State of Washington
Department of Fish and Wildlife
Mailing Address: 600 Capitol Way N, Olympia WA 98501-1091, (360) 902-2200, TDD (360) 902-2207
Main Office Location: Natural Resources Building, 1111 Washington Street SE, Olympia WA

December 3, 2010

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

Dear Mr. Jones: Rob

Attached is the final Hatchery Genetic Management Plan (HGMPs) for the Washington Department of Fish and Wildlife's (WDFW) Touchet River summer steelhead endemic stock program, as required for compliance under the Endangered Species Act. We are submitting this HGMP as an application for Endangered Species Act (ESA) Section 10 permit.

At this time, no production and operational changes to this program have occurred, and WDFW, Lower Snake River Compensation Program, and the Confederated Tribes of the Umatilla Indian Reservation have agreed that this program will remain unchanged until the SE Washington Steelhead Management Plan can be completed in the next 1-2 years. Once complete, program changes that could occur will be captured in an updated HGMP submitted to NOAA Fisheries.

If you have questions or wish to discuss the HGMP, please don't hesitate to contact Mark Schuck at the Snake River Lab, Jon Lovrak, Lyons Ferry Complex Manager, or myself.

Sincerely,

Heather Bartlett

Heather Bartlett
Hatcheries Division Manager

Enclosures (1)

cc: Jon Lovrak
Glen Mendel
Mark Schuck
Joe Bumgarner
James Dixon
Jon Anderson
Scott Marshall, LSRCP
Joe Krakker, LSRCP
Brian Zimmerman, CTUIR

WDFW Touchet River Endemic Stock Summer Steelhead - Touchet River Release

HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	**Mid-Columbia Summer Steelhead –Touchet River Stock: Lyons Ferry Complex**
Species or Hatchery Stock:	**Touchet River Summer Steelhead** *Oncorhynchus mykiss*
Agency/Operator:	**Washington Department of Fish and Wildlife**
Watershed and Region:	**Touchet River / Walla Walla River / Mid-Columbia Basin, Washington State**
Date Submitted:	**April 20, 2002**
Date Last Updated:	**November 29, 2010**

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Hatchery: Lyons Ferry Complex.
Program: Touchet River Endemic Summer Steelhead Broodstock Program

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

Summer Steelhead *(O. Mykiss),* Touchet River (Mid-Columbia ESU, Threatened)
Summer Steelhead (*O. Mykiss*), Lyons Ferry Hatchery (LFH) Stock (not-listed)

Both stocks are currently produced at WDFW's Lyons Ferry Complex. The proposed plan may slowly phase out the LFH stock from the Touchet River. This will depend on the performance of the new Touchet River endemic steelhead stock.

1.3) Responsible organization and individuals

Hatchery Evaluations Staff Lead Contact

Name (and title):	**Joe Bumgarner**, Steelhead Evaluation Biologist
Agency or Tribe:	Washington Dept. of Fish and Wildlife
Address:	401 South Cottonwood, Dayton, WA 99328
Telephone:	(509)-382-4755, or 382-1004
Fax:	(509) 382-2427
Email:	bumgajdb@dfw.wa.gov

Hatchery Operations Staff Lead Contact

Name (and title):	**Jon Lovrak**, Lyons Ferry Complex Manager
Agency or Tribe:	Washington Dept. of Fish and Wildlife
Address:	PO Box 278, Starbuck, WA 99359
Telephone:	(509) 646-9201
Fax:	(509) 646-3400
Email:	lovrajgl@dfw.wa.gov

Fish Management Staff Lead Contact

Name (and title):	**Glen Mendel**, District Fish Biologist
Agency or Tribe:	Washington Dept. of Fish and Wildlife
Address:	529 W. Main, Dayton, WA 99328
Telephone:	(509)-382-1005, or 382-1010
Fax:	(509) 382-1267
Email:	mendegwm@dfw.wa.gov

Other agencies, tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program:

Confederated Tribes of the Umatilla Indian Reservation – co-manager
U. S. Fish and Wildlife Service – Lower Snake River Compensation Plan (LSRCP) –

Provides Program funding/oversight, provides coordination responsibility between all LSRCP cooperators.

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

The Lower Snake River Compensation Plan (LSRCP – US Fish and Wildlife Service) presently funds production of mitigation fish (LFH stock summer steelhead established as a result of hydroelectric projects in the Snake River) that are released in the Touchet and Walla Walla rivers. The LSRCP program is committed to funding actions that are responsive to ESA needs for listed Columbia River steelhead affected by LSRCP hatchery actions. While the Touchet and Walla Walla rivers empty into the Columbia River, and are not part of the Snake River, they were included as part of the mitigation responsibilities for LSRCP. Managers at the time believed that smolt survival for the LSRCP program might not be as high as proposed, and as some insurance, this off-site out-of-basin mitigation was put in place. To provide for this additional loss, and without exceeding the limits of the available habitat from Snake River tributaries, the management agencies at the time chose the Touchet and Walla Walla rivers as suitable outlets for the required mitigation, as they were geographically located near the Snake River. Currently, steelhead management for mitigation in the Walla Walla river basin is mandated to provide 900 returning adult hatchery steelhead (LFH stock) to the Walla Walla River, and 750 adult hatchery steelhead (LFH stock) to the Touchet River.

While both Operational and Evaluation costs are presently covered by LSRCP funding, additional funding will likely be required to fully develop the Touchet River endemic summer steelhead program.

1.5) Location(s) of hatchery and associated facilities.

Lyons Ferry Hatchery – RM 58 on the Snake River in Franklin County, Washington.

Dayton Adult Trap – RM 53.3 on the Touchet River (WRIA 32), City of Dayton, Columbia County, Washington.

Dayton Acclimation Pond (AP) – RM 53 on the Touchet River (WRIA 32), City of Dayton, Columbia County, Washington.

North Fork Touchet River – Baileysburg Bridge – Site of direct stream releases for endemic stock fish. Located about 2.5 miles above the adult trap in Dayton.

1.6) Type of program.

Integrated Harvest

1.7) Purpose (Goal) of program (based on priority).

1. **Mitigation:** Continue to provide mitigation as specified under the LSRCP program while meeting conservation and recovery criteria established for the Touchet River

population and Mid-Columbia River ESU. Provide harvest opportunities established under *US v Oregon* for tribal and recreational fisheries.

2. **Conservation:** Contribute to the population of naturally reproducing Touchet River summer steelhead that produce viable progeny, and which contribute to the conservation and recovery of the Touchet River population and Mid-Columbia River ESU.

1.8) Justification for the program.

The endemic population of summer steelhead in the Touchet River has remained relatively stable, though depressed, since 1984. Regardless, the summer steelhead population was listed as threatened under the ESA as part of the Mid-Columbia River ESU (March 25, 1999; FR 64 No. 57: 14517-14528). The LSRCP summer steelhead program in Washington has been operated since 1983 to provide mitigation for the construction of the four lower Snake River dams. The current hatchery program has used LFH stock since the late 1980s (Schuck et al 1998), with releases in both the Walla Walla and Touchet rivers as off-site, out-of-basin mitigation (see Section 1.4). The LFH stock was derived from mainly Wells Hatchery stock, with some partial influence from the Wallowa stock, and returns of both of those back to LFH. It does not represent individuals that came from the Touchet or Walla Walla River systems. The April 2, 1999, Biological Opinion issued by NMFS on the LSRCP-produced hatchery steelhead considered that the continued use of non-endemic steelhead stocks (such as the LFH stock) in the Mid-Columbia jeopardized the continued existence and chance for recovery of natural steelhead populations within the Columbia River.

Actions described within this HGMP represent the development and assessment of an endemic broodstock for Touchet River summer steelhead. Assessment is a crucial first activity in a series of actions that may eventually constitute a re-direction of LSRCP mitigation, by reducing and/or replacing releases of LFH stock steelhead in the Touchet River and other basins. This is considered necessary to align the LSRCP mitigation program with recovery requirements of the ESA. That, coupled with the desire of WDFW to recover depressed Mid-Columbia natural steelhead stocks, has prompted these proposed new hatchery actions.

Development of a hatchery stock based on endemic steelhead from the Touchet River for mitigation production may not increase natural productivity, but will serve several purposes. Primarily, the program as designed within this HGMP will continue to provide harvest mitigation under LSRCP while complying with NMFS's Reasonable and Prudent Actions as listed in their Biological Opinion. WDFW desires to maintain healthy, abundant populations of steelhead within the Columbia River, but also wants to provide abundant fishery opportunities as provided for under the LSRCP mitigation program.

As secondary benefits, this program should maintain or increase numbers of naturally reproducing Touchet River steelhead. This will be accomplished because returning adults will be allowed to spawn in prime rearing areas. This should help conserve and/or rebuild the existing natural population to a healthy status. WDFW currently believes that natural population to be at the replacement level. This program may then act as a safety-net

feature if further demographic threats appear in the Touchet River basin. This program may also assist in the long-term preservation of the stock that can support recovery while other limiting factors are addressed in the basin. The program will also minimize the potential for genetic introgression and depression that may occur with continued use of the existing LFH stock. Interbreeding between LFH stock steelhead and natural steelhead may be reducing productivity and fitness within the natural population. Lastly, this program may also reduce straying effects currently seen by use of the LFH stock in the Touchet River. LFH stock steelhead released into the Touchet have been shown to stray into other Columbia and Snake River basin rivers (Schuck et 1999). While this program will produce hatchery-reared fish, straying may be reduced because the new hatchery stock will be developed from the endemic population, which may stray to a lesser extent. However, WDFW realizes that straying of LFH stock from past Touchet River releases is likely be environmentally related (i.e. low river flows and high water temperature which restrict returning passage in the lower Walla Walla River), and regardless of the stock used, straying into other basins may still occur.

1.9) List of program "Performance Standards".

(From NMFS *Artificial Propagation Performance Standards and Indicators*, October 24, 2000 Draft)

3.1 Legal mandates
3.2 Harvest
3.3 Conservation of natural spawning populations
3.4 Life History Characteristics
3.5 Genetic Characteristics
3.6 Research Activities
3.7 Operation of Artificial Production Facilities

1.10) List of program "Performance Indicators", designated by "benefits" and "risks."

1.10.1) "Performance Indicators" addressing benefits.
1.10.1) "Performance Indicators" addressing benefits.

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. Utilization of more recent reviews on the standardized methods for evaluation of hatcheries and supplementation at a basin wide ESU scale is warranted.

In a report prepared for Northwest Power and Conservation Council, the Independent Scientific Review Panel (ISRP) and the Independent Scientific Advisory Board (ISAB) reviewed the nature of the demographic, genetic and ecological risks that could be associated with supplementation, and concluded that the current information available was

insufficient to provide an adequate assessment of the magnitude of these effects under alternative management scenarios (ISRP and ISAB 2005). The ISRP and ISAB recommended that an interagency working group be formed to produce a design(s) for an evaluation of hatchery supplementation applicable at a basin-wide scale. Following on this recommendation, the *Ad Hoc* Supplementation Workgroup (AHSWG) was created and produced a guiding document (Galbreath et al. 2008) that describes framework for integrated hatchery research, monitoring, and evaluation to be evaluated at a basin-wide ESU scale.

The AHSWG framework is structured around three categories of research monitoring and evaluation; 1) implementation and compliance monitoring, 2) hatchery effectiveness monitoring, and 3) uncertainty research. The hatchery effectiveness category addresses regional questions relative to both harvest augmentation and supplementation hatchery programs and defines a set of management objectives specific to supplementation projects. The framework utilizes a common set of standardized performance measures as established by the Collaborative System wide 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. This is needed to address management questions and critical uncertainties associated with the 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 developed by 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)
	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.

Category	Standards	Indicators
	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.
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 trend 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 outmigration 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 indistinguishable from natural-origin fish. 3.9.2. Life history characteristics of hatchery-origin adult fish are indistinguishable from natural-origin fish. 3.9.3. Juvenile emigration timing and survival differences between hatchery and natural-origin fish must be minimal.
	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 between the affected hatchery and natural populations.

Category	Standards	Indicators
4. OPERATION OF ARTIFICIAL PRODUCTION FACILITIES	4.1. Artificial production facilities are operated in compliance with all applicable fish health guidelines and facility operation standards and protocols such as those described by IHOT, PNFHPC, the Co-Managers of Washington Fish Health Policy, INAD, and MDFWP.	4.1.1. Annual reports indicating level of compliance with applicable standards and criteria. 4.1.2. Periodic audits indicating level of compliance with applicable standards and criteria.
	4.2. Effluent from artificial production facility will not detrimentally affect natural populations.	4.2.1. Discharge water quality compared to applicable water quality standards and guidelines, such as those described or required by NPDES, IHOT, PNFHPC, and Co-Managers of Washington Fish Health Policy tribal water quality plans, including those relating to temperature, nutrient loading, chemicals, etc.
	4.3. Water withdrawals and instream water diversion structures for artificial production facility operation will not prevent access to natural spawning areas, affect spawning behavior of natural populations, or impact juvenile rearing environment.	4.3.1. Water withdrawals compared to applicable passage criteria. 4.3.2. Water withdrawals compared to NMFS, USFWS, and WDFW juvenile screening criteria. 4.3.3. Number of adult fish aggregating and/or spawning immediately below water intake point. 4.3.4. Number of adult fish passing water intake point. 4.3.5. Proportion of diversion of total stream flow between intake and outfall.
	4.4. Releases do not introduce pathogens not already existing in the local populations, and do not significantly increase the levels of existing pathogens.	4.4.1. Certification of juvenile fish health immediately prior to release, including pathogens present and their virulence. 4.4.2. Juvenile densities during artificial rearing. 4.4.3. Samples of natural populations for disease occurrence before and after artificial production releases.
	4.5. Any distribution of carcasses or other products for nutrient enhancement is accomplished in compliance with appropriate disease control regulations and guidelines, including state, tribal, and federal carcass distribution guidelines.	4.5.1. Number and location(s) of carcasses or other products distributed for nutrient enrichment. 4.5.2. Statement of compliance with applicable regulations and guidelines.
	4.6. Adult broodstock collection operation does not significantly alter spatial and temporal distribution of any naturally produced population.	4.6.1. Spatial and temporal spawning distribution of natural population above and below weir/trap, currently and compared to historic distribution.
	4.7. Weir/trap operations do not result in significant stress, injury, or mortality in natural populations.	4.7.1. Mortality rates in trap. 4.7.2. Prespawning mortality rates of trapped fish in hatchery or after release.

Category	Standards	Indicators
	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.

Use the above information to determine whether the population has declined, remained stable, or has been recovered to sustainable levels. The ability to estimate hatchery and natural proportions will be determined by implementation plans, budgets, and assessment priorities.

1.10.2) "Performance Indicators" addressing risks.

The suite of performance measures developed by the CSMEP represents a crosswalk mechanism that is needed to quantitatively monitor and evaluate the standards and indicators listed in Table 1. The CSMEP measures have been adopted by the AHSWG (Galbreath et. al. 2008). The adoption of this regionally-applied means of assessment will facilitate coordinated analysis of findings from basin-wide M&E efforts and will provide the scientifically-based foundation to address the management questions and critical uncertainties associated with supplementation and ESA listed stock status/recovery.

Listed below are the suite of Performance Measures (modified from the management objectives listed in Beasley et al. (2008), and the assumptions that need to be tested for each standard.

Table 2. Standardized performance measures and definitions for status and trends and hatchery effectiveness monitoring and the associated performance indicator that it addresses. (Taken from Beasley et al. 2008).

Performance Measure		Definition	Related Indicator
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	2.3.2, 3.1.2, 3.2.1, 3.2.2, 3.2.4, 3.6.1, 3.7.1, 3.7.4, 5.3.1

Performance Measure		Definition	Related Indicator
	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.	3.2.1, 3.2.3, 3.2.4, 3.6.3, 3.7.3
	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.	3.2.1, 3.2.3, 3.2.4, 3.6.3, 3.7.3
	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.	3.2.3, 3.2.4, 3.6.3, 3.7.3, 4.6.1
	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.	3.2.1, 3.2.3, 3.2.4, 3.6.3, 3.7.3
	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.	2.2.1, 3.1.1, 3.4.1, 3.4.2, 3.4.3, 3.7.2, 3.7.4
	Ocean/Mainstem Harvest	Number of fish caught in ocean and mainstem (tribal, sport, or commercial) by hatchery and natural origin.	1.1.1, 1.1.2, 2.3.1, 2.4.2, 2.6.2, 3.3.2, 3.3.3
	Harvest Abundance in Tributary	Number of fish caught in ocean and mainstem (tribal, sport, or commercial) by hatchery and natural origin.	1.1.1, 1.1.2, 2.3.1, 2.4.2, 2.6.2, 3.3.2, 3.3.3
	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.	3.2.1, 3.5.1, 3.5.2
	Juvenile Emigrant Abundance	Gauss software is (Aptech Systems, Maple Valley, Washington) issued to estimate emigration estimates. Estimates are given for parr, pre-smolts, smolts and the entire migration year. Calculations are completed using a Modified Bailey Method and bootstrapping for 95% CIs. Gauss program developed by the University of Idaho (Steinhorst 2000).	3.2.1, 3.6.1, 3.7.4
	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: $Var(X \cdot Y) = E(X)^2 \cdot Var(Y) + E(Y)^2 \cdot Var(X) + Var(X) \cdot Var(Y)$	3.2.1, 3.6.1, 3.7.4
	Run Prediction	This will not be in the raw or summarized performance database.	2.3.1,

Performance Measure		Definition	Related Indicator
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 first mainstem dam, first mainstem dam to first mainstem dam, and first mainstem dam to tributary. *First mainstem dam to first mainstem dam* SAR 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 life stage 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 life stage 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: $Var\left(\frac{X}{Y}\right) = \left(\frac{EX}{EY}\right)^2 \cdot \left(\frac{Var(Y)}{(EY)^2}\right)$	3.2.1, 3.2.2, 3.7.4
	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.	3.2.1, 3.2.2, 3.7.4
	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 juvenile 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 .	3.2.1, 3.2.2, 3.7.4

Performance Measure		Definition	Related Indicator
	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].	3.2.3, 4.5.1
	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.	3.2.2, 3.6.2, 3.7.5, 3.9.3,
	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.	3.2.2, 3.6.2, 3.7.5, 3.9.3,
	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. screw traps) are used to calculate survival estimates.	3.2.2, 3.6.2, 3.7.5, 3.9.3,
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.	3.2.3, 3.2.4, 3.6.3, 3.7.3, 4.3.3, 4.6.1
	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.	3.4.1, 3.4.2, 3.4.3
	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	3.10, 4.4.3
Genetic	Genetic Diversity	Indices of genetic diversity – measured within a tributary) heterozygosity – allozymes, microsatellites), or among tributaries across population aggregates (e.g., FST).	3.2.5, 3.8.3, 3.9.1
	Reproductive Success (Nb/N)	Derived measure: determining hatchery: wild proportions, effective population size is modeled.	3.7.2
	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 populations and are gaining widespread use of with the development of highly polymorphic molecular markers.	3.2.1, 3.2.2, 3.2.4, 3.6.1, 3.7.1, 3.7.2 3.7.4, 5.3.1
	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.	3.2.5
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 screw trap 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.	3.8.1, 3.8.2, 3.9.2
	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.	3.8.1, 3.8.2, 3.9.2

Performance Measure		Definition	Related Indicator
	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 screw trap 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.	3.8.1, 3.8.2, 3.9.2
	Size-at-Return	Size distribution of spawners using fork length and mid-eye hypural length. Raw database measure only.	3.8.1, 3.9.2
	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 life stage-specific emigration period are generated (mean length by week then averaged by life stage). For entire juvenile abundance leaving a weighted mean (by life stage) is calculated. Size-at-emigration for hatchery production is generated from pre release sampling of juveniles at the hatchery.	3.8.2, 3.9.2
	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).	3.8.2, 3.9.2
	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.	3.8.1, 3.9.2
	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.	3.2.4, 3.6.4, 3.8.1, 3.9.2
	Spawn-timing	This will be a raw database measure only.	3.2.4, 3.6.4, 3.8.1, 3.9.2
	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 .	3.2.4, 3.6.4, 3.8.2, 3.9.2, 3.9.3, 4.8.1
	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 life stage. 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 life stage divided by tributary abundance estimate by life stage). Daily products are added and rounded to the nearest integer to determine weighted median, 0%, 50%, 90% and 100% detection dates.	3.2.4, 3.6.4, 3.8.2, 3.9.2, 3.9.3, 4.8.1
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 screw trap catch and while conducting snorkel surveys.	2.4.3, 3.3.3, 3.4.1
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).	2.5.2, 2.5.3, 2.6.1, 4.4.2

Performance Measure		Definition	Related Indicator
	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.).	2.5.1, 2.5.3
	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).	2.5.3,3.8.2, 3.9.2
	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.	3.8.1, 3.8.2, 3.9.2
	Spawn Timing	Spawn date of broodstock spawners by age, sex and origin, Also reported as cumulative timing and median dates.	3.2.4, 3.6.4, 3.8.1, 3.9.2
	Hatchery Broodstock Fraction	Percent of hatchery broodstock actually used to spawn the next generation of hatchery F1s. Does not include prespawning mortality.	2.2.1
	Hatchery Broodstock Prespawning Mortality	Percent of adults that die while retained in the hatchery, but before spawning.	4.7.2
	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.*	3.10, 4.4.3
	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	3.10, 4.4.3
	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.	3.9.2
	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"	3.1.1, 3.1.2
	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).	3.1.1, 3.1.2
	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).	2.5.4, 4.8.1
	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	4.2.1
	Water Temperature	Hatchery operational measure (Celsius) - measured continuously at the hatchery with thermographs and 3 times daily at acclimation facilities with hand-held devices.	

WDFW will use the above indicators to determine whether the program has, or is, causing unacceptable risks to the listed natural populations within the Tucannon River. The ability of the evaluation staff to estimate hatchery and natural proportions in the Tucannon River and other basins will be determined by implementation plans, budgets, and assessment priorities.

1.11) Expected size of program.

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

The current program level (production of 50,000 smolts on an annual basis) is to collect 36 natural-origin fish annually during the initial years as the program is being evaluated. Should the endemic program be successful, adult collections will be increased (described in the following sections). All fish retained for broodstock are hauled in a live tank to LFH for holding. All fish are spawned at LFH.

Should the endemic broodstock program be successful, WDFW is proposing the following for maximum production in the Touchet River: Collect 88 fish annually all of Touchet River endemic stock (may consist of either natural or hatchery-origin) to meet production goals in Table 2. Percent of hatchery or natural origin fish in the broodstock will be determined at a later date with agreement among the co-managers, NMFS and WDFW. If possible, a sliding scale approach for broodstock collection will be developed. Increasing the broodstock will take many years of development (see Section 1.14).

No LFH stock steelhead will be collected in the Touchet River for hatchery propagation in this program.

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

For at least the first ten years of smolt releases into the Touchet River as the program is being developed and evaluated, the goal will be to produce 50,000 smolts that will be released into the upper watershed. Because survival in the hatchery of the endemic population is variable, up to 75,000 smolts may be released annually. If greater than 75,000 smolts are to be released, then WDFW proposes that up to 25,000 fingerlings could be released into the upper Touchet River basin in the fall before normal migration. In addition to those numbers, 85,000 LFH stock smolts will continue to be released into the Touchet River from Dayton AP as part of the regular LSRCP mitigation production (Table 1).

After at least the first ten years, the endemic stock program will be evaluated and decisions will be made between the co-managers and NMFS as to future production goals. Assuming the endemic program is successful, HGMP and FMEP are in place to allow harvest, and the Touchet Endemic stock is expanded to full production, only then would steelhead of Touchet River endemic stock be marked for harvest and released into the Touchet River. (See Section 1.14 for decision timelines). LFH stock releases would be discontinued at that time.

If such a decision is reached, WDFW proposes the following smolt release numbers (Table 2). The primary hatchery production goal for the endemic program in the long-term would release a maximum of 150,000 smolts (all or a combination of acclimated and direct stream release combined) into the Touchet River at or above the city of Dayton. As mentioned above, greater survival may occur in the hatchery and more smolts could be produced than

currently anticipated. To ensure that all fish that were removed from the river for broodstock have the chance to contribute to the population, excess juvenile steelhead will be identified in October of the year prior to release and released into the Touchet River as fingerlings.

Table 3. Short-term summer steelhead production from LFC destined for the Touchet River. Represents initial releases of summer steelhead into the Touchet River as the endemic program is started (approximately 10 years)

Life Stage	Release Location (release method)	Stock	Production Goal	Maximum Annual Release Level
Eyed Eggs			0	0
Unfed Fry			0	0
Fry			0	0
Fingerling	Touchet River above RM 53 (direct)	Endemic	0	25,000
Yearling	Touchet River above RM 53 (direct)	Endemic	50,000	75,000
Yearling	Touchet River at RM 53 (acclimated)	LFH	85,000	85,000

Table 4. Proposed long -term summer steelhead production from Lyons Ferry Complex destined for the Touchet River. Represents releases of summer steelhead into the Touchet River after full production of the endemic program has been reached. (This assumes that LFH stock was determined to cause jeopardy by NMFS at any release level and that harvest will be allowed on endemic hatchery stock adults when they return)

Life Stage	Release Location (release method)	Stock	Production Goal	Maximum Annual Release Level
Eyed Eggs			0	0
Unfed Fry			0	0
Fry			0	0
Fingerling	Touchet River above RM 53 (direct)	Endemic	0	25,000
Yearling	Touchet River above RM 53 (direct)	Endemic	0	Up to 50,000
Yearling	Touchet River at RM 53 (acclimated)	Endemic	150,000	Up to 150,000

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

The Touchet River endemic hatchery broodstock is a new program and has no pre-existing performance data within the hatchery, and the current smolt-to-adult returns (SARs) are limited to just the past few years (Table 3). Smolt-to-adult survival appears to be improving. This is likely due to changes that have occurred during the hatchery rearing phase at Lyons Ferry (i.e. size at release). SARs to the LSRCP project area for LFH stock steelhead into the Touchet and Walla Walla rivers are provided in Table 4, and are considerably higher than what we've documented for the Touchet endemic stock program.

