Hatchery Scientific Review Group (HSRG) comments and WDFW response to 17 Lower Columbia River HGMPs.

HSRG Comments

#1 **Use of AHA Modeling Results**

WDFW notes that AHA modeling was performed to evaluate each of the programs, but the results of this modeling are not discussed in any detail. Instead, the reader is pointed to Attachment 3 which describes the results for estimated pHOS and its impact on the program.

The HGMPs could be strengthened if the AHA assumptions and results were used as the working hypothesis for the program. AHA documents a working hypothesis of how the natural and hatchery components of the population interact and provides an estimate of harvest benefits, stray rates, how pHOS was calculated etc. Because many of the assumptions have a high level of uncertainty, WDFW could then show how existing field data supports or rejects those assumptions and how the M&E plan will address each and over what time frame.

WDFW Response: AHA output from modeling done while drafting the Conservation and Sustainable Fisheries Plan (2010) will be added to the HGMPs. These show that WDFW programs are consistent with HSRG standards. Attachment 3 will be revised to show existing field data as it becomes available through our proposed monitoring and evaluations. See HGMPs section 11.1.

#2 **Program Description**

It is unclear as to the exact condition the HGMP is supposed to represent. Does it reflect the past, current or future hatchery program? The confusion comes from the write-up for section 1.16 and data presented in Attachment 3.

In many of the documents (Section 1.16) WDFW states that it will be evaluating program alternatives through the LCR regional watershed planning process and on-going M&E and research findings. In Attachment 3, WDFW notes that programs may change based on the Columbia River EIS. The attachment also has implementation targets dates that range from 2008 to 2014 (some actually have a N/A in this field). It is difficult to see how NMFS can perform a NEPA analysis on such a document.

If the HGMP is required to meet legal obligations between now and 2014, then the programs need to prove they are being operated in a scientifically defensible manner given current knowledge. The current versions of the HGMP do not provide sufficient data or analysis to support such a conclusion, in most cases.

WDFW Response: The HGMPs represent the current hatchery programs and address where changes were made based on AHA modeling. As such AHA tables will be added to the HGMPs.

#3 **Program Goals**

The HSRG noted that hatchery programs need to have "clear, specific, quantifiable harvest and conservation goals for natural and hatchery populations" (HSRG 2009). Such goals are not provided in the HGMPs. Instead the HGMPs use language such as (section 1.7):

The goal of this program is to provide maximum sport harvest under the selective fishery regulations (retention of adipose-clipped fish only) while eliminating a directed harvest on wild winter steelhead. Also serves as mitigation for development (including hydro-power) and habitat degradation.

This is not a clear, specific or quantifiable set of goals.

Harvest and conservation goals are readily available from recovery plans and the AHA analysis and if included, would strengthen the HGMPs.

WDFW Response: Will be addressed in HGMPs

#4 **Lack of Supporting Evidence that Best Management Practices are being followed.**

Throughout the documents WDFW states they have implemented certain practices that protect natural populations by reducing both direct and indirect effects (section 2.2.3). However, no data are presented to show these practices are followed. For example:

"Steelhead release programs practice active pond management to remove fish less than 180 11Jm.fl and greater than 250 mm fl on release or fish are released at 5.5 jpp (Tipping 2001). Or, "To maximize smolting characteristics and minimize residual steelhead, WDFW adheres to a combination of acclimation, volitional release strategies, active pond management, size, and release guidelines (Tipping 2001)"

Data provided in fish size at release tables indicate fish are often released at sizes less than 5.5 fpp or are released directly to the river. Additionally, no data is presented describing how many fish less than 180 mm were culled each year and their resulting disposition by program. If these practices are indeed followed then the hatchery should have data that can be summarized and presented for each program (even if it's just a single year). The HGMP should state if this guideline is being followed for each program.

"Steelhead Rearing Guidelines target release sizes, condition factors and coefficient of variation (CV) for length of less than 10. 0% or less that result in actively migrating smolts that vacate the system and limit freshwater interactions with listed species. "

Much of this data is not presented for most programs (especially CV). Data to show how fast fish migrate from the system is also not presented. Results from studies are available for the Cowlitz and other streams in the NW and were

presented in earlier versions of these documents (2004). Condition factor is reported for some programs (See Kalama Early Winter for example), but not for others (Coweeman).

"Returning hatchery fish are subject to selective harvest and are identified by adipose and LV or RV fin-clip. Recycling downstream for sport harvest opportunity eliminates as many fish as possible removing potential spawners" ... or "Returning hatchery fish are under heavy selective harvest and are identified by adipose fin-clip."

WDFW Response: 250 mm was typo. Entire sentence was deleted. Fish per pound (fpp) equalities were added to release tables in all HGMPs. CVs were added to release tables. Migration rate information added, condition factor is not available for all programs and is presented where available.

Harvest rates are not provided in the HGMPs (section 10.11). Additionally, it is unclear how releasing fish already in hand back to the stream (recycling) reduces potential spawners.

WDFW proposes to continue monitoring, researching and reporting of hatchery smolt migration performance behavior, and intra and interspecific interactions with wild fish to assess, and adjust if necessary, hatchery production and release strategies to minimize effects on wild fish."

WDFW Response: See HGMP sections 1.12, 3.3.1. More specific text re: Genetics Study added.

"Prior to release, the population health and condition is established by the Area Fish Health Specialist. This is commonly done 1-3 weeks pre-release and up to 6 weeks on systems with pathogen free water and little or no history of disease."

No pathology information is provided to document these inspections occur or what the results of these inspections were (section 10.9). The in-hatchery survival rates by life stage in some tables can be quite low (See Kalama Early Winter Table 9.2 Rearing), but is not commented on. This gives the reader the impression that there are no disease issues at WDFW hatcheries, which is not the case.

