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:	**July 20, 2005**

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 Stock (not-listed)

Both stocks are currently produced at WDFW's Lyons Ferry Complex. The proposed plan may slowly phase out the Lyons Ferry Hatchery (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

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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

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 believed during the negotiation of the LSRCP that smolt survival in the Snake might not be as high as proposed, and as some assurance of success, off-site mitigation was proposed. 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 steelhead to the Walla Walla River, and 750 adult steelhead 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 broodstock program. For example, the current adult trap on the Touchet River in the city of Dayton is largely ineffective due to design (primary function is an intake water supply for the Dayton Acclimation Pond), and will likely limit the progress of the program in the future unless major modifications can be made to the existing structure, or a completely separate adult trap can be constructed.

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

Lyons Ferry Hatchery – along Snake River in Franklin County, Washington (RM 58)

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

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

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 program has been operated since 1983 to provide mitigation for adult steelhead lost because of 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 (see Section 1.4). The LFH stock was derived from mainly Wells Hatchery stock, and returns back to LFH. It does not represent individuals that came from the Touchet or Walla Walla systems. The April 2, 1999 Biological Opinion issued by NMFS on the LSRCP-produced hatchery steelhead concluded 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. Washington Department of Fish and Wildlife 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 a secondary benefit, this program will attempt to maintain or increase numbers of naturally reproducing Touchet River steelhead. This will be accomplished by allowing Touchet River endemic stock returning hatchery adults to spawn in prime rearing areas. This should help conserve and/or rebuild the existing natural population to a healthy status. 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 of Touchet River steelhead. Lyons Ferry 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. WDFW realizes that straying of LFH stock adult steelhead from past Touchet River releases is likely 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.

(From NMFS *Artificial Propagation Performance Standards and Indicators*, October 24, 2000 Draft: numbers specific to that document)

3.1.2 Program contributes to mitigation requirements.
- *Number of fish returning as applicable to mitigation requirements.*

3.2.1 Fish are produced and released in a manner enabling effective harvest.
- *Number of target fish caught by fishery*
- *Number of non-target fish caught by fishery*
- *Angler days by fishery*
- *Escapement of target fish*

3.2.2 Release groups sufficiently marked to assess impacts.
- *Marking rate by type in each group*
- *Sampling rate by fishery*
- *Number of marks by type documented by fishery.*

3.3.1 Program contributes to an increasing number of spawners returning to natural spawning areas.
- *Number of spawners on spawning ground and at hatchery by age.*
- *Number of redds in production index areas.*
- *Spawner-recruit ratios.*

3.3.2 Juvenile releases are sufficiently marked for evaluation.
- *Mark rates by type*
- *Mark recoveries for juveniles and adult returns.*

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.

(From NMFS *Artificial Propagation Performance Standards and Indicators*, October 24, 2000 Draft: numbers specific to that document)

3.4.1 Fish collected for broodstock are taken throughout the return in proportions to the run distribution.
- *Timing of broodstock collection is documented and compared to entire return.*
- *Age composition of broodstock is documented though scale collection of entire run at adult trap.*

3.4.2 Broodstock collection does not reduce potential juvenile production in natural areas.
- *Broodstock collection and passage numbers are documented, and juvenile production will be documented on a yearly basis. Collection of broodstock will be adjusted (if possible) according to run size.*

3.4.3 Life history characteristics of artificially produced population do not diverge from natural population.
- *Life history characteristics of natural and endemic hatchery population are measured (age composition of smolts, smolt timing, size at smolting, smolt to adult return, adult sex ratio, age of adult return, fecundity, length/weight at age of return, temporal and spatial spawning distribution of returning adults).*

3.4.4 Annual release numbers do not exceed local, basin and migratory corridor capacities.
- *Annual release numbers of both LFH and endemic stock and their release locations and times documented.*
- *Natural production (juveniles and smolts) documented.*
- *Annual release numbers of juveniles and release locations.*

3.5.1 Patterns of genetic variation with natural populations do not change appreciably.
- *Genetic composition of naturally and artificially propagated adults is monitored and compared each generation (endemic stock only).*

3.5.2 Broodstock collection does not adversely affect the genetic diversity of the naturally spawning population.
- *Spawning escapement and composition documented.*
- *Timing of brood collection is documented.*

3.5.3 Artificially produced adults do not exceed appropriate proportion within the naturally spawning population.
- *Observed and estimated numbers of natural and endemic hatchery adults passing traps will be documented*

3.5.4 Juveniles are released on-station, or after sufficient acclimation to maximize homing ability to intended return locations.
- *Time, type and locations of hatchery releases are documented*

3.5.5 Fully smolted juveniles are released from hatchery program.
- *Level of smoltification at release is documented.*
- *Size at release of fry plants is documented.*

3.6.1 Artificial production program uses standard scientific procedures to evaluate aspects of the program.
- *Scientifically based experimental design, with measurable objectives and hypotheses.*

3.6.2 The program is monitored and evaluated on an appropriate schedule and scale to address progress toward achieving objectives.
- *Monitoring and evaluation framework includes timelines.*
- *Annual and final reports are produced.*

3.7.1 Artificial production facilities are operated in compliance with all applicable operational and fish health standards and protocols.
- *Compliance with operational and fish health standards and protocols is documented in annual reports.*

3.7.2 Effluent from facilities will not detrimentally affect natural populations.
- *Discharge water complies with applicable water quality standards, and in this case is outside the basin where the natural population exists (except for acclimation time).*

3.7.3 Water withdrawls will not prevent access to spawning areas, affect spawning behavior of natural populations, or significantly impact juvenile rearing environment.
- *Water withdrawls are documented and for this program are out of target species basin, except for acclimation time at release*
- *NMFS Screening criteria is documented*
- *Adult passage at diversion point is documented.*

3.7.4 Releases do not result in introduction of pathogens into natural production areas.
- *Proposed releases will be Fish-Health-certified prior to release.*

3.7.5 Carcass distribution for nutrient enhancement is in compliance with appropriate regulations.
- *Carcass and/or kelt distribution is documented for the target stream*
- *Compliance is documented*

3.7.6 Broodstock collection does not significantly impede passage or alter spatial/temporal distribution of natural population.
- *Temporal/spatial distribution of population around traps is documented.*

3.7.7 Weirs/traps do not result in significant stress/injury/mortality to natural population.
- *Mortality rates in traps are documented.*
- *Visual observations of fish delay periodically made.*

3.7.8 Predation by artificially produced fish does not significantly reduce natural population.
- *Release information is documented and compared to natural population data.*
- *Majority of releases will occur downstream of juvenile rearing habitat.*

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).

According to ESA Section 4(d) rules, NMFS has determined that harvesting fish derived from listed populations will be warranted as long as an approved management plan is in place (i.e. HGMP or FMEP). Therefore, should the endemic broodstock program be successful, WDFW is proposing to collect 88 fish annually (all of Touchet River endemic stock) of either natural or hatchery-origin to meet production goals in Table 2**.** This would provide maximum production in the Touchet River:

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. 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. All LFH broodstock steelhead are currently trapped at LFH on the Snake River.

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

For at least the first five years of juvenile/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 unknown, up to 75,000 smolts may be released. If greater than 75,000 smolts are expected to survive to release, then WDFW is proposing that up to 25,000 fingerlings could be released into the upper Touchet River basin in the fall before normal migration. In addition to that, 85,000 LFH stock smolts will continue to be released into the Touchet River from Dayton Acclimation Pond as part of the regular LSRCP mitigation production (Table 1).

After at least the first five 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 documents 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 1. Short-term summer steelhead production from Lyons Ferry Complex destined for the Touchet River. Represents initial releases of summer steelhead into the Touchet River as the endemic program is started (approximately 5-7 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 2. 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. Smolt to adult return rates (SAR) for several recent release years of LFH stock steelhead into the Touchet and Walla Walla rivers has been documented (Table 3).

Estimated natural escapement into the Touchet River based on redd counts appears to be at replacement in many run years (see Table 6), contributing to the relatively stable population trend. 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 replacement line in all years (Table 3). We expect survival of the endemic brood hatchery-reared fish to equal or exceed the SAR's documented for the LFH stock. Early rearing survivals (egg-to- pre-smolt) within the hatchery are expected to exceed those observed in the Touchet River natural population. Should the stock-switch occur in the future, many 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 ocean conditions, and improvements in basin productivity and migration corridor survival.