Table 5. Estimated smolt-to-adult survival rate of hatchery endemic summer steelhead smolts from the Touchet River based on adult PIT tag detections at Columbia and River dams.

Brood Year	Release Location	Number of PIT Tags	Bonneville Dam or above	Percent Survival	McNary Dam or above	Percent Survival
Touchet River						
2000	N.F. Touchet	507	0	0.00	0	0.00
2001	N.F. Touchet	800	0	0.00	0	0.00
2003	N.F. Touchet	9,920	44	0.44	35	0.35
2004	N.F. Touchet	9,993	26	0.26	22	0.22
2005	N.F. Touchet	8,987	38	0.42	31	0.34
2006	N.F. Touchet	8,495	83	0.98	65	0.76
2007	N.F. Touchet	7,919	107	1.35	85	1.07
			Average (all)	**0.49**		**0.39**
			Average ('03-'07)	**0.69**		**0.55**

Table 6. Estimated smolt-to-adult survival rate of LFH stock summer steelhead released into the Touchet or Walla Walla rivers based on CWT recoveries.

	Touchet River		Walla Walla River	
Brood Year	Total Return	LSRCP Area	Total Return	LSRCP Area
1987	2.17	1.51		
1988	1.45	1.12		
1989	1.02	0.53	0.67	0.34
1990	2.46	1.88		
1991	1.30	0.84		
1992	2.36	1.86	1.61	1.05
1993			3.54	2.72
1994	4.23	3.97	3.29	2.98
1995	1.40	1.22		
1996	0.91	0.87		
1997	2.32	2.24		
1998				
1999	3.54	3.11		
2000	1.04	0.84	0.89	0.82
2001	1.40	1.34	1.27	1.10
2002	1.43	1.16	1.71	1.54
2003	1.81	1.35	2.10	1.67
2004	1.26	1.17	0.96	0.82
2005[1]	2.25	1.79	1.80	1.73
Average	***1.90***	***1.58***	***1.78***	***1.48***

[1] 2005 returns are incomplete at this time, and mainly include only 1-salt returns.

Estimated natural escapement into the Touchet River based on redd counts in index area (Table 5, Figure 1) appears to be relatively stable. The recruit:spawner relationship derived from these index redd count data suggests that Touchet River summer steelhead is right at replacement level (Figure 2). Recent and historical performance of hatchery-reared steelhead in the Touchet River (LFH stock) has shown the program capable of returning adults far above the LSRCP return goals in nearly all years (Table 4). We originally expected survival of the endemic brood hatchery-reared fish to equal or exceed the SAR's documented for the LFH stock. However, SARs have fallen short of those expectations to date due to other factors. Early rearing survivals (i.e., egg-to-smolt) within the hatchery have been similar to other stocks reared at Lyons Ferry (Table 6), however, the Touchet River endemic stock has been difficult to rear. Fish in the hatchery exhibit a high fright response, which has greatly affected their rearing capabilities.

Should the stock switch occur in the future, some of the fish produced from the endemic brood will be allowed to spawn in the wild and contribute to filling available habitat and increasing the number of naturally produced fish spawning in the wild one generation later. However, the main focus will be on mitigation harvest. Spawner-to-smolt survival within the hatchery is expected to increase because of the broodstock and hatchery program, but spawner-to-spawner survival of subsequent natural populations will be dependent upon in-stream habitat conditions, ocean conditions, and improvements in basin productivity and migratory corridor survival.

Table 7. Standardized redd estimates and redds/kilometer within index reaches of the Touchet River in southeast Washington, 1987-2009.

Year	North Fork		South Fork		Wolf Fork		Robinson Fork		Total
	Redds	Redds/km	Redds	Redds/km	Redds	Redds/km	Redds	Redds/km	Redds
1987	99	5.2	147	5.5	100	5.7	34	3.8	380
1988	184	9.7	260	9.7	172	9.8	73	8.1	689
1989	65	3.4	71	2.7	42	2.4	20	2.3	198
1990	88	4.6	90	3.4	88	5.0	23	2.5	289
1991	66	3.5	61	2.3	72	4.1	14	1.6	213
1992	152	8	180	6.8	95	5.4	41	4.6	468
1993	65	3.4	107	4	36	2.1	20	2.2	228
1994	135	7.1	121	4.5	81	4.6	26	2.9	363
1995	88	4.6	116	4.3	83	4.8	17	1.9	304
1996	64	3.4	104	3.9	72	4.1	23	2.6	263
1997	56	2.9	39	1.4	65	3.7	16	1.8	176
1998	118	6.2	112	4.2	84	4.8	30	3.3	344
1999	82	4.3	131	4.9	49	2.8	19	2.1	281
2000	65	3.4	70	2.6	45	2.6	22	2.5	202
2001	55	2.9	84	3.1	57	3.3	17	1.9	213
2002	115	6	123	4.6	60	3.4	29	3.2	327
2003	160	8.4	125	4.7	100	5.7	37	4.1	422
2004	68	3.6	48	1.8	44	2.5	16	1.8	176
2005	116	6.1	94	3.5	91	5.2	28	3.1	329
2006	91	4.7	78	2.9	58	3.3	38	4.2	265
2007	160	8.4	133	5.0	97	5.5	32	3.5	422
2008	80	4.2	99	3.7	46	2.6	22	2.4	247
2009	88	4.6	102	3.8	56	3.2	25	2.8	271

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

The broodstock program started in February 2000, with 2000 brood year fish collected from the Dayton trap and spawned at LFH. The endemic program has now been in operation for nine years.

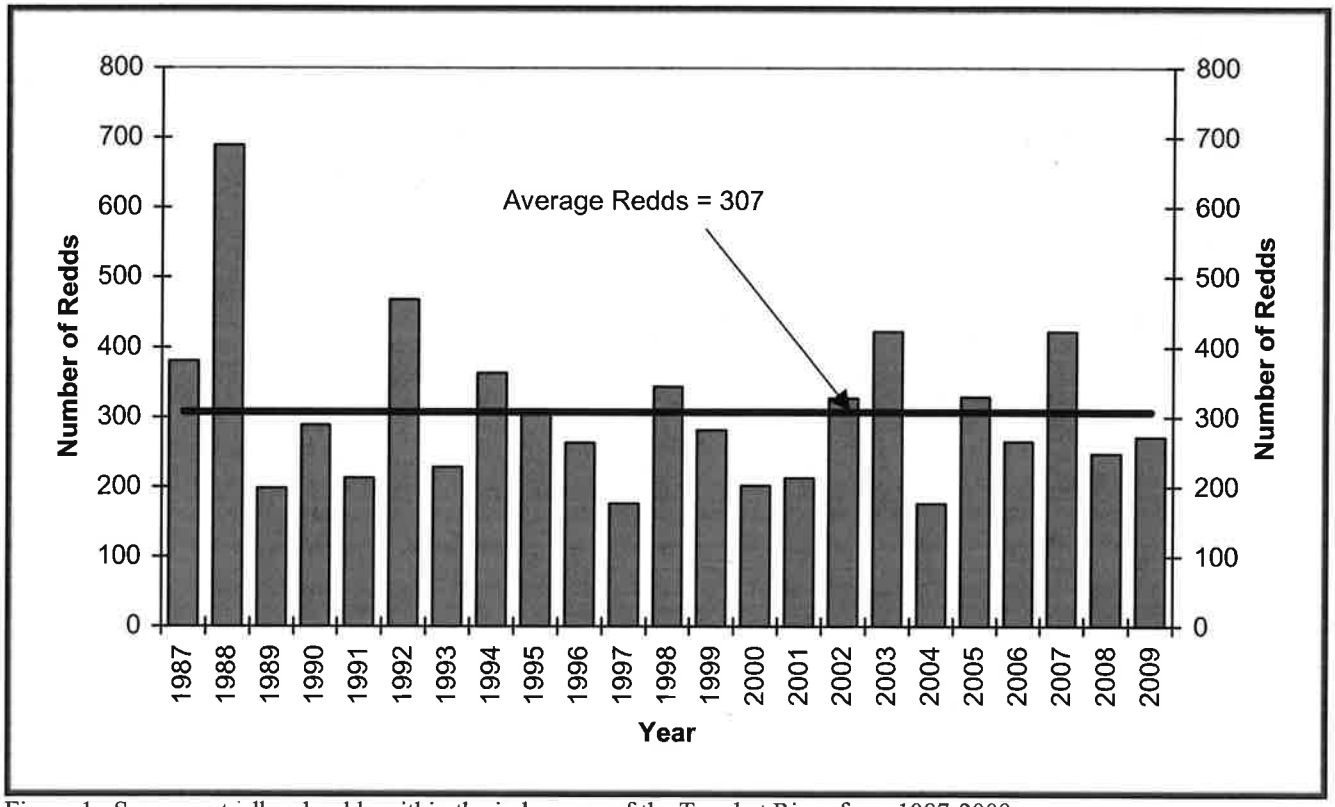


Figure 1. Summer steelhead redds within the index area of the Touchet River from 1987-2009.

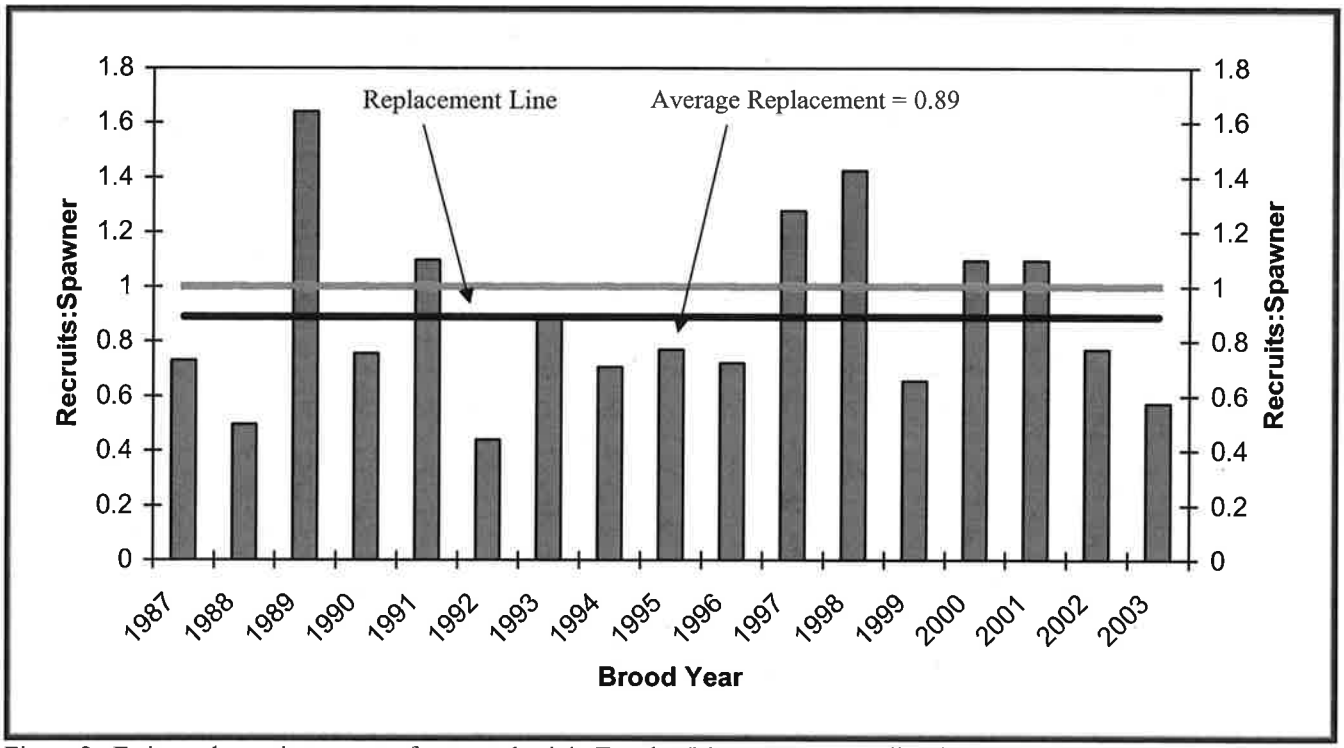


Figure 2. Estimated recruits:spawner for natural origin Touchet River summer steelhead, 1987-2003 brood years.

Table 8. Estimated in-hatchery survival of summer steelhead from the Touchet River, Tucannon River, Lyons Ferry and Wallowa stocks, 2000-2008 brood years.

	Touchet River Endemic			Tucannon River Endemic			Lyons Ferry			Wallowa		
Brood year	Egg-to-fry	Fry-to-smolt	Egg-to-smolt	Egg-to-fry	Fry-to-smolt	Egg-to-smolt	Egg-to-fry	Fry-to-smolt	Egg-to-smolt	Egg-to-fry	Fry-to-smolt	Egg-to-smolt
2000	99.4	84.3	83.7	100.0	83.4	83.4	94.9	61.8	65.2	97.0	85.1	82.5
2001	100.0	87.3	87.3	97.4	79.3	82.3	79.4	83.7	66.4	66.5	72.0	47.9
2002	47.7	99.1	47.3	77.2	84.5	65.2	95.3	60.4	63.0	81.8	90.5	74.1
2003	93.5	83.7	78.2	98.0	95.0	93.1	97.8	75.9	74.2	95.8	100.0	96.9
2004	92.8	100.0	93.4	98.3	100.0	100.0	98.7	87.0	85.8	98.7	100.0	100.0
2005	95.5	100.0	100.0	91.1	92.9	90.7	97.2	79.6	77.4	96.8	61.9	61.7
2006	83.0	96.5	80.1	91.2	95.1	93.5	98.3	84.2	83.4	98.9	91.0	93.5
2007	98.6	70.4	69.3	94.3	93.8	88.5	99.0	82.8	84.7	96.3	75.3	72.5
2008	99.7	86.9	86.7	99.7	None	None	97.7	87.9	85.6	99.4	79.8	78.0
Average	***90.0***	***89.8***	***80.7***	***94.1***	***90.5***	***87.1***	***95.4***	***78.1***	***76.2***	***92.4***	***85.0***	***78.6***

Note: See Bumgarner et al 2009 for further details regarding survival estimates presented in this table.

1.14) Expected duration of program.

The first priority of this hatchery endemic broodstock program as proposed by WDFW is for eventual continued mitigation under the LSCRP. Unknowns about the endemic program success have made us take a cautious approach in phasing out the current steelhead hatchery stock (LFH) used in the basin. Originally, WDFW and the co-managers proposed that the endemic program be operated for at least five years at a low production level (release of 50,000 smolts) where it could be evaluated against pre-determined expectations. Due to a variety of factors, the program evaluation was expanded to at least 10 years. Releases of LFH stock (~85,000 smolts/year) will continue in the basin, though the number of LFH smolts may be reduced again in the near future. Over the next few years, WDFW will evaluate both in- and out- of hatchery performance to determine if the endemic program should be increased/continued in the future to provide future harvest mitigation. Should the endemic stock produce adults as expected, WDFW proposes the following (Table 7) to show the potential change in hatchery production within the Touchet River. Further planning and discussions with the co-managers will have to occur before such a plan is implemented.

Table 9. Proposed broodstock collection and smolt production of the Touchet River summer steelhead endemic stock program.

Brood Year	Endemic Broodstock Collection	Endemic Smolts Released	LFH Stock Smolt Released
2000-2009	36 Adults	50,000	85,000
WDFW will examine all aspects of endemic stock program, and provide recommendations to co-managers and NMFS about continued production of the endemic stock and LFH stock within the Touchet River. Assuming Endemic stock is successful, the phase out of the LFH program could be as follows.			
2010-2014	50 Adults	80,000	50,000
Up to 25% of the fish collected in 2013 and 2014 for broodstock could be of hatchery-reared endemic stock origin.			
2015-future	88 Adults	150,000	None
Up to 35% of the fish collected for broodstock could be of endemic stock origin.			

1.15) Watersheds targeted by program.

As stated earlier, this HGMP targets natural summer steelhead and proposed new hatchery production within the Touchet River (WRIA 32) only, which is a subbasin of the Walla Walla River. Another HGMP that targets the Walla Walla River Basin (WRIA 32 – Walla Walla River in Washington, Touchet River) has been developed by the LSRCP program as part of their Section 7 Consultation with NOAA Fisheries.

1.16) Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed.

1.16.1) Brief Overview of Key Issues

The LSRCP summer steelhead compensation program in the Touchet River has been active since 1983. Non-endemic hatchery-origin summer steelhead stocks (mainly Wells and Wallowa stocks) were used to develop the current LFH stock to achieve the mitigation goals. The NOAA Fisheries Biological Opinion (1999) concluded that continued use of LFH stock hatchery steelhead would jeopardize the listed natural steelhead populations (including the Touchet River population). Beginning in 2000, unmarked (presumed wild-origin) adults were trapped to begin development of a new endemic broodstock in the Touchet River. If successful, the endemic broodstock would replace existing LFH stock summer steelhead in the Touchet River for harvest augmentation only; WDFW does not intend these fish for direct supplementation. The Umatilla Tribe, however, wishes it to be more a directed supplementation program.

Because of this difference in management intent, many questions/issues need to be resolved if the program should expand to full production. What is the appropriate number/percentage of hatchery endemic origin fish to be passed above the Dayton adult trap? What percentage of the broodstock should be naturally reared fish to prevent the stock from genetic divergence? What maximum percentage of the natural run should be collected for broodstock? An issue for WDFW management and NOAA Fisheries will be the use of the Touchet River endemic steelhead stock to support the mitigation fishery (i.e. direct harvest) should the LFH stock releases be eliminated in the future. If the endemic stock program is unsuccessful, an alternative plan for use of the LFH stock in the basin will have to be developed (See LFH stock – Walla Walla River HGMP). Options that could be considered include changing the number of LFH stock fish released and their release locations. Escapement of LFH stock fish to primary rearing areas may be contained to <5% by releasing LFH stock fish lower in the river and reducing their numbers from current production levels, or by removal of hatchery fish at the Dayton Dam, Nursery Bridge Dam, or other diversion facilities within the basin. Such actions, if successful, may make the need for an endemic stock program unnecessary.

The non-endemic LFH program has been very successful in returning adults to the Touchet and Walla Walla rivers, and into the Snake River, for the mitigation fishery as specified under the LSRCP. Microsatellite DNA analysis suggests that little genetic introgression has occurred between the LFH and natural stock of steelhead in the Touchet River

(Bumgarner et al, 2004). Evaluations on the endemic broodstock are being conducted to determine if they can achieve return rates to support the mitigation fishery. Currently, endemic stock fish have not been marked for harvest (because they are considered listed fish under the ESA), which has limited our ability to effectively recover returning adults and evaluate the program. Overall estimated adult returns to date have been poor (<0.5% SAR), and broodstock collection, spawn timing, and juvenile rearing issues continue to hamper the success of the program.

The broodstock founding population size is small (<15 females/brood year), creating genetic concerns for the future that need to be considered if the program is expanded. Once collected, the broodstock can spawn over a 2-3 month time period making spawning difficult, creating large variance in juvenile fish sizes during rearing, and not allowing adequate time for fish to grow to programmed release sizes. Small size at release is believed to be the primary factor in poor SARs for this stock, though other factors may also be affected the survivals documented. Facilities at LFH are currently inadequate to correctly deal with the large range of juvenile sizes, and limited raceways available to rear the individual stock conflicts with other programs at LFH (spring and fall Chinook salmon). Reductions in the LFH stock in recent years because of ESA concerns, and development of endemic broodstocks (Touchet and Tucannon) has and will create inefficient use of rearing space at LFH that will need to addresssed.

1.16.2) Potential Alternatives to the Current Program

Alternative 1: Maintain Status Quo – continue to evaluate endemic programs, and manage The LFH steelhead stock in the Touchet River as segregated hatchery program. Following the HSRG review, the HRT review, completion of the statewide steelhead management plan, and completion of on-going evaluations, WDFW will meet with the tribal co-managers to examine study results and develop consensus plan for the endemic program.

Preferred Alternative: At this point in time, Alternative 1 is preferred. The hatchery reviews have been completed and responded to, but the SE Washington Steelhead Management Plan needs to be completed. Further, currently WDFW and the Umatilla Tribe have not reached an agreement on the direction for this program (supplementation only or supplementation with harvest). Survivals to date have been poor compared to releases of Lyons Ferry stock fish in the Touchet River. WDFW would like to maintain the mitigation fishery in the Touchet River, but survivals of endemic stock fish back to the area do not suggest that the mitigation could be fulfilled. As such, it may require further refinement of the Lyons Ferry program in the Touchet River. Such details need to be developed in the Management Plan.

Alternative 2: Slight modification of the Status Quo – This could entail modifying release numbers or location as well as removal of returning Lyons Ferry stock steelhead at traps. Release of LFH stock in the Touchet River could be located further downstream by direct stream release method. Returns from this alternative would likely create a shift in the return distribution of adults to the lower reaches of the Touchet River. Production of Lyons Ferry stock steelhead could also be reduced and/or returning adults could be trapped

and removed to minimize spawning in the primary spawning areas of the Touchet River. These actions would reduce potential impacts to the remaining natural population from further introgression with the LFH stock, though their effects on the mitigation fishery could be detrimental.

Alternative 3: Eliminate the releases of LFH stock in the Touchet River to protect the listed population of concern. This action would protect the remaining natural population from introgression with the LFH stock. This program would be primarily for harvest augmentation, but escapement of hatchery endemic fish would potentially have fewer detrimental effects to the natural population.

Alternative 4: Eliminate the releases of LFH stock in the Touchet River, and change to a n integrated harvest program.

Alternative 5: Eliminate the releases of LFH stock in the Touchet River, and change to a supplementation program (similar to the intent of Tucannon River endemic program). This alternative has been recommended by the Umatilla Tribe.

Alternative 6: Increase the endemic stock program in the Touchet rivers to a specified production level, and maintain some level of production of the Lyons Ferry stock steelhead for harvest mitigation. This action would continue the popular and economically important sport fisheries within each of these rivers, yet would increase the number of endemic hatchery fish returning that may add in the recovery of the listed populations. Modifications to the existing LFH stock program could include decreased releases into the rivers and modified release locations or removal of LFH returns at a lower river weir to reduce the potential interaction of these fish with the ESA listed population. Genetic testing may have to occur every few years to measure the success of hatchery origin returns and natural origin returns.

Alternative 7: Recondition endemic kelts after spawning. Steelhead have the ability to spawn more than once given the proper survival conditions. Other projects in the Columbia River basin have successfully reconditioned post-spawned fish, and released them back into the natural stream for additional spawning. This management alternative provides an option to increase natural spawning in the river, and maintain genetic diversity. Funding to implement this work will continue to be investigated.

1.16.3) Potential Reforms and Investments

Reform/Investment 1: Increase LFH water supply and rearing space. Development of the current endemic programs (Touchet and Tucannon) have left the hatchery short on rearing space during some times of the year. Any expansion of these two programs or addition of another endemic stock (Walla Walla) would require substantial hatchery modifications. The existing water supply would have to be expanded; additional raceway or pond space would be necessary for more additional distinct groups of summer steelhead. The current lakes are being underutilized given their capacity, and rearing endemic stocks in the lakes could potentially increase their survival, however they are not designed for small groups of

fish or to be partitioned into multiple containers. Additionally, rearing of endemic steelhead in the hatchery has been problematic. These are endemic stocks with no hatchery history, and as such, have much more difficult to rear successfully in a hatchery environment. Improvements have been made over the course of the test program, but refinements of rearing techniques are still ongoing. Later and extended spawn timing have shortened the rearing cycle significantly, making it extremely labor intensive to meet release size goals. Automated and/or underwater feeding systems may be needed to improve stock rearing performance in the hatchery. Additionally, partial mimicry of the natural life cycle (age 2 smolt) may be necessary for at least a portion of each years brood. The cost to perform such modifications is currently estimated to be in the range of $$$$$ or $$$$$$.

Reform/Investment 2: Touchet River weir modifications. A new fish ladder and trap has been completed at the Dayton Dam, although under normal and even low flow conditions, steelhead can easily jump the barrier dam and bypass the fish ladder/trap. Upstream migration of steelhead is currently limited by installing temporary pickets/panels across the face of the dam. However, their effectiveness is reduced under higher flow conditions due to physical constraints of the pickets, and fish can escape upstream. Modification of the existing dam/weir on the Touchet River should improve trapping, allow for better adult enumeration, and improve removal of non-native hatchery steelhead. Estimated cost for completion could be $$$.

Reform/Investment 3: Implement kelt reconditioning for the endemic broodstock program. This investment would allow endemic fish used for broodstock to contribute to the genetic diversity in their natal streams, with a life history that was expressed more prevalent prior to habitat destruction and mainstem dams. Estimated annual cost for reconditioning is estimated at $$$/year mainly for feed and care of fish while at the hatchery. This action would require more space and water at Lyons Ferry.

Reform/Investment 4: Increased Hatchery Operational Costs: Both Lyons Ferry and Tucannon Hatcheries were designed and built for specific fish production programs. Continued production changes to meet recovery goals rather than the mitigation and fishery goals the facilities were built for represent an inefficient use of these sites, and will continue to increase operational costs. Permitting, domestic and production water system monitoring, safety, and other requirements are increasing in complexity, number and cost. Increases in the cost of fuel, power, fish food, labor, steel and other expenses, coupled with the associated indirect, will continue to have a significant fiscal impact. Finally, both facilities are aging, and maintenance costs are increasing as pumps, motors, buildings, operational and other systems wear out and require replacement. Use of additional steelhead stocks will increase staff, water and power costs, as well as transportation costs. We expect these increased costs to be approximately $$$ per year.

Note: The Dayton AP may not support the efficient growth needed in the Touchet River endemic stock during the normal acclimation period (Feb-April). Cold spring time water temperatures from the river will not support the growth rates needed to achieve size at release goals. Fish reared at LFH would need to "pushed" prior to transfer to Dayton AP.