WDFW Response: Will be addressed in HGMPs

"This is a generic statement made for most programs. Yet in other places in the documents it is stated this type of data are not available. If it's available it should be reported, or at least the study where the data was collected, cited (section 1.10.2).

"Harvest of hatchery-produced fish minimizes impact to wild populations."

Neither assumed hooking mortality rates or the number ofNOR's killed each year are reported. The assumed impact on NORs can be taken from the harvest plans for the lower Columbia.

WDFW Response: Assumed mortality rate and catch and release mortality information has been added to the HGMPs (see section 3.3.1). WDFW has implemented several creel programs and a hooking mortality study in the tributaries to better assess the harvest that is occurring and its impacts on wild steelhead populations. WDFW's intent is to conduct creel for 2-3 years in each tributary and then continue the program into other areas (i.e EF Lewis, Coweeman, Kalama, Elochoman, etc.). The hooking mortality study is expected to occur for at least 3 years. These programs are currently funded through revenue from the Columbia River Endorsement Fee licensing program. Final results from these programs are expected in 2013 and 2014.

The current programs and the goals/expectations are shown below.

- SF Toutle Creel
  - Full creel for entire season
  - Goals:
    - Estimate Total Harvest
    - Estimate wild steelhead handle rates during fishery and resulting population impacts
    - Potentially estimate harvest rate (dependent on ability to estimate total hatchery return)
- Washougal Creel
  - Conducted during selective gear fishery only (1 year)
  - Full creel for entire season (2 years)
  - Goals:
    - Estimate Total Harvest
    - Estimate wild steelhead handle rates during fishery and resulting population impacts
    - Compare selective gear fishery period to regular season
- White Salmon Creel
  - Single year creel (2012) to evaluate last significant hatchery return to the White Salmon after Condit dam removal
  - Goals:
    - Angler Participation
    - Upstream distribution of hatchery steelhead
- Klickitat Creel
  - Goals:
    - Estimate Total Harvest
    - Estimate wild steelhead handle rates during fishery and resulting population impacts.
- Wind River steelhead hooking mortality study
  - Goals:
    - Tag fish to estimate long-term hooking mortality rates for wild summer steelhead

#5 **Ecological Effects of Programs not Described**

The ecological affect hatchery juveniles have on natural populations is not addressed for most programs in any quantifiable manner. We recognized this data is difficult to collect and is not available for most hatchery programs. Regardless, to be credible, the ecological effects must be considered. This could be done using the WDFW's PCD-Risk model which estimates losses due to predation, competition and disease. The results could be used to describe a range of risks and if found to be high (i.e. > 10 percent loss) could be used to design the studies needed to confirm modeling results.

WDFW Response: Recent WDFW research (Sharpe et al. 2008) has shown that the predation risk from hatchery steelhead smolt releases are minimal on smaller prey fish. Additionally, strategies and actions included in the Statewide Steelhead Management Plan are:

- Assess the current risks and benefits, including economic benefits, of each artificial production program relative to genetic, demographic, and ecological risk factors. Key factors to include in the risk assessment for each type or program are discussed below.
    - Segregated Programs. Key risks associated with segregated programs are a potential loss of diversity (within and between stocks), loss of fitness, and competition.
        - Evaluate the potential range of gene flow from returning adults of hatchery-origin to wild-origin stocks in all watersheds where Chambers Winter or Skamania Summer steelhead stocks are released, or where a segregated program has been in place for three or more generations.

See also section 11.1 "Genetic Monitoring".

Citation:

Sharpe, C.S., P.C. Topping, T.N. Pearsons, J.F. Dixon and H.J. Fuss. 2008. Predation of naturally- produced sub-yearling Chinook by hatchery steelhead juveniles in Western Washington Rivers. Science Division, Washington Department of Fish and Wildlife. Olympia, Washington. 57 pp.

#6 **Lack of Specificity**

Much of the discussions regarding M&E are generic statements that may or may not apply to the program described in the HGMP. For example, the M&E activities simply summarize everything that is going on in the Lower Columbia River. How this M&E will be used to manage the hatchery programs is not well described.

WDFW Response: Will be addressed in each specific HGMP

#7 **Section 1.16**
This entire section doesn't seem to be answering the question? Suggest redrafting, what is here is more of an M & E description? Question is about what other alternatives to achieve harvest goal have you considered?

#7a I'm confused by the difference between these two? I thought you were using a locally adapted HATCHERY broodstock?

Alternative 2: Use local hatchery (integrated or segregated) stocks. This action would require the program to develop a local hatchery broodstock. WDFW would complete a population risk assessment prior to converting a brood stock from the current segregated brood stock source to an local hatchery brood stock source. Data used in this risk assessment could include stray rates, temporal separation, removal rates of returning adult wild fish (including harvest related removals), handle rates of wild fish in sport fisheries, impacts from Columbia River fisheries, AHA modeling results and results of genetic analyses. This may include construction of additional infrastructure in the basin.

Alternative 3: Use local indigenous (integrated or segregated) stocks. This action would require the program to develop a local indigenous broodstock. WDFW would complete a population risk assessment prior to converting a brood stock from the current segregated brood stock source to an local indigenous brood stock source. Data used in this risk assessment could include stray rates, temporal separation, removal rates of returning adult wild fish (including harvest related removals), handle rates of wild fish in sport fisheries, impacts from Columbia River fisheries, AHA modeling results and results of genetic analyses. This may include construction of additional infrastructure in the basin and increase handle of ESA listed stocks

WDFW Response: Will be addressed in each specific HGMP

#7b

Alternative 4: Adjust current segregated program size and release strategies appropriately in response to the results of recently implemented monitoring programs. Program changes would not be solely based on gene flow/introgression rates but would also incorporate data used to evaluate Alternatives 2 and 3.

Isn't this built in to this program, alternative? If you don't meet pHOS targets are you saying that you will not change the program?