Table 3. Smolt-to-adult survival estimates based on coded-wire tags or freeze brand recoveries (Lower Granite Dam) for LFH stock summer steelhead released into the Walla Walla River or the Touchet River from Dayton Acclimation Pond. (Note: 1999 and 2000 BY returns are still being added to RMIS database)

	Walla Walla River Releases			Touchet River Releases		
Brood Year	Coded-Wire Tag Total Recoveries (% Survival)	Freeze Brand Recoveries at Lower Granite Dam (% Survival)	Coded-Wire Tag Recoveries in LSRCP Area (% Survival)	Coded-Wire Tag Total Recoveries (% Survival)	Freeze Brand Recoveries at Lower Granite Dam (% Survival)	Coded-Wire Tag Recoveries in LSRCP Area (% Survival)
1987				1,244 (1.59)	453 (0.58)	728 (0.93)
1988				989 (1.22)	179 (0.22)	753 (0.93)
1989	232 (0.59)	24 (0.06)	104 (0.26)	379 (0.96)	77 (0.20)	186 (0.47)
1990				2,461 (2.05)	591 (0.49)	1,748 (1.45)
1991				564 (1.24)	30 (0.07)	367 (0.81)
1992	508 (1.31)	110 (0.28)	294 (0.76)	701 (1.74)	226 (0.56)	503 (1.25)
1993	1,687 (2.80)	296 (0.49)	1,205 (2.00)			
1994	1,090 (2.18)	375 (0.75)	938 (1.88)	1,528 (2.54)	754 (1.25)	1,369 (2.27)
1995				797 (1.01)	299 (0.38)	657 (0.83)
1996				317 (0.57)	210 (0.38)	300 (0.54)

Brood Year	Walla Walla River Releases			Touchet River Releases		
	Coded-Wire Tag Total Recoveries (% Survival)	Freeze Brand Recoveries at Lower Granite Dam (% Survival)	Coded-Wire Tag Recoveries in LSRCP Area (% Survival)	Coded-Wire Tag Total Recoveries (% Survival)	Freeze Brand Recoveries at Lower Granite Dam (% Survival)	Coded-Wire Tag Recoveries in LSRCP Area (% Survival)
1997				685 (1.73)	232 (0.58)	648 (1.63)
1998						
1999				1,077 (2.74)	138 (0.35)	976 (2.48)
2000	171 (0.91)	NA	161 (0.85)	151 (0.74)	NA	151 (0.74)
Mean	1.56%	0.40%	1.15%	1.51%	0.46%	1.19%

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 five years.

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. WDFW and the co-managers are therefore proposing that the endemic program be operated for at least five years at a low production level (release of 50,000 smolts) where it can be evaluated against pre-determined expectations. Releases of LFH stock (85,000) will continue in the basin. 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. After the initial five or more years of the program, WDFW and the co-managers will decide on production levels for both endemic and LFH stock releases into the Touchet River. Should the endemic stock produce adults as expected, WDFW proposes the following (Table 4) to show the potential change in hatchery production within the Touchet River.

Table 4. 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
2000-2006	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.			
2007-2008	50 Adults	80,000	60,000
All 2007 and 2008 fish collected for broodstock would be natural origin			
2009-2010	64 Adults	100,000	50,000
Up to 25% of the fish collected in 2009 and 2010 for broodstock could be of hatchery-reared endemic stock origin.			
2011-2012	88 Adults	150,000	None
Up to 35% of the fish collected in 2011 and 2012 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) and some of its other tributaries 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 Lyons Ferry Hatchery (LFH) stock to achieve the mitigation goals. Beginning in 2000, unmarked (wild-origin) adults were trapped to begin development of a new endemic broodstock. If successful, the endemic broodstock would replace existing LFH stock summer steelhead in the Touchet River for harvest augmentation. However, many questions/issues need to be resolved if the program expands to full production. What is the appropriate number/percentage of endemic origin fish to be passed above the Dayton adult trap? What percent of the hatchery broodstock should be naturally produced fish to prevent the stock from genetic divergence? What maximum percent 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, a plan for continued use of the LFH stock in the basin will have to be decided (See LFH stock – Walla Walla River HGMP). Options that could be considered include changing the number fish to release and their location based on current protocols. Stray rates (LFH stock) 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. Therefore, change to the use of an endemic stock may not be necessary.

The non-endemic LFH program has been very successful in returning adults to the Touchet and Walla Walla rivers for the mitigation fishery. Recent microsatellite DNA analysis suggests that little genetic introgression has occurred between the LFH and natural stock of steelhead in the Touchet River. Further genetic analysis is needed to confirm these results. 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 evaluate the program.

The endemic broodstock founding population size is small (<15 females/brood year), raising genetic concerns for the future. The current adult broodstock trapping facilities in the Touchet River are inadequate for collecting fish, and for evaluating the program as a whole. 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. Facilities at LFH are currently inadequate to deal with the large range of juvenile sizes, and available raceway space to rear the individual stocks conflicts with other programs at LFH. Reductions in the LFH stock in recent years because of ESA concerns, and development of endemic broodstocks (Touchet and Tucannon) has created inefficient use of rearing space at LFH.

1.16.2) Potential Alternatives to the Current Program

Alternative 1: 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 alternative is premature until the efficacy of pursuing expansion of the Endemic program is proven. Washington is still legally due compensation under the LSRCP. Currently the compensation provides a very popular sport fishery in the Touchet and Walla Walla rivers, and elsewhere.

Alternative 2: Collect more fish for broodstock to reduce the genetic risk from the small founding population size. Until sufficient success in rearing the endemic steelhead has been proven, collecting more fish at this time could unnecessarily "mine" natural origin adults that currently come back to the system. The evaluation of the endemic stock is just getting started. Further genetic and survival data collected in the next few years may suggest that switching to an endemic stock would be the wrong decision.

Alternative 3: Develop alternative rearing facilities at LFH for the LFH stock and endemic stock. Development of the endemic programs (Touchet and Tucannon) has left the hatchery short on rearing space during some times of the years. The large rearing lakes with LFH or Wallowa stock steelhead are being underutilized. One solution would be split the lakes in half to allow smaller production groups to be reared. Smaller rearing ponds or additional raceways could also be constructed at the hatchery. However, major modification will have to occur to the existing structures for this to work. In addition, the LFH stock would have to be moved into standard raceways. This would not provide a benefit to the LFH stock, as the lakes (semi-natural rearing environment) are known to produce very high quality smolts that survive beyond program expectation.

Alternative 4: 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. WDFW proposed this alternative life history strategy with the endemic steelhead programs (Touchet and Tucannon) though BPA, but was not funded. Funding to implement this work will continue to be investigated.

1.16.3) Potential Reforms and Investments

Reform/Investment 1: Modify existing lakes, construct additional rearing ponds, or construct additional raceways with additional water at LFH for rearing more distinct groups of summer steelhead (i.e. more endemic broodstocks from local rivers instead of the LFH stock). Additional early rearing tanks are needed to better manage the growth rates of the juveniles produced from the extended spawning cycle. Local broodstock may help reduce the overall risk of having non-native stock spawning in the local rivers. The current lakes are being underutilized given their capacity, and rearing endemic stocks in the lakes could potentially increase their survival. The cost to perform such a modification is currently estimated to be in the range $$$$$.

Reform/Investment 2: Construct a new adult trap at the current location in the Touchet River. The current trap consists of a barrier dam and a water intake structure for the Dayton Acclimation Pond. Under normal and even low flow conditions, steelhead can easily jump the barrier dam. Upstream migration of steelhead is limited by installing temporary PVC pickets across the face of the dam. However, the trap gets disabled from relatively moderate flow events because of the debris loads in the river, and the ability for fish to bypass the dam pickets. Further, the trap is too small and not adequate for an expanded broodstock collection program. The adult trap has been fitted into the water intake structure for the Dayton Acclimation Pond. A modified trap (a ladder with a trap area) with better efficiency could also be used to manage the retuning LFH stock fish, excluding them from the upper basin. In addition, a modified trap would allow for a more accurate account of the native and endemic stock fish returning on an annual basis. In addition to trap modification, a different system to prevent fish from jumping the barrier dam needs to be installed. Each of these reforms will be very costly. Currently, there is a proposal to FRIMA to modify the water intake structure for irrigation efficiencies. A part of this proposal will also address the fish passage/trapping concerns, but does not allow modification for fish passing the barrier dam. Cost sharing may be necessary to complete this project. Estimated cost for completion could be $$$$.

Reform/Investment 3: Genetic characterization of the natural stock should continue to see if they are truly separate from the LFH stock, providing more insight to better manage steelhead within the basin. Genetic sampling will consists of yearling monitoring from both the LFH and the various Walla Walla basin stocks. We estimate that samples will require ~$/year for analysis.

Reform/Investment 4: Determine smolt-to-adult survival rates for endemic brood program. Currently, the fish are not marked for harvest, and our adult traps are inadequate to complete the evaluation on the endemic program. PIT tags could be inserted into a large percentage of the smolts prior to release. Detectors at the mainstem dams would then be used when they returned as adults to determine smolt to adult survival. This survival estimate could then be compared to what has been documented for LFH stock released in to the Touchet River. Informed decisions can then be made about switching to the endemic broodstock or not. Estimated costs would be $$.