This may create "domestication", and increase the rates of precocity. Increasing the program size will require more rearing space with the increase in densities at LFH. The lakes at LFH are an option IF the program is above the minimum threshold for rearing (~125,000). Anything lower would be very difficult to manage growth.

Further, in addition to the above challenges, the Touchet Endemic stock program has been difficult to rear in the hatchery, with many of the fish not obtaining size at release goals within the first year. WDFW is currently testing a small part of the population under a two-year rearing cycle. This rearing strategy may become more critical if the broodstock has to be collected over the entire run timing. Currently, the broodstock is collected from the early part of the run to allow the hatchery more time for rearing fish in a one year time frame. A two-year program would require additional raceways at LFH for rearing two brood years of steelhead simultaneously.

Reform/Investment 5: Monitoring and evaluation of endemic stock and non-native stock summer steelhead programs in SE Washington. Prior to the initiation of the endemic stock programs, natural-origin summer steelhead monitoring in SE Washington was limited to spawning ground surveys to estimate adult returns and distribution, juvenile abundance estimates through electrofishing or snorkeling, and smolt trapping (Tucannon River). Endemic stock program monitoring to date has been focused on broodstock collection, hatchery rearing performance, adult returns and genetic stock structure in relation to the LFH stock. Hatchery-origin summer steelhead monitoring has been limited to creel surveys to recover coded-wire tags, spawning ground and juvenile surveys (to look for impacts that hatchery fish might have natural origin populations), and estimating the percentage of strays at adult traps. If the programs are changed to eliminate LFH stock releases into some or all river systems, a more complete monitoring and evaluation program should be developed to track the success/failure of each program in meeting recovery and mitigation goals, and impacts (positive or negative) to the natural populations remaining in the stream. Monitoring and evaluation may include more traps to monitor adult returns and straying, more PIT tagging and PIT tag arrays, smolt traps to monitor natural production, and genetic pedigree studies to determine impacts to the natural populations. Monitoring and evaluation will be a long-term investment and may require many years of dedicated funding ($$$/annually).

For reference

$	<$50,000
$$	$50,000-<$100,000
$$$	$100,000-<$500,000
$$$$	$500,000-<$1,000,000
$$$$$	$1,000,000-<$5,000,000
$$$$$$	Over $5,000,000

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

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

For the Lyons Ferry LSRCP program, WDFW currently has Tucannon River Spring Chinook HGMP (includes natural produced fall chinook salmon from the Tucannon River – Smolt Trapping operations); USFWS Section 7 Consultation with NMFS for LSRCP actions and the NMFS Biological Opinion; HGMP's (Summer Steelhead) for LFH Stock in the Walla Walla/Touchet, Tucannon, and Snake River releases, and Wallowa Stock releases in the Grande Ronde River; Lyons Ferry Fall Chinook HGMP, and a statewide Section 6 Consultation with USFWS (Bull Trout).

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

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

WDFW has estimated natural and hatchery-origin summer steelhead escapement into the index areas of the Touchet River since 1987 (see Table 8). There is large yearly variation in escapement, but on average about 330 natural spawners/year are believed to spawn in the upper basin. The average percent of LFH stock and hatchery endemic fish into the indexed areas has been estimated at about 7% and 20%, respectively, in more recent years.

Adult trapping data from the Touchet adult trap has shown the population to be made up of 3, 4, and 5-year old individuals (primarily 2-year freshwater age and one or two year ocean age; Table 9). Touchet steelhead are typical of "A" run summer steelhead with more fish returning as 1-salt age (60%) than as 2-salt age (40%). One-salt age fish average 59.8 cm in length while two-salt age fish average 70.5 cm with individuals as large as 86 cm. Sex ratio varies between years (56%-79%), but has generally been heavily skewed to females (67.5%) on average. About 5% of each years annual return are repeat spawners.

Fish enter the Touchet River as early as May and as late as the following May. Redds have been observed near RM 45, with juveniles documented at RM 40 (in Waitsburg, Mendel et al 1999) upstream, including numerous smaller forks and tributaries (North Fork, South Fork, Wolf Fork, Robinson Fork, Coppei Cr., Patit Cr., etc.). Spawning is believed to begin as early as late February and continues through May. While hatchery (LFH and endemic) and natural fish enter and spawn in the river at the same time, WDFW believes that spawning locations of the LFH stock steelhead are spatially separated, mainly due to the location of the Dayton AP. The number of hatchery fish (LFH stock) captured in the adult trap has varied over the years, but averaged about 10% each year. However, in more recent years with returns of endemic stock fish getting better, hatchery origin fish (LFH and endemic stock combined) at the adult trap has been as high as 29%.

Juvenile summer steelhead rear successfully in the Touchet above RM 40, and are widely spread throughout the upper mainstem, each of the major forks, and smaller tributaries. Rearing success appears to be dependent upon habitat and water quality, which is poor below RM 40 and only moderate between RM 40-53 (Mendel et al 1999). Above RM 53, rearing conditions are generally good for steelhead. Juveniles will typically spend from one to three (primarily two) years in the Touchet River before migrating as smolts, though a few age four individuals have been identified from adult scale samples. Age of smoltification is likely determined by both genetic and environmental factors (growth and

temperature). The Touchet River is productive and yearling smolts (Age 1; ~7%) are likely being produced from the lower reaches where summer water temperatures allow for

Table 10. Estimated number of redds, redds/km, total fish by origin, and percent hatchery fish on the spawning grounds in the index area of the Touchet River, 1987-2009.

Year	Redds	Redds/km	Total Fish	Natural	Hatchery	Endemic	% Natural Stock	% LFH Stock	% Endemic Stock
1987	380	5.1	469	412	57	0	87.8	12.2	0.0
1988	689	9.3	847	747	100	0	88.2	11.8	0.0
1989	198	2.7	244	215	29	0	88.1	11.9	0.0
1990	289	3.9	365	314	42	0	88.2	11.8	0.0
1991	213	2.9	263	231	32	0	87.8	12.2	0.0
1992	468	6.2	577	507	70	0	87.9	12.1	0.0
1993	228	2.9	281	247	34	0	87.9	12.1	0.0
1994	363	4.8	447	428	19	0	95.7	4.3	0.0
1995	304	3.9	375	300	75	0	80.0	20.0	0.0
1996	263	3.5	324	286	38	0	88.3	11.7	0.0
1997	176	2.5	217	191	26	0	88.0	12.0	0.0
1998	344	4.6	424	374	50	0	88.2	11.8	0.0
1999	281	3.5	356	309	47	0	86.8	13.2	0.0
2000	202	2.8	242	223	19	0	92.1	7.9	0.0
2001	213	2.8	259	251	8	0	96.9	3.1	0.0
2002	327	4.3	437	411	26	0	94.1	5.9	0.0
2003	422	5.7	456	427	26	3	93.6	5.7	0.7
2004	176	2.4	240	186	21	33	77.5	8.8	13.8
2005	329	4.5	470	312	115	43	66.4	24.5	9.1
2006	265	3.8	333	263	6	64	79.0	1.8	19.2
2007	422	5.6	475	332	38	105	69.9	8.0	22.1
2008	247	3.2	292	221	18	53	75.7	6.2	18.2
2009	271	3.6	350	210	10	129	60.0	2.9	36.9
Mean 2004-2009							***71.4***	***8.7***	***19.9***
Mean 1987-2009							***84.7***	***10.1***	***5.2***

accelerated growth. Smolts leave the upper Touchet River primarily between early October-December, and again in April to late May. Smolt size of natural steelhead is generally unknown. The limited smolt trapping information available indicates the average migrant size is about 130 mm for the fall migrants, and about 150 mm for the spring migrants. This size is considerable smaller that what has been documented for summer steelhead on the Tucannon River, but the Touchet River smolt trap is higher in the basin. Hatchery smolts from the LFH stock have averaged between 195 – 215 mm at release. All hatchery LFH stock smolts have been released from Dayton AP (RM 53) since1987. All hatchery endemic stock smolts have been released directly to the North Fork Touchet River at the Baileysburg Bridge (RM 55).

Table 11. Summary of fresh and salt-water age composition of natural origin adults from the Touchet River, 1994-1995 and 1999-2010 brood years.

BY	Age 1.1		Age 1.2		Age 2.1		Age 2.2		Age 3.1		Age 3.2		Age 4.1		Age 4.2		% Repeat spawners
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	
1994	0	0.0	0	0.0	6	28.6	8	38.1	3	14.3	3	14.3	0	0.0	0	0.0	4.8
1995	0	0.0	0	0.0	0	0.0	6	85.7	0	0.0	0	0.0	0	0.0	1	14.3	0.0
1999	0	0.0	1	3.2	18	58.1	9	29.0	2	6.5	0	0.0	0	0.0	0	0.0	3.2
2000	1	3.2	1	3.2	17	54.8	8	25.8	3	9.7	1	3.2	0	0.0	0	0.0	0.0
2001	1	0.6	14	8.0	84	48.3	40	23.0	15	8.6	9	5.2	1	0.6	0	0.0	5.7
2002	6	4.8	3	2.4	84	67.7	20	16.1	6	4.8	3	2.4	0	0.0	0	0.0	1.6
2003	0	0.0	8	6.7	20	16.7	73	60.8	2	1.7	10	8.3	0	0.0	0	0.0	5.8
2004	0	0.0	1	0.8	47	39.2	18	15.0	18	15.0	2	1.7	1	0.8	0	0.0	8.1
2005	0	0.0	0	0.0	37	44.0	21	25.0	15	17.9	8	9.5	0	0.0	0	0.0	3.6
2006	2	1.3	7	4.5	85	54.8	38	24.5	7	4.5	11	7.1	0	0.0	0	0.0	3.2
2007	2	1.4	11	7.9	46	32.9	54	38.6	7	5.0	14	10.0	1	0.7	0	0.0	2.8
2008	2	1.7	6	5.2	47	40.5	38	32.8	7	6.0	7	6.0	0	0.0	0	0.0	7.7
2009	3	2.1	0	0.0	81	56.3	21	14.6	19	13.2	8	5.6	0	0.0	0	0.0	8.3
2010	15	4.1	14	3.8	230	62.8	74	20.2	23	6.3	4	1.1	0	0.0	0	0.0	1.9
Totals	**32**	**1.4**	**66**	**3.3**	**802**	**43.9**	**428**	**32.3**	**127**	**8.4**	**80**	**5.3**	**3**	**0.2**	**1**	**1.0**	**5.1**

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

Touchet River natural-origin steelhead is part of the listed Mid-Columbia River ESU and will be used to establish the new broodstock for an Integrated Harvest Program. As such, Touchet River natural steelhead will be directly affected by broodstock collection, which will very slightly decrease natural production in the basin for a few years until spawning adults from the program return.

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

The proposed program may incidentally affect Touchet River bull trout. Juvenile hatchery steelhead (either smolts or fingerlings) may compete for food and space with naturally rearing bull trout as some degree of extended rearing by steelhead is expected, but little overlap exists between the two species. Bull trout will also be captured in the adult trap. All bull trout captured will be sampled and immediately released after sampling. Trapping/sampling/handling of bull trout has been authorized by USFWS under a Section 6 Cooperative Agreement with WDFW. As a positive benefit to bull trout, any fingerlings that may be released into the system from the hatchery program, or additional natural production of juvenile steelhead in the Touchet River from the hatchery program, may serve as prey for bull trout. Between 1999 and 2008, we've captured a total of 488 bull trout in the Touchet Adult Trap. Of that total, seven (1.4%) mortalities have occurred that were directly related to the trapping activities.

2.2.2) Status of 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.

Summer Steelhead – Natural origin summer steelhead in the Touchet and Walla Walla rivers are listed as "threatened" under the ESA as part of the Mid-Columbia River ESU. Touchet and Walla Walla rivers summer steelhead were classified as depressed because of chronically low escapement by WDFW (SASSI 1992). The populations are likely at a "critical" population threshold because it has been chronically depressed. For the Touchet and Walla Walla rivers, we are not completely certain of the replacement status of both populations, but believe them to be at, or just below replacement (See Figure 2 for the estimated recruit/spawner Relationship of Touchet River summer steelhead). As such, stochastic events pose significant genetic risk to the population because of low absolute population numbers. An interim escapement goal of 600 natural spawners in the Touchet River, and 950 natural-origin spawner in the Walla Walla River was previously established (1992 SASSI). Escapement documented for indexed areas of the Touchet River have been provided in Table 8. Average natural escapement has been about 330 spawners/year, and is based on indexed redd surveys. Natural origin spawners into other areas of the Touchet River basin that are not routinely surveyed may equate to another 150 fish (WDFW – Glen Mendel pers comm.). Therefore, the Touchet River is below the management goal. Present escapement levels into the Walla Walla River are unknown due to lack of documentation.

The Touchet River summer steelhead population has been identified as an intermediate population in the Umatilla/Walla Walla Major Population Group (MPG). It was identified as a higher risk population due to the lack of data available at time of determination. Since that time, WDFW has provided updated data on population status, productivity, and the percent hatchery influence as found through this HGMP document. Limiting factors to the MPG were related to passage (upstream and downstream through the hydrosystem), habitat (temperature, sediment, tributary passage, degraded channel structure), hatchery (non-endemic origin), and predation/competition/disease factors.

Key actions proposed in the plan call for protecting and improving the freshwater habitiat, improve hatchery management to reduce non-DPS origin fish on the spawning grounds, and improve mainstem survival. It is unknown at this time what specific actions will be taken to reduce hatchery effects with the Touchet River basin, but some form of hatchery change/reform will occur in the next few years.

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

The estimated recruits/spawner are provided in Figure 2. (WDFW – Snake River Lab, Data Files).

- Provide the most recent 12 year (e.g. 1988-1999) annual spawning abundance estimates, or any other abundance information. Indicate the source of these data.

Estimated natural and hatchery-origin (LFH and endemic hatchery stocks) spawning summer steelhead in indexed areas of the Touchet River upstream of Dayton from 1987-2009 are presented in Table 8. (WDFW – Snake River Lab, Data Files).

- Provide the most recent 12 year (e.g. 1988-2000) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.

See Table 8 above.

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

Broodstock Trapping: Listed summer steelhead adults (Touchet River origin) will be trapped and collected for broodstock from January through May, which constitutes a direct take of listed fish (Take Table A). Adults will also be trapped, handled, and passed upstream during trap operations which may lead to injury and/or mortality to listed fish. The adult trap is located on federal property, but within the City of Dayton, Washington. Human disturbance or poaching of summer steelhead has not been experienced in any years of trapping. The trap facility does have security fencing to protect listed fish.

Bull trout are indigenous to Touchet River, and indirect "take" of bull trout are anticipated through the broodstock collection program. Any bull trout encountered at the adult trap will be sampled (i.e., length, DNA, scales, PIT tagged) and then passed immediately upstream, with minimal delay. Trapping and sampling of bull trout has been authorized by USFWS in accordance with a Section 6 Cooperative Agreement for the Endangered and Threatened Fish and Wildlife Program – Washington.

Spawning, Rearing and Releases: Spawning of the adults, egg incubation, and rearing/release of summer steelhead for 14 months from March through the following April has a potential for lethal take of these listed summer steelhead. Mortality can occur in association with fish culture activities and conditions which affect fish health and development, from handling procedures, fertilization procedures, water temperature, water quality, water flow, feeding success, and transport. Further, the release of endemic origin hatchery-reared Touchet River summer steelhead may incidentally affect (take) other listed salmonids in the Columbia River by displacement or competition.

Note: The LFH stock steelhead are currently released below primary rearing and spawning areas of natural summer steelhead. Should full production be reached as

proposed in this program, it is expected that most of the endemic brood progeny will be released in the same location (Dayton AP) as the current LFH stock releases.

Monitoring and Evaluation: Contact with listed summer steelhead during spawner escapement surveys (March through May), smolt trapping, and PIT tagging programs may potentially take listed summer steelhead. Each of these activities is described in more detail below.

Spawning Ground Surveys: "Take" associated with spawning ground surveys (Take Table B) will occur in the form of "observe/harass" and from occasional carcass recovery of kelts. Spawning surveys for listed steelhead are conducted from March through May, and generally conducted once every two weeks, with the intent to estimate spawning escapement into the Touchet River just above Dayton (does not include all tributaries of the Touchet River). Index sections, about 2-4 miles in length, are located in each of the major river forks (South, North, Robinson, and Wolf), and are surveyed multiple times throughout the season to document redds and how quickly redds fade from sight of the surveyors. During each survey, surveyors generally walk down the bank and not in the water when possible. Surveyors look for redds, record and mark their location, and look for live and dead fish. At the end of the season, more extensive areas of the river are walked (generally 50-70%). The "final survey" redd count and redd visibility/fading rates are then used to estimate spawning escapement to the system. Properly conducted surveys are not expected to result in any direct mortality to spawning steelhead.

PIT Tagging: "Take" of listed natural and hatchery-origin steelhead will occur during PIT tag studies (Take Table B). Tagging will occur at the hatchery prior to smolt release, and/or at the Touchet River Smolt trap (described in the next section). Tagging of listed hatchery-reared fish with PIT tags will provide information on downstream migration performance (relative survival, migration speed, and timing), and is also currently being used to estimate smolt-to-adult survival rates from the various release points in the Touchet River (Dayton AP, direct stream releases upstream). Tagging procedures follow established protocols used throughout the Columbia and Snake River basins by WDFW and other agencies when PIT tags are utilized. Mortality of PIT tagged fish is expected to be 1% or less at the hatchery prior to release.

Smolt Trapping: Smolt trapping on the Touchet River began in the fall of 2007. "Take" of outmigrating listed steelhead (natural and hatchery-origin) will occur at WDFW's smolt trap (Take Table B) located on the mainstem Touchet River. The trap has been operated each year from October - June to capture natural and hatchery-origin steelhead to enable WDFW staff to estimate natural smolt production from the upper basin, and performance of hatchery releases (e.g. may provide an estimate of residualism from hatchery releases). All captured natural origin fish will receive a PIT tag, with a portion transported back upstream about one to two miles and released to calculate trap efficiency. At certain times

of year the trap may be checked only once a day. Delayed migration will result for fish captured in the trap, and delayed mortality as a result of injury may also result. Mortality of natural steelhead is expected to remain below 0.5% (based on smolt trapping in the Tucannon River since 1997-present).

- 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.

Operation of the adult trap during early spring to collect endemic broodstock will also indirectly take listed bull trout. Current trap operations may prevent or delay upstream migration of a small number of bull trout that approach the weir/fish ladder. However, the current weir/trap is estimated to be only 25-50% efficient, depending on stream flows. Trapping for bull trout has been authorized by USFWS through a Section 6 Cooperative Agreement. Mortalities from the trap operation to bull trout have been low (1.4%).

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

WDFW has operated the current adult trap site (RM 53.3) during the springs of 1993, 1994, 1995, 1999-2009 (Table 10). The previous trap facility (water diversion for the Dayton AP; 1993-2007) was not designed to trap adult fish, and therefore trapping has only provided a sub-sample of the run each year. The trap was heavily damaged following the 1996 flood on the Touchet River, and attempts to operate it again were not made until 1999 when it was apparent that an endemic broodstock would need to be developed for the future. Following the trapping in 1999, it appeared the existing trap could be used to start an endemic broodstock. In 2001, an additional trap was added within the intake structure to collect more fish. From 1993-2007, 25 mortalities (1.7%) occurred from trapping activities. During 2007/2008, the adult fishway and fish trap were constructed at the original site. The trap configuration is better compared to previous years, and there have been no mortalities of natural origin adult steelhead in two years.

Mortality on the fish collected for broodstock has varied considerably (Table 11). Treatments to control fungus on the broodstock were not aggressively used during the first few years of the program. However, with high mortality experienced, more aggressive treatments were initiated and continue to be used. Pre-spawn mortality has decreased since the first few years of the program.

-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).

See "Take" Tables A and B at back of document.

Table 12. Number of natural and hatchery-origin adult steelhead captured at the Touchet River adult trap (RM 53.3) from 1993-1995, 1999-2009, and the percent natural mortalities from trapping operations.

Year	Total Steelhead	Natural	LFH Stock	Endemic Stock	Percent Hatchery SH	Natural Mortalities	% Natural Mortalities
1993	61	53	8	0	13.1%	4	7.5
1994	45	43	2	0	4.4%	0	0.0
1995	10	8	2	0	20.0%	0	0.0
1996	---	---	---	---	---	---	---
1997	---	---	---	---	---	---	---
1998	---	---	---	---	---	---	---
1999	49	42	7	0	14.3%	0	0.0
2000	34	31	3	0	8.8%	1	3.2
2001	217	181	36	0	16.6%	4	2.2
2002	193	174	19	0	9.8%	3	1.7
2003	131	120	10	1	8.4%	1	0.8
2004	145	101	28	16	30.3%	3	2.9
2005	143	86	46	11	39.9%	6	6.9
2006	211	161	15	35	23.7%	2	1.2
2007	216	145	27	44	32.9%	1	0.7
2008	165	119	19	27	27.9%	0	0.0
2009	248	147	25	76	40.7%	0	0.0

Table 13. Number of Touchet River endemic broodstock collected and mortalities experienced from 2000-2009. (Note: in some years we live spawned males at the adult trap on spawning days, these have been counted in the table as being collected for broodstock).

Year	Females Collected	Males Collected	Female Pre-Spawning Mortality	Male Pre-Spawning Mortality	Percent Pre-Spawning Mortality
2000	13	7	1	0	5.0
2001	20	15	6	4	28.5
2002	17	20	2	3	13.5
2003	18	18	1	1	5.6
2004	16	14	1	1	6.7
2005	21	18	1	0	2.6
2006	20	19	1	0	2.6
2007	16	18	0	1	2.9
2008	14	14	0	0	0.0
2009	17	15	0	1	3.1

- 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.

The adult trap is not 100% efficient at trapping steelhead. The current diversion design allows fish to pass over the structure during high spring flows. In cases where WDFW personnel are unable to check the trap daily, the trap area can be closed for entry, or opened for unrestricted passage through the ladder.

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

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

Lyons Ferry Complex is part of the LSRCP Program. The current program's steelhead actions were stated as causing jeopardy to the listed natural population of summer steelhead under the NMFS Biological Opinion, and actions proposed under this HGMP are consistent with the Reasonable and Prudent Actions suggested by NMFS. Implementation of this HGMP will result in the development of a new endemic stock of steelhead for release into the Touchet River. Depending on success of this stock and decisions to be made in the future the program may eventually drastically reduce, or eliminate, the current releases of LFH stock steelhead in the Touchet River. If that occurs, eventually all releases of hatchery-origin summer steelhead into the Touchet River will be derived from the endemic broodstock proposed within this HGMP.

3.1a) FCRPS BiOp Supplemental Comprehensive Analysis (SCA)

The FCRPS BiOp Hatchery Strategy 1, Action 40 call for the "Reform FCRPS Hatchery Operations to Reduce Genetic and Ecological Effects on ESA Listed Salmon and Steelhead". Specifically, it calls for direct funding of the Touchet River steelhead supplementation program to transition to local broodstock using BMP's (best management practices).

The SCA pulled the baseline and status information directly from the Mid-Columbia ICTRT reports. At the time, the Touchet River data was not available for population viability analysis, but has been completed since and presented within this HGMP (recruites/spawner estimate). Appendix C of SCA does not cover the Touchet River summer steelhead population, but Appendix D (Hatchery Effects Report) does. Appendix D shows that there would be a negative effect on population viability because of spawning hatchery fish on the spawning grounds. Hatchery actions stated in the document that could lessen the effects are 1) upgrade existing facilities to reduce the number of hatchery fish on the spawning grounds, 2) Improve the diversion dam curtain to reduce hatchery spawners. Other actions call for the continued monitoring of population genetics and to continue PIT tagging for program evaluation and monitoring or returns and distributions.

3.1b) Mid-Columbia River Steelhead DPS Recovery Plan (Draft)

The Touchet River summer steelhead population has been identified as an intermediate population in the Umatilla/Walla Walla MPG (see ICTRT Population Groupings). It was identified as a higher risk population due to the lack of data available at time of determination. Since that time, WDFW has provided updated data on population status,

productivity, and the percent hatchery influence as found through this HGMP document. An updated risk rating should be assessed with the most current data. Limiting factors to the MPG were related to passage (upstream and downstream through the hydrosystem), habitat (temperature, sediment, tributary passage, degraded channel structure), hatchery (non-endemic origin), and predation/competition/disease factors.

Key actions proposed in the plan call for protecting and improving the freshwater habitiat, improve hatchery management to reduce non-DPS origin fish on the spawning grounds, and improve mainstem survival. Actions proposed within this HGMP are consistent as applicable to the hatchery component. It is unknown at this time what specific actions will be taken to reduce hatchery effects with the Touchet River basin, but some form of hatchery change/reform will occur in the next few years. This HGMP has proposed various actions that could occur (Section 1.16) should agreement be reached among all the co-managers.

3.1c) ICTRT Population and Viability Status Goals (2007)

The following was taken from the January 8th, 2007 ICTRT Scenarios for MPG and ESU viability consistent with TRT viability criteria memo to NOAA Fisheries. Their description of the Major Population Groups (MPG) that includes the Touchet River. Proposed actions within this HGMP are consistent with the ICTRT recommendations for viability. If actions from this hatchery program aid in the recovery of the Touchet River population, it will assist in meeting the goals for the MPG.

Walla Walla-Umatilla MPG
Component populations:

	Size Category	Life History Type
Willow Creek (extirpated)		
Umatilla River	Large	Summer
Walla Walla River	Intermediate	Summer
Touchet River	Intermediate	Summer

Basic application of TRT criteria:

- Two populations must meet viability criteria, one of which must meet high viability criteria
- One Large or Very Large Population (Umatilla River) must meet viability criteria

Considerations:

- Willow Creek population has been extirpated
- Some hatchery influence exists throughout the Walla Walla, Touchet and Umatilla populations.
- Current status suggests that the Walla Walla is closer to meeting viability criteria than the Touchet.

TRT Recommendation:

1 Highly Viable and 1 Viable:	Umatilla River Walla Walla River OR Touchet River
Maintained:	All remaining extant populations

3.1d) Hatchery Scientific Review Group (HSRG) Observation and Recommendations

The HSRG completed their review of the hatchery summer steelhead programs in the Walla Walla Basin in 2008. The following paragraphs present their Observations and Recommendations.