WDFW Response: Last sentence removed and descriptions edited for clarity

#7c

Reform/Investment 1: Update rearing and holding systems. The rearing system requires smaller rearing vessels as well as some heated water to accelerate

growth to make one year smolts from stock across the entire run time. The cost to perform such a modification is currently estimated to be in the range.

Range of what to what?, missing a number

WDFW Response: Region 5 will address in the HGMP

#7d

Cowlitz Introgression study (new) – evaluated introgression rates of Chambers (winter) and Skamania (summer) hatchery stocks into Lower Cowlitz wild winter steelhead population.

And what did this study show? Isn't it complete?

WDFW Response: The Cowlitz River study evaluated the genetic relationship between naturally spawning winter steelhead in the Lower Cowlitz river and three hatchery stocks: summer-run (Skamania stock), early winter-run (Chambers Ck. Stock) and late Winter (Cowlitz R Stock). The study found the natural origin fish were genetically distinct from the hatchery fish; however there was evidence of introgression from the hatchery stocks. The early winter steelhead program showed the highest level of introgression.

Since completion of this study, WDFW is proposing to move to a SNPs baseline for future studies/monitoring involving genetic introgression instead of the microsatellite baseline used in the Cowlitz analysis. More specifics on this study design have been added to section 11.

Citation:

Small, M., A.R. Marshall, J. Henning, and J. Von Bargen. 2010. Genetic relationships among naturally spawning Steelhead (Oncorhynchus mykiss) in lower Cowlitz River tributaries and hatchery Steelhead stocks released in the Cowlitz Basin: implications for recovery planning. WDFW Progress Report to Tacoma Power. 38p

#7e

The sole purpose of the release of hatchery early stock winter steelhead into the Kalama is to continue a winter steelhead sport fishery while eliminating a directed harvest on wild winter steelhead. Up until 2005, hatchery smolts were transferred and released out of Gobar Ponds; currently only the integrated program releases fish from Gobar Creek, above Kalama Falls (see Kalama Winter-late Wild Steelhead HGMP). Hatchery winter steelhead returning to Kalama Falls are mark-identified (opercle punch or caudal fin-clip) and recycled downstream (released near the Sportman Loop Lower Kalama River public water access site at R.M. 0.7) to provide maximum harvest. If they are trapped at Kalama Falls and are ripe, they are donated to a food bank or taken to Kress Lake for landlocked sport fishing opportunity. Any adults that escape the fishery may spawn in the system, but the barrier at Kalama Falls provides a measure of separation between this hatchery steelhead and the main spawning

area of the wild winter steelhead passed above Kalama Falls Hatchery. Only natural-origin adults are passed into the Upper Kalama Bas

How are early and later winter hatchery steelhead identified if they are both ad-clipped? Can late winter steelhead end up in the early winter broodstock

How many each year are recycled? How many recycled fish are caught? How many unaccounted for?

Only ripe fish donated? Or are you saying ripe fish are collected for broodstock

WDFW Response:

- Fish are differentially marked. Early winters are ventral fin clipped as well as ad clipped. Late winters are ad-only.
- 5 year running average for recycled fish is 595 fish, WDFW is pulling records for recycled fish trapped. Creel is not currently being done but WDFW is proposing a rotational creel program to address the harvest rate on recycled fish.
- First-time captures that are ripe are NOT recycled – they are either used for broodstock, donated to a food bank, or transported to Kress lake.
- Only green fish are recycled, upon second capture fish are either donated to food bank or transported to Kress Lake.

#7e

Genetic sample collection (new and existing) – genetic samples are collected from adult wild steelhead populations and naturally produced steelhead smolts during summer steelhead monitoring, at winter steelhead trapping locations, during FIFO monitoring (smolts) and potentially during creel surveys. These samples and future sample collections may be valuable in assessing gene flow/introgression (see HGMP section 11).

Is this being done on the Kalama?

WDFW Response: More specific genetics study text was added to section 11.

Public Comments and Washington Department of Fish and Wildlife (WDFW) Responses to 17 Lower Columbia River HGMPs

Comment #1

I am writing you to express my opposition to the continued release of hatchery steelhead into the South Fork Toutle, Coweeman, and East Fork Lewis Rivers as outlined in the recent Lower Columbia River Hatchery Genetic Management Plans. Releasing non-native hatchery fish into watersheds without collection facilities conflicts with the departments own policies as outlined in the Statewide Steelhead Management Plan, and undermines the productivity of wild populations in these basins, jeopardizing the recovery of ESA listed Lower Columbia steelhead. The Hatchery Scientific Review Group for the Columbia has identified the East Fork Lewis, South Fork Toutle and Coweeman as primary populations, and set 5% as the acceptable threshold for the percentage of hatchery origin spawners (pHOS). WDFW's own estimates indicate that on average 70% of the spawning escapement in the Lewis consists of hatchery summer steelhead. While the department has reduced the number of fish released in the East Fork the absence of a hatchery collection facility in the basin means that even reductions in the size of hatchery releases will not bring the pHOS anywhere near HSRG guidelines.

Despite the lack of direct estimates of the % hatchery origin spawners in the South Fork Toutle and Coweeman the problem posed by the absence of collection facilities in these watersheds means that the threat posed by hatchery spawners to wild populations is likely very substantial. The HSRG identified each of these three watersheds as excellent candidates for Wild steelhead management zones, an alternative which I support. Almost every watershed in the Lower Columbia ESU receives releases of hatchery steelhead and salmon, and there are ample opportunities to harvest hatchery steelhead. Given the wealth of hatchery harvest opportunity provided elsewhere in the ESU, and the inability of these programs to meet the standards laid out in the Statewide Steelhead Management Plan and the HSRG the department should prioritize the recovery of wild steelhead in the South Fork Toutle, Coweeman and East Fork Lewis and discontinue hatchery releases in these systems.