Reform/Investment 6: Implement kelt reconditioning for the endemic broodstock program. This investment would allow these fish 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.

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 Section 10 Permits #1126 (research activities on the Tucannon and Asotin Creek), and #1129 (hatchery supplementation for Tucannon River spring chinook); 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 Lyons Ferry 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.

Washington Department of Fish and Wildlife has estimated natural and hatchery-origin summer steelhead escapement into portions of the Touchet River since 1987 (see Table 6). The largest escapement was seen in 1988 when an estimated 1,094 fish spawned (WDFW 1999), an estimated 1,006 of which were natural-origin. While all others years have been lower than the 1988 season, and there is large yearly variation in escapement, about 360 natural spawners/year are believed to spawn in the upper basin. Adult trapping data from the Touchet adult trap has shown the population to be made up of 3 and 4-year old individuals (primarily 2-year freshwater age and one or two year ocean age). Rarely have 2 and 5-year old individuals been identified in the population (Table 5).

Table 5. Fresh and salt-water age composition [a] of natural origin adults from the Touchet River, 1994-1995 and 1999-2005 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	YES [b]
1995	0	0.0	0	0.0	0	0.0	5	85.7	0	0.0	0	0.0	0	0.0	1	14.3	NONE
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	YES [c]
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	NONE
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	YES [d]
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	YES [e]
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	YES [f]
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	YES [g]
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	YES [h]
Totals	8	1.2	28	4.1	313	45.6	203	29.5	64	9.3	36	5.2	2	0.3	1	0.1	

[a] Age reporting protocol is F.S, where F=freshwater years and S=saltwater years of age.
[b] One fish sampled in 1994 was a repeat spawner, 2.1S for 4.8% of the run.
[c] One fish sampled in 1999 was a repeat spawner, 2.1S for 3.2% of the run.
[d] Ten fish sampled in 2001 were repeat spawners, eight fish were 2.1S, and two were 2.1S1 for a total of 5.7% of the run.
[e] Two fish sampled in 2002 were repeat spawners, one fish was 2.1S, and one was 2.1S for a total of 1.6% of the run.
[f] Six fish sampled in 2003 were repeat spawners, one fish was 1.1S, four were 2.1S, and one was 3.1S for a total of 5.8% of the run.
[g] Ten fish sampled in 2004 were repeat spawners, four were 2.1S, one was 3.1S, five were 2.1S1, and one was 2.1SS for a total of 8.1% of the run.
[h] Three fish sampled in 2005 were repeat spawners, one was 2.1S, one was 2.2S, and one was 2.1S1S for a total of 3.6% of the total run.

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 cm in length while two-salt age fish average 67 cm with individuals as large as 86 cm (Martin et al 2000). Sex ratio varies between years (60%-81%), but has generally been heavily skewed to females (69%) on average.

Fish enter the Touchet River as early as May and as late as the following April. Redds have been observed near RM 45, with juveniles documented from 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 continue through May. While hatchery and natural fish enter and spawn in the river at the same time, WDFW believes that spawning locations are spatially separated. The number of hatchery fish captured in the adult trap has varied, but has been documented at about 10% each year, though some years have been as high as 20% (Schuck et al, 1995-1997).

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; ~5%) are likely being produced from the lower reaches where spring/summer water temperatures allow for accelerated growth. Smolts leave the Touchet River primarily between early April and late May. Smolt size of natural steelhead is unknown but probably averages 185 – 195 mm, similar to what has been documented in the Tucannon River. Hatchery smolts from the LFH stock have averaged between 195 – 215 mm at release. All hatchery LFH stock smolts have been released from Dayton Acclimation Pond (RM 53) since1987.

- 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 2005, we've captured a total of 320 bull trout in the Touchet Adult Trap. Of that total, four mortalities (1.25%) 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 the populations, but believe them to be at, or just below replacement. 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 portions of the Touchet River is listed in Table 6. Average natural escapement has been about 360 spawners/year, and is based on an expanded index redd surveys (which includes about 20% of the basin that are not surveyed). Therefore, the Touchet River is below the management goal. Present escapement levels into the Walla Walla River are unknown due to lack of documentation.

Table 6. Estimated number of natural and hatchery-origin spawning summer steelhead in portions of the Touchet River upstream of Dayton, 1987-2005.

Brood Year	Natural Origin	Hatchery Origin	% Natural
1987	334	29	92
1988	1006	88	92
1989	214	19	92
1990	332	29	92
1991	193	17	92
1992	374	32	92
1993	484	36	94
1994	358	19	80
1995	388	96	80
1996 [a]	NA	NA	NA
1997 [a]	NA	NA	NA
1998	474	53	90
1999	271	46	84
2000	217	56	79
2001	253	56	81
2002 [b]	NA	NA	95
2003 [b]	NA	NA	92
2004	193	34	85
2005	348	97	78

[a] Estimates not available for these years because spring river flows were too high or muddy to accurately count summer steelhead redds.

[b] Estimated natural and hatchery origin fish based on adult trapping at the Dayton Adult Trap.

- 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.

Parent-to-progeny ratio data are not currently available for Touchet River natural-origin summer steelhead, but WDFW monitoring and evaluation actions have been undertaken to gather such data. Critical to this sort of evaluation will be the utilization and

improvement to the Dayton Adult Trap. Natural juvenile production estimates in portions of the Touchet River for most years between 1986 – 2004 can be used to estimate survivals for early life stages (see figure below). No natural smolt production estimates are currently available, but WDFW has proposed operating a smolt trap in the near future (if the Dayton Adult Trap can be modified to better quantify production of steelhead above Dayton) to monitor the natural smolt migration, and to evaluate natural production within the basin.

- 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 spawning summer steelhead in portions of the Touchet River upstream of Dayton from 1987-2004 are presented in Table 6 (above). Data are compiled from LSRCP annual report for Lyons Ferry Summer Steelhead Hatchery Evaluations (1985-2005). Also, see Figure 1 for estimated Age 0 and Age 1+ natural-origin summer steelhead in portions of the Touchet River between 1992 and 2001. While spawning surveys were not available for 2002 or 2003, apparently many steelhead spawned in the Touchet River system those years based on the juvenile density data obtained from electrofishing surveys.

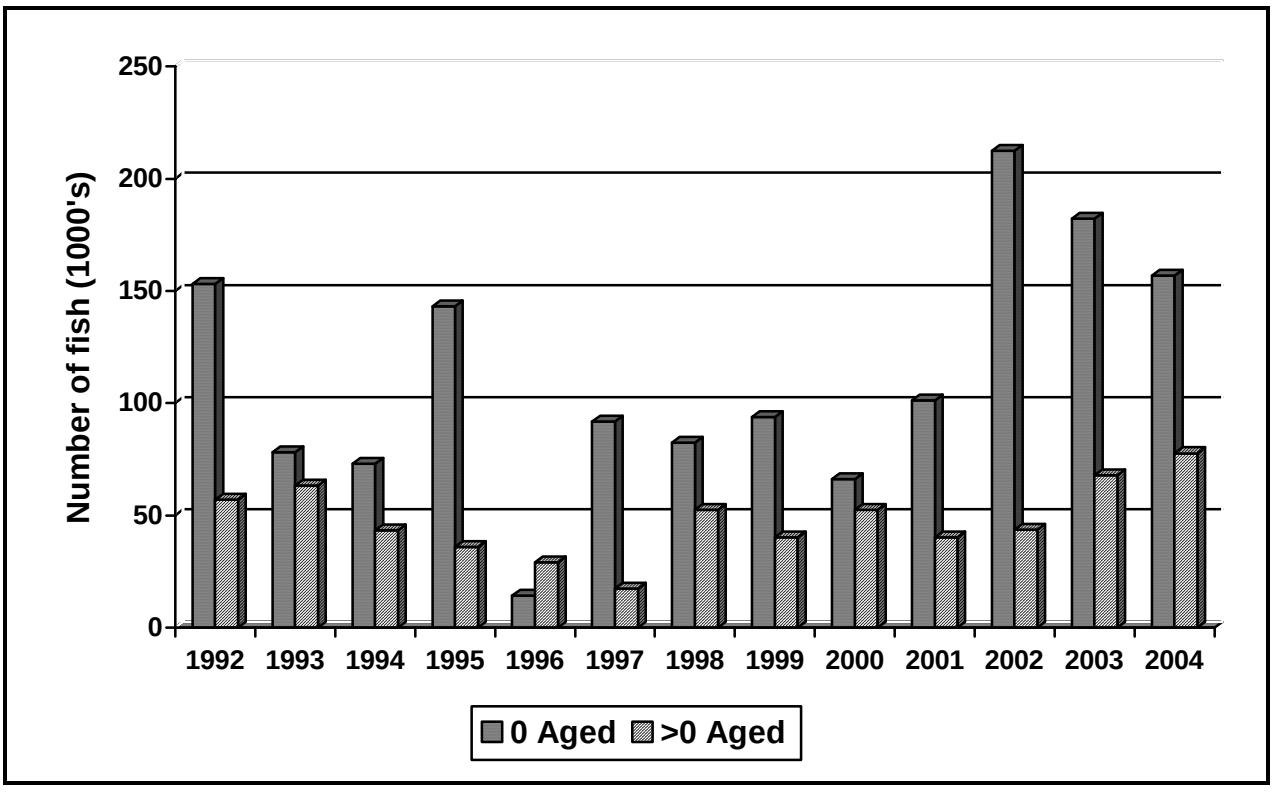

Figure 1. Estimates of Age 0 and Age 1+ natural-origin summer steelhead in portions of the Touchet River between 1992 - 2004. Data represents summary of populations from the North Fork, South Fork and Wolf Fork.