HSRG Observations: The WDFW operates both an integrated conservation and segregated harvest program within the Touchet subbasin. Releases for the segregated program are imported annually from Lyons Ferry Hatchery (85,000 smolts acclimated at the Dayton Pond). Smolt releases from the segregated program occur below primary rearing and spawning reaches of the Touchet River. The existing integrated program (50,000 smolts with a 100% pNOB are hauled and planted directly from Lyons Ferry Hatchery) is operated consistent with the criteria for a Primary population; however, strays from the segregated harvest program constitute more than 10% of the effective natural spawners (basin-wide) and likely pose an ecological and genetic risk to the population. This is not consistent with the standards for a Primary population. An adult trap is located within the City of Dayton; however, it has limited potential for controlling hatchery fish since adult steelhead can pass without entering the trap. A new facility has been constructed and its capabilities are unknown. Comments on smolt quality (size, size variation, degree of Smoltification) by managers indicate it may be affecting SAR of the integrated conservation program. Adults from both Lyons Ferry hatchery and the endemic stock also appear above Lower Granite Dam. Low natural productivity in the Touchet limits abundance and management options for the population.

HSRG Recommendations: The HSRG solution transitions the broodstock collection of Lyons Ferry Hatchery stock to sites within the Walla Walla and Touchet in place of current broodstock collection at Lyons Ferry Hatchery to aid in local adaptation. The solution maintains the current release numbers in the Walla Walla but reduces them in the Touchet River. In addition to the integrated program (49,000 smolts), a segregated program of approximately 20,000 smolts could be operated consistent with the designation of a Primary population if 90% of the returning unharvested adults were removed. Smolts from the integrated program should be acclimated in areas of their intended return. A single integrated program of approximately 70,000 smolts could be managed consistent with a Primary population designation. Expanding the program beyond this level would require habitat enhancements to improve productivity and the development of facilities to trap and control adults on the spawning ground.

In regards to the Touchet River endemic stock summer steelhead, we provide the following:

1. Beginning in 2009, all LFH hatchery stock fish captured at the Dayton Dam trap were

removed and placed in a nearby pond for fishing. In 2009 we attempted a barrier on the dam/weir to force all returning fish through the fish ladder and trap. It was partially successful, but high stream flows limited its effectiveness and eventually caused it to fail. We will be looking at other alternatives to be in place for 2010.

2. Smolts for the endemic program will be acclimated if we expand the program and replace the LFH stock, otherwise, they will not.

3. The recommendations provided are very limited for options to operate a segregated program and the recommendations presume the endemic program can meet our ESA AND LSRCP goals. A segregated program of 20,000 smolts (LFH stock) would return ~400 fish at a 2% survival rate (See Table 4). An integrated program of 70,000 smolts would return ~350 adults based on the current SAR of 0.5% (See Table 3). Those two program combined would return 750 fish (total to the Columbia River system), yet WDFW's return goal for harvest under the LSRCP program to the Touchet River is 750 fish. In addition, adult return PIT tag information suggests that ~40% of the endemic stock, and 80% of the LFH stock enter the Snake River system, and never return to the Walla Walla basin (Table 12). To be fair, this information is relatively new, and was perhaps not made clear enough to the HSRG during their review process.

4. Use of local returning hatchery fish for broodstock does not address some of the major causes for straying such as lack of water or suitable habitat in the lower Walla Walla and lower Touchet in fall and early winter (See #3 above for effects).

5. A 20,000 local returning LFH stock program would require the spawning of ~5 females/year. The genetic risks from such a small founding populations size appears to great. Further, rearing space at the hatchery to maintain these multiple small groups is currently not feasible without major modifications to the hatchery.

Table 14. Adult PIT tag detections of Touchet River endemic stock and Lyons Ferry stock summer steelhead.

Release Year	Pass McNary	Mean Date Past McNary	Upper Columbia	Walla Walla River	Stay above Ice Harbor	Unknown above McNary	% to Walla Walla River	% above Ice Harbor	% Unknown above McNary
Touchet River Endemic Stock									
2004	35	6 Oct	1	3	15	16	8.6	42.8	45.7
2005	22	20 Sept	1	10	7	4	45.5	31.8	18.2
2006	32	13 Sept	1	7	18	6	21.9	56.3	18.8
2007	42	23 Sept	3	19	13	7	45.2	31.0	16.7
2005-2007	*96*	*19 Sept*	*5*	*36*	*38*	*17*	*37.5*	*39.5*	*17.7*
Lyons Ferry Stock – Release into Touchet River at Dayton Acclimation Pond									
2007	97	5 Aug	2	13	75	7	13.4	77.3	7.2
Lyons Ferry Stock – Release into Walla Walla River									
2007	76	7 Aug	1	1	67	7	1.0	88.2	9.2

Notes: The 2004 release year was not used in the average calculations for the Touchet endemic stock because of when the Walla Walla PIT tag array was deployed. The 2007 release years include only 1-salt returns from the 2008 run year. The PIT tag array in the lower Walla Walla is not 100% efficient and likely varies depending on flow. Many of the recoveries from the Touchet River endemic stock and Lyons Ferry stock from Dayton AP were detected at the Dayton adult trap, hence their percent return to the Walla Walla appears higher.

6. Use of an endemic or integrated option would reduce wild fish spawning naturally, at least in the short-term, and it may reduce or eliminate non-tribal harvest because harvest would have to shift to ESA listed hatchery fish. This would not likely achieve LSRCP mitigation goals.

7. The HSRG review is step 1 of our expected review for steelhead hatchery programs in SE WA. The USFWS hatchery review for LSRCP facilities is step 2. The completion of the regional (SE WA) steelhead management plan (as part of the WA State steelhead management planning process) is step 3 in our review of steelhead hatchery and management actions for SE WA.

3.1e) USFWS Hatchery Review Team (HRT) Observation and Recommendations

The Hatchery Review Team (HRT) provided 15 preliminary recommendations and 5 draft programmatic alternative actions. The draft recommendation proposed by the HRT is Alternative 2, and calls for addressing the recommendations provided, along with removal of the Lyons Ferry stock releases. Individual recommendations on the Facility, RM&E, Management, or Education and Outreach are presented below.

Issue TT-SS1: The Review Team understands that the short-term goal of the program is to "evaluate the capability of developing an endemic Touchet River hatchery stock that can replace the Lyons Ferry stock for meeting harvest mitigation goals while, at the same time, reducing genetic and demographic risks to the natural population of steelhead in the Touchet River." *The Team further understands that the purpose of the endemic broodstock program is NOT, at the present time, to restore or rebuild the naturally spawning population in the upper Touchet River via natural spawning supplementation by hatchery-origin fish. This latter goal could be a FUTURE purpose of the program but only if the CURRENT research goal of the program is first achieved and the capability to expand the program demonstrated. If this desired*

outcome is achieved, then the endemic program could be expanded with new long-term goals (e.g., harvest, conservation, or both) and new operational objectives for achieving them. The Team concluded that the current size and scope of the program are consistent with the research goal of the program but not with the goal of rebuilding a natural population via natural spawning supplementation by hatchery-origin fish (see Issues that follow). Management actions and operations inconsistent with the scope and goal of any hatchery program can pose significant risks to natural populations with little likelihood of achieving the intended benefits in most cases. Consequently, the deliberate passage of hatchery-origin fish upstream to spawn naturally and/or the direct release of hatchery-origin fry and smolts upstream of the weir would appear to directly conflict with the Team's understood purpose of the current program.

Recommendation TT-SS1: Clearly define the specific goal and purpose of the current endemic broodstock program and restrict management actions to only those operations that directly support that specific goal. New goals can be established after the current short-term research goals are achieved. **Response: WDFW and the co-managers have yet to agreed to implement expansion of the endemic stock program for supplementation or mitigation within the Touchet River. Decisions will be made following the development of the SE Washington Steelhead Management Plan.**

Broodstock Choice and Collection

Issue TT-SS2: Utilizing only the early portion of the Touchet River run for broodstock, then allowing the hatchery progeny of those steelhead passage upstream to spawn naturally may, over the long term, impose artificial selection for earlier run timing in the natural population. *Touchet River steelhead return from late February through May; however, only adults trapped during February through mid-April are used for broodstock. Collecting only the early portion of the run is performed so that the progeny can be reared and released as one-year-old smolts.*

Recommendation TT-SS2: Collect steelhead for broodstock from the entire spectrum of the run and adjust culture protocols accordingly (see below). **Response: WDFW has developed run timing curves based on previous years trapping efforts. Beginning in 2011, a formalized trapping protocol to collect broodstock from the central part of the run (over a compressed 3-4 week time period) will be established and agreed upon by all parties.**

Hatchery and Natural Spawning, Adult Returns

Issue TT-SS3. The genetic effective number of breeders for the broodstock is too low to support a natural spawning supplementation program under the current research goals of the program. *Hatchery-origin steelhead of the endemic Touchet River stock are passed upstream to spawn naturally in the Touchet River because NOAA Fisheries includes those fish with the ESA listed Snake River Summer Steelhead DPS. However, the deliberate release of those fish upstream to spawn naturally is not consistent with the research goals of the program. The deliberate release of hatchery-origin fish upstream also poses a genetic risk to the natural population because the mean effective number of breeders (parents) per year is only Ne = 28.3 adults, and hatchery-origin fish compose up to 20% of the naturally spawning population upstream of the weir.*

Recommendation TT-SS3: Discontinue passing hatchery-origin steelhead upstream to spawn naturally. Increase the number of steelhead collected for broodstock to yield a minimum effective number of breeders each year of $N_b > 50$. This could be accomplished by spawning equal numbers of endemic hatchery and natural-origin fish pairwise within each of the 2x2 spawning matrices: HxW and WxH, respectively. This would yield a value of $pNOB = 50\%$. **Response: This recommendation would be fine depending on program intent in the future. Currently there is no agreed upon program, and the disposition**

of passing hatchery origin (Touchet endemic stock) fish above the weir has yet to be decided. In the interim, WDFW will continue to pass Touchet River hatchery origin fish above the Dayton Adult Trap. All returning Lyons Ferry stock steelhead are removed from the river upon capture and the weir and are either sacrificed or placed in the Dayton Juvenile Fishing Pond.

Issue TT-SS4: Spawning early returning steelhead may increase stray rates due to the amplification of an early return time of their progeny, when access to the Touchet River is limited (lower sections of the Walla Walla River may be impassable in August and September). *This poses genetic and ecological risks to other steelhead stocks.*

Recommendation TT-SS4: Collect steelhead for broodstock from the entire spectrum of the run. **Response: WDFW has developed run timing curves based on previous years trapping efforts. Beginning in 2011, a formalized trapping protocol to collect broodstock from the central part of the run (over a compressed 3-4 week time period) will be established and agreed upon by all parties.**

Issue TT-SS5a: Adult male steelhead held for broodstock and returned to the Touchet River may transmit diseases from Lyons Ferry FH to the natural population in the Touchet River. *Of special concern is the transmission of the IHN virus.*

Issue TT-SS5b: Adult male steelhead transported and utilized multiple times during spawning, then returned to the Touchet River experience excessive stress, increasing the potential for fish health issues. *Males returned to the Touchet River likely die shortly after release.*

Recommendation TT-SS5: Discontinue the return and release of adult male steelhead into the Touchet River. **WDFW Response: WDFW will examine the risks of this practice. Many of the males have been in good shape when returned to the river. We believed that they should be given the opportunity to contribute to natural spawning, though their success at this was never confirmed. Further, WDFW did not believe the likelihood of introducing or enhancing IHNV is a valid issue as natural origin Touchet River steelhead have been confirmed to carry the virus already.**

Issue TT-SS6: Rearing densities in the indoor nursery tanks "shallow troughs" (1.15 max DI) exceed culture guidelines for steelhead, thus increasing fish health risks. *Due to space limitations in the intermediate and outdoor raceways, steelhead are held in the troughs beyond recommended rearing densities for steelhead. This protocol results in density indexes attaining D.I. = 1.15 in the indoor nursery tanks prior to transfer to the outdoor raceways.*

Recommendation TT-SS6: Reduce rearing densities in the shallow troughs to a maximum D.I. = 0.5 by increasing the number of nursery rearing or intermediate rearing tanks (see LF-SS12), by reducing the total number of Lyons Ferry steelhead reared, by reducing the number of fish reared in other programs, or by reducing the total number of stocks reared at Lyons Ferry FH. **WDFW Response: This problem was identified a few years ago. WDFW has proposed to increase the rearing capacity by utilizing the area where the spring Chinook captive broodstock program took place. The large 20' circular ponds are proposed for removal and replacement with shallow rearing tanks. It is also desired to have the area covered and, if possible, to be enclosed.**

Issue TT-SS7: Outplanting fry that are progeny of IHN virus positive females may pose fish health risks to the Touchet River natural population. *Although the risk of the IHN virus being transferred to the progeny is considered low due to egg disinfection, the release of those fish still poses fish health risks to natural populations of steelhead populations compared to the expected very low if any benefits. Studies indicate that outplants at the subyearling fry stage have shown extremely low survivals to adulthood and may actually pose significant ecological risks by displacing natural-origin fry which are generally smaller at the time of outplanting.*

Recommendation TT-SS7: Discontinue outplanting fry. If the program size is increased, consider sampling the fry for viruses and retain and rear the group to smolt-stage only if they are IHN virus negative. **WDFW Response: all co-managers and NOAA fisheries selected fry release of the IHNV females as the preferred alternative. WDFW believes this was a relatively neutral action, with minimal risk to the natural population, while reducing the risk in the hatchery to all other steelhead stocks present. IHNV is present in the basin and out-plants occurred into habitat that had experienced low natural spawning, thus minimizing the ecological interaction between hatchery and natural fry. This practice will likely continue.**

Issue TT-SS8: Pre-release exams which include testing for virus, bacteria and parasites are not done at the Lyons Ferry FH Complex and associated acclimation sites. *There is a potential risk that endemic or vertically transmitted diseases might be undetected in released juveniles. This could affect their future survival and/or infected fish could serve as vectors in infecting other aquatic animals. Pre-release inspections, done 4-6 weeks before release or transfer are required by USFWS fish health policy FW 713 713.*

Recommendation TT-SS8: Sample 60 fish for pre-release inspections to meet the American Fisheries Society – Fish Health Section Blue Book requirements to ensure a 95% confidence in detecting pathogens at the minimum assumed pathogen prevalence level of 5%. Additional testing for non-reportable pathogens, such as *Flavobacterium psychrophilum* and *Nucleospora salmonis*, may be informative for co-managers. **WDFW response: Additional testing for other pathogens such as *Nucleospora sp.* should be accomplished since past efforts have been sporadic and localized. However, *Nucleospora sp.* surveillance using PCR testing is expensive with cost of $30.00 per sample and may be limited. WDFW fish health staff questions the value of testing all fish for selected pathogens before release. If IHN virus (or other pathogens) were detected, we would be strongly hesitant to destroy these ESA listed fish. Testing will simply document the infection, and the cost raises the question of the value of such actions.**

Issue TT-SS9: SAR's for progeny of larger-sized Touchet steelhead at release are higher than those for smaller sized (0.7% versus 0.2%). *Additionally, steelhead of smaller size at release may increase the potential for those steelhead to residualize. Current hatchery practices are to utilize only broodstock from the earlier portion of the run in order to increase size at release; however, this practice poses genetic and ecological risks (see recommendation TT-SS4).*

Recommendation TT-SS9: Continue to investigate the production of two-year-old smolts and/or the use of heated water to accelerate incubation growth rates for progeny of later-spawned individuals. **WDFW response: We continue to evaluate the two-year smolt program, with the second release of two-years smolts to occur in 2011. Initial results indicated that two-year smolts had similar migration success (based on PIT tags) as the "large" size smolts, and both out-performed the "small" sized smolts. However, rates of precocial males and females prior to release was high**

(15%); these fish did not migrate from the system and could pose unwanted risks if planted in the river. Future of two-years smolts would have to address this problem in a more aggressive manner.

Issue TT-SS10a: Periodic high flows that occur when Touchet steelhead are returning may limit broodstock collection throughout the run. *Modifications to the Touchet weir have improved but not resolved trapping capabilities but limitations remain.*

Issue TT-SS10b: Limited control of upstream passage of adult hatchery-origin steelhead (both Touchet and Lyons Ferry stock) during high flows poses genetic and ecological risks to the natural-origin Touchet River steelhead population.

Recommendation TT-SS10: Continue to work to modify the weir to improve trapping efficiency and control of upstream passage. **WDFW response: We continue to modify the weir facility to control the number of hatchery origin fish. Our latest system appears to work effectively, but high stream flows can still disable the weir for short periods of time. However, the new ladder system appears to be preferred by steelhead, and it appears based on mark/site recap observations from floy tagged fish that about 25% of the fish appear to bypass the weir by jumping when the weir is disabled.**

Issue TT-SS11: Tucannon and Touchet steelhead stocks are held in the same adult holding pond at Lyons Ferry FH. *The two stocks are separated by a grated partition that splits the pond. Holding two stocks of steelhead in the same pond increases the potential for disease transmission between the stocks.*

Recommendation TT-SS11: Modify existing holding facilities or build new holding ponds so that the stocks can be held separately on first pass water. **WDFW will examine the possibility of using a different holding pond for the different stocks.**

Issue TT-SS12: Touchet steelhead have a high degree of straying upstream of Ice Harbor dam. *Off-site releases (regardless as to whether they were acclimated or direct stream releases) of hatchery reared salmon and steelhead have consistently demonstrated reduced homing abilities in returning adults (Evenson 1992, Vander Haegen 1995, Johnson 1990). Current hatchery practices may be contributing to these stray rates, including the practice of rearing the fish to smolt stage at Lyons Ferry FH, then transporting them and direct-stream releasing them in the Touchet River. Facilities at mainstem dams to accommodate passage of migrating adults both upstream and downstream may also be inadequate.*

Recommendation TT-SS12a: Continue to investigate the degree of homing and straying and experiment with rearing and release strategies to reduce straying. Investigate the feasibility of building a small steelhead incubation and rearing facility (hatchery) on the Touchet River to increase homing and reduce straying. **WDFW Response: Should this program be expanded, one option would be to acclimate the fish in the Dayton Acclimation Pond prior to release. Additional facilities on the upper Touchet River are not very likely. Further, warm water temperatures in the Lower Walla Walla Basin may be the most contributing factor to those fish that return to the Snake River Basin. WDFW has observed this same pattern in other stocks of fish.**

Recommendation TT-SS12b: Continue to investigate safe passage of adult steelhead, both upstream and downstream of mainstem dams. **WDFW Response: The WDFW agrees, however WDFW has little, if any control, at the mainstem dams to improve upstream/downstream passage of steelhead**

adults. A study to determine the potential causes of their behavior is needed and could be included with ongoing COE migration studies through the University of Idaho, which attempt to evaluate adult salmon migration behavior through the Hydrosystem. Short of removing the dams, we are unaware of an immediate action to improve this situation.

Issue TT-SS13: Releasing Touchet stock steelhead and Lyons Ferry steelhead in different manners complicates comparison of the performance of the two stocks. *The Lyons Ferry program may be benefiting from increased survival over the endemic Touchet stock due to larger size at release and acclimation prior to release.*

Recommendation TT-SS13: Evaluate rearing and release strategies to maximize the return of the endemic stock (e.g. acclimation, volitional release, size-at-release). If necessary, discontinue the use of the Dayton Pond AF for releasing Lyons Ferry steelhead and use the pond for acclimating Touchet River steelhead prior to release. Lyons Ferry steelhead can be directly released downstream from the Dayton Pond AF if those releases continue. **WDFW Response: We agree that this might be an alternative release strategy in the future. WDFW and the co-managers will have to agree on which stock(s) will be used and where the releases should occur based on management goals.**

Issue TT-SS14: Current marking and tagging practices are suitable for achieving current program objectives. *Touchet stock are coded-wire tagged so that the hatchery fish can be distinguished from natural-origin fish when they return to the trap. 8,000-10,000 steelhead are PIT tagged to provide survival and stray data.*

Recommendation TT-SS14: Continue the current marking and tagging practices. Consider increasing the number of steelhead PIT tagged to 10,000-15,000 so that smolt-to-adult survival can be estimated, given that survival rates associated with this endemic program currently vary and are at times low. **WDFW Response: We believe the current tagging levels are adequate. Survival in some years was low, but has been associated with the first years of the programs where the hatchery experienced difficulty in rearing fish up to the appropriate release size. Since release size goals have been met, survival has improved, and the current number of PIT tags is adequate for the monitoring needed.**

HRT Alternatives to Current Program

Alternative 1: Current program with recommendations

Alternative 2: Expand the Touchet endemic steelhead program by creating a stepping-stone program for harvest and conservation

Alternative 3: Expand the Touchet endemic steelhead program by creating a segregated, for harvest program downstream of the weir and manage the population upstream of the weir for natural production only

Alternative 4. Establish a rearing facility on the Touchet River (this alternative is tentative until further investigation by the Review Team)

Alternative 5: Terminate the Touchet endemic steelhead program

Recommended Alternatives

The Team recommends Alternative 2: phase-out or terminate the release of Lyons Ferry hatchery steelhead in the Touchet River and expand the current integrated endemic program for steelhead to a two-stage, stepping-stone program. Alternative 2 is intended to be implemented consistent with all the recommendations in Alternative 1. The intent of Alternative 2 is to address both conservation and harvest goals for steelhead in the Touchet River. The Review Team understands that the primary purpose of the current endemic program is research; to determine the potential efficacy of developing a localized integrated hatchery program as an alternative to the continued outplanting of non-native Lyons Ferry steelhead. The Review Team concluded that adult return rates back to the Touchet River from the current endemic program were sufficient to expand the program for the immediate purpose of addressing conservation needs for steelhead in the Touchet River, largely because hatchery-origin adults in excess potential broodstock needs are currently being trapped and passed upstream. A second broodstock could be developed, based on adult returns from the first broodstock, to support Tribal and recreational fisheries. However, continued improvements in smolt-to-adult return rates (SARs) for the endemic program in the Touchet River may be necessary before this latter second stage broodstock can be developed. Adult returns from both broodstocks would contribute to the overall LSRCP mitigation goal for steelhead in the Snake River, while fish from the second segregated‖ broodstock would contribute exclusively to the mitigation goal of 750 hatchery-origin steelhead available for harvest in the Touchet River.

The size of the integrated conservation component of the program would be based annually on the returning natural population. The current endemic (*integrated*) program could be expanded to approximately 50 adults (25 females) without increasing the number of natural-origin adults used for broodstock by retaining equal numbers of F1 hatchery-origin and natural-origin adults and crossing the two groups of fish pairwise (♀-nat. x ♂-hat., and ♀-nat. x ♂-hat.) in each of the spawning matrices so that all progeny had at least one natural-origin parent. This spawning protocol would result in a value of *pNOB* = 50% for the first broodstock. Returning F1 hatchery-origin adults (tagged but not fin-clipped) surplus to the needs of the integrated broodstock would not be passed upstream but would be retained and spawned as a second broodstock to produce fish for harvest. These latter F2 hatchery-origin progeny would be given an adipose fin clip and - as returning adults - could be included in the second broodstock as needed by directly crossing them with returning adults resulting from the first broodstock (e.g., ♀-F1-hat. x ♂-F2-hat., and ♀-F2-hat. x ♂-F1-hat). This cross-breeding of natural-origin fish with F1 hatchery fish in the first broodstock, and F1 x F2 hatchery fish for the second broodstock would ensure (a) continuous gene flow from the natural population to the 2nd broodstock, thereby reducing genetic risks to the natural population, and (b) the absence of sibling matings. Surplus hatchery-origin adults produced from the first broodstock would, in general, not be passed upstream unless doing so was necessary to prevent extirpation or to maintain a viable natural population.

The number of adults spawned for the second broodstock would be based on the 750-adult mitigation goal and the expected or predicted smolt-to-adult return rates back to the Touchet River. For example, assuming a 0.30% smolt-to-adult return rate (SAR) back to the Touchet River (unpublished data, WDFW), approximately 250,000 smolts from the second broodstock would need to be released into the Touchet River to achieve the mitigation return goal of 750 adult steelhead, and approximately 80 females (160 adults total) would need to be retained for broodstock to produce 250,000 smolts. These latter broodstock and smolt release numbers may

exceed culture facilities currently available at Lyons Ferry Hatchery and may create concerns regarding ecological (competition) risks to natural origin smolts in the Touchet River. Consequently, the Team recommends implementation of modified culture protocols that are expected to increase smolt-to-adult return rates from the current average of 0.30% (most recent estimated rates are approximately 0.5%), including the use of heated water during egg incubation or early rearing to increase mean size at release. As smolt-to-adult return rates increase and a second broodstock and the proposed stepping stonel program develop, a greater proportion of the second broodstock could be composed of F1-hatchery fish from the first broodstock. No F2 hatchery-origin adults would be passed upstream to spawn naturally unless absolutely necessary as an emergency conservation measure.

Both components of the stepping stone program could be accomplished at Lyons Ferry Fish Hatchery by differentially marking broodstock where the integrated conservation component would be coded-wire tag-only and the harvest component would be 100% adipose-fin clipped with only a portion tagged for monitoring and evaluation purposes. The harvest component could be direct released while the integrated component could be released from the acclimated pond if the pond was not of sufficient size to acclimate both groups of fish simultaneously.

The Team's recommendation is intended to meet near-term conservation goals for the Touchet River population, while developing a harvest component to meet harvest and fishery management goals in the area. The Team's recommended alternative is also meant to be consistent with the intent of the current *US v. Oregon* agreement and LSRCP mitigation obligations. The Team also felt that our recommended alternative would be consistent with any potential actions that may be taken in the future to address ICTRT recovery recommendations.

The Team recognizes that Alternative 2 will require a significant investment to expand or modify culture facilities at Lyons Ferry Hatchery to accelerate the growth of Touchet River steelhead or rear a portion of each brood year for two years to achieve the desired size at release. On the other hand, the Team's recommendation could be initiated at a smaller scale than currently required to meet the 750 adult-return mitigation goal for steelhead in the Touchet River.