Comment #2

Are plans in motion to violate the steelhead recovery management plan? If so, why? Under whose authority? What use is the management plan if it's not implemented uniformly?

Comment #3

I have fished the South Fork of the Toutle for years in the Winter and this past season was closed early due to decreased run size. Furthermore, I have caught hatchery steelhead in the winter when there should not be any there. This is putting stress on the native fish population in the river system and depressing escapement (which there are no goals for because the reds are not counted). Another issue with the hatchery program on the South Fork is that there is nowhere for the fish to go once they are in the system since there is no facility (fish trap). Once in the system they are trying to spawn if not caught and killed. This is not good practice when we need to be increasing native run sizes.

Comment #4

Lets try saving some money and try a new directions please... 100 years of Hatchery productions has not saved one stream from the continued donward spiral of Native salmonids...
They first steelhead I ever landed on fly rod came on a spring moring on the East Fork of lewis just above Day break park. A magnigicent WILD SPRING run fish. Very few of these fish are left.

Comment #5

Thank you for the opportunity to provide input on the release of hatchery steelhead into the South Fork Toutle, Coweeman, and East Fork Lewis Rivers described in the recent Lower Columbia River HGMP. Frankly, I am astounded that WDFW would even think of releasing non-native hatchery fish in rivers without collection facilities. Significant interbreeding with the wild steelhead in these watersheds will occur and this just seems like a shortsighted approach that will make it harder for these ESA listed fish to recover. I confess I can't understand why the WDFW would not do so. Is it your self-interest in hatcheries? Is it pressure by short-sighted fishermen who want abundant fisheries but are unwilling to make a short-term sacrifice to achieve that end? As someone who likes to fish at least as much as the next guy, and who would love to fish in rivers filled with wild steelhead, I am asking that you not move forward with the continuing release of hatchery fish into these rivers. We have examples of rivers in our state where hatchery release of steelhead was discontinued—and in each case they have fared well. Every place I fish that has strong fisheries, from British Columbia for steelhead to Montana and Idaho for trout—the fisheries are free from hatchery fish. And the local businesses are all grateful for it because people travel from all over the world to fish (and spend money) there. When was the last time that happened in Washington and what were our wild fish populations like then? Please give these fish a chance and discontinue hatchery releases in these systems.

Comment #6

Moreover, extensive research conducted by Araki et al. on the Hood River demonstrates convincingly that hatchery fish have a much lower rate of reproductive success than wild steelhead, and should be kept off the spawning grounds if wild populations are to rebuild.

Comment #7

AS always the sport fishing industry profits the most from solid management of fishing seasons, Boats, transportation, lodging, tackle, and all that goes with the costs benefit the public and private sectors. Yet the administration misses the point and fails to provide the consumers with long enough and best periods of consumption. It is frustrating to deal with this short sighted production. Also Stop spending monies that will not maximize the production and benefits yo the consumers.

Comment #9

First of all let me say there is no such thing as a wild salmon or wild steelhead in the Columbia. This is all being fed to the public by our Federal Government. I am 71 years old now and as a young man on the kalama river I would sometimes go to the lower hatchery. I would watch as they got what they called their quota of salmon or steelhead. They then would put up a fence made of just regular chicken wire on the little stream coming into the hatchery and no more fish could come in. Now do you honestly believe all these fish just up and died? No they went back into the kalama river and spawned. This gave us a mixture of hatchery fish and native fish "WILD" A lot of the hatcheries were built back in the 1930,s so this went on for a very long time.

I am quite sure this went on at all the hatcheries on the Columbia River. Now forget all these Salmon and Steelhead that were mixed hatchery and native "WILD" This went on for years and years. Now comes the 1970,s and I am fishing by Lions Day Park in Woodland Wa. I have a Steelhead and a long comes a Game Warden a Mr. Suhadolnic rest his soul. He checks my fish and gets all excited saying I had caught a hatchery fish and he knew it was a hatchery fish because the adipose fin was clipped. Now I ask you how in the world could you honestly say a fish was WILD or hatchery they did not start clipping the adipose fin until the 1970,s. A little more when they built the dams on the Lewis River they destroyed the fish runs. I ask you where did they get the stock to restore the fish runs??? The myth that is trying to make people believe that the so called WILD fish fight harder than the hatchery is what it is a myth. The truth is the hen fights harder than the buck pound for pound. Has more desire to reproduce I believe

Comment #10

I fish the Green River and would not like to see the steelhead program shut down. I have fished the river as kid and would like to see this program continued. Thank you.

Comment #11

Please cease hatchery production in these rivers where wild steelhead could once again thrive!

Comment #12

I am sure by now you have received several emails from anglers and concerned citizens that are in support of the recommendations of the Wild Steelhead Coalition to not continue a mismanaged hatchery system on these Columbia tributaries. I also agree fully with the Wild Steelhead Coalition.

Additionally, as a fly fisher, guide, and fly shop owner, I would say that these recommendations from the Wild Steelhead coalition are not only better for the fish but they are better for business too. My customers are more interested in fishing for wild fish than hatchery reared fish. In fact, I constantly am asked by customers why the department seems to want to get rid of wild fish and/or why hatchery fish are so important. I don't have answers to these questions, just speculations.

Sport fishing is an economic engine and many of us depend on it for our income. Additionally, the money my customers spend to go fishing in addition to tackle (boats, motels, gas, food, etc) is an underrated and significant number. Please redeploy funds from these hatchery programs to conservation programs. We can educate the public of Washington to the importance of wild fish and help grow a catch and release ethic like other states have done. The department could easily start by changing the tone of the posts on their facebook page. And that doesn't even cost anything!