- 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 6 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 June, 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 current temporary trap is located on federal property, but within the City of Dayton, Washington. Human disturbance or poaching of summer steelhead held in the trap was not experienced during operation of the trap in 1999-2005, or during previous years. The trap facility does have security measures (fence and lighting) to protect listed fish.

Bull trout are indigenous to Touchet River, and indirect takes of bull trout are anticipated through the broodstock collection program. Any bull trout encountered at the adult trap will be sampled (length, DNA, scales) 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, is expected that most of the endemic brood progeny will be released in the same location (Dayton Acclimation Pond) as the current LFH stock releases.

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

Spawning Ground Surveys: Takes 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 conducted once a week, 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 2-3 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 rate 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.

Snorkeling: Takes in the form of "observe/harass" occur during snorkel surveys (Take Table B). Snorkel surveys may occur between July-September, and will be conducted to monitor distribution and abundance of juvenile summer steelhead in portions of the Touchet River. Surveys are generally conducted with two people, both starting at the lower end of an index site. Each snorkeler moves upstream counting about ½ of the river. The total number of fish is then recorded and the site length and width are measured for total surface area. Total time to complete an index site varies, but is generally less than 15 minutes. We have no estimate of the degree of harm, injury, or mortality to listed fish associated with snorkeling activities, but it is believed to be very low. Based on observations during snorkeling, the fish observed move slightly when the snorkelers pass, but quickly re-establish themselves near their original location.

Electrofishing: Takes of listed steelhead in the Touchet River will occur during electrofishing surveys (Take Table B) if conducted. Funding for these surveys is currently in question. Electrofishing surveys may occur July through mid-August, and are conducted to monitor distribution and abundance of natural-origin steelhead. Electrofishing surveys and estimates may also be used to estimate the number of residuals that failed to migrate after release (see residualism below). Through previous studies, we have determined that Age 0 steelhead juveniles cannot accurately be sampled by snorkeling in some areas of the river (Schuck et al 1998), hence electrofishing surveys are necessary to estimate production of Age 0 natural steelhead. Estimating abundance and density of age-0 steelhead will be critical in the overall evaluation of success of the proposed hatchery program, as

egg-to-fry survival within the natural system can then be calculated. Abundance estimates of Age 1+ natural steelhead is less critical than for age-0 steelhead, because without smolt trapping, it is impossible to evaluate when fish have left the system, or died of natural causes. However, the yearling data is simultaneously collected while sampling young of the year, and provides valuable trend information over time (see Figure 1).

Surveys are conduced using a modified Smith-Root backpack electroshocker with upgraded, state of the art electronic components. Use of this programmable output waveform electroshocker has decreased the incidence of injury to small fish. Guidelines established by NMFS and WDFW will be followed when conducting surveys. Pertinent environmental information during surveys (conductivity and temperature for each site) will be recorded, as previously specified in Section 10 Permit #1126 (research activities on the Tucannon River).

PIT Tagging: Takes 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) from the various release points in the Touchet River (Dayton Acclimation Pond, 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%.

Residualism: Estimates of residual steelhead from our endemic stock releases will be attempted through two activities. Electrofishing surveys during the summer will be used to estimate endemic hatchery-origin fish that failed to leave the stream following release. However, because there is an active trout fishery in Dayton, some of these may be taken out of the stream before electrofishing surveys are conducted. Therefore, WDFW will attempt to provide an estimate of the number of residual endemic hatchery stock before the fishery opens (June 1). Trained WDFW personnel will use hook and line and mark/recapture methods as described in Martin et al. (2000).

Smolt Trapping: Currently, WDFW does not operate a smolt trap on the Touchet River. Funding within may become available in the future to purchase and operate a smolt trap.

Takes of outmigrating listed steelhead (natural and hatchery-origin) will occur at WDFW's smolt trap (Take Table B) located on the mainstem Touchet River (exact location currently unknown). The trap will be operated March-June to capture natural and hatchery-origin steelhead to enable WDFW staff to estimate natural smolt production from the upper basin, and performance or hatchery releases (e.g. may provide an estimate of residualism from hatchery releases). Some of the natural and hatchery fish captured will be measured, weighed and released. Small groups of captured fish will receive a

partial caudal fin clip for identification and transported back upstream about one to two miles and released to calculate trap efficiency. Other groups of fish (about 100/group) may be PIT tagged from the smolt trap to determine migration speed and relative survival from the smolt trap. Most fish will be counted and released immediately back to the stream (after recovery) to continue their migration. During peak outmigration, fish may be held in live boxes for two to three hours before release (mark/recapture trial, or PIT tagged). At other times during the season 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. However, the current trap is estimated to be only 10-20% efficient. The trap/weir is not operated at other times of the year, and will therefore not interfere with bull trout migration. Trapping for bull trout has been authorized by USFWS through a Section 6 Cooperative Agreement.

- 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, 1999-2005 (Table 7). The trap facility (water diversion for the Dayton Acclimation Pond) was not designed to trap adult fish, and therefore trapping has only provided a sub-sample of the run each year. Trapping of natural and hatchery-origin steelhead from 1993-1995 was for estimating escapement, and to assess the feasibility of developing a new broodstock. 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. During spring 2000, a small portion of the estimated natural run was trapped and collected for broodstock. However, because of high water flow and a shift in the river channel, the trap was less effective than in the past and the number of fish collected for broodstock fell short of the program goal. In 2001, an additional trap was added within the intake structure to collect more fish. Due to either a better trap, or because trapping efficiency was increased due to low water flows in 2001, we trapped more fish than for all previous years combined. Numbers trapped declined after 2001, but remained higher that for early trapping years. During all years of trapping, 22 mortalities (2.6%) have occurred in the trap.

Table 7. Number of trapped natural and hatchery-origin adult steelhead captured at the Touchet River adult trap (RM 53.3) from 1993-1995, 1999-2005.

Brood Year	Natural Origin	Hatchery Origin	Endemic Origin	Total Trapped
1993	52	8	- - -	60
1994	43	2	- - -	45
1995	8	2	- - -	10
1999	42	7	- - -	49
2000	31	8	- - -	39
2001	184	41	- - -	225
2002	173	9	- - -	182
2003	130	10	1	140
2004	102	25	17	144
2005	86	24	12	122

During 2000, all fish were live spawned and retained at LFH for rejuvenation and possible re-use. However, rejuvenation efforts failed and all fish died during the summer of 2000 from starvation. Only limited attempts at rejuvenation will be made in the future. WDFW will monitor current research in the Columbia basin on kelt rejuvenation for future possible use.

Mortality on the fish collected for broodstock has varied considerably (Table 8). 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.

Table 8. Number of Touchet River endemic broodstock collected and mortalities experienced from 2000-2005. (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

-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.

- 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 box is closed for entry, but fish are able to jump the weir pickets. Where projected take may be exceeded, the trap can easily be removed to allow unrestricted passage.

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.

3.2) 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 (currently under negotiation).
- 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.
- 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). Developing FMEP's for Mid-Columbia fisheries are currently being drafted by WDFW which will describe in detail the current fisheries management within the Walla Walla Basin, including the Touchet River summer steelhead. Fishery management objectives within the draft 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, in progress), 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 1987–1998, sport harvest from the Touchet River ranged between 207-635 fish during the annual September through mid-April fishery (WDFW 1987-1999). This represents a 23% 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 in progress). 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. 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. There will be a short-term (3-5 years) increase in overall steelhead production from LFH (LFH stock and endemic brood), while the endemic broodstock programs are being developed and assessed, and mitigation production continues.