If comanagers conclude that implementing Alternative 2 is premature at this time, then the Team recommends implementation of Alternative 1 and Alternative 4: continuation of the current research program with implementation of all program specific recommendations and potential development of a rearing facility on the Touchet River to improve SARs. Currently, Lyons Ferry steelhead are acclimated and released from the acclimation pond in Dayton and the endemic steelhead are direct released upstream of the weir. The Team believes that, as part of the continued research program, the release of Lyons Ferry steelhead in the Touchet River should be suspended and the acclimation pond used to acclimate steelhead smolts from the endemic program to determine if that simple change will result in an increase in SARs. The Teams recommendations also include termination of the passage of hatchery-origin adults upstream of the weir because doing so creates genetic risks and is superfluous to the research goal of the program. Instead, those hatchery-origin fish should be crossed with natural-origin adults to further test the efficacy of the current program.

The Team did not support development of a new, segregated hatchery program for steelhead in the

Touchet River (Alternative 3), largely because it would inevitably create risks similar to the current program after many generations and would not – in the long term – provide conservation benefits for a natural population that may not be viable. The Team also believed that termination of the current endemic program (Alternative 5) was premature from a research perspective because many options for potentially improving SARs had not been tested.

WDFW Response: As WDFW completes the SE Washington Steelhead Management Plan, these and other discussed alternative will be considered for program development. At this time, WDFW preferred alternative is to continue the program as it has been for the last 10 years. Additional survival data and returns of adults from the two-year smolt program will help inform decisions about the future program as it moves forward.

3.1f) US v Oregon Production Agreement

US v. Oregon - The hatchery program outlined within this HGMP is consistent with US v OR management agreement table B6 (see table below), with the intent restore populations and to provide fish for harvest in tribal and sport fisheries into the future. Decisions to change this program from the current actions have been delayed while WDFW completes the Steelhead Management Plan for SE Washington. Further, the program has not moved forward due to disagreement of program intent with the co-manager, and adult return data has not been as positive as originally hoped.

3.2) List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates. *Indicate whether this HGMP is consistent with these plans and commitments, and explain any discrepancies.*

This HGMP would be consistent with the following cooperative and legal management agreements. Where changes to agreements are likely to occur over the life of this HGMP, WDFW is committed to amending this plan to be consistent with the prevailing legal mandates.

- *U.S. v. Oregon* Management Plan for the Columbia River. The following was created directly from Table B6 of the 2008 U.S. v Oregon Management Plan. This current HGMP is consistent with the hatchery production table presented in the 2008 Management Plan, where the Touchet River endemic stock is being evaluated, and may eventually replace the Lyons Ferry stock.

Release Site	Rearing Facility	Stock	Life Stage	Target Release Number	Mark	Non-ad-Clipped	Primary Program Purpose	Funding
Walla Walla River	Lyons Ferry Hatchery	Lyons Ferry A	Smolt	100,000	100% AD-Clip, 20K LV CWT	0	Fishery	LSRCP
Touchet River @ Dayton Acclimation Pond	Lyons Ferry Hatchery	Lyons Ferry A	Smolt	85,000	100% AD-Clip, 20K LV CWT	0	Fishery	LSRCP
Touchet River	Lyons Ferry Hatchery	Touchet A	Smolt	50,000	100% CWT	50,000	Broodstock Evaluation / Supplementation	LSRCP
Tucannon River	Lyons Ferry Hatchery	Lyons Ferry A	Smolt	50,000	100% CWT	50,000	Broodstock Evaluation /	LSRCP

Tucannon River	Lyons Ferry Hatchery	Lyons Ferry A	Smolt	100,000	100% AD-Clip, 20K LV CWT	0	Supplementation Fishery	LSRCP
Snake River @Lyons Ferry Hatchery	Lyons Ferry Hatchery	Lyons Ferry A	Smolt	60,000	100% AD-Clip, 20K LV CWT	0	Fishery	LSRCP
Grande Ronde River @ Cottonwood Acclimation Pond	Lyons Ferry Hatchery	Wallowa A	Smolt	160,000	100% AD-Clip, 20K LV CWT	0	Fishery	LSRCP

The Parties agree on current production levels to achieve mitigation objectives for the Walla Walla, Touchet, Tucannon, and lower Grande Ronde (Cottonwood) programs but not necessarily the stock used (non-local) or the release location. These steelhead programs may change during the period covered by this Agreement. To guide this change, the Parties commit to developing steelhead management plans for broodyear 2010, designed to transition to endemic stocks or segregated programs. The management plans will incorporate the hatchery mitigation requirement, timing of the 2008-2017 *United States v. Oregon* Management Agreement transition, fishery objectives, marking, supplementation component linked to passage improvements on Mill Creek (Walla Walla basin), release locations, criteria to be met for collecting natural-origin adults from the upper Walla Walla basin, marking, etc.

- Lower Snake River Compensation Plan goals as authorized by Congress direct actions to mitigate for losses that resulted from construction of the four Lower Snake River hydropower projects.

- Columbia Basin Fish Accords - The following excerpt is taken directly from the Columbia Basin Fish Accords.

  "The parties to US v. Oregon have agreed to monitor the Lyons Ferry production program over the term of the 10-year US v. Oregon management plan. Any US v. Oregon party may propose changes to that program by invoking the modification provisions of the US v. Oregon management plan. The Action Agencies understand that that Tribes' willingness to accept spill operations as outlined above is directly related to their expectation that the Lyons Ferry production program remains stable and substantially unaltered than as currently designed for the term of this Agreement."

  Per this language, and actions proposed within this HGMP, any changes to the current production of summer steelhead at Lyons Ferry (endemic stock or Lyons Ferry stock) will be taken to the US v Oregon process and discussed among the co-managers.

- WDFW Wild Salmonid Policy. Fish and Wildlife is directed by State and Departmental management guidelines to conserve and protect fish and wildlife populations within Washington, and use of an endemic broodstock to minimize staying of hatchery fish is preferred. No other comprehensive management agreements are in effect.
- Fisheries Management and Evaluation Plan (FMEP). Developed FMEP's for Mid-Columbia fisheries are completed. The FMEP will describe in detail the current fisheries management within the Walla Walla Basin, including the Touchet River summer steelhead. Fishery management objectives within the FMEP and this HGMP are consistent.

3.3) Relationship to harvest objectives.

As an Integrated Harvest Program, development and use of an endemic Touchet River broodstock is intended to fulfill mitigation goals (see details in WDFW's FMEP for the Mid-Columbia), yet will allow for some conservation/recovery of the depressed stock. The LSRCP, as a mitigation program, defined replacement of adults "in place" and "in kind" for appropriate state management purposes. In addition, WDFW has identified the maintenance of abundant naturally spawning populations and harvest as valuable management goals (WDFW Wild Salmonid Policy, 1999).

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

During the period 1987–2006, sport harvest from the Touchet River ranged between 51-859 fish during the annual September through mid-April fishery (WDFW 1987-2007). The terminal fishery in the Touchet and Walla Walla rivers combined represents on average about a 15% in-river harvest rate on fish estimated to have returned to the Columbia River basin. Also, Touchet River-origin fish have contributed, and are expected to contribute in the future, to fisheries in the Columbia and Snake Rivers. These fisheries are consistent with LSRCP goals, and with *U.S. v. Oregon* management plans and principles for tribal and sport fisheries. All sport fisheries within the region are selective for hatchery-reared fish and require release of natural-origin summer steelhead (FMEP). Sport fishing regulations in the Touchet River have been altered in recent years to reduce the incidental catch of natural fish by closing primary spawning areas of the river to fishing (FMEP). These actions work in concert with focused fishing effort on hatchery-origin fish to maximize natural escapement and minimize escapement of LFH summer steelhead stock into the upper Touchet Basin. Proposed marking of endemic brood releases, when appropriate and as described in this HGMP, will be used to regulate their take in fisheries as necessary.

The existing LFH stock used within the Touchet river has provided harvestable steelhead annually since 1985. Since the LFH stock will continue to be released in the Touchet River for a short time, harvest mitigation will continue, with the FMEP providing guidance to fisheries within the Walla Walla Basin. Limited hooking mortality is expected to occur as a result of sport fisheries on adults returning from endemic smolt releases (FMEP). As proposed, eventually all LFH summer steelhead stock releases will be discontinued and replaced with endemic stock smolt releases. Should full production of endemic steelhead be achieved, WDFW desires that all of the smolts be marked to allow harvest.

3.4) Relationship to habitat protection and recovery strategies.

Limited comprehensive review of the ecological health of the Touchet River watershed in relation to salmonid population status and recovery has been completed. Limiting factors such as water temperature, channel stability, sediment, and instream habitat are known to exist in the basin (WDFW unpublished data), but the extent of these problems is unquantified to date. Bonneville Power Administration is presently funding a review of the

habitat and fishery resources of the Walla Walla basin (Mendel et al. 1999).

3.5) Ecological interactions.

Natural predators such as bull trout live sympatrically with Touchet River natural-origin steelhead, and may incidentally prey upon released hatchery-reared smolts of small size. Additionally, kingfishers, mergansers and other avian and mammal predators may prey on hatchery-reared juveniles/smolts as they migrate down the Touchet River.

The release, and subsequent return as adults, of endemic brood steelhead could affect existing ESA-listed populations of bull trout and summer steelhead. However, temporal and spatial overlap that could give rise to competitive or aggressive interactions for food and space will be minimized by the release of smolts near Dayton. Smolts are expected to quickly emigrate from the system. Also, they will be below bull trout spawning and juvenile rearing areas, but overlap with sub-adult and adult migratory habitat is likely. Some residualization of small juvenile fish, leading to their outmigration as a 2-year old smolt, may occur. Returning adults are expected to spawn concurrently with natural steelhead throughout their entire range in the Touchet River, increasing the abundance of juvenile steelhead throughout the basin and filling available habitat.

In the initial program phase, complete marking (100%) of hatchery-reared endemic brood juveniles will allow returning adults to be enumerated and their contribution to the escapement (in absolute numbers and as a proportion of the run) documented. In addition, a large portion of each years release will be PIT tagged for smolt-to-adult monitoring. Some studies suggest that domestication of hatchery-reared salmonids may decrease their reproductive fitness. This loss of fitness could be transmitted to the offspring of these spawning adults. Life history characteristics of the hatchery-reared fish will be documented to compare their performance with the natural population. Size at migration, migration timing and performance, adult return timing and spawn timing will be documented and reported as part of the LSRCP Monitoring and Evaluation project.

For the first several years of hatchery endemic production, returning adults from the program will not be subject to harvest, but allowed to escape/spawn in the basin to contribute to the naturally produced steelhead.

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.

Presently, LFH will be where adults are held and spawned, eggs hatched and juveniles reared through the fingerling or smolt stage. Eight wells at LFH produce up to 137 cfs or 61,600 gpm of nearly constant 52^0 F, pathogen-free water. Discharge from LFH complies with all NPDES standards and enters the Snake River and will not affect Touchet River water quality.

For steelhead smolts acclimated at the Dayton AP, water is removed from the Touchet River under a permit for non-consumptive fish propagation purposes. The Touchet River is a productive watershed flowing from the Blue Mountains of southeast Washington. Temperatures approach freezing in winter and rise to 80^0 F or greater during the summer near the mouth. Water temperatures while fish are acclimating range between 35-60^0 F, depending on environmental conditions. Adult summer steelhead spawn in the Touchet River in the spring when high river flows provide ample water for passage and spawning.

Two release strategies for steelhead smolts in the Touchet River are being proposed by WDFW. During the initial years of the program, approximately 50,000 (up to 75,000) smolts from the endemic stock program will be transported from LFH in April and released into the upper Touchet Watershed (North Fork at Baileysburg). In addition, 85,000 LFH stock steelhead smolts will be released from the Dayton AP. Should the full endemic program be reached in the future, a maximum 150,000 smolts from the endemic program will be released from the Dayton AP (RM 53.3). Currently, WDFW will leave the option open to release a maximum of 50,000 smolts into the upper watershed by direct stream release. Total endemic smolt program will not exceed 150,000 smolts. Five to ten weeks of acclimation may occur before releasing endemic brood smolts into the river from Dayton AP.

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.

Water intake screens at Dayton AP meet current NMFS screening guidelines, and effluent discharge is monitored, reported, and currently complies with NPDES standards. Water withdrawal at LFH is through wells, and effluent is discharged to the Snake River, complying with NPDES standards.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

Broodstock will be collected at an adult trap in the mainstem Touchet River within the city of Dayton (Photos 1 and 2). Routine maintenance may require the remove/sloucing of gravel or fine sediment that accumulates in the acclimation pond diversion, or within the fish ladder over the course of time. All removal of gravel/sediment will be by hand or hydraulic (pump) actions. Prior approval from WDFW Habitat Division will occur before any sediment is disturbed.

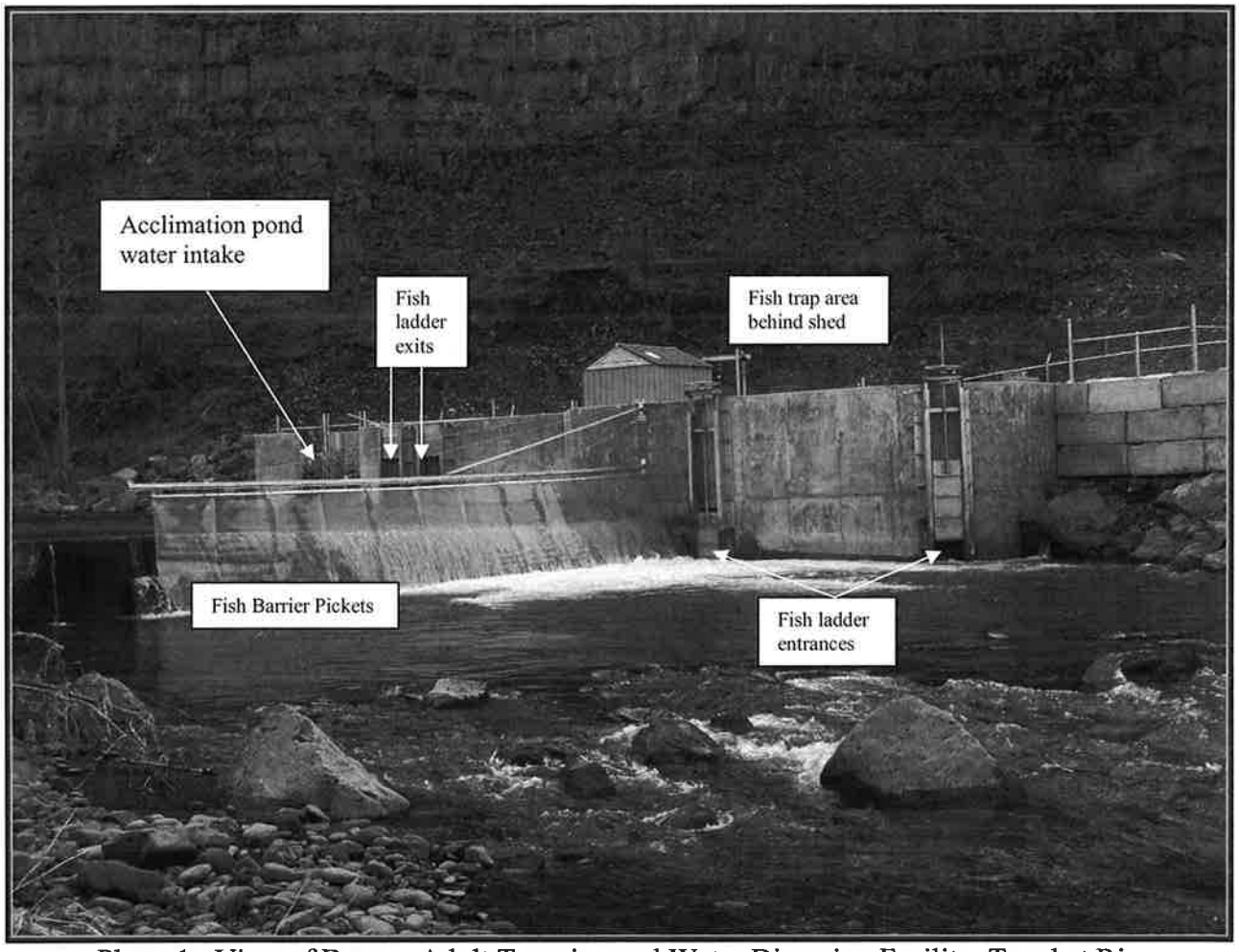


Photo 1. View of Dayton Adult Trapping and Water Diversion Facility, Touchet River.

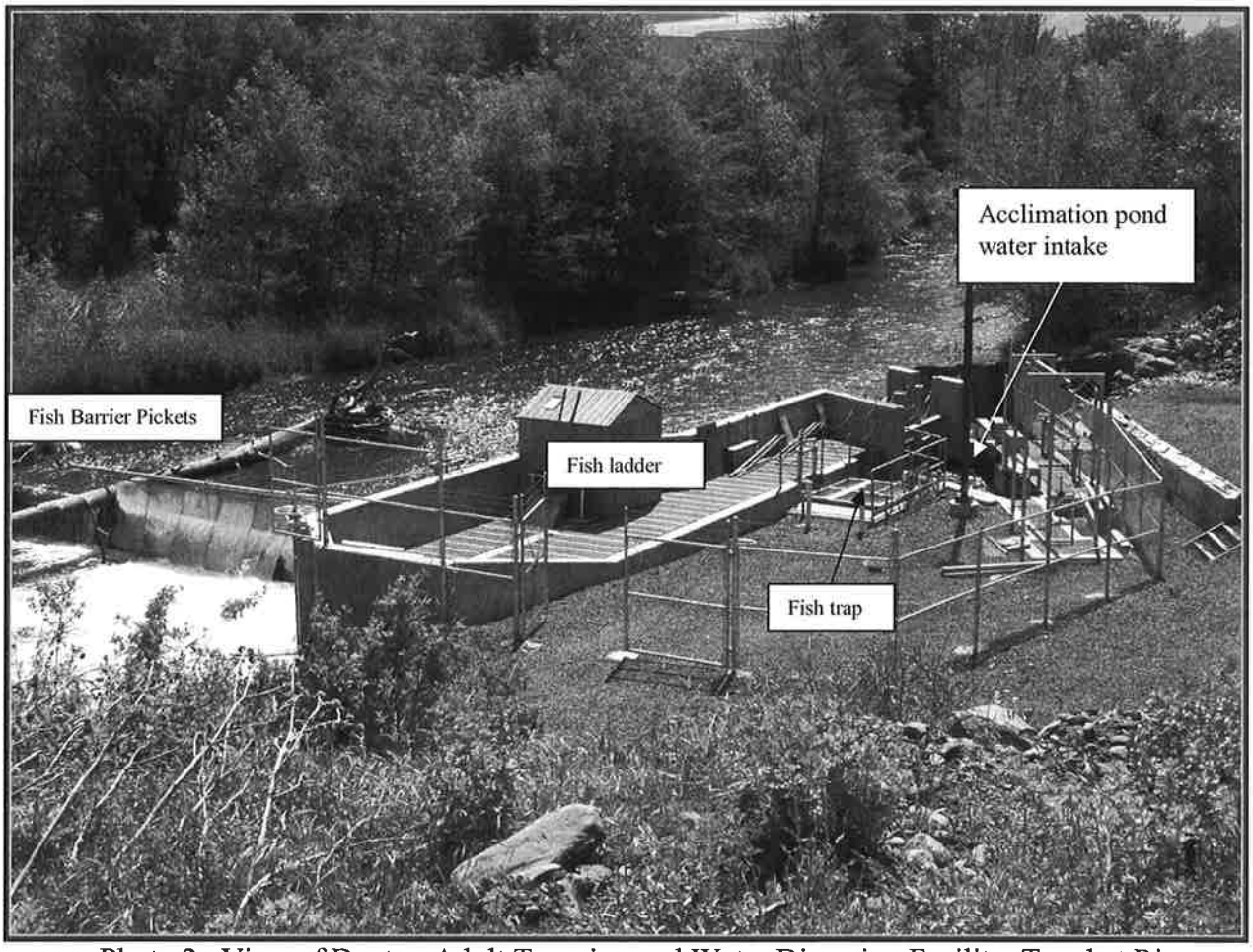


Photo 2. View of Dayton Adult Trapping and Water Diversion Facility, Touchet River.

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

Following sampling and origin determination, adults captured and identified suitable for hatchery broodstock are netted into a plastic transport tub fitted with re-circulating water, and hauled in the back of a pickup truck to LFH (elapsed time 30-45 min.). A maximum of six adults can be transported in the tub at one time. If the endemic program expands and more adults are required to be moved at one time, arrangements will be made with LFH staff to bring a larger transport tank for broodstock.

5.3) Broodstock holding and spawning facilities.

Lyons Ferry Hatchery Complex is part of the LSRCP program that is responsible for mitigation production within the Snake and Walla Walla basins. There are no other facilities for the production of Touchet River endemic stock steelhead, and offspring of all fish removed from the basin will be returned to the Touchet River. Broodstock are hauled to LFH where they are placed in adult holding raceways (10'x 6'x 80') that receive constant temperature well water. Spawning takes place within the same building. Routine maintenance on broodstock holding facilities includes checking on water intake valves, gate valves at the lower end of the holding ponds, water alarms, disinfection and formalin

treatment systems, and general condition of the holding ponds.

5.4) Incubation facilities.

The incubation room at LFH is designed to accept and incubate eggs from individual females, through the eyed stage. Two nested square buckets receive water via individual plastic tubes. Isolated incubation vessels allow disease sampling, detection and control. After eyeing is complete and virus sample results are received, eggs are consolidated into hatching baskets and transferred to shallow hatching troughs. As the eggs hatch, fry fall through the hatching baskets, and settle to the bottom of the rearing troughs where they absorb their egg sacks, and eventually start feeding. Routine maintenance in the incubation and early rearing facilities includes checking on water intake valves, water alarms, disinfection and formalin treatment systems, and general condition of the incubation room.

5.5) Rearing facilities.

Four intermediate indoor rearing tanks, eight outside intermediate rearing tanks, and 37 outside raceways are available for rearing juvenile steelhead are available at LFH. Water supply is from wells as previously described. Routine maintenance for the rearing raceways includes checking on water intake valves, water alarms, seals around outlet screens, and general condition of the rearing raceways. Rearing raceways and intermediate tanks are disinfected and cleaned between different stocks of fish.

a. Acclimation/release facilities.

Dayton AP has a volume of 348,000 ft^3, and is supplied with a maximum of six cfs (ft^3/sec) Touchet River water. Water withdrawal from the Touchet River is permitted through a non-consumptive permit issued by Washington Department of Ecology. Rotating screens adhering to NMFS screening guidelines are in place to protect any listed species within the Touchet River. Any listed fish entering the water intake facility are allowed to freely exit the area through a bypass flume. WDFW hatchery staff conducts routine maintenance of the water intake screen during the acclimation season. Any sediment accumulation in the screen area will be removed by hand or hydraulic pump under approval from WDFW Habitat Division.

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

Pre-spawning mortality on the broodstock has been documented (Table 11). Losses in more recent years have been curtailed due to more aggressive formalin treatments to control fungus outbreaks after weekly spawning activities have started.

Mortalities at that Dayton adult trap have been very low. Mortalities in the past were generally due to fish getting behind racks or netting to prevent the fish from escaping the holding area of the trap. The new trap is free of such areas and mortalities have not occurred to date (2 years).

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.

Strict operational procedures as laid out by Integrated Hatchery Operation Team (IHOT 1993) are followed at LFH. Where possible, remedial actions identified in a 1996 IHOT compliance audit are implemented. Staff are available to respond to critical operational problems at all times. Water flow and low water alarm systems, and emergency generator power supply systems to provide incubation and rearing water to the facilities are installed at LFH. Fish health monitoring occurs monthly, or more often, as required in cases of disease epizootics. Fish health practices follow PNWFHPC (1989) protocol.

5.9) Maintenance

Annual Maintenance

- Annual water supply pump rehabilitation. (***Please reference Snake River Fall Chinook HGMP***).
- Rotating drum screen maintenance for rearing lakes ($1,000).
- Chemicals for egg disinfection and fungus control ($2,500)
- Vehicle maintenance ($500).
- Annual fish transportation; a total of 58,600 lbs. smolts hauled from Lyons Ferry to Dayton AF and direct releases to Tucannon River and Walla Walla River ($7,500).
- Dredge intake at Touchet River/Dayton AF. ($3,500)
- Fire safety and maintenance service (***Please reference Snake River Fall Chinook HGMP***).

Non-recurring Maintenance (next 5 years)

- Stop log replacement for Lake # 1 ($1,500).
- Asphalt seal Dayton AF pond. ($5,000)
- New fish culture equipment; items such as crowders, dipnets, scales, shallow trough baffle plates etc. ($1,500).
- Increase intermediate rearing capacity (***Please reference Snake River Fall Chinook HGMP***).
- Develop increased water supply to meet program diversity requirements for "stepping stone" approach. (***Please reference Snake River Fall Chinook HGMP***).
- Replace formalin treatment pump ($1,200).
- Replace blower feeder motor ($1,500).

SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

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

6.1) Source.

Natural-origin steelhead captured in the Touchet River adult trap, or those captured hook and line above the city of Waitsburg will be used for broodstock.

6.2) Supporting information.

6.2.1) History.

Hatchery mitigation production releases into the Touchet River began in 1983. Broodstock originated from the Wells Hatchery (upper Columbia) and/or the Wallowa Hatchery (Snake River) programs through 1986. Beginning in 1987, a newly developing LFH stock was used as the primary source for releases. LFH stock was derived from adult returns of Wells and Wallowa origin releases at the hatchery. Complete losses at LFH of the BY1989 production because of IHNV caused the release of Wells/Skamania origin steelhead in 1990. Since 1991, only LFH origin broodstock have been used for Touchet River releases. Because of the inconsistent and incompatible nature of broodstock used in the past, and despite the success of the LFH stock, WDFW and co-managers desire to transition to an endemic broodstock to continue mitigation and assist with natural recovery under ESA.