Washington Department of Fish and Wildlife (WDFW) Response to Comments #1-7 and #9-12

WDFW has several policies/plans that help inform management decisions regarding the HGMPs under review at this time. Those policies include:

1. Hatchery and Fishery Reform Policy (Commission Policy C3619)
2. The Statewide Steelhead Management Plan (SSMP)
3. The Conservation and Sustainable Fisheries Plan (draft)
4. The Hatchery Action Implementation Plans (HAIP)
5. Lower Columbia Salmon Recovery Plan (LCSRP)

Descriptions of these policies and excerpts are shown below the Summary of Actions to help clarify the responses.

Summary of actions to date and proposed future actions

- Hatchery programs in the EF Lewis, Coweeman and SF Toutle have been significantly reduced beginning with the 2009 smolt releases to achieve HSRG standards (Table 1).
- Fisheries were modified in a number of areas to increase harvest on hatchery steelhead and/or reduce handle of wild steelhead (Table 2).
- Creel programs have been initiated to verify catch record cards, estimate wild fish handle and estimate harvest rate if possible.
- A hooking mortality study was initiated on the Wind River to develop mortality rate estimates for steelhead from sport fishing.
- Lower Columbia River (LCR) wild steelhead populations are stable and near Recovery Plan abundance targets (Tables 8-10). The status of these populations allows for increased flexibility as watershed plans are developed, because there is less risk to the populations.
- Recycling programs have been eliminated or modified to reduce potential negative interactions with wild fish.
- The Hatchery Scientific Review Group (HSRG) suggests a standard of less than 5% pHOS for primary populations with pHOS defined as the proportion of **effective** hatchery origin spawners. The WDFW SSMP requires segregated (isolated) programs to result in an average gene flow of less than 2% from the hatchery to the wild stock. Effective pHOS is often used as a surrogate for estimating gene flow. Based on current modeling, program sizes implemented in 2009 and proposed for 2013 (EF Lewis winter steelhead) currently meet HSRG standards for pHOS and the SSMP requirement of less than 2% gene flow (Tables 3-7).
- WDFW realizes many parameters used in the modeling to estimate pHOS and gene flow lack empirical data. WDFW is proposing to implement a monitoring program to measure genetic introgression (gene flow) from segregated steelhead programs for key populations.
- WDFW will further reduce the winter steelhead program in the EF Lewis River to 38,000 fish (from 60,000), beginning with the 2013 or 2014 brood. Modeled estimates for pHOS at the 60,000 fish program size meet HSRG standards of less than 5% (Table 3); however, they do not meet the SSMP requirement of less than 2% gene flow. Until results of the genetic introgression monitoring program are known, this additional reduction is necessary to meet the requirements of the SSMP.

- WDFW will be establishing a network of gene banks in the lower Columbia River. WDFW is utilizing a series of workgroups to develop regional watershed plans for the SSMP.
    - The workgroup developing plans for the Kalama, Toutle and Coweeman has proposed the NF Toutle/Green as a potential gene bank location in the Cascade Strata.
    - The workgroup developing plans for the Gorge Strata has proposed the Wind River be continued as a gene bank for that area.
    - There will be additional workgroups established for the remainder of the Cascade Strata (Lewis, Washougal, Salmon) and the Coastal Strata (Grays, Elochoman/Skamokawa, Mill/Abernathy/Germany). These work groups will propose additional gene banks within these areas.

Policies/Plans – Key Excerpts

Hatchery and Fishery Reform Policy

Guidelines from the policy include:

1. Use the principles, standards, and recommendations of the Hatchery Scientific Review Group (HSRG) to guide the management of hatcheries operated by the Department.
2. Develop watershed-specific action plans that systematically implement hatchery reform as part of a comprehensive, integrated (All-H) strategy for meeting conservation and harvest goals at the watershed and Evolutionarily Significant Unit (ESU)/Distinct Population Segment (DPS) levels. Action Plans will include development of stock (watershed) specific population designations and application of HSRG broodstock management standards.

Statewide Steelhead Management Plan

The Statewide Steelhead Management Plan (SSMP) was finalized in February 2008.

"The Department will use the SSMP to build on the habitat work already done by the watershed and regional groups by incorporating hatchery, harvest and hydro actions into watershed plans. These watershed plans will then be combined into Regional Management Plans for each Distinct Population Segment (DPS)."

- In Southwest Washington (Region 5), WDFW will develop watershed work groups to assist in the development of the regional watershed plans. Work group status is:
    - Coweeman, Toutle, Kalama – near completion
    - Upper & Lower Gorge – near completion
    - Lewis, Salmon, Washougal – proposed to start January 2013
    - Grays, Elochoman/Skamokawa, Mill/Abernathy/Germany – proposed for late 2013
    - Upper & Lower Cowlitz – plans will be developed consistent with the updated Fisheries and Hatchery Management Plan (FHMP), developed by the Cowlitz Fisheries Technical Committee (FTC) with input from the Cowlitz Ad-Hoc Advisory Group.

Several strategies and actions included in the SSMP are shown below:

- Establish Network of Wild Stock Gene Banks. The gene bank must be a place where wild stocks are largely protected from the effects of hatchery programs. At least one wild

stock gene bank will be established for each major population group in each steelhead DPS.