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. Lyons Ferry has eight deep wells that produce nearly constant 52^0 F, fish pathogen-free water. The hatchery is permitted to pump up to 53,000 gpm (118.1 cfs). High concentrations of dissolved Manganese (variable among the eight wells), and particulate Manganese Oxide, is strongly suspected of limiting the density at which chinook can be reared in raceways at LFH, but no such limitations are known for steelhead. While the water also has higher concentrations of other minerals (common in deep wells), no negative impacts on eggs or fish from these are known. Discharge from LFH complies with all NPDES standards and enters the Snake River and will not affect Touchet River water quality.

For smolts acclimated at the Dayton Acclimation Pond, 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 40-60^0 F. 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. In addition, 100,000 LFH stock steelhead smolts will be released from the Dayton Acclimation Pond. Should the full program be reached in the future, a maximum 150,000 smolts from the endemic program will be released from the Dayton Acclimation Pond (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 Acclimation Pond.

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 Acclimation Pond meet current NMFS screening guidelines, and effluent discharge is monitored, reported, and currently complies with NPDES standards. Water with drawl 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. 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.

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 aeration, and hauled in the back of a pickup truck to LFH (elapsed time 30-60 min.). Salt is added, and PolyAqua to maintain the production of slime on the fish. An air pump is also used to add additional oxygen for the transport. A maximum of five adults can be transported in the tub at one time.

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. 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. Gametes are crossed, and water hardening begins within the spawning building. Fertilized eggs are then transported to the hatchery building for incubation.

5.4) Incubation facilities.

The incubation room at LFH is designed to accept and incubate eggs from individual females, through the eyed stage. Colanders nested in PVC 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 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. Substrate has not been recommended at this time in the hatching troughs due to questions about cleaning and disease control. The possibility of adding substrate to the hatching troughs will be explored further.

5.5) Rearing facilities.

Four intermediate indoor rearing tanks and 37 outside raceways available for rearing juveniles are available at LFH. Water supply is from wells as previously described. Feeding is by hand, through demand feeders, or by pneumatic feeders that can be programmed to feed throughout daylight hours.

a. Acclimation/release facilities.

Dayton Acclimation Pond has a volume of 348,000 ft^3, and is supplied with a maximum of six cfs (ft^3/sec) river water. During at least the first five 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 Acclimation Pond 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 mid-May. The pond is drained quickly and all fish left in the pond are released into the mainstem Touchet River in the city of Dayton. Any releases that are occurring directly to the river will be in locations with easy truck access.

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

Pre-spawning mortality on the broodstock has been documented (Table 8). Losses in more recent years have been curtailed due to more aggressive formalin treatments to control fungus outbreaks after weekly spawning activities have started.

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.

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.

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. Propagation and release of the LFH stock summer steelhead will continue for several more years until the endemic stock can be documented as performing as expected.

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 indigenous 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. Listing under ESA, concerns of hatchery fish straying on ESA listed stocks, and the potentially depressed population level have spurred WDFW and co-managers to examine the possibility of replacing the existing LFH stock with an endemic broodstock. 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 BY2006. All returning endemic brood adults between BY2000-BY2007 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 BY2007, collection of endemic brood may increase as the program expands. Beginning in BY2009, 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) will 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 Lyons Ferry stock. Presented in this next section is a genetic analysis summary report that were 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. The following two graphs represent a brief summary of the analysis completed to date (Figures 2 and 3). A more complete analysis is available upon request. Results indicate that each of these natural stocks (Tucannon (Green), Touchet (Blue [adults] and Black [juveniles], and Walla Walla (Orange)) remain genetically distinct from the LFH stock despite years of hatchery stocking in each basin. Tucannon and LFH stocks are more similar and indicate some introgression between the two. Further analysis of additional samples from more years and other locations needs to occur, and long-term monitoring of the genetic characteristics of the new endemic broodstock(s) should occur because of the small founding populations sizes currently used for the endemic programs.

6.2.5) Reasons for choosing.

Endemic steelhead are optimally adapted for survival in the Touchet River. 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.

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. 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 Acclimation Pond.

SECTION 7. BROODSTOCK COLLECTION

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

7.2) Collection or sampling design.

Trapping operations occur at a modified water intake facility that supplies water for the Dayton Acclimation Pond (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, and focuses the catch on fish destined for the upper basin. Since the trap has been incorporated to the water intake structure, it is not very effective (~10-20% of each year's run), and limits the number of fish that are trapped. Fish are able to bypass the trap 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.

7.3) Identity.

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. For evaluation purposes, all endemic program hatchery smolts will receive a CWT and/or visual implant elastomer (VI) tag in the adipose eye tissue for external identification upon recapture at the adult trap. They may receive some other effective mark that can be identified upon return, but will not designate them as hatchery origin to local steelhead fisherman (not adipose of ventral fin clipped). 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, many will escape into the upper watershed to spawn naturally.

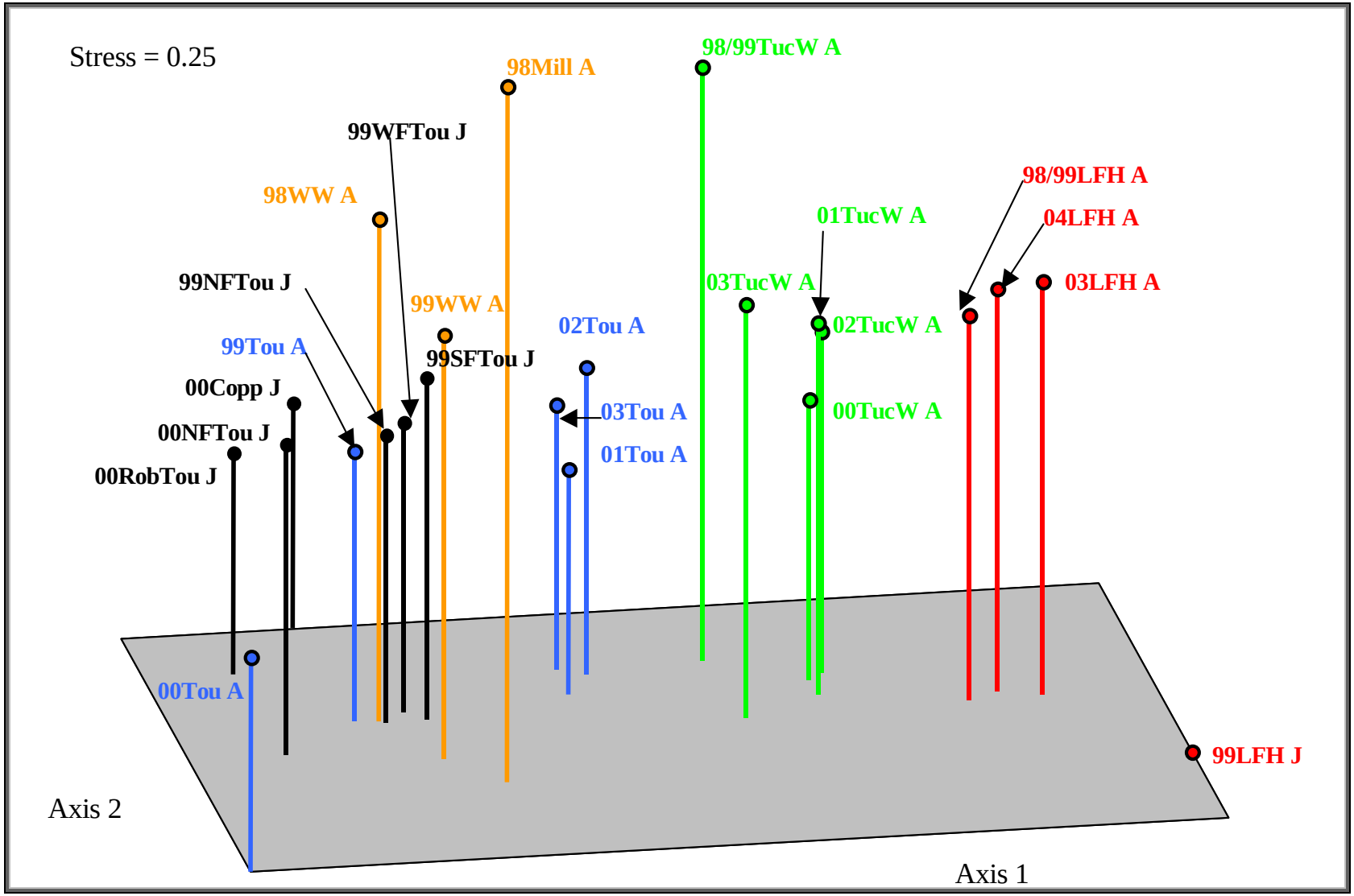

Figure 2. MDS of genetic distances among Tucannon and Touchet steelhead collections from NTSYS-pc. Genetic distances (Cavalli-Sforza and Edwards) were calculated using GENDIST in PHYLIP. Samples were collected either for adults (A) or juveniles (J). Lyons Ferry Stock fish are indicted in red, Tucannon wild stock are indicated in green, Touchet wild stock adult samples are indicated in blue, Walla Walla River wild stock are indicated in orange, and Touchet River tributary juvenile samples are indicated in black.