In 2000, broodstock were collected at random from the natural population, so no direct or unintentional selection is believed to have occurred. Genetic samples from the broodstock collected and other fish passed at the trap between 2000 and 2005, and from juvenile populations throughout the Touchet River drainage will serve as a baseline to measure potential future genetic changes.

6.2.2) Annual size.

The proposed use of 36-88 adults (collected) or 32-80 adults (spawning) of steelhead for broodstock represents about 10-25% of the estimated natural fish escaping to spawn in the Touchet since 1989 (see previous tables). Collection is targeted to produce a yearly release of artificially propagated, genetically appropriate Touchet River steelhead smolts without jeopardizing natural production. The direct and indirect effects of proposed hatchery production are expected to aid in boosting the population to above the viable population threshold, and not present a conflict between ESA and harvest mitigation.

6.2.3) Past and proposed level of natural fish in broodstock.

The endemic broodstock will consist entirely of naturally reared fish through BY2009. All returning endemic brood adults between BY2000-BY2009 will be allowed to spawn naturally and not be used for broodstock, because the small founding population for these years raises genetic concerns. Starting in BY2010, collection of endemic brood may increase as the program expands. Beginning in BY2010, up to 25% of the broodstock collected may be of first generation hatchery-reared endemic brood, but will likely depend on returns of natural origin fish. At full production (80 spawning adults), no more than 35% of the broodstock collected will be of identifiable first generation hatchery-origin endemic stock.

6.2.4) Genetic or ecological differences.

Hatchery endemic broodstock will initially be developed solely from natural-origin adults and should retain the genetic structure of the natural population. Genetic samples (fin clips or punches) may be collected from hatchery and natural-origin summer steelhead in the Touchet River every year. Samples will periodically be analyzed for population structure and genetic variation.

In 2004, we had acquired multiple years of genetic data from the Touchet River endemic population, and from other areas in SE Washington, including the LFH stock. Presented in this next section is a genetic analysis summary report that was provided in 2004 by the WDFW Genetics Lab, Olympia Washington. This section was pulled from the Lyons Ferry Complex Steelhead Evaluation Report for the 2003 run year (Bumgarner et al, 2004).

Genetic Summary

Since 1998, the Snake River Lab and WDFW's Fish Management staff have periodically collected samples from SE Washington summer steelhead populations (adult and juvenile) for genetic stock analysis. Samples have been collected from the Walla Walla, Touchet and Tucannon River basins, and LFH stock.

There is always the potential for genetic introgression of LFH steelhead into the Touchet and Walla Walla River populations. However, even with the large releases of LFH summer steelhead in the past, genetic introgression with MCR steelhead has not been observed to a large degree in the Touchet and Walla Walla Rivers. Genetic samples collected in the Touchet and Walla Walla basins showed that there are still genetic differences between the natural and hatchery-origin summer steelhead (Figures 3 and 4 - Bumgarner *et al.* 2007). Individual assignment tests were conducted on the genetic samples (Table 13). The Lyons Ferry stock had a 46% self-assignment rate, approximately 10% assignment to Tucannon and Touchet, and 1% assignment to Walla Walla. The Touchet sample had 53% self-assignment, 6% assignment to Tucannon, 5% assignment to LFH, and 5% assignment to Walla Walla. The Walla Walla sample had the highest self-assignment rate, 56%, the fewest number of individuals assigning to LFH, 1%, and the lowest number of unassigned fish, 27%. With hatchery production cuts, and future decreases likely, the chance for introgression will be further decreased.

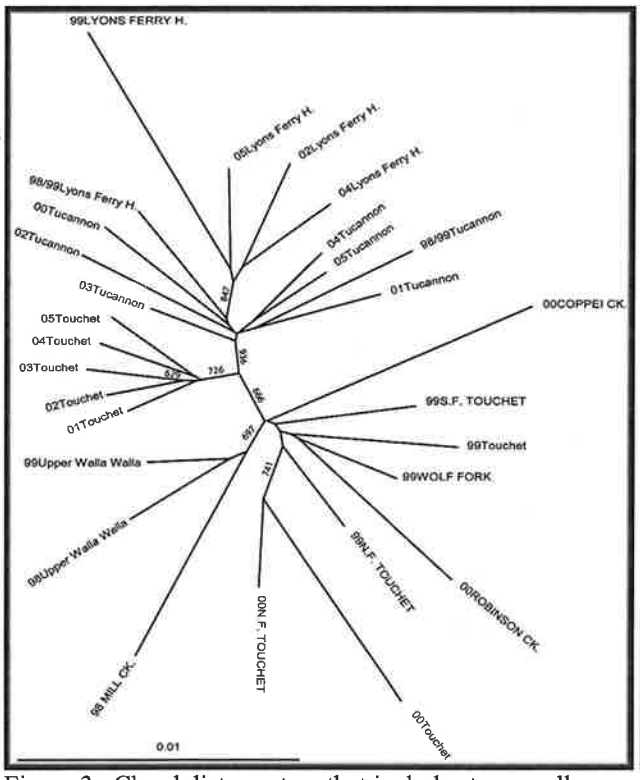


Figure 3. Chord distance tree that includes temporally stratified samples (from Figure 2), plus samples from Touchet River tributaries, Mill Creek, and Walla Walla River. Sample labels with all letters capitalized are juvenile samples. Node support numbers are values from bootstrap analysis (1000 bootstraps).

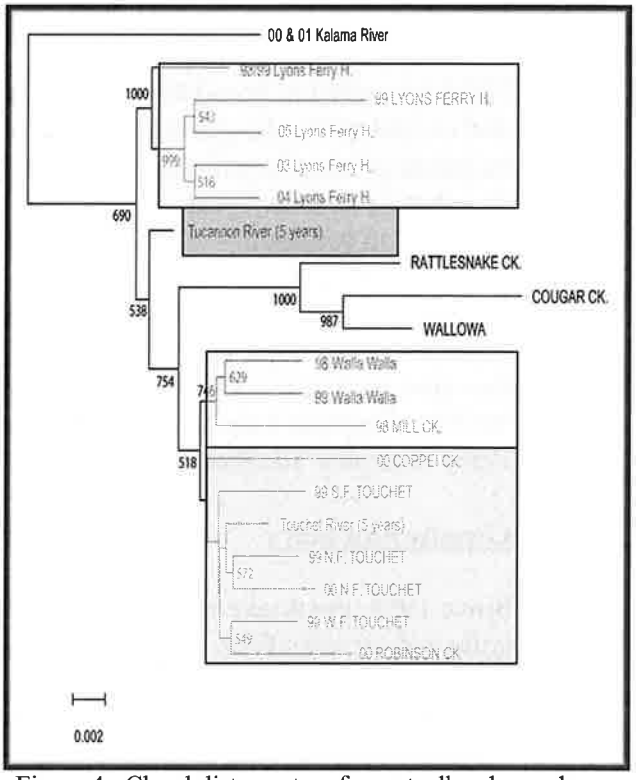


Figure 4. Chord distance tree from steelhead samples from Columbia River, Walla Walla River, and Snake River. Sample labels with all letters capitalized are juvenile samples. Node support numbers are values from bootstrap analysis (1000 bootstraps).

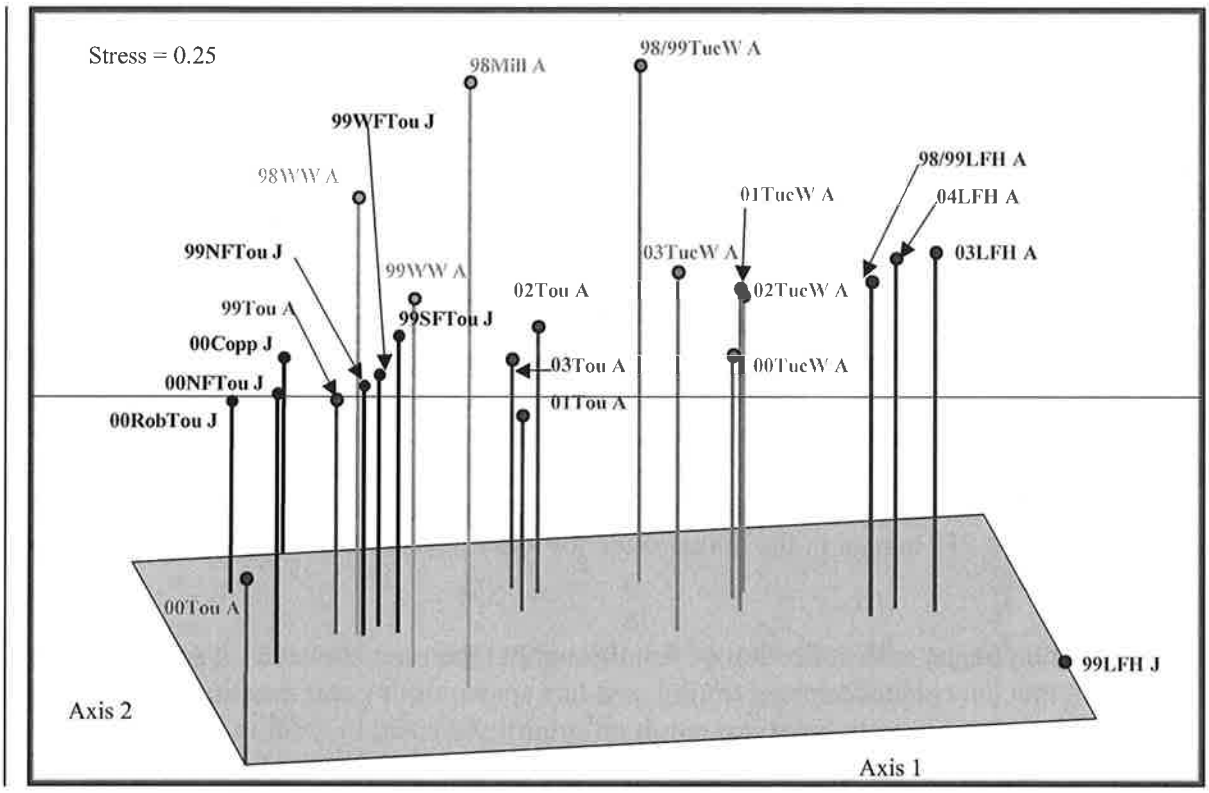
Table 13. Individual assignment results reported are the proportions of individuals assigned to each population category, given the assignment LOD was greater than one and the individual's likelihood resided within the 95% confidence interval for the estimated population of origin.

	N	Tucannon	LFH	Touchet	Walla Walla	Unassigned
Tucannon River	451	0.29	0.14	0.09	0.05	0.43
Lyons Ferry Hatchery	333	0.10	0.46	0.13	0.01	0.31
Touchet River.....	987	0.06	0.05	0.53	0.05	0.30
Walla Walla	177	0.04	0.01	0.12	0.56	0.27

6.2.5) Reasons for choosing.

The Touchet River endemic steelhead stock are likely more optimally adapted for survival in the Touchet River as compared to the LFH stock. Washington Department of Fish and Wildlife and the co-managers believe they will be most capable of surviving, returning to, and effectively spawning in the Touchet River. Also, ESA concerns will be satisfied because they are of Touchet River origin. However, due to environmental factors (water temperatures, mainstem dams), we know that a portion of the endemic stock fish will likely

stray to areas outside the Touchet River Basin. This "straying" is of summer steelhead in not a localized problem for just Touchet River steelhead, but occurs in other basins as well.



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.

Use of natural adult steelhead for broodstock will provide the greatest protection of the population's genetic structure in this Integrated Harvest (plus conservation) type program. Broodstock will be collected over the entire run timing to the best of our abilities (See Section 7). Further, the LFH stock will be phased out over time (assuming success of the endemic stock), and the majority, if not all, of the new endemic stock will be released downstream of the primary spawning and rearing habitat in the Touchet River at Dayton AP, with generally about 10% escaping to the upper watershed based on current information.

SECTION 7. BROODSTOCK COLLECTION

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

7.2) Collection or sampling design.

Adult trapping operations occurs a new fishway/fish trap facility constructed in 2007 (RM 53) located in the town of Dayton. Steelhead production below Dayton is limited, with the

exception of Coppei Creek, which enters the Touchet River at RM 42. Natural steelhead enter the lower Touchet River from May of the preceding year through May of the year they spawn. The majority of the steelhead arrive back to the Dayton Trap between February and May. Trapping for adults occurs during those times. Fish are able to bypass the fishway at virtually any springtime river flow, ensuring that a large percentage of the run is not delayed by trapping efforts. Because of the potential poor trapping efficiency, hook and line sampling for broodstock may occur in some years to supplement broodstock collections. Natural fish that are captured in the trap (or captured hook and line) are considered to be a random sub-sample of the population.

While the trap is in operation, personnel will check the trap daily for fish. The trap may be checked more than once a day if many fish are expected to be captured. Fish are netted from the trap box, and placed in a V-shaped trough, keeping water in the trough (has a calming effect on the fish so they can be sampled). After origin has been determined (natural, endemic broodstock, or hatchery production-LFH stock), the fish will either be collected for broodstock or passed upstream. Some natural-origin and endemic brood fish may have scales and DNA samples collected from them before release. Fish collected for broodstock are PIT tagged in the dorsal sinus for identification and to assist in the matings of broodstock.

The program began with collection of fish throughout the run. However, it soon became apparent that the extended spawn timing, and late spawn timing was creating difficulties in the hatchery rearing cycle (one-year smolt program). As such, in order to alleviate some of the problems, the majority of the broodstock have been collected from the early part of the run to the adult trap (Figure 5). This problem needs to be addressed by all parties involved to develop an appropriate strategy to meet the production goals. For example, one option would be to collected fish throughout the run, but then identify a portion of the spawning population that would be reared as a two-year smolt program. Other options may apply as well, with all needing further discussion before implementation can occur.

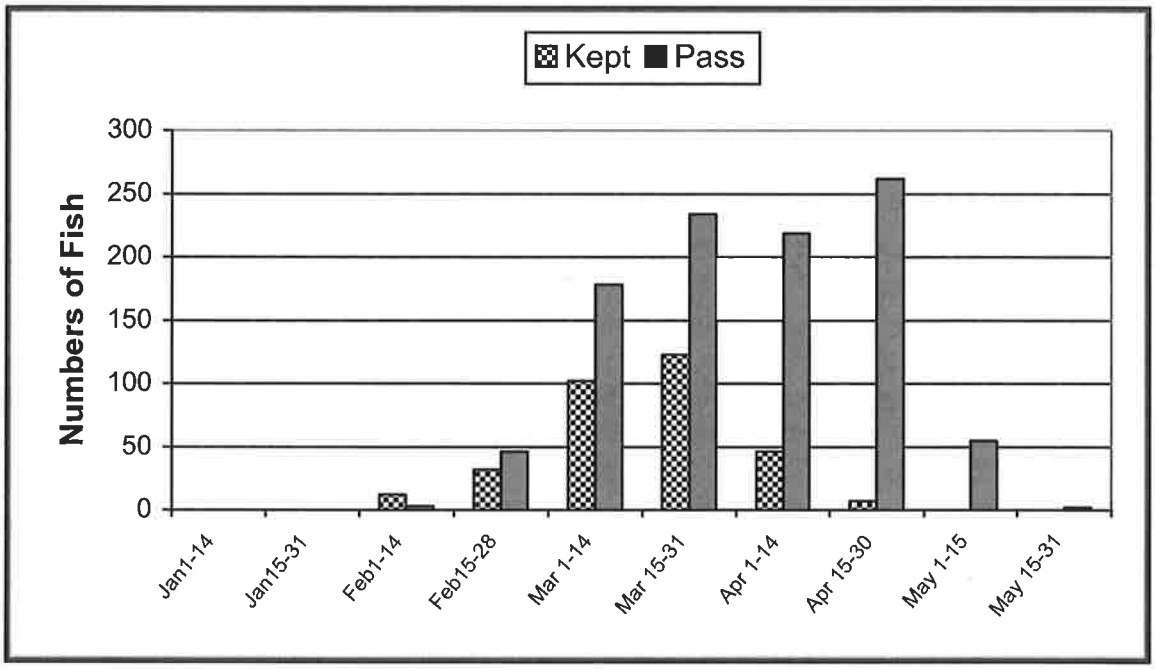


Figure 3. Broodstock collected by weekly catch (2000-2009 BY's).

7.3) Identity.

Currently, all unmarked (no external marks) fish can be selected as possible candidates for broodstock collection.

Presently and in the future, all LFH stock steelhead released into the Touchet River will receive an adipose clip or a combination adipose/left ventral/CWT as the endemic program is under evaluation. As such, all returning LFH stock fish are externally marked and can be removed from the adult trap. Current protocols call for all externally marked hatchery fish to be removed and placed in the Dayton Juvenile Pond for fishing.

For evaluation purposes, all endemic program hatchery smolts currently receive a CWT for positive identification upon recapture at the adult trap. However, we've found that the majority of the endemic steelhead also have eroded dorsal fins that allow them to be identified as hatchery origin. A portion of the endemic stock fish are also PIT tagged, and all endemic origin fish captured at the Dayton Adult Trap are scanned for PIT tags. WDFW is proposing that if the program expands to full production (after being proven successful), all endemic smolts (150,000) or fry outplants (25,000) will be marked with an adipose clip or adipose fin clip/CWT/ with VI or ADLV, which will allow them to be harvested by the local and downriver sport fisheries, fulfilling the LSCRP mitigation responsibilities.

The approach to mark all endemic brood smolts is consistent with WDFW's Wild Salmonid Policy. Further, this will allow for a more complete evaluation of the success and/or failure of the program in the future. Since the sport fishery is only marginally successful in removing all hatchery adults, even if fish are marked, some (10-20%) may

escape into the upper watershed to spawn naturally.

7.4) Proposed number to be collected:

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

Short Term: 36 adults for BY2000-BY2009.
Intermediate: Will be decided upon based on study results and trap capabilities.
Long Term: 88 adults at some time in the future

7.4.2) Broodstock collection levels for the last twelve years (e.g. 1988-99), or for most recent years available: See Table 13.

Table 15. Number of females and males collected from 2000-2009 BY Touchet Endemic summer steelhead, and the number of eggs and smolts produced.

Brood Year	Collected Adults		Spawned Adults		Effective Population Size	Eggs Collected	Smolts Produced
	Female	Male	Female	Male			
2000	13	7	12	7	17.7	53,139	36,487
2001	20	15	14	11	24.6	67,861	45,501
2002	17	20	14	9	21.9	70,843	31,440
2003	18	18	16	17	32.9	82,602	58,733
2004	16	14	15	10	24.0	66,125	55,706
2005	21	18	18	17	34.9	79,540	52,476
2006	20	19	18	18	36.0	88,668	58,989
2007	16	18	16	17	32.9	73,101	48,298 [b]
2008	14	14	14	12	25.8	66,928	49,656 [c]
2009	16	15	13	13	26.0	72,668	

[b] High fry-smolt loss was due to stress induced mortality of 20,389 fish caused by overcrowding during the PIT tagging operation.
[c] ~6,000 fish were removed and placed into a separate rearing container for a two-year smolt program study.

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

No hatchery origin fish (endemic or LFH stock) are currently collected for broodstock. All returning endemic hatchery fish are samples and released upstream of the Dayton Adult Trap for natural spawning. All returning LFH stock hatchery fish captured at the Dayton Adult trap are removed and placed in the Dayton Juvenile Pond for fishing opportunities.

Should broodstock levels increase (approaching full program), a portion of the endemic origin fish may be collected for broodstock. All other hatchery-reared endemic fish will be passed above the trap for natural spawning, unless protocols which have yet to be determined dictate otherwise. Live-spawned or kill spawned adults used as broodstock for the program will be returned to the Touchet River for additional natural spawning or nutrient enhancement. Carcass distribution will require the approval of WDFW's pathologist to ensure proper disease control measures.

7.6) Fish transportation and holding methods.

Adults are transported in plastic tubs or tank trucks with re-circulation aeration. Hauling time from the Dayton trap site to LFH is approximately 30-45 minutes, depending on road conditions.

Touchet River adults will be held separately from other steelhead broodstock to prevent accidental cross spawning. The raceways are enclosed over the middle one-third of the raceway length by the spawning building, where spawning occurs. Fish may be treated with a suite of approved chemicals to control fungus, parasites and bacterial diseases, as prescribed by WDFW fish health specialist.

7.7) Describe fish health maintenance and sanitation procedures applied.

Monthly fish health inspections occur at LFH. Because of very low numbers of adults held in broodstock raceways, raceway cleaning is unnecessary. Treatments for fungal infections are applied as chemical flushes through the raceways.

All female steelhead broodstock will be tested for IHN virus via cell culture, and the IHN virus levels in the ovarian fluid will be determined. Eggs the Touchet endemic program with high levels of IHN virus ($>10^3$) may be destroyed, reared separately, or planted into the Touchet River as fry, pending agreement among the co-managers. Eggs from negative and low IHN virus (10^1 to 10^3) females will be reared separately.

If IHN outbreaks occur in any fish-rearing vessel, fish from the affected rearing container will be promptly isolated and may be destroyed. Broodstock held at Lyons Ferry will be treated with formalin every other day to control external fungus. Treatment of chinook eggs will halt at 7 days before hatch. Steelhead egg treatments will stop when the eggs are transferred to baskets for hatching.

7.8) Disposition of carcasses.

All Touchet River broodstock carcasses will be returned to the Touchet River for nutrient enhancement after approval by WDFW fish health specialist if such release of carcasses is determined not to pose a significant fish health risk for the natural population. WDFW will return live fish to the upper Touchet River (above RM 53) to contribute to natural spawning (see 7.5 above). Anesthetizing adults for handling will require carbon dioxide if fish are to be planted back to the river as carcasses, or kelt reconditioning. MS-222 has a withdrawal period.

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.

In the beginning, WDFW made every attempt to collect broodstock from throughout the natural run period to provide for random selection of adults from the entire adult

population, which should have prevent run timing divergence of the hatchery-reared population from the natural population. However, this method was not conducive to the program needs, and broodstock collection has been shifted to the early part of the run (See Section 7.2).

Returning adults from endemic smolt releases will be allowed to enter the spawning population without being used for the program, at least during the initial years of returns. During broodstock trapping, measures will be taken to ensure the trap holding area is free of sharp objects that may cause injury to fish. Steps will also be taken to adjust attraction water entering the trap to discourage jumping of the fish captured. The current trap is located behind a secure fenced area. All fish handled (either to be passed or collected) are first placed in a V-shaped box containing water, with the head area covered with a rubber strip. This produces a calming effect on the fish that can then be sampled (scales, DNA, fork length, sex, external condition, identifying marks, etc.) without the use of anesthetic.

Disease control efforts at LFH (in accordance with PNWFHC and IHOT standards) will effectively control expansion of species specific or general salmonid diseases.

SECTION 8. MATING

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

8.1) Selection method.

All males and females that have been collected for broodstock will be examined weekly during the spawning season to determine ripeness, and all fish will be spawned when ripe. The priority will be to use any males that have not yet contributed in spawning. All females and males are PIT tagged at trapping for identification during spawning. This also allows staff to track the number times a particular male may contribute in the spawning process.

8.2) Matings.

Mating occurs in a 2x2 factorial cross (when possible) to ensure the highest likelihood of fertilization. Jack or precocious steelhead (<20" TL) are generally not seen in the population. Likewise, repeat spawners are not known to exist in significant numbers in the population (about 5%), so their chance of re-use is low.

8.3) Fertilization.

Equal sex ratios in the spawning population were originally identified as a goal for the program. However, problems getting enough ripe males to spawn with females was a problem. Further, fecundity has generally been greater than originally planned. As such current program goals can be reached by spawning on 13-14 females. As such, additional males will be collected, or live spawned and released at the adult trap to ensure adequate number of males are available. During spawning, a 2x2 factorial spawning occurs (or a

1x2 when only one female is available) to increase the number of crosses. The small number of fish ripe on individual days usually limits spawning options. Males are usually limited to primary status on one half the eggs from two females. Where insufficient males are available to meet these criteria, males can be used as primary more than twice. In those circumstances, males will be used no more than four times as primary spawners (egg equivalent = 2 females). After fertilization, eggs are rinsed in a buffered iodine solution (100 ppm) to control viral and bacterial disease, and allowed to water harden for one hour in the same solution.

8.4) Cryopreserved gametes.

Cryopreservation has not been used on any Touchet endemic stock males at this time, but may be used in future brood years to increase diversity. Currently, no semen from natural-origin males has been preserved for use in the program.

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.

In the beginning, the broodstock collection protocol was to ensure that the collected adults represented a proportional temporal distribution of the natural population. This strategy has been somewhat abandoned after the first two years. More fish are not collected from the early part of the run (See Section 7.2). A 2x2 factorial mating scheme has been, and will be, applied to reduce the risk of loss of within-population genetic diversity for the small steelhead population that is the subject of this Integrated Harvest program

SECTION 9. INCUBATION AND REARING

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

9.1) Incubation:

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

Following is the egg survival information at LFH for the nine most recent brood years of the Touchet River endemic stock steelhead (Table 14).

Table 16. Numbers of males and females spawned, eggs taken, and survival by life state of Touchet River endemic stock summer steelhead spawned at LFH, 2000 to 2008 brood years.

	Spawned								Fry to	Egg to
			Eggs	Eggs	Percent		Egg to fry		smolt	smolt
BY	Female	Male	taken	retained [a]	retained	Fry	survival	Smolts	survival	survival
2000	12	7	53,139	43,572	82.0	43,296	99.4	36,487	84.3	83.7
2001	14	11	67,861	52,116	76.8	52,116	100.0	45,501	87.3	87.3
2002	14	19	70,843	66,460	93.8	31,715	47.7	31,440	99.1	47.3
2003	16	17	82,602	75,059	90.9	70,198	93.5	58,733	83.7	78.2
2004	15	10	66,125	59,644	90.2	55,358	92.8	55,706	100.0	93.4
2005	18	17	79,540	52,195	63.6	49,870	95.5	52,476	100.0	100.0
2006	18	18	88,668	73,633	83.0	61,141	83.0	58,989	96.5	80.1
2007	16	17	73,101	69,626	95.2	68,626	98.6	48,298	70.4 [b]	69.3
2008	14	12	66,928	57,279	85.6	57,111	99.7			

[a] The number of eggs retained includes all losses from green egg to eye up (mortality and eggs destroyed due to IHNV).