- Describe Path with Measurable Benchmarks to Long-term Goals. Evaluate the current benefits and risks of the current program relative to the long-term goals for each stock. Describe a path to the long-term goals with measurable benchmarks for modifications to fishery, hatchery, and habitat management and the expected performance of each stock. For programs affecting the wild stocks of importance for conservation and recovery, the long-term goal will include the following elements:
    - Segregated programs implemented to enhance harvest opportunities (i.e. segregated harvest program) will result in an average gene flow of less than 2% from the hatchery to the wild stock. Use broodstock that originated from releases of juveniles in that watershed unless no hatchery or trapping facility exists.
    - Segregated conservation programs implemented to maintain the hatchery population as a distinct or genetically segregated population in order to preserve and recover depleted wild stocks.
    - Assess the current risks and benefits, including economic benefits, of each artificial production program relative to genetic, demographic, and ecological risk factors. Key factors to include in the risk assessment for each type or program are discussed below.
        - Segregated Programs. Key risks associated with segregated programs are a potential loss of diversity (within and between stocks), loss of fitness, and competition.
            - Evaluate the potential range of gene flow from returning adults of hatchery-origin to wild-origin stocks in all watersheds where Chambers Winter or Skamania Summer steelhead stocks are released, or where a segregated program has been in place for three or more generations.
        - Where risks are inconsistent with watershed goals, implement one or more of the following actions:
            - Leave trapping facilities open during the entire return time for adults of the segregated stock.
            - Eliminate recycling of hatchery-origin adults to anadromous waters.
            - Release steelhead juveniles from steelhead programs only at locations where returning adults can be captured.
            - Increase the harvest rates on hatchery-origin fish.
            - Reduce the number of fish released or change the release location, rearing practices affecting the rate of residualism, or other program characteristics to reduce the rate of gene flow.
            - Eliminate the segregated hatchery program.
            - Replace the segregated program with an integrated program with risks that are consistent with watershed goals.

Conservation and Sustainable Fisheries Plan (CSFP)

The CSFP is a draft plan that has been developed to meet WDFW's responsibilities outlined in the Lower Columbia Salmon Recovery Plan (LCSRP) and address the HSRG suggested solutions and achieve HRSG standards for primary, contributing and stabilizing populations.

The plan describes the implementation of changes to hatchery and harvest programs and how they assist in recovery and achieve HSRG guidelines. The draft plan also identifies Viable Salmonid Population (VSP) parameters that will be addressed.

Hatchery Action Implementation Plans (HAIP)

The HAIPs illustrate how WDFW is implementing hatchery programs to incorporate the HSRG guidelines. The plans provide the current programs and explain the future goals.

Lower Columbia Salmon Recovery Plan (LCSRP)

Some subbasins will be free of hatchery influence and hatchery programs. In other subbasins, hatchery programs will serve specific conservation and harvest purposes consistent with goals for naturally-spawning populations. The mosaic of programs is designed to ensure that overall each DPS will be naturally self-sustaining.

Strategies

- Reconfigure production-based hatchery programs to minimize impacts on natural populations and complement recovery objectives.
- Adaptively manage hatcheries to respond to future knowledge, enhance natural production, and improve operational efficiencies.

Detailed description of actions to date and proposed future actions

The South Fork Toutle, Coweeman and East Fork Lewis rivers are all listed as primary populations in the Lower Columbia Salmon Recovery Plan (LCSRP). The CSFP states these four steelhead programs (Coweeman, SF Toutle, EF Lewis winter and summer) will be segregated programs. WDFW has implemented a number of changes in these systems consistent with the CSFP and the SSMP.

Program Reductions

Beginning with the 2009 release-year winter and summer smolt releases in these three systems were reduced (Table 1).

Table 1. Changes in Hatchery Releases of Steelhead Smolts.

River	Stock	Prior to 2009 Brood	Current 2009 Brood	Percent Reduction
SF Toutle	Summer Steelhead	25,000	20,000	20%
Coweeman	Winter Steelhead	20,000	12,000	40%
EF Lewis	Winter Steelhead	90,000	60,000	33%
EF Lewis	Summer Steelhead	30,000	15,000	50%

These reductions were done to strategically realign hatchery programs to ensure production levels are 1) consistent with LCSRP population classifications and fitness improvement goals, 2) consistent with the CSFP and 3) "where risks are inconsistent with watershed goals" reduce production, consistent with the SSMP. Reducing program size is one action identified in the SSMP to reduce risk to wild populations in systems where acclimation and/or adult collection facilities are absent.

Through the watershed planning process, the summer steelhead hatchery program in the Green River (North Toutle Hatchery) has been proposed for elimination to create a gene bank for winter steelhead in the NF Toutle/Green watershed. This program is currently 25,000 summer steelhead. This is expected to occur with the formal adoption of the steelhead watershed plan for the Toutle basin.

Increased Harvest

The CSFP and the SSMP also call for implementation of strategies to reduce the percentage of hatchery fish on the spawning grounds. WDFW has implemented a process to increase harvest opportunity by increasing time and area openers and increased bag limits (CSFP). Several proposed changes have come out of the watershed planning workgroups that have not yet been implemented and are being vetted through the sport fishery rule change proposal process. Other changes have been implemented through the "emergency fishing rule" process until watershed workgroups can be convened to discuss the merits of these changes, or through prior sport fishery rule change cycles. Table 2 summarizes the fishery regulation changes that have been implemented. Increasing harvest of hatchery origin fish is one action identified in the SSMP to reduce risk to wild populations in systems where acclimation and/or adult collection facilities are absent.

Table 2. Implementation of Increased Harvest Opportunities in Selected Tributaries.

River	Action	Purpose	Conservation
SF Toutle	Early opener (late May)	Increase harvest of hatchery summer steelhead	Selective gear rules in early fishery. Early fishery limited to lower areas of system. Downstream of majority of wild spawning areas.
Coweeman	Area expansion. Upstream to Baird Creek	Increase access and harvest opportunity for hatchery winter steelhead	Winter fishery timeframe – Nov 1 - March 15 Closed March 15 thru first weekend in June to protect wild winter steelhead adults and smolts.
EF Lewis/Washougal	Early Opener (April 16)	Increase harvest opportunity for hatchery summer-run steelhead that enter these watersheds in early spring	Selective gear fisheries were established in these basins beginning April 16 – Friday before the first Saturday in June.