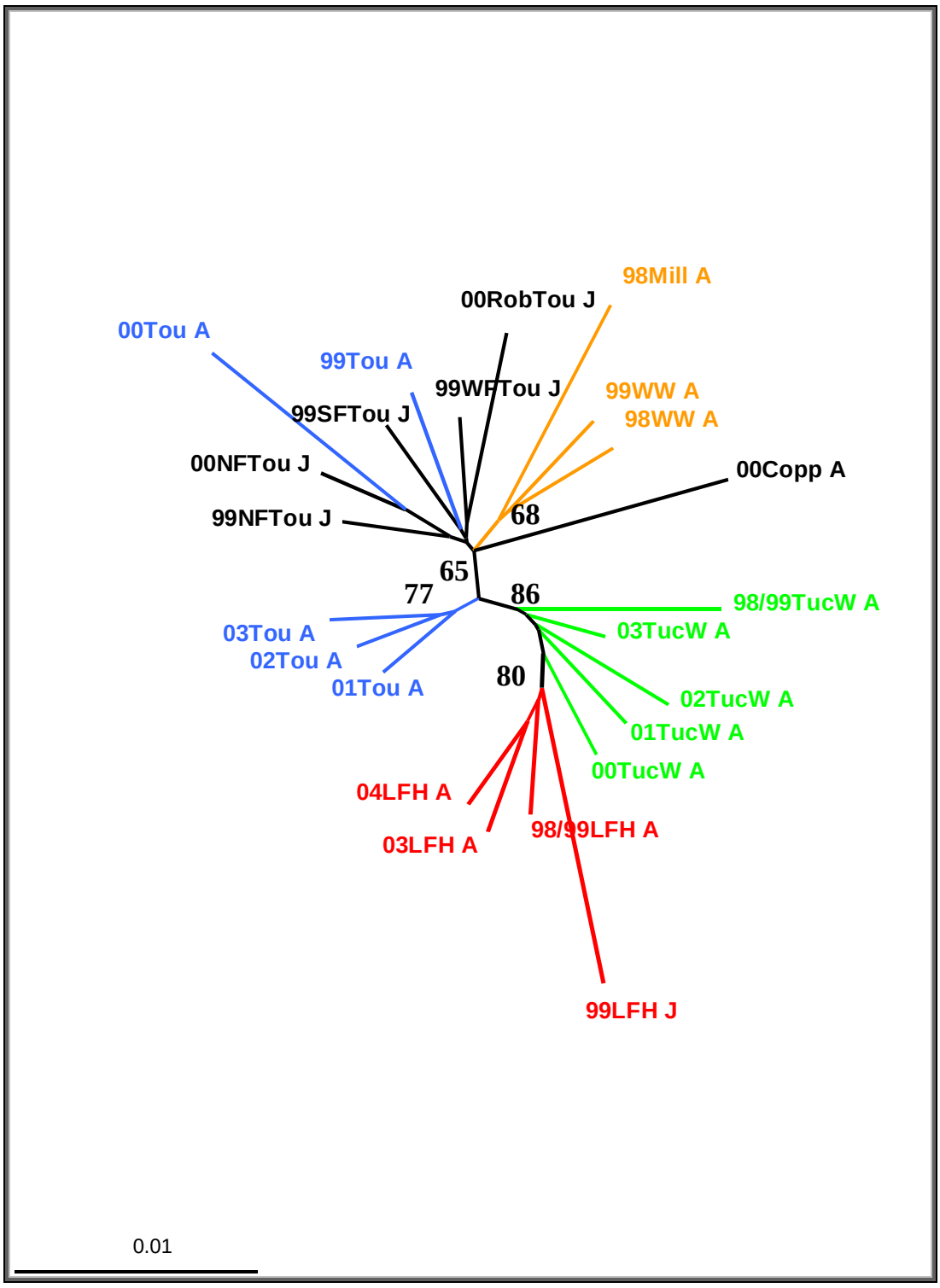

Figure 3. Neighbor-joining consensus tree of Cavalli-Sforza and Edwards distances among collections from PHYLIP. Numbers at the nodes indicate the percentage of 10,000 trees in which the collections beyond the node grouped together and only values over 65% are shown. Lyons Ferry Stock fish are indicted in red, Tucannon wild stock are green, Touchet wild stock adult samples are blue, Walla Walla River wild stock are orange, and Touchet River tributary juvenile samples are in black.

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-BY2006.
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 9.

Table 9. Number of females and males collected from 2000-2005 BY Touchet Endemic summer steelhead, and the number of eggs and smolts produced.

Brood	Collected Adults		Spawned Adults		Eggs	Smolts
Year	Female	Male	Female	Male	Collected	Produced
2000	13	7	12	7	53,139	36,487
2001	20	15	14	11	67,861	45,501
2002	17	20	14	17	70,843	31,440
2003	18	18	17	17	82,602	58,733
2004	16	14	15	10	66,125	55,706
2005	21	18	18	16	53,640	

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

LFH stock origin hatchery fish collected at the Dayton Trap are passed immediately downstream of the trap into a sport fishery, or may be trucked downstream ~10 miles to the city of Waitsburg where they will have an even greater opportunity to be harvested in the fishery. All endemic adults produced from the hatchery program captured in the Dayton adult trap will be passed upstream to contribute to the spawning population in the upper basin. 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. Live-spawned or kill spawned adults used as broodstock for the program will be returned to the Touchet River for 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 and/or oxygenation. To ameliorate hauling stress, salt (NaCl) is added to the water in quantities appropriate to the tub or tank volume (as described in WDFW fish health manual). Hauling time from the Dayton trap site to LFH is approximately 30-60 minutes, depending on road conditions.

Fish are held in brood stock raceways at LFH as previously described. All Touchet River broodstock are held in a separate raceway away from other stocks of steelhead at LFH. Fish are anesthetized using MS-222, degree of ripeness determined. Fish may be treated with a suite of approved chemicals to control fungus, parasites and bacterial diseases, as

prescribed by WDFW fish health specialist. If ripe fish will be live spawned, they will be released back into the Touchet River to survive or contribute nutrients to the system. If the broodstock is killed, their carcasses will be returned to the Touchet River above Dayton for nutrient enhancement. During 2000 spawning we live spawned fish and attempted to re-condition them for future spawning, but were unsuccessful.

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.

7.8) Disposition of carcasses.

During 2000, Touchet River endemic broodstock were live-spawned and surviving males and females were retained in an attempt to rejuvenate them for subsequent re-spawning in 2001. The re-conditioning process failed during 2000, and was not attempted in 2001. During 2001 spawning, Touchet River broodstock were live or kill spawned and then returned to the system to survive or contribute nutrients. WDFW will continue to monitor results and success from re-conditioning experiments in the Columbia Basin. 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 proposes to return live fish or carcasses of killed spawned endemic broodstock to the upper Touchet River (above RM 53) in the future for nutrient enhancement (see **7.5** above).

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.

WDFW will make 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 prevent run timing divergence of the hatchery-reared population from the natural population, and provide for natural fish escapement into the habitat to spawn. Returning adults from natural brood smolt releases will be allowed to enter the spawning population without being used for the program, at least during the initial years of returns. All LFH stock fish will be placed downstream (0-10 miles) of the Dayton trap following capture to reduce their effects on the natural population upstream of the trap, and allow them a second opportunity to be harvest in the local sport fishery.

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 males are PIT tagged for identification purposes after they have been spawned to track the number times a particular male may contribute.

8.2) Matings.

Mating occurs in a 2x2 factorial cross 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. WDFW has investigated the possibility of rejuvenating spawners at LFH and re-using them in the next brood year, with no success. This proposed action is experimental at this time, and WDFW will not likely attempt rejuvenation until more positive results are obtained from other researchers.

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.

Broodstock collection protocol will ensure that adults represent a proportional temporal distribution of the natural population. 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.

LFH collects large numbers of LFH stock steelhead eggs annually. Following is the egg survival information at LFH for the six most recent brood years (Table 10).

Table 10. History of egg survival for Touchet River endemic stock summer steelhead at WDFW's Lyons Ferry Hatchery from 2001-2005 brood years.

Brood Year	Eggs Taken	Eggs at Eye-up	% Survival to eye-up
2000	53,139	43,572	82.0
2001	67,861	52,116	76.8
2002	70,843	66,460	93.8
2003	82,602	75,059	90.9
2004	66,125	56,066	84.8
2005	53,640	50,629	94.4
Mean			**87.1**

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

Estimated egg take and fecundity is based on six years of spawning data. Egg survival to eye-up was is higher than what we observe for the existing LFH stock of steelhead used. Number of eggs collected from adults trapped and ultimately the number of fry could exceed program needs. Furthermore, the disease history of natural broodstock is not known. 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 may be likely. 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.