[b] High fry-smolt loss was due to stress induced mortality of 20,389 fish caused by overcrowding during the PIT tagging operation.

9.1.2) Cause for, and disposition of surplus egg takes.

Estimated egg take and fecundity is based on nine years of spawning data. Egg survival to eye-up is slightly higher than what we observe for the LFH stock. Eggs in excess of the program needs will be retained to ensure the goal is met in case of unexpected loss from IHNV or other unexpected circumstances. (Note: present disease control protocol requires the disposal of eggs from IHNV positive female to control outbreaks of the disease within the hatchery). Because of the limited supply of endemic Touchet River fish, an exception from that protocol is in effect. LFH staff will work with the WDFW fish health specialist to ensure appropriate measures are taken to disinfect eggs and isolate fish from known IHNV positive females. Excess fingerlings above the smolt production goal would eventually be released within the Touchet River basin in areas of underseeded habitat. Any fingerling plants outside the Touchet River (or its tributaries) will be agreed to by the co-managers.

9.1.3) Loading densities applied during incubation.

Eggs from individual females are incubated individually in nested square buckets (~3 gallon) through eye-up. Water flow through each incubation bucket is ~2g/min. After eye-up, eggs are placed in hatching baskets with a capacity of 20,000 eggs each.

9.1.4) Incubation conditions.

Incubation, as with rearing, occurs with pathogen free, sediment free, 51-53 ^{0}F well water. The incubation building is fitted with back-up pumps to maintain flow through the troughs in emergency situations, and with secondary packed columns to maintain water oxygenation above 10 ppm. Flow monitors will sound an alarm if flow through the incubation troughs is interrupted. IHOT incubation protocols will be followed where practical.

9.1.5) Ponding.

Fish hatch from baskets and drop into troughs where they remain for 4-8 weeks after feeding commences. Fish are fed after all are buttoned up (usually 1-3 days post swimup). Fish are then moved to intermediate inside tanks (usually at about 800 fish/lb). Fish rear in intermediate tanks until July or when fish reach 100/lb, at which time they are transferred to outside raceways.

9.1.6) Fish health maintenance and monitoring.

Eggs are examined daily by hatchery personnel. Prophylactic treatment of eggs for the control of fungus is prescribed by a WDFW fish health specialist, and may include treatment with formalin or other accepted fungicides. Non-viable eggs and sac-fry are removed.

While not documented for the Touchet River endemic stock as yet, catastrophic losses have occurred in the LFH summer steelhead stock due to IHNV in the past (BY1989 100% loss). Following the loss in 1989, strict spawning protocols and procedures were implemented to prevent a similar event. These protocols and procedures will be strictly followed with the Touchet River endemic program.

Touchet River stock females have been detected with IHNV during virology screening of the broodstock. Given the past history, it has been decided by the managers to not rear any progeny where the females tested high for the IHN virus. Instead, these progeny have been reared in isolation at LFH, and then released into the Touchet River as fry. IHNV positive fish have been detected in 2005 (5), 2006 (3), 2008 (1), and 2009 (1)..

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.

Eggs are incubated in pathogen free, silt free well water to ensure maximum egg survival and minimize potential loss from disease. The hatchery incubation room is protected by a separate low water alarm system and an automatic water reuse pumping system, and for the use of wells separate from the hatchery's main well field.

9.2) Rearing:

9.2.1) Provide survival rate data by hatchery life stage for the most recent twelve years (1988-99), or for years where dependable data are available.

See Table 14 Above

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

LFH raceway rearing density index criteria for steelhead will not exceed 0.26 lbs fish/ft^3. Where steelhead are reared in acclimation ponds, densities can be 10% of the raceway maximum. Generally, endemic brood juveniles will rear in vessels at densities less than 0.26 lbs fish/ft^3. To date, endemic stock fish have not been put in the acclimation facilities.

9.2.3) Fish rearing conditions

Raceways are supplied with oxygenated water from the hatchery's central degassing building. Approximately 1,000 gpm water enters each raceway through secondary degassing cans. Oxygen levels range between 10-12 ppm entering, to 8-10 ppm leaving the raceway, depending on ambient air temperature and number of fish in the raceway. Flow index (FLI) is monitored monthly at all facilities and rarely exceeds 80% of the allowable loading. Raceways are cleaned three times a week by brushing to remove accumulated uneaten feed and fecal material. Feeding is by hand.

For the Touchet endemic program, overhead camouflage netting and in-raceway aquamats have been installed to reduce the fright response that is so prevalent in this stock of fish. The combination of these efforts, and the hatchery staff feeding from cover has aided in the rearing of these fish.

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.

Growth rate information for the Touchet River endemic stock steelhead for last two years (2007 and 2008 brood years; Table 15).

Table 17. Size of Touchet River Endemic stock steelhead at LFH for the 2007, 2008 Brood Years.

2007 Brood Year			2008 Brood Year		
Month/Year	FPP	g/fish	Month/Year	FPP	g/fish
3/07	N/A	N/A	3/08	N/A	N/A
4/07	N/A	N/A	4/08	N/A	N/A
5/07	882.8	0.5	5/08	1950.2	0.2
6/07	325.5	1.4	6/08	566.6	0.8
7/07	125.8	3.6	7/08	227.1	2.0
8/07	67.6	6.7	8/08	121.2	3.7
9/07	42.1	10.8	9/08	58.4	7.8
10/07	27.8	16.3	10/08	35.6	12.8
11/07	19.7	23.0	11/08	22.2	20.5
12/07	14.2	32.0	12/08	15.2	29.9
1/08	11.1	40.9	1/09	10.2	44.5
2/08	8.9	51.0	2/09	7.9	57.4
3/08	7.3	62.2	3/09	5.6	81.1
4/08	4.9	92.7	4/09	4.3	105.6
5/08	4.7	96.6	5/09	N/A	N/A

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

See Table 15 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 .

Fry/fingerling will be fed an appropriate commercial dry or semi-moist trout/salmon diet. Feeding occurs several times daily as necessary to provide the diet at a range of 0.7 – 1.1% B.W./day. Feed conversion is expected to fall in a range of 1.1 – 1.4 pounds fed to pounds produced. Due to the duration of spawning time from the natural steelhead, a variety of starter diets and feed schedules may be used to achieve a similar size among the fish before they are moved outside to the rearing raceways. This strategy will reduce the variation (CV's) in size of juveniles within the population, and may reduce the number of residuals observed when fish are eventually released as smolts.

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

A WDFW fish health specialist monitors fish health at least monthly. More frequent care is provided as needed if disease is noted. Treatment for disease is provided by Hatchery Specialists under the direction of the Fish Health Specialist. Sanitation consists of raceway cleaning three times each week by brushing, and disinfecting equipment between raceways and/or between species on the hatchery site.

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

Program goal for the endemic program will be to release fish between April 15-30 at 4.5 fish/lb. Pre-liberation samples will note smolt development visually based on degree of silvering, presence/absence of parr marks, fin clarity and banding of the caudal fin. No gill ATPase activity or blood chemistry samples to determine degree of smoltification, or to guide fish release timing is anticipated.

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

Camouflage covers over the outside raceways are currently used to help maintain the fright response. In-raceway aquamats have been installed to provide cover for the juveniles. Aquamats have helped reduce the fright response of this stock during feeding. Raceways are old enough that the walls and bottoms are of nearly natural coloration and texture, and promote natural looking fish.

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.

Professional personnel trained in fish cultural procedures are present at Lyons Ferry Complex facilities. Facilities are state-of-the-art to provide a safe and secure rearing environment through the use of alarm systems, backup generators, and water re-use pumping systems to prevent catastrophic fish losses.

Fish will be reared under camouflage covers to maintain fright response to humans and other potential predators. Should full program be reached in the future, up to 100% of the endemic brood smolt releases could occur at Dayton AP. Options will be kept open at this time with the possibility of up to 50,000 smolts to be released in the upper basin as a direct stream release. For the fish released from the Dayton AP final rearing will occur on river water to provide acclimation/imprinting time and begin the conversion to natural feed sources present in river water.

SECTION 10. RELEASE

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

10.1) Proposed fish release levels

The following (Table 16) shows the current WDFW endemic stock juvenile or smolt releases (goal and maximum) into the Touchet River while the program is being evaluated at initial production levels.

During at least the first ten years of the program, fish will be reared at LFH through mid-April, and then all of the endemic progeny will be transported the Touchet River upstream of Dayton and released directly to the river. Should the program reach full production in the future, fish would be reared at LFH until mid-February and then transported to Dayton AP for acclimation and release. A small portion of these may be held at LFH until mid-

April and then direct stream released above Dayton. WDFW, co-managers, and NMFS will agree to release types and numbers. Should the fish be acclimated, acclimation on river water occurs for 5-10 weeks, then the screens are pulled and fish are allowed to volitionally migrate from the pond until 30 April.

Table 18. Short-term steelhead production releases (by stock) into the Touchet River.

Age Class	Maximum Number	Goal	Size (fpp)	Release Date	Location	Stock
Eggs						
Unfed Fry						
Fry						
Fingerling	25,000	0	50	1 October	N.F. Touchet River RM 53-58 (direct)	Touchet
Yearling	100,000	85,000	4.5	15-30 April	Dayton AP (acclimated)	LFH
Yearling	75,000	50,000	4.5	15-30 April	N.F. Touchet River RM 53-58 (direct)	Touchet

10.1a) Proposed fish release levels

The following table (17) shows proposed WDFW endemic stock juvenile or smolt releases (goal and maximum) into the Touchet River after the proposed full production has been reached. At this proposed level the LFH stock will have removed from the Touchet River.

Table 19. Proposed long-term steelhead production of Touchet Endemic Stock into the Touchet River.

Age Class	Maximum Number	Goal	Size (fpp)	Release Date	Location	Stock
Eggs						
Unfed Fry						
Fry						
Fingerling	25,000	0	50	1 October	N.F. Touchet River RM 53-58 (direct)	Touchet
Yearling	150,000	Up to 150,000	4.5	15-30 April	Dayton Acc Pond (acclimated)	Touchet
Yearling		Up to 50,000	4.5	15-30 April	N.F. Touchet River RM 53-58 (direct)	Touchet

10.2) Specific location(s) of proposed release(s).

Stream, river, or watercourse:	Touchet River (WRIA 32)
Release point:	RM 53-58
Major watershed:	Touchet River
Basin or Region:	Walla Walla Basin, Mid - Columbia River

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

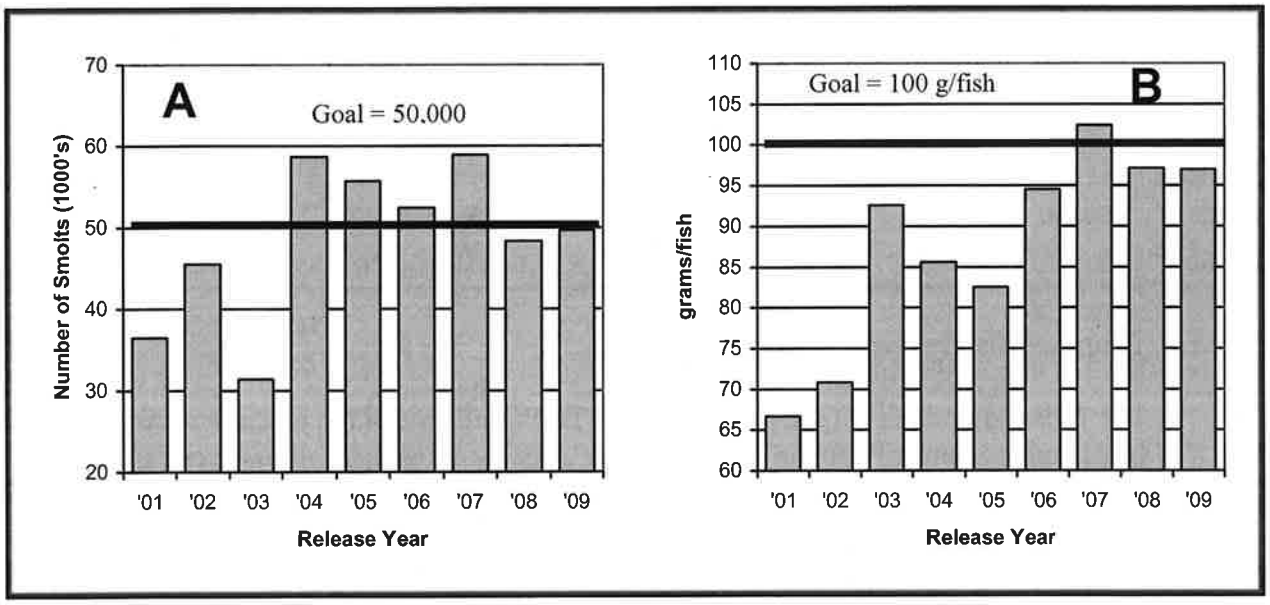


Figure 4. Touchet River endemic stock smolt production (A) and average size at release (B) from 2001-2009 release years. Through 2009, all smolts were released at one year of age. Beginning in 2010, a small number of smolts released will be from a test two-year smolt program.

10.4) Actual dates of release and description of release protocols.

Direct stream releases have occurred at RM 55.2 each year to date. Release dates have varied from early April to early May based on stream flow conditions and expected size of fish at release. Releases occur directly to the river via a pipe from the transport truck.

10.5) Fish transportation procedures, if applicable.

Fish will be transported from LFH to release sites above the town of Dayton, Washington by tank truck. Transportation time can be up to one hour.

10.6) Acclimation procedures.

Should full production be reached in the future, all or a portion of the fish will be acclimated at the Dayton AP from 15 February through a volitional release during the

month of April (6-10 weeks total acclimation). Rearing will occur on Touchet River water, which will provide acclimation to the chemistry and temperature regime of the Touchet basin. All other endemic production will be released directly to the stream in upper Touchet River (North Fork) basin in April as agreed to at that time with the co-managers.

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

In the initial years of the program, all natural brood origin smolts will receive a coded wire tag in the snout for external identification upon return as adults. Should the full smolt production be achieved in the future, all or a proportion of the fish will be released from Dayton AP. All of these fish will be adipose fin clipped, with a portion also receiving a left ventral fin clip and coded wire tagged for harvest evaluation purposes. PIT tags will also be applied to a portion of the population for program evaluation.

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

Monitoring of fish numbers, growth and mortality at the hatcheries will provide reasonably accurate estimates of live fish throughout their rearing life. No excess fish surplus to program goals occurred to date.

Because fish are of Touchet River origin, all fish will be released into the Touchet River as smolts or fingerling. Should the program develop to the stage where the potential surpluses of juveniles for hatchery rearing may occur, those surpluses will be identified in early fall (1 October). The preferred alternative would be to release fingerling into the Touchet basin at that time, targeting river reaches that had population densities below carrying capacity, although surplus production is expected to be small. Another alternative would be to use surplus fingerling for reintroduction of steelhead into portions of the Walla Walla basin that are devoid of steelhead. This alternative would require the concurrence of co-managing Tribes, and Federal managers.

10.0) Fish health certification procedures applied pre-release.

Fish will be examined by a WDFW fish health specialist and certified for release as required under the PNWFHPC (1989) guidelines.

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

Under conditions requiring release of fish at either hatchery in response to a water system failure, all fish would be hauled by truck to the Touchet River in the City of Dayton and released.

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.

In the initial phases of the program, all fish will be released into the upper river basin that

is currently underseeded by steelhead. Since the standard release strategy will consist of releasing smolts, most will orient to the river for a short time (1-10 days) and then emigrate. Some smaller fish may not be developmentally ready to emigrate and will assume residence in the river for up to another year. This number would be much greater in the case of fall fingerling plants. However, because the river is presently underseeded, WDFW does not expect these fish to represent a problem for juvenile steelhead or bull trout in the system. Fish rearing for an additional year within the Touchet River will contribute to the conservation / recovery goal for the program as it represents a life history variant of those emigrating as yearlings.

Should the program increase to full program as outlined in this HGMP, all or a larger percentage of the fish will be released from Dayton AP. Residual fish will likely be present in the river at the release location and downstream. Residual fish should not represent a problem for juvenile steelhead in the system at this location as natural production in that area of the river is low. Further, there is a fishery in the same area through the town of Dayton that will remove some of endemic hatchery stock residuals throughout the summer months.

Predation by hatchery fish on natural-origin smolts is less likely to occur than predation on fry (NMFS 1995). Salmonid predators are generally thought to prey on fish 1/3 or less their length (CBFWA 1996). Witty et al. (1995) concluded that predation by hatchery production on wild salmonids does not significantly impact naturally produced fish survival in the Columbia River migration corridor.

The Species Interaction Work Group (SIWG;1984) reported that potential impacts from competition between hatchery and natural fish are assumed to be greatest in the spawning and nursery areas and at release locations where fish densities are highest (NMFS 1995). These impacts likely diminish as hatchery smolts disperse, but resource competition may continue to occur at some unknown, but lower, level as smolts move downstream through the migration corridor. Steward and Bjornn (1990), however, concluded that hatchery fish kept in the hatchery for extended periods before release as smolts (e.g. yearling salmonids) may have different food and habitat preferences than natural fish, and that hatchery fish will be unlikely to out-compete natural fish. Hatchery-produced smolts emigrate seaward soon after liberation, minimizing the potential for competition with natural fish (Steward and Bjornn 1990). Competition between hatchery-origin salmonids with wild salmonids, including steelhead, in the mainstem corridor was judged not to be a significant factor (Witty et al. 1995).

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

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

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

	Performance Measure	Definition	Performance Measures Currently Completed (Yes, No, Partial)
Abundance	Adult Escapement to Tributary	Number of adults that have escaped to a certain point (i.e. - mouth of stream). Population based measure. Calculated with PIT tag array in middle Touchet River, or Dayton Adult Trap. Provides total hatchery and wild escapement and wild only escapement. [Assumes tributary harvest is accounted for]. Uses TRT population definition where available	YES
	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.	PARTIAL Above Dayton Adult Trap only
	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.	PARTIAL Above Dayton Adult Trap only
	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.	YES When stream flows allow surveys
	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 as hatchery spawner abundance, and 2) wild spawner abundance which multiplies by the proportion of natural origin (wild) fish. In-hatchery: Total number of fish actually used in hatchery production. Partitioned by gender and origin.	YES
	Hatchery Fraction	Percent of fish on the spawning ground that originated from a hatchery. Applied in two ways: 1) Uses weir data to determine number of fish by origin released above Dayton Adult Trap, and 2) Based on the PIT tag array (natural and hatchery origin detected), minus estimates of harvest if needed and mortality prior to spawning	YES
	Ocean/Mainstem Harvest	Number of fish caught in ocean and mainstem (tribal, sport, or commercial) by hatchery and natural origin.	PARTIAL hatchery fish only
	Harvest Abundance in Tributary	Number of fish caught in tributaries (tribal, sport, or commercial) by hatchery and natural origin.	PARTIAL hatchery fish only
	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.	NO
	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).	YES
	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: $Var(X \cdot Y) = E(X)^2 \cdot Var(Y) + E(Y)^2 \cdot Var(X) + Var(X) \cdot Var(Y)$	YES
	Run Prediction	This will not be in the raw or summarized performance database.	NO

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 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 first mainstem dam, first mainstem dam to first mainstem dam, and first mainstem dam to tributary. *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. 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: $Var\left(\frac{X}{Y}\right)=\left(\frac{EX}{EY}\right)^2\cdot\left(\frac{Var(Y)}{(EY)^2}\right)$	PARTIAL
	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 or PIT tag array. Two variants calculated: 1) escapement, and 2) spawners.	YES
	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 juvenile 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.	YES
	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.	PARTIAL Not all fish are treated as run of the river fish – data will need parsing
	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.	PARTIAL may not be possible based on PIT tag numbers
	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. screw traps) are used to calculate survival estimates.	PARTIAL see comments above
Distribution	Adult Spawner Spatial Distribution	Tributary spawner distribution. Reach specific summaries based on index areas. Hatchery-origin vs. natural-origin spawners across spawning areas within populations will be determined from weir data or PIT tag arrays.	YES
	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 based on PIT tag array, and 2) uses fish released above Dayton Adult Trap.	YES
	Juvenile Rearing Distribution		NO
	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	PARTIAL hatchery fish only

Genetics	Genetic Diversity	Indices of genetic diversity – measured within a tributary) heterozygosity – allozymes, microsatellites), or among tributaries across population aggregates (e.g., FST). Baseline was set from 2000-2005, period sampling should occur every ten years after program has reached full production.	YES
	Reproductive Success (Nb/N)	Derived measure: determining hatchery: wild proportions, effective population size is modeled.	NO
	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.	NO
	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.	NO
Life History	Age Structure	Proportion of escapement composed of adult individuals of different brood years. Calculated for wild and hatchery origin Adult returns. Accessed via scale method, or mark recoveries. Smolt migration age is determined by brood year (year when eggs are placed in the gravel). Scales are collected from natural-origin smolts annually.	YES
	Age–at–Return	Age distribution of spawners on spawning ground. Calculated for wild and hatchery adult returns based on PIT tag returns and scale data or marks collected at weirs.	YES
	Age–at-Emigration	Smolt migration age is determined by brood year (year when eggs are placed in the gravel). Scales are collected from natural-origin smolts annually. All hatchery-origin steelhead smolts are one year in age at release.	YES
	Size-at-Return	Size distribution of spawners using fork length. Raw database measure only.	YES
	Size-at-Emigration	Fork length (mm) and weight (g) are representatively collected weekly from natural smolts captured in emigration traps. Mean fork length and variance for all samples within a life stage-specific emigration period are generated (mean length by week then averaged by life stage). Size-at-emigration for hatchery production is generated from pre release sampling of juveniles at the hatchery.	YES
	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). Samples taken annually from hatchery and smolt trap in lower Tucannon River.	YES
	Percent Females (adults)	The percentage of females in the spawning population. Calculated using 1) weir data, CalculAed for wild, hatchery, and total fish.	PARTIAL Above Dayton Adult Trap only
	Adult Run-timing	Arrival timing of adults at adult monitoring sites (weir, PIT array) calculated as range, 10%, median, 90% percentiles. Calculated for wild and hatchery origin fish separately, and total.	YES
	Spawn-timing	This will be a raw database measure only, could be based on hatchery spawning or spawning in the river based on index redd count areas.	YES
	Juvenile Emigration Timing	Juvenile emigration timing is characterized by individual life stages at the rotary screw trap. Emigration timing at the rotary screw trap is expressed as the percent of total abundance over time. Emigration timing to the first mainstream dam will be based on PIT tags.	YES
	Mainstem Arrival Timing (McNary Dam)	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 life stage. 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 life stage divided by tributary abundance estimate by life stage). Daily products are added and rounded to the nearest integer to determine weighted median, 0%, 50%, 90% and 100% detection dates.	YES
Habitat	Physical Habitat		NO
	Fish and Amphibian Assemblage	Observations through rotary screw trap catch.	YES

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).	YES
	In-hatchery Life Stage Survival	In-hatchery survival is calculated during early life history stages of hatchery-origin juvenile steelhead. 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 fin clipping or CWT 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.	YES
	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.	YES
	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).	YES
	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.	YES
	Spawn Timing	Spawn date of broodstock spawners by age, sex and origin, Also reported as cumulative timing and median dates.	YES
	Hatchery Broodstock Fraction	Percent of hatchery broodstock actually used to spawn the next generation of hatchery F1s. Does not include prespawn mortality.	YES
	Hatchery Broodstock Prespawn Mortality	Percent of adults that die while retained in the hatchery, but before spawning.	YES
	Female Spawner IHNV Values	Screening procedure for diagnosis and detection of IHNV in adult female ovarian fluids.	YES
	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	YES
	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.	YES
	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". ("Marks" refer to adipose fin clips OR ventral fin clips).	YES
	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".	YES
	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).	YES
	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.	PARTIAL
	Water Temperature	Hatchery operational measure (Celsius) - measured continuously at the hatchery with thermographs and 3 times daily at acclimation facilities with hand-held devices.	PARTIAL

Estimate the contribution of conservation / mitigation program-origin summer steelhead to the basin and compare performance to the natural population.

The Dayton Adult trap operations/broodstock collections/sampling has been thoroughly described in previous sections of this HGMP. In addition to the Dayton Adult Trap, WDFW will install a temporary adult trap in Coppei Creek, a smaller tributary to the Touchet River that runs through the city of Waitsburg, about 10 miles below the city of Dayton. Spawning ground surveys from WDFW Fish Management Staff has documented

summer steelhead spawning, however the composition of the run (hatchery endemic : hatchery LFH : natural origin) is unknown.

A previous attempt to trap in Coppei Creek was attempted in 2005, but was unsuccessful due to high, flashy stream flows that are commonly experienced in the stream. WDFW Fish Management Staff has re-initiated adult trapping in the process of construction a new adult trap and floating weir panels that may be able to withstand the higher stream flows during runoff events. Trapping in Coppei Creek has occurred in 2009 and 2010.

All fish captured in the Coppei Creek trap will be sampled for origin, sex, fork length, any marks/tags, and scanned for PIT tags. Scales will be collected from all fish that appear to natural origin. Any ADLV +CWT fish (most likely Lyons Ferry Stock) will be immediately sacrificed for retrieval of the coded wire tag information. Based on previous spawning ground surveys, WDFW fish management staff anticipates that up to 200 fish may return to Coppei Creek annually. Depending on stream flows, the trap may be disabled for periods of the trapping season, hence it will be unlikely that all returning steelhead to Coppei Creek will be trapped/handled.

