this facility. Reporting of tagged juvenile releases and tag recoveries among returning adults are submitted to RMIS within the specified reporting periods.
	HA34	Ensure that marking program adequately represents all groups of fish being reared on the hatchery and released in the Salmon River.	Funding is required to investigate the utility of Parental Based Tagging; that technology may replace CWTs. The issue of CWT representation has been addressed.
	HA35	assess post release mortality of transported and released steelhead in the upper Salmon River	Post release mortality is assessed through the use of PIT tags. Survival from release to Lower Granite Dam is estimated with 95% CIs. While managers do not disagree that there may be potential issues with hauling smolts long distance prior to release, we have not seen any evidence to indicate that these fish survive at a significantly lower rate than fish released directly from rearing facilities or from significantly shorter transport times.

Research Monitoring and Accountability	HA36	Evaluate risks vs. benefits of outplanting SawA steelhead into Yankee Fork, Valley Creek, and Slate Creek. Discontinue releases if no benefits result from outplants.	Steelhead smolts are no longer released into Slate or Valley creeks. These releases have been consolidated into the Yankee Fork Salmon River and are evaluated by Shoshone-Bannock Tribal Fishery Evaluation Biologists (see Yankee Fork steelhead HGMP)
	MV22	Increase communication with other Magic Valley fish farm producers. Ensure written records of fish health exams and history are kept.	This recommendation has been and is being accomplished.
	MV23	Assess post release survival and fish health physiological response to transportation from hatchery to Salmon River release.	Managers agree that alternative rearing strategies should be explored. Alternative may require infra-structure changes.
	MV24	Develop protocols for evaluating impacts of out-of-basin hatchery steelhead outplants on native Salmon river steelhead.	Funding is required to investigate the utility of Parental Based Tagging that would provide the ability to monitor relative reproductive success of hatchery origin fish that spawn naturally. Managers have initiated phasing out the use of Dworshak B-run steelhead in the Salmon River and replacing it with a locally adapted B-run broodstock.
	MV25	Ensure the CWT g groups represent the entire populations of progeny from all spawn groups for each brood year.	Funding is required to investigate the utility of Parental Based Tagging; that technology may replace CWTs. The issue of CWT representation has been addressed.
	MV26a	Ensure marking crews are adequately staffed, trained, and equipped.	All marking and tagging is contracted through professional services with the Pacific States Marine Fisheries Commission
	MV26b	Add chiller to c control growth. Manage growth to provide steelhead at a consistent size to facilitate marking.	Managers agree that alternative rearing strategies should be explored. Alternative may require infra-structure changes.
	MV27a	Develop PIT tagging protocols to annually estimate adult return.	Representative PIT tagging occurs each year for this release group to enable estimation of adult returns to Lower Granite Dam.

Research Monitoring and Accountability	MV27b	Implement Pit tag program to monitor downstream migration, SAR, and in-season harvest.	PIT tagging as part of MV27b above allows for the estimation of juvenile survival and migration timing. Steelhead released as part of the East Fork Natural program are not intended to contribute to mark-selective fisheries.
	MV27c	Develop PIT tagging program that is consistent with program goals and objectives and is linked to regional goals and objectives, and improve marking technology.	see MV27a & b
	MV30	Work with Idaho to develop a data management plan that incorporates data management goals and objectives, data management, and r reporting requirements of CWT data. Incorporate reporting into cooperative agreements with co managers.	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.
	MV31	Work through back log of annual reports.	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.
	MV32	Properly disinfect the traps and other equipment prior to using them in other river systems. This should be addressed by the IDFG through a Hazard Analysis and Critical Control Points (HACCP) Plan.	Managers implement best management practices that are consistent with existing federal/state guidelines for screening and disinfection of equipment.
	MV33	Develop a more formal process (e.g., AOP) to discuss, evaluate, and document in-season issues as they arise.	Sufficient coordination occurs to address these issues.
	MV46	Evaluate the benefits and risks of outplanting SawA and/or PAHA into Yankee Fork, Valley Creek, and Slate Creek.	None of the steelhead reared at MVFH are released in any of these locations. See HA36.

Research Monitoring and Accountability	MV47	Mark or tag all A-run steelhead reared at Magic Valley FH and released in the Salmon River basin. This recommendation applies also to all hatchery-origin fish released in the Salmon River basin.	Releases into Valley and Slate creeks no longer occur. Offsite releases in the upper Salmon River have been consolidated into the Yankee Fork Salmon River. Approximately one half of the smolts released into the Yankee Fork Salmon River are released with adipose fins intact. This mark plan is consistent with the 2008-2017 US vs. OR Management Agreement. The Shoshone-Bannock Tribe monitors juvenile releases and adult returns to Yankee Fork Salmon River (See Yankee Fork Steelhead HGMP).
	MV48	Mark all hatchery produced steelhead released in the Salmon River	All hatchery A-run steelhead released into the mainstem Salmon River are adipose fin-clipped. Some releases in the Yankee Fork Salmon river are not marked as stipulated in the 2008-2017 US vs. OR Management Agreement.
	SA28	Monitor out-migrant survival. Investigate size/time of release, environmental factors, and fish health to explain low juvenile survival to Lower Granite.	Post release survival is estimated every year with PIT tags. M&E priorities are 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.
	SA29	Implement CWT across all rearing containers to ensure CWTs are representative of all fish in the group.	Funding is required to investigate the utility of Parental Based Tagging; that technology may replace CWTs. The issue of CWT representation has been addressed.
	SA30a	Work with LSRCP and co managers to develop PIT tagging protocols that allow estimating adult return to Snake and Salmon River basins. Determine numbers to mark that provide predetermined precision estimates of adult return in 'average' years.	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.

Research Monitoring and Accountability	SA30b	PIT tag adequate number of smolts to estimate downstream migration survival and smolt-to-adult return rates, and assist with in season harvest management.	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. Sufficient juveniles are PIT tagged each year to estimate juvenile and adult survival rates.
	SA30c	Work with states and tribes to develop a PIT tagging program consistent with program goals and objectives that is linked to regional goals and objectives, and coordinated through a PIT tag steering committee.	Currently being accomplished through annual coordination processes.
	SA32	Work with co-managers to develop a data management plan that incorporates tagging goals and objectives, data management, and reporting requirements of CWT data at the program and regional level. Incorporate data management plan into cooperative agreement	Coded-wire tagging goals and objectives are described in the annual AOP document. For this facility. Reporting of tagged juvenile releases and tag recoveries among returning adults are submitted to RMIS within the specified reporting periods.
	SA33	Reduce back log of annual reports. Ensure are contract reporting requirements are met according to established guidelines.	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.
	SA34	Implement hazard analysis and Critical Control Point (HACCP) plan addressing disinfection of sampling equipment (including rotary screw traps) prior to moving between drainages.	This recommendation is being accomplished and being developed by the hatchery and M&E staff.
	SA35	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.	Sufficient coordination occurs to address this issue.
Education and Outreach	HA24	Update visitor center displays	This project has been prioritized by the Hatchery Evaluation Team and will be accomplished as soon as funding becomes available.

Education and Outreach	MV36	Provide information regarding harvest and conservation benefits of the LSRCP program suitable for the public.	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. Managers also make in-season information about hatchery returns and harvests on publicly accessible websites.
	SA37	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. We are working with the LSRCP office to develop web accessible harvest reports. IDFG maintains summary harvest data on a department website