Touchet natural steelhead eggs averaged 238/oz for BY2000. Eggs from individual females (10.5 -27 oz. ; 2,499 – 5,544) were incubated individually in two quart colanders through eye-up. Water flow through each colander 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 by bulb-syringe.

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) <u>Rearing</u>:

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. (Table 11)

Table 11. Number of spawners, average fecundity, and survival by life state of Touchet Endemic stock steelhead spawned at LFH, 2000-2003.

	Spawned									
BY	female	male	Average fecundity	Eggs taken	Live eggs	Percent survival	Fry	Egg-fry survival[a]	Smolts	Fry-smolt survival
2000	12	7	4,428	53,139	43,572	82.0	43,296	99.4	36,487	84.3
2001	14	11	4,847	67,861	52,116	76.8	52,116	100.0	45,501	87.3
2002	14	17	5,060	70,843	66,460	93.8	31,715	47.7	31,440	99.1
2003	17	17	4,859	82,602	75059	90.9	70,198	93.5	58,733	83.7
2004	15	10	4,408	66,125	56066	84.8	55358	98.7	55,706	100.0
2005	13	16	4,126	53,640	50629	94.4				

[a] The imprecision of hatchery methods at times measures survival between life stages as >100% 100% is reported as a maximum.

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

LFH raceway rearing density index criteria for steelhead will not exceed 0.25 lbs fish/ft^3. Where steelhead are reared in rearing ponds, densities can be 10% of the raceway maximum. Generally, indigenous brood juveniles will rear in vessels at a density index much less than 0.25 lbs fish/ft^3.

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 pneumatic presentation from timed feeders, or by hand presentation.

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 LFH and Touchet stock steelhead for last year (e.g. 1999-00), or for most recent year available: (Tables 12 shows a general growth plan for LFH Stock steelhead at LFH. Touchet Endemic stock fish would be similar, but delayed due to a later spawn timing – because of that, it has been difficult to obtain the desired release size.

Table 12. Growth and size of LFH Stock Steelhead at LFH for the 1999-2001 Brood Years.

Month/Year	FPP	g/fish	Month/Year	FPP	g/fish	Month/Year	FPP	g/fish
2/99	NA	NA	2/00	1,200.0	0.4	2/01	NA	NA
3/99	1,100.0	0.4	3/00	700.0	0.6	3/01	1,218	0.4
4/99	349.0	1.3	4/00	341.0	1.3	4/01	330.0	1.4
5/99	195.8	2.3	5/00	177.0	2.6	5/01	141.0	3.2
6/99	103.8	434	6/00	90.0	5.0	6/01	69.0	6.6
7/99	49.9	9.1	7/00	42.2	10.7	7/01	42.6	10.6
8/99	36.0	12.6	8/00	31.1	14.6	8/01	34.0	13.3
9/99	17.2	26.4	9/00	16.1	28.2	9/01	20.7	21.9
10/99	12.2	37.2	10/00	12.1	37.5	10/01	13.0	34.9
11/99	9.6	47.3	11/00	8.1	56.0	11/01	9.1	49.8
12/99	7.1	63.9	12/00	7.0	64.8	12/01	8.4	54.0
1/00	6.2	73.2	1/01	4.6	98.6	1/02	6.9	65.7
2/00	5.5	82.5	2/01	4.1	110.6	2/02	4.2	108
3/00	4.9	92.6	3/01	3.9	116.3	3/02	3.4	133.4
4/00	4.2	108.0	4/01	3.2	141.8	4/02	3.4	133.4

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

See above tables.

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 as 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 1-30 at 4.0-5.0 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 planned at this time to help maintain the fright response. Demand or pneumatic feeders may also be used where possible to limit human disturbance or habituation to humans. 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 man 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 Acclimation Pond. 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 Acclimation Pond 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 13) shows proposed WDFW endemic stock juvenile or smolt releases (goal and maximum) into the Touchet River for the next few years while the program is being evaluated at initial production levels.

Table 13. 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	100,000	4 - 5	1-30 April	Dayton Acc Pond (acclimated)	LFH
Yearling	75,000	50,000	4 - 5	1-30 April	N.F. Touchet River RM 53-58 (direct)	Touchet

10.1a) Proposed fish release levels

The following table (14) 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 14. 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	1-30 April	Dayton Acc Pond (acclimated)	Touchet
Yearling		Up to 50,000	4 - 5	1-30 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.

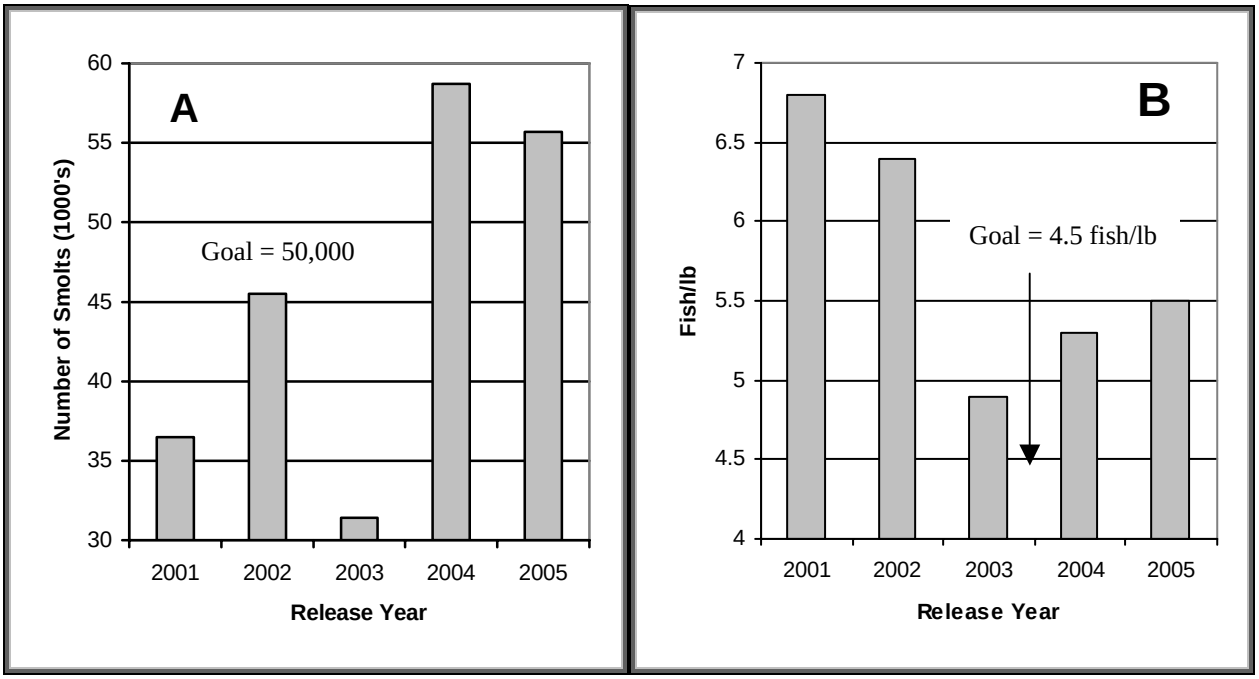

Figure 4. Touchet River smolt production (A) and average size at release (B) from 2001-2005 release years.

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

Direct Stream release have occurred at RM 57.2 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.

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 Acclimation Pond from 15 February through release in May (5-9 weeks). 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 and a VI tag in the adipose eye tissue for external identification upon return as adults. Should fry need to be released in October, they would be similarly marked, but a different VI tag color would be used to evaluate the success of fry/parr releases into the basin. Should the full smolt production be achieved in the future, all or a proportion of the fish will be released from Dayton Acclimation Pond. All of these fish will be adipose fin clipped, with a portion also receiving a left ventral fin clip and coded wire tagged for evaluation purposes.

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 fish surplus to program goals occurred in the 2000 or 2001 production years, and are not likely before 2004/2005.

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 Acclimation Pond. 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.

Estimate the contribution of Integrated Harvest program - origin summer steelhead to the basin and compare performance to the natural population.

Indicators: *3.1.2, 3.2.1, 3.2.2, 3.3.1, 3.3.2, 3.4.3, 3.4.2, 3.5.1, 3.5.3, 3.5.4, 3.5.5.*

1. Differentially mark all hatchery-reared summer steelhead fingerling to allow for distinction from natural-origin fish upon return as adults on the spawning grounds. This will be accomplished by coded wire and visible implant elastomer tagging or another permanent, effective method. Adipose fin clipping may be used after 2005 if program is successful.