Conduct spawning ground surveys to estimate spawners, and use in conjunction with trapping data to estimate the proportions of natural, endemic brood hatchery, and other hatchery-origin steelhead in the spawning population.Estimate the number of natural, and naturally spawning hatchery-origin summer steelhead contributing to the Touchet River annual escapement. Operate a smolt trap on the Touchet River to: 1) Estimate the number, timing, and age composition of natural-origin steelhead smolts from the river, 2) estimate the migration success to the smolt trap from releases of endemic stock hatchery steelhead in the upper basin, and 3) allow downriver migration comparison between natural and hatchery propagated by PIT tagging at the smolt trap. Estimated SARs by brood year to determine if fish are surviving – escapement to hatchery, spawning grounds and harvest.

Monitor and evaluate any changes in the genetic, phenotypic, or ecological characteristics of the populations potentially affected by the program.

Collect additional GSI data (DNA-based) from regional summer steelhead adult populations to determine the degree to which discrete populations persist in the individual watersheds. Collect length and scale samples from all adults (natural and hatchery) returning to the trap on the Touchet River. Assess age structure of returning hatchery-origin fish and compare with natural fish. Compare length at age of natural and hatchery-reared returning adults. Operate a smolt trap on the Touchet River to: 1) Estimate the number, timing, and age composition of natural-origin steelhead smolts from the river, 2) estimate the migration success to the smolt trap from releases of endemic stock hatchery steelhead in the upper basin, and 3) allow downriver migration comparison between natural and endemic stock hatchery steelhead by PIT tagging at the smolt trap.

Assess the need and methods for improvement of mitigation / conservation activities in order to meet program objectives, or the need to discontinue the program because of failure to meet objectives.

Determine the pre-spawning and green egg to released smolt survivals for the program. Monitor growth and feed conversion for fingerlings. Determine green egg to eyed egg, eyed egg to fry, and fry to released smolt survival rates. Maintain and compile records of cultural techniques used for each life stage, such as: collection and handling procedures, and trap holding durations for broodstock; fish and egg condition at time of spawning; fertilization procedures, incubation methods/densities, temperature unit records by developmental stage, shocking methods, and fungus treatment methods for eggs; ponding methods, rearing/pond loading densities, feeding schedules and rates for juveniles; and release methods summarize results of tasks for presentation in annual reports. Identify where the propagation program is falling short of objectives, and make recommendations for improved production as needed.

Determine if broodstock procurement methods are collecting the required number of adults that represent the demographics of the donor population with minimal injuries and stress to the fish. Monitor operation of adult trapping operations to ensure compliance with established broodstock collection protocols. Monitor timing, duration, composition, and magnitude of run at each adult collection site.Maintain daily records of trap operation and maintenance (e.g. time of collection), number and condition of fish trapped, and environmental conditions (e.g. river level, water temperature). Collect biological information on collection-related mortalities. Determine causes of mortality, and use carcasses for stock profile sampling, if possible. Summarize results for presentation in annual reports. Provide recommendations on means to improve broodstock collection, and refine protocols if needed for application in subsequent seasons.

Monitor fish health, specifically as related to cultural practices that can be adapted to prevent fish health problems. Professional fish health specialists supplied by WDFW will monitor fish health. Fish health monitoring will be conducted by a fish health specialist. Significant fish mortality to unknown causes will be sampled for histopathological study. The incidence of viral pathogens in broodstock will be determined by sampling fish at spawning in accordance with procedures set forth in PNWFHPC. Recommendations on fish cultural practices will be provided on a monthly basis, based upon the fish health condition of juveniles. Fish health monitoring results will be summarized as part of an annual report.

Monitor and document facility operation to ensure compliance with applicable standards and to ensure that operation does not adversely affect natural populations.

Collect and evaluate information on adult returns.

This element will be addressed through consideration of the results of previous elements, and through the collection of information required under adaptive criteria. All will be used as the basis for determining the progress toward program goals and whether the program should continue.

Monitor the harvest of hatchery produced endemic stock Touchet and LFH hatchery stock

steelhead in sport and treaty fisheries. Document trends in abundance. Collect age, sex, length, average egg size, and fecundity data from a representative sample of broodstock used in the endemic stock program for use as baseline data to document any phenotypic changes in the populations. Compare newly acquired DNA analysis data reporting allele frequency variation of returning hatchery and natural fish with baseline genetic data. Determine if there is evidence of a loss in genetic variation (not expected from random drift) that may have resulted from the endemic stock program. Commencing with the first year of returns of progeny from naturally spawned, hatchery-origin summer steelhead, evaluate results of spawning ground surveys and age class data collections to: Estimate the abundance and trends in abundance of spawners; Estimate the proportion of the escapement comprised by steelhead of hatchery lineage, and of natural lineage; Through mark sampling, estimate brood year contribution for hatchery lineage and natural-origin fish.

Use the above information to determine whether the population has declined, remained stable, or has been recovered to sustainable levels. The ability to estimate hatchery and natural proportions will be determined by implementation plans, budgets, and assessment priorities.

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

Funding for most of the Monitoring and Evaluation will be provided by the LSRCP program as part of the ongoing mitigation program. Expanded Monitoring and Evaluation will require additional funding (e.g. smolt trapping).

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.

1. Juvenile sampling at hatchery facilities will be conducted with accepted procedures to minimize stress and mortality from sampling. Sample sizes will be the minimum necessary to achieve statistically valid results for growth, tag retention and fish health.
2. Smolt trapping operations will ensure that holding time, stress and potential for injury of captured migrants is minimized. Marked groups for assessing trap efficiency will be the minimum necessary to achieve statistically valid results.
3. Adult trapping facilities will be monitored daily, or more often as necessary to prevent injury and unnecessary delay.
4. Spawning ground surveys will be conducted in such a manner to avoid scaring spawning fish off redds. Also, care will taken when walking in areas with redds so eggs won't be accidentally crushed.

SECTION 12. RESEARCH

12.1) Objective or purpose.

The ongoing LSRCP program research is designed to:

- Determine the feasibility of an endemic stock program on the Touchet River to replace the existing LFH stock fish from the basin.

- Document hatchery rearing and release activities and subsequent adult returns.
- Determine success of the program in meeting mitigation goals and adult returns to the Touchet River, or the Snake River Basin.
- Provide management recommendations aimed at improving program effectiveness and efficiency.
- Provide management recommendations aimed at reducing program impacts on listed fish.

12.2) Cooperating and funding agencies.

Lower Snake River Compensation Program – Funding Agency
Confederated Tribes of the Umatilla Indian Reservation – Co-manager

12.3) Principle investigator or project supervisor and staff.

Mark Schuck Glen Mendel Joe Bumgarner
Jerry Dedloff Temporary field technicians

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

Same as 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.

Year Round. Endemic stock fish are present in the hatchery during all times of the year due to the overlap or juvenile rearing/release and adult collection time for broodstock. Specific times for activities conducted under research and monitoring are described below.

Broodstock Trapping – January through May
Spawning – March through May
Juvenile Rearing – March though following April
Smolt Trapping – October -June
Spawning Ground Surveys – March though May
PIT Tagging – January/February at LFH, October-June at Touchet River Smolt Trap

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

Handling of listed fish will generally be restricted to enumeration and sampling at the site of capture (Dayton Adult Trap, Touchet River smolt trap). Listed fish will generally be anesthetized prior to human handling, except at the adult trap where sampling troughs are

used.

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

Injury due to capture and sampling is inevitable. However, precautions have been taken during all activities to make sure that mortalities are kept to a minimum.

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".

See attached "take table" for anticipated mortalities to listed fish that could occur.

12.10) Alternative methods to achieve project objectives.

Alternatives to the current program were described in Section 1.16.

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

Other listed species that may be potentially affected by this program have been described in Section 2.2 (bull trout)

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.

WDFW and the other co-mangers within the basin, along with NOAA Fisheries have take all known necessary steps to eliminate and/or minimize ecological effects, injury, and mortality to listed fish as part of this hatchery program. Any specific research conducted on listed fish will be approved by NOAA fisheries before proceeding.

SECTION 13. ATTACHMENTS AND CITATIONS

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FMEP (Fisheries Management and Evaluation Plan). 2000 in progress. FMEP for Mid-Columbia River Region. Prepared by the Washington Department of Fish and Wildlife.

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Mendel, G., V. Naef, D. Karl 1999. Assessment of Salmonid Fishes and their Habitat Conditions in the Walla Walla River Basin – 1998 Annual Report. Washington Department of Fish and Wildlife Report # FPA99-01, for U.S. Department of Energy, Bonneville Power Administration Fish and Wildlife Project # 98-20.

National Marine Fisheries Service. 1995. Biological Opinion for 1995 to 1998 hatchery operations in the Columbia River Basin. NOAA/NMFS, April 5, 1995. 82 pp.

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SIWG (Species Interaction Work Group). 1984. Evaluation of potential interaction effects in the planning and selection of salmonid enhancement projects. J. Rensel, chairman and K. Fresh editor. Report prepared for the Enhancement Planning Team for implementation of the Salmon and Steelhead Conservation and Enhancement Act of 1980. Washington Dept. Fish and Wildlife. Olympia, WA. 80 pp.

Steward, C.R. and T.C. Bjornn. 1990. Supplementation of salmon and steelhead stocks with hatchery fish: a synthesis of published literature. Tech. Rpt. 90-1. Idaho Cooperative Fish and Wildlife Research Unit. University of Idaho, Moscow, ID.

Washington Department of Fisheries (WDF), Washington Department of Wildlife (WDW), and Western Washington Treaty Indian Tribes (WWTIT). 1993. 1992 Washington State salmon and steelhead stock inventory

(SASSI). Wash. Dept. Fish Wildlife, Olympia, 212 p. and 5 regional volumes. Washington Dept. Fish and Wildlife, 600 Capitol Way N, Olympia, WA. 98501-1091.

Washington Department of Fish and Wildlife. 1987-1999. Steelhead Sport Catch Summaries for Washington State.

Washington Department of Fish and Wildlife. 1999. Unpublished data from the files of the Snake River Lab.

Witty, K., C. Willis, and S. Cramer. 1995. A review of potential impacts of hatchery fish on naturally produced salmonids in the migration corridor of the Snake and Columbia rivers. Comprehensive Environmental Assessment - Final Report. S.P Cramer and Associates. Gresham, OR. 76 pp.

SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

"I hereby certify that the foregoing information 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)

Currently, there are 40 separate listings of Federal Status endangered/threatened species within the State of Washington. In the list below (Table 1), are all non-salmonid listed species and their current status ratings. Of the following species listed, only the bald eagle, and the plant species Spalding's Catchfly are suspected to be found in the area where the Touchet River Endemic Stock production program occurs (i.e. Lyons Ferry Hatchery, Dayton AP, Dayton Adult Trap). Species such as the Gray Wolf, the Grizzly Bear, the Canadian Lynx, and the northern spotted owl were once likely found occasionally in the Touchet and Walla Walla River basins, but their current existence is unlikely. The geographic distributions of the other listed species were generally limited to the Cascade Mountain Range, the Selkirk Mountains in NE Washington, the Willamette Valley (Oregon), Puget Sound and Coastal areas.

Table 1. List of current ESA listed species (animal and plant) within the State of Washington.

Status Rating	Species
	ANIMALS
Endangered	Albatross, short-tailed (*Phoebastria (=Diomedea) albatrus*)
Threatened	Bear, grizzly (*Ursus arctos horribilis*)
Threatened	Butterfly, Oregon silverspot (*Speyeria zerene hippolyta*)
Endangered	Caribou, woodland (ID, WA, B.C.) (*Rangifer tarandus caribou*)
Endangered	Deer, Columbian white-tailed (*Odocoileus virginianus leucurus*)
Threatened	Eagle, bald (lower 48 States) (*Haliaeetus leucocephalus*)
Threatened	Lynx, Canada (lower 48 States DPS) (*Lynx canadensis*)
Threatened	Murrelet, marbled (CA, OR, WA) (*Brachyramphus marmoratus marmoratus*)
Threatened	Owl, northern spotted (*Strix occidentalis caurina*)
Endangered	Pelican, brown (*Pelecanus occidentalis*)
Threatened	Plover, western snowy (Pacific coastal pop.) (*Charadrius alexandrinus nivosus*)
Threatened	Sea turtle, green (*Chelonia mydas*)
Endangered	Sea turtle, leatherback (*Dermochelys coriacea*)
Threatened	Sea-lion, Steller (eastern pop.) (*Eumetopias jubatus*)
Endangered	Whale, humpback (*Megaptera novaeangliae*)
Endangered	Wolf, gray (*Canis lupus*)
	PLANTS
Endangered	Sandwort, Marsh (*Arenaria paludicola*)
Threatened	Paintbrush, golden (*Castilleja levisecta*)
Endangered	Stickseed, showy (*Hackelia venusta*)
Threatened	Howellia, water (*Howellia aquatilis*)
Endangered	Desert-parsley, Bradshaw's (*Lomatium bradshawii*)
Threatened	Lupine, Kincaid's (*Lupinus sulphureus (=oreganus) ssp. Kincaidii (=var. kincaidii)*)
Threatened	Checker-mallow, Nelson's (*Sidalcea nelsoniana*)
Endangered	Checkermallow, Wenatchee Mountains (*Sidalcea oregana var. calva*)
Threatened	Catchfly, Spalding's (*Silene spaldingii*)
Threatened	Ladies'-tresses, Ute (*Spiranthes diluvialis*)

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

Section 10 permits, 4(d) rules, etc. for other programs associated with hatchery program.
Section 7 biological opinions for other programs associated with hatchery program.

See Section 2.1

15.2) <u>Description of non-anadromous salmonid species and habitat that may be affected by hatchery program.</u>

Bald Eagle (Much of following has been compiled from: Watson, J.W., and E.A Rodrick. 2001. Bald Eagle (*Haliaeetus leucocephalus*) – Washington Department of Fish and Wildlife – Birds (Vol #4, Chapter 8) 18pp.)

General species description and habitat requirements (citations).

Bald eagles are one of the world's larger predatory birds, ranging from 7-14 pounds, with wingspans up to 8 feet. They mate for life and are believed to live 30 years or longer in the wild. Habitat requirements generally consist of a moderate forested area with large trees that are generally located nears rivers, lakes, marshes, or other wetlands. Bald eagles have few natural enemies, and in general need an environment of quiet isolation, a condition that has changed dramatically over the last 100 years.

Major wintering concentrations are often located along rivers with salmon runs. Primary food sources have been marine or freshwater fish, waterfowl and seabirds, with secondary sources including mammals, mollusks and crustations (Retfalvi 1970, Knight et al. 1990, Watson et al. 1991, Watson and Pierce 1998).

Local population status and habitat use (citations).

Bald Eagles breed throughout most of the United States and Canada, with the highest concentrations occurring along the marine shorelines of Alaska and Canada. They winter throughout most of the breeding range, primarily south of southern Alaska and Canada (U.S. Fish and Wildlife Service 1986, Stinson et al. 2000). Within Washington, bald eagles nest primarily west of the Cascade Mountains, with scattered breeding areas along major rivers in the eastern part of the state. The bald eagle is a State Threatened species in Washington, and a Federally listed species. Early declines in populations in the lower 48 states were caused by habitat destruction and degradation, illegal shooting, and contamination of its' food source from the pesticide DDT. It is currently vulnerable to loss of nesting and winter roost habitat and is sensitive to human disturbance, primarily from development and timber harvest along shorelines. Territories are generally defined by 1) nearness of water and availability of food, 2) the availability of suitable nesting, perching, and roosting trees, and 3) the number of breeding eagles the area (Stalmaster 1987).

Site-specific inventories, surveys, etc. (citations).

Site-specific inventories (abundance/status) on bald eagles in the Touchet River is unknown. Nesting sites have not been confirmed, but could exist in some areas of the

Touchet River as habitat requirements are suitable. However, areas associated with the hatchery program would not be suitable for bald eagles.

Spalding's Catchfly

General species description and habitat requirements (citations).

Citation: Hitchcock, C.L., A. Cronquist, M. Ownbey, and J.W. Thompson. 1964. Vascular Plants of the Pacific Northwest, Part 2: *Salicaceae to Saxifragaceae.* University of Washington Press, Seattle. 597 pp.

The Spalding's Catchfly is a long-lived, herbaceous perennial, 8-24 inches tall, typically with one stem, but can have several. Each stem bears 4-7 pairs of lance shaped leaves 2 to 3 inches in length. The light green foliage and stem are lightly to more typically densely covered with sticky hairs. The cream-colored flowers are arranged in a spiral at that top of the stem. The outer, green portion of the flower forms a tube, ~1/2 inch long with ten distinct veins running it's length. The flower consists of 5 petals, each with a long narrow "claw" that is largely concealed by the calyx tube and a very short "blade", or flared portion at the summit of the claw. Four (sometimes as many as 6) short petal-like appendages are attached inside and just below each blade.

The species begins to flower in mid- to late July, with some individuals still flowering by early September. Most other forbs within it's habitat have finished flowering when *S. spaldingii* is just hitting its peak. A majority of individuals have developed young fruits by mid- to late August.

S. spaldingii occurs primarily within open grasslands with a minor shrub component and occasionally with in a mosaic of grassland and ponderosa pines. It is most commonly found at elevations of 1900-3050 feet, near lower tree line, with a preference for northerly-facing aspects. The species is primarily restricted to mesic (not extremely wet nor extremely dry) prairie or steppe vegetation that makes up the Palouse Region in SE Washington.

Local population status and habitat use (citations).

Within the State of Washington, S. spaldingii, has been confirmed to be found in Asotin, Lincoln, Spokane and Whitman counties, with a status listing of 'threatened". A total of 28 populations have been identified (FR# 1018-AF79, Vol 66, No. 196, p. 51598). This plant is threatened by a variety of factors including habitat destruction and fragmentation resulting from agricultural and urban development, grazing and trampling by domestic livestock and native herbivores, herbicide treatment and competition from nonnative plant species (Gamon 1991; Schassberger 1988). It is currently estimated that 98% of the original Palouse prairie habitat has been lost to the mentioned activities (Gamon 1991). Each of the populations documented are generally very small, and are currently quite fragmented, raising questions about their long-term viability.

Site-specific inventories, surveys, etc. (citations).

Site-specific findings in Columbia and Walla Walla counties are not available. However, it's possible that portions of the Walla Walla River Basin could contain the listed species. But it is not expected that the current steelhead program as described would effect the listed species.

15.3) Analysis of effects.

Bald Eagle

Identify potential direct, indirect, and cumulative effects of hatchery program on species and habitat (immediate and future effects).

To the best of our knowledge, the program as described in this HGMP will not directly have any negative effects on the listed species. Providing adults and juveniles to the system, even within the short term, will provide a potential prey item, which would likely benefit the listed species. Further, the current fishery associated with harvest on the adult steelhead will not likely disturb the behavior (territory, nesting, etc.) of the eagles in the area. The surrounding habitat associated with this hatchery compensation program will not be altered, which would be the only other source of negative "take" possible to the listed species, again unlikely given the habitat requirements of the bald eagle.

Identify potential level of take (past and projected future).

Disturbance to listed species from people fishing in the area. A take estimate is not possible for this potential disturbance in the past or in the future. Eagle sightings in the area near the fishery have not been substantiated.

Hatchery operations - water withdrawals, effluent, trapping, releases, routine operations and maintenance activities, non-routine operations and maintenance activities (e.g. intake excavation, construction, emergency operations, etc.)

Operation of the Dayton adult trap will not affect (directly or indirectly) the existence of the listed species in the area. Habitat requirements for the species do not apply at LFH or near the Dayton adult trap. Activities at LFH all take place on existing hatchery grounds. No new construction activities are planned for the program in either location that could impact the listed species. Effluent from LFH meets state water quality standards and is therefore not a concern.

Fish health - pathogen transmission, therapeutics, chemicals.

Not expected to be a problem. The two species have co-existed for thousands of years, the steelhead being the prey of the eagle. Eagles are likely immune to any potential pathogens that hatchery fish might be carrying. Therapeutics and chemicals when applied (at LFH) would follow label directions for proper use, eliminating any potential "take".

Ecological/biological - competition, behavioral, etc.

Behavioral disturbances to the listed species could occur if fishing pressure and eagle abundance overlap. This is not likely due to the current fishing areas most utilized by the steelhead anglers, and habitat limitations that seem to preclude the use of bald eagles in the highest fishing areas.

Predation -

A positive benefit to adult or juvenile bald eagles in this case (food source).

Monitoring and evaluations - surveys (trap, seine, electrofish, snorkel, spawning, carcass, boat, etc.).

Both the LFH and Dayton adult trap are not in the suitable habitat areas of the bald eagle.

Habitat - modifications, impacts, quality, blockage, de-watering, etc.

Modifications to the surrounding hatchery areas are not planned at this time, so no loss of potential habitat to the listed species is expected.

Spalding's Catchfly

Identify potential direct, indirect, and cumulative effects of hatchery program on species and habitat (immediate and future effects).

To the best of our knowledge, the program as described in this HGMP will not have direct, indirect, or cumulative effects on the listed species. The surrounding habitat associated with this hatchery compensation program will not be altered, which would be the only source of "take" possible to the listed species. Interactions with the summer steelhead will not occur.

Identify potential level of take (past and projected future).

None (past or projected future)

Hatchery operations - water withdrawals, effluent, trapping, releases, routine operations and maintenance activities, non-routine operations and maintenance activities (e.g. intake excavation, construction, emergency operations, etc.)

Operation of the Dayton adult trap will not affect (directly or indirectly) the existence of the listed species in the area. Habitat requirements for the species do not seem to apply at Dayton Adult Trap or at LFH. Activities at Lyons Ferry all take place on existing hatchery grounds. No new construction activities are planned for the program in either location that could impact the listed species. Effluent from LFH falls below state water quality standards guidelines, and is therefore not a concern.

Fish health - pathogen transmission, therapeutics, chemicals.

Not Applicable – pathogens would not be transmitted between the species, therapeutics and chemicals are not used.

Ecological/biological - competition, behavioral, etc.

Not Applicable - Non-overlapping habitats between the summer steelhead and the flower.

Predation -

Not Applicable - Hatchery summer steelhead do not prey on the flower.

Monitoring and evaluations - surveys (trap, seine, electrofish, snorkel, spawning, carcass, boat, etc.).

Not Applicable.

Habitat - modifications, impacts, quality, blockage, de-watering, etc.

Modifications to the surrounding hatchery areas are not planned at this time, so no loss of potential habitat to the listed species is expected.

15.4 Actions taken to mitigate for potential effects.

Identify actions taken to mitigate for potential effects to listed species and their habitat.

No actions are considered necessary at this time. Only minor disturbance to bald eagles will likely occur in the area (not directly related to this program), and land disturbance where Spalding's Catchfly may habitat will not occur over the course of the program.

15.5 References

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Table A. Estimated listed salmonid take levels of by hatchery activity.

Listed species affected: Summer Steelhead ESU/Population: Mid-Columbia/Touchet River Activity: Broodstock Collection, spawning, rearing and releases				
Location of hatchery activity: Lyons Ferry Complex Dates of activity: Year Round Hatchery program operator: Jon lovrak/Joe Bumgarner				
Type of Take	**Annual Take of Listed Fish By Life Stage *(Number of Fish)***			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)	0	0	200	0
Collect for transport b)	0	0	20	0
Capture, handle, and release c)	0	0	500	0
Capture, handle, tag/mark/tissue sample, and released d)	0	10,000	500	100
Removal (e.g. broodstock) e)	0	0	88	0
Intentional lethal take f)	0	0	88	0
Unintentional lethal take g)	0	0	20	0
Other Take (specify) h)	0	0	0	0

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 (i.e. radio tagging study to assess weir effects).
c. Take associated with weir or trapping operations where listed fish are captured, handled, and released upstream or downstream. Includes trapping at the Dayton Adult trap and Coppei Creek Trap
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. Includes trapping at the Dayton Adult trap and Coppei Creek Trap
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 "take" not identified above as a category.

Instructions:

1. *An entry for a fish to be taken should be in the take category that describes the greatest impact.*
2. *Each take to be entered in the table should be in one take category only (there should not be more than one entry for the same sampling event).*
3. *If an individual fish is to be taken more than once on separate occasions, each take must be entered in the take table.*

Table B. Estimated listed salmonid take levels of by Research/Monitoring/Evaluation activity.

Listed species affected: Summer Steelhead ESU/Population: Mid-Columbia/Touchet River Activity: Spawning surveys and smolt trapping				
Location of hatchery activity: Touchet River Dates of activity: Year Round Research/Monitoring/Evaluation program operator: Mark Schuck, Joe Bumgarner, Glen Mendel				
Type of Take	**Annual Take of Listed Fish By Life Stage *(Number of Fish)***			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)	0	0	0	0
Collect for transport b)	0	0	0	0
Capture, handle, and release c)	0	3,000	20 (kelts in smolt trap)	0
Capture, handle, tag/mark/tissue sample, and released d)	0	10,000	50 (i)	0
Removal (e.g. broodstock) e)	0	0	0	0
Intentional lethal take f)	0	0	0	0
Unintentional lethal take g)	0	200	0	0
Other Take (specify) h)	0	0	0	0

a. Contact with listed fish though snorkeling.
b. Take (non-lethal) of juveniles/smolts (natural and endemic hatchery stock origin) captured and marked for smolt trap efficiency tests.
c. Take associated with smolt trapping operations where listed fish are captured, handled and released upstream or downstream.
d. Take occurring due to PIT tagging and/or bio-sampling (length/weight and scales) of fish collected through smolt trapping operations prior to release. Most of juveniles/smolts sampled will be during PIT tagging of hatchery endemic stock.
e. Listed fish removed from the wild and collected for use as broodstock
f. Intentional mortality of listed fish during smolt trapping.
g. Unintentional mortality of listed fish, including loss of fish during transport during smolt trapping.
h. Other "take" not identified above as a category.
i. Rainbow trout mature

Instructions:

1. An entry for a fish to be taken should be in the take category that describes the greatest impact.
2. Each take to be entered in the table should be in one take category only (there should not be more than one entry for the same sampling event).
3. If an individual fish is to be taken more than once on separate occasions, each take must be entered in the take table.