Harvest Monitoring Programs

WDFW has implemented several creel programs and a hooking mortality study in the tributaries to better assess the harvest that is occurring and its impacts on wild steelhead populations. WDFW's intent is to conduct creel for 2-3 years in each tributary and then continue the program into other areas. The current programs and the goals/expectations are shown below.

- SF Toutle
    - Full creel for entire season
    - Goals:

        - Estimate Total Harvest
        - Estimate wild steelhead handle rates during fishery and resulting population impacts
        - Potentially estimate harvest rate (dependent on ability to estimate total hatchery return)
- Washougal
    - Conducted during selective gear fishery only (1 year)
    - Full creel for entire season (2 years)
    - Goals:
        - Estimate Total Harvest
        - Estimate wild steelhead handle rates during fishery and resulting population impacts
        - Compare selective gear fishery period to regular season
- White Salmon
    - Single year creel (2012) to evaluate last significant hatchery return to the White Salmon after Condit dam removal
    - Goals:
        - Angler Participation
        - Upstream distribution of hatchery steelhead
- Klickitat
    - Goals:
        - Estimate Total Harvest
        - Estimate wild steelhead handle rates during fishery and resulting population impacts.
- Wind River steelhead hooking mortality study
    - Goals:
        - Tag fish to estimate long-term hooking mortality rates for wild summer steelhead

Gene Banks/Wild Steelhead Management Zones

The SSMP says that for segregated programs, "the potential range of gene flow from returning adults of hatchery-origin to wild-origin stocks in all watersheds where Chambers Winter or Skamania Summer steelhead stocks are released, or where a segregated program has been in place for three or more generations should be evaluated". The HSRG suggests a standard of less than 5% pHOS for primary populations with pHOS defined as the proportion of **effective** hatchery origin spawners. Effective pHOS is often used as a surrogate for estimating gene flow. The WDFW SSMP requires segregated (isolated) programs to result in an average gene flow of less than 2% from the hatchery to the wild stock. Table 3 shows the results of a recent analysis of effective pHOS at various production levels.

Table 3. Effective pHOS Values Based on Numbers of Hatchery Smolts Released.

River	Stock	Release Number	pHOS	Comments
SF Toutle	Summer	25,000	2%	Prior program (pre-2009)
SF Toutle	Summer	20,000	2%	Current program (2009)
Coweeman	Winter	20,000	2%	Prior program (pre-2009)
Coweeman	Winter	12,000	1%	Current program (2009)
EF Lewis	Winter	90,000	7%	Prior program (pre-2009)
EF Lewis	Winter	60,000	4%	Current program (2009)
EF Lewis	Winter	38,000	2%	Proposed program (2013)
EF Lewis	Summer	30,000	5%	Prior program (pre-2009)
EF Lewis	Summer	15,000	2%	Current program (2009)

As shown in Table 3, all of the current programs are meeting the less than 5% effective pHOS criteria of the HSRG and the less than 2% gene flow criteria of the SSMP, with the exception of the EF Lewis winter steelhead program at the current 60,000 fish program size.

WDFW acknowledges there was a reference to a 70% value for spawning escapement included in the EF Lewis Summer Steelhead HGMP. This value does not represent effective pHOS. More recent data from summer tagging efforts (July) and fall snorkeling surveys (early September) indicate that the annual percentage of hatchery origin fish in the EF Lewis (at the time of tagging/surveying) was approximately 30% in years with returns from the 30,000 fish program. Tagging and surveys in 2012, the first year of 2-salt returns from the reduced program size of 15,000 fish, indicate this percentage was approximately 22%. These values represent the percentage of hatchery fish in the system at a single point in time and do not represent estimates of pHOS. Due to additional harvest after tagging/snorkeling, the differences in spatial distribution of hatchery and wild spawners, and differences in spawn timing the actual pHOS (effective) is likely much less.

WDFW analyzed the gene flow estimates based on equations provided in Scott and Gill (2008). Tables 4a-7 show the estimated gene flow for the EF Lewis winter and summer steelhead, the SF Toutle summer steelhead and the Coweeman winter steelhead hatchery programs. These tables show the results of the gene flow analysis based on the 10-year average number of wild spawners.

Table 4a. Estimated Gene Flow for East Fork Lewis Winter Steelhead Based on Equations in Scott and Gill (2008) and the 10-Year Average Escapement of Wild Spawners (60,000 fish release).

Parameter[1]	Source	Definition	Scenario [2]			
			1	2	3	4
O_h		Proportion of N spawners in overlap	0.05	0.33	0.05	0.33
O_n		Proportion of H spawners in overlap	0.05	0.33	0.05	0.33
k_2		Relative Reproductive Success of H x W crosses	0.11	0.11	0.5	0.5
k_1	HSRG	Relative Reproductive Success of H x H crosses	0.11 all scenarios			
N_w	10 yr. AVG	Number of wild spawners	515 all scenarios			
N_h	HSRG	Number of hatchery spawners	163 all scenarios			
q	Calculated	Proportion of hatchery fish among all spawners	0.240 all scenarios			
a	Calculated	Parameter from Scott and Gill (2008)	0.05	0.33	0.05	0.33
b	Calculated	Parameter from Scott and Gill (2008)	0.0013	0.009	0.0015	0.017
Gene flow	**Scott et al. 2008**	**Estimate of Gene flow**	**0.034**	**0.036**	**0.038**	**0.066**

[1] *Parameters where possible were taken from HSRG (AHA) analyses. Estimates for O_h, O_n, and k_2 were based on professional opinion.*

[2] *Gene flow was estimated under four scenarios with high and low overlap of wild and hatchery spawners and high and low relative reproductive success of hatchery x wild (HxW) crosses. Green shading represents parameters with empirical evidence as support. Yellow shading represents parameters based on professional opinion or estimated from AHA model.*

Table 4b. Estimated Gene Flow for East Fork Lewis Winter Steelhead Based on Equations in Scott and Gill (2008) and the 10-Year Average Escapement of Wild Spawners (38,000 fish release).