Indicators: *3.1.2, 3.2.2, 3.3.1, 3.3.2, 3.4.1, 3.4.2, 3.4.3, 3.5.3, 3.7.6, 3.7.7.*

2. Conduct trapping at permanent and temporary trap locations throughout the summer steelhead return (February to May) to collect broodstock for the hatchery Integrated Harvest program, enumerate overall returns, and to collect information regarding fish origin for the spawning escapement, and age class composition.

Indicators: *3.2.1, 3.3.1, 3.3.2, 3.4.4, 3.5.2, 3.7.6.*

3. 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.

Indicators: *3.1.2, 3.2.1, 3.3.1, 3.3.2, 3.4.2, 3.5.3, 6.*

4. Estimate the number of natural, and naturally spawning hatchery-origin summer steelhead contributing to the Touchet River annual escapement.

Indicators: *3.3.2, 3.4.2, 3.4.3, 3.4.4, 3.5.5, 3.7.8.*

5. Conduct summer electrofishing and snorkel surveys to estimate densities and the population of Age 0 and Age 1+ summer steelhead throughout the Touchet River basin to compare to historical records since 1984. Electrofishing and snorkel surveys will also be able to determine the degree of residual steelhead left in the river from hatchery endemic brood releases.

Indicators: *3.2.2, 3.3.2, 3.4.3, 3.4.4, 3.5.5.*

6. 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. [Note: WDFW does not

currently operate a smolt trap on the Tucannon River. There is a possibility that a smolt trap operation will begin in the spring of 2002.

Indicators: *3.1.2, 3.2.1, 3.2.2, 3.3.2, 3.4.4, 3.5.4, 3.5.5.*

7. 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.

Indicators: *3.5.1*

1. Collect additional GSI data (allozyme or DNA-based) from regional summer steelhead adult populations to determine the degree to which discrete populations persist in the individual watersheds. Allozyme collections will be used for comparison with past collections to monitor changes in allelic characteristics, and with the intent to assess whether the hatchery endemic broodstock program negatively affects the genetic diversity of the natural population in the Touchet River.

Indicators: *3.4.3, 3.4.2, 3.5.3.*

2. 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.

Indicators: *3.4.2, 3.4.4*

3. Conduct summer electrofishing and snorkel surveys to estimate densities and the population of Age 0 and Age 1+ summer steelhead throughout the Touchet River basin to compare to historical records since 1984. Electrofishing and snorkel surveys will also be able to determine the degree of residual steelhead left in the river from endemic stock hatchery releases.

Indicators: *3.2.2, 3.3.2, 3.4.3, 3.4.4, 3.5.5.*

4. 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. [Note: WDFW does not currently operate a smolt trap on the Touchet River. There is a possibility that a smolt trap operation will begin in the spring of 2002.

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.

Indicators: *3.4.3, 3.4.4, 3.5.4, 3.5.5, 3.6.1, 3.6.2*

1. Determine the pre-spawning and green egg to released smolt survivals for the

program.

a. Monitor growth and feed conversion for fingerling.
b. Determine green egg to eyed egg, eyed egg to fry, and fry to released smolt survival rates.
c. 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.
d. Identify where the propagation program is falling short of objectives, and make recommendations for improved production as needed.

Indicators: *3.4.1, 3.4.2, 3.4.3, 3.5.2, 3.6.2, 3.7.1, 3.7.6, 3.7.7.*

2. 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.
    a. Monitor operation of adult trapping operations to ensure compliance with established broodstock collection protocols.
    b. Monitor timing, duration, composition, and magnitude of run at each adult collection site.
    c. 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).
    d. Collect biological information on collection-related mortalities. Determine causes of mortality, and use carcasses for stock profile sampling, if possible.
    e. 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.

Indicators: *3.7.1, 3.7.4*

3. 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.
    a. Fish health monitoring will be conducted by a fish health specialist. Significant fish mortality to unknown causes will be sampled for histopathological study.
    b. 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.
    c. Fish health monitoring results will be summarized as part of an annual report.

Indicators: *3.7.1, 3.7.2, 3.7.3, 3.7.4, 3.7.5.*

4. 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.

Indicators: *3.1.2, 3.2.1, 3.2.2, 3.3.1, 3.4.3, 3.5.1, 3.5.2, 3.6.1, 3.6.2*

1. Monitor the harvest of hatchery produced endemic stock Touchet and LFH hatchery stock steelhead in sport and treaty fisheries. Document trends in abundance.
2. 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.
3. 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.
4. 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:
    a. Estimate the abundance and trends in abundance of spawners;
    b. Estimate the proportion of the escapement comprised by steelhead of hatchery lineage, and of natural lineage;
    c. 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 may 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.
5. Snorkel surveys will be conducted only at a minimum number of sites necessary to achieve statistically valid results for population estimates. Displacement of fish will be kept to a minimum by snorkeling on days when water clarity and visibility are at maximum.
6. Electrofishing surveys will be conducted only at a minimum number of sites necessary to achieve statistically valid results for population estimates. If possible surveys will be conducted when water temperatures are below stressful levels to fish. WDFW will follow NMFS and WDFW electrofishing guidelines by: not shocking near redds or spawning adults, use of approved electroshockers, having experienced crew members during all shocking surveys, using DC current (pulsed or direct where appropriate), recording temperature, conductivity and electroshocker settings, and providing a good environment for fish holding/sampling after capture.

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, Lower Granite Dam, 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
Jeremy Jording Mike Herr Jerry Dedloff John Johnston
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 – April though following April
Smolt Trapping – Not Applicable at this time
Electrofishing – July though August
Spawning Ground Surveys – March though May
PIT Tagging – March (could increase if smolt trap was deployed within the basin)

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 release at the site of capture (Dayton Adult Trap, Electrofishing Sites). 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 effected 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

CBFWA (Columbia Basin Fish and Wildlife Authority). 1996. Draft programmatic environmental impact statement - impacts of artificial salmon and steelhead production strategies in the Columbia River basin. USFWS, NMFS, and Bonneville Power Administration. Portland, OR. December 10, 1996 draft.

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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.

Martin, S., M. Schuck, J. Bumgarner, J. Dedloff and A. Viola. 2000. Lyons Ferry Trout Evaluation Study: 1997-98 Annual Report. Washington Department of Fish and Wildlife Report to the USFWS. Report No. FPA00-06.

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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.

PNWFHPC (Pacific Northwest Fish Health Protection Committee). 1989. Model comprehensive fish health protection program.

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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 11), 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 Acclimation Pond, 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 11. 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) Description of non-anadromous salmonid species and habitat that may be affected by hatchery program.

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) <u>Analysis of effects.</u>

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.

<u>Hatchery operations</u> - *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.

<u>Fish health</u> - *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

Gamon, J. 1991. Report on the status in Washington of *Silene spaldingii* Wats. Report prepared for Washington State Department of Natural Resources by the Washington Natural Heritage Program, Olympia. 53pp.

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.

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Stalmaster, M.V. 1976. Winter ecology and effects of human activity on bald eagles in the Nooksack River Valley, Washington. Thesis, Western Washington State University, Bellingham, Washington, USA.

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Watson, J.W., M.G. Garrett, and R. T. Anthony. 1991. Foraging ecology of bald eagles in the Columbia River Estuary. Journal of Wildlife Management 55:492-499.

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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: Steve Rodgers/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	800	0
Capture, handle, tag/mark/tissue sample, and released d)	0	12,000	0	400
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.
c. Take associated with weir or trapping operations where listed fish are captured, handled, and released upstream or downstream.
d. Take occurring due to tagging and/or bio-sampling of fish collected through trapping operations prior to upstream or downstream release, or through carcass recovery programs.
e. Listed fish removed from the wild and collected for use as broodstock.
f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.
g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.
h. Other takes not identified above as a category.

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, Snorkel, Electrofishing surveys and smolt trapping, residualism estimates				
Location of hatchery activity: Touchet River (Various locations) Dates of activity: Year Round Research/ Monitoring / Evaluation program operator: 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)	2500	2500	25	0
Collect for transport b)	0	2000	0	0
Capture, handle, and release c)	6000	6000	20	0
Capture, handle, tag/mark/tissue sample, and release d)	0	6000	50 (i)	0
Removal (e.g. broodstock) e)	0	0	0	0
Intentional lethal take f)	0	0	0	0
Unintentional lethal take g)	500	400	0	0
Other Take (specify) h)	0	0	0	0

a. Contact with listed fish though snorkeling.
b. Take (non-lethal) of juveniles/smolts captured and marked for smolt trap efficiency tests.
c. Take associated with smolt trapping operations, electrofishing, and hook and line methods to estimate residuals, 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 or electrofishing surveys 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 or electrofishing.
g. Unintentional mortality of listed fish, including loss of fish during transport during smolt trapping or holding after electrofishing.
h. Other takes 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.