Parameter[1]	Source	Definition	Scenario [2]			
			1	2	3	4
O_h		Proportion of N spawners in overlap	0.05	0.33	0.05	0.33
O_n		Proportion of H spawners in overlap	0.05	0.33	0.05	0.33
k_2		Relative Reproductive Success of H x W crosses	0.11	0.11	0.5	0.5
k_1	HSRG	Relative Reproductive Success of H x H crosses	0.11 all scenarios			
N_w	10 yr. AVG	Number of wild spawners	515 all scenarios			
N_h	HSRG	Number of hatchery spawners	106 all scenarios			
q	Calculated	Proportion of hatchery fish among all spawners	0.171 all scenarios			
a	Calculated	Parameter from Scott and Gill (2008)	0.05	0.33	0.05	0.33
b	Calculated	Parameter from Scott and Gill (2008)	0.0009	0.0062	0.001	0.0122
Gene flow	**Scott et al. 2008**	**Estimate of Gene flow**	**0.022**	**0.023**	**0.025**	**0.045**

[1] *Parameters where possible were taken from HSRG (AHA) analyses. Estimates for O_h, O_n, and k_2 were based on professional opinion.*

[2] *Gene flow was estimated under four scenarios with high and low overlap of wild and hatchery spawners and high and low relative reproductive success of hatchery x wild (HxW) crosses. Green shading represents parameters with empirical evidence as support. Yellow shading represents parameters based on professional opinion or estimated from AHA model.*

Table 5. Estimated Gene Flow for East Fork Lewis Summer Steelhead Based on Equations in Scott and Gill (2008) and the 10-Year Average Escapement of Wild Spawners (15,000 fish release).

Parameter[1]	Source	Definition	Scenario [2]			
			1	2	3	4
O_h		Proportion of N spawners in overlap	0.05	0.33	0.05	0.33
O_n		Proportion of H spawners in overlap	0.05	0.33	0.05	0.33
k_2		Relative Reproductive Success of H x W crosses	0.11	0.11	0.5	0.5
k_1	HSRG	Relative Reproductive Success of H x H crosses	0.18 all scenarios			
N_w	10 yr. AVG	Number of wild spawners	627 all scenarios			
N_h	HSRG	Number of hatchery spawners	24 all scenarios			
q	Calculated	Proportion of hatchery fish among all spawners	0.037 all scenarios			
a	Calculated	Parameter from Scott and Gill (2008)	0.05	0.33	0.05	0.33
b	Calculated	Parameter from Scott and Gill (2008)	0.0003	0.002	0.0004	0.003
Gene flow	**Scott et al. 2008**	**Estimate of Gene flow**	**0.007**	**0.006**	**0.007**	**0.011**

[1] *Parameters where possible were taken from HSRG (AHA) analyses. Estimates for O_h, O_n, and k_2 were based on professional opinion.*

[2] *Gene flow was estimated under four scenarios with high and low overlap of wild and hatchery spawners and high and low relative reproductive success of hatchery x wild (HxW) crosses. Green shading represents parameters with empirical evidence as support. Yellow shading represents parameters based on professional opinion or estimated from AHA model.*

Table 6. Estimated Gene Flow for South Fork Toutle Summer Steelhead Based on Equations in Scott and Gill (2008) and the 10-Year Average Escapement of Wild Spawners (20,000 fish release).

Parameter[1]	Source	Definition	Scenario [2]			
			1	2	3	4
O_h		Proportion of N spawners in overlap	0.05	0.33	0.05	0.33
O_n		Proportion of H spawners in overlap	0.05	0.33	0.05	0.33
k_2		Relative Reproductive Success of H x W crosses	0.11	0.11	0.5	0.5
k_1	HSRG	Relative Reproductive Success of H x H crosses	0.18 all scenarios			
N_w	10 yr. AVG	Number of wild spawners	648 all scenarios			
N_h	HSRG	Number of hatchery spawners	59 all scenarios			
q	Calculated	Proportion of hatchery fish among all spawners	0.083 all scenarios			
a	Calculated	Parameter from Scott and Gill (2008)	0.05	0.33	0.05	0.33
b	Calculated	Parameter from Scott and Gill (2008)	0.0007	0.004	0.0008	0.008
Gene flow	**Scott et al. 2008**	**Estimate of Gene flow**	**0.016**	**0.015**	**0.017**	**0.025**

[1] *Parameters where possible were taken from HSRG (AHA) analyses. Estimates for O_h, O_n, and k_2 were based on professional opinion.*

[2] *Gene flow was estimated under four scenarios with high and low overlap of wild and hatchery spawners and high and low relative reproductive success of hatchery x wild (HxW) crosses. Green shading represents parameters with empirical evidence as support. Yellow shading represents parameters based on professional opinion or estimated from AHA model.*

Table 7. Estimated Gene Flow for Coweeman Winter Steelhead Based on Equations in Scott and Gill (2008) and the 10-Year Average Escapement of Wild Spawners (12,000 fish release).

Parameter[1]	Source	Definition	Scenario [2]			
			1	2	3	4
O_h		Proportion of N spawners in overlap	0.05	0.33	0.05	0.33
O_n		Proportion of H spawners in overlap	0.05	0.33	0.05	0.33
k_2		Relative Reproductive Success of H x W crosses	0.11	0.11	0.5	0.5
k_1	HSRG	Relative Reproductive Success of H x H crosses	0.11 all scenarios			
N_w	10 yr. AVG	Number of wild spawners	487 all scenarios			
N_h	HSRG	Number of hatchery spawners	41 all scenarios			
q	Calculated	Proportion of hatchery fish among all spawners	0.078 all scenarios			
a	Calculated	Parameter from Scott and Gill (2008)	0.05	0.33	0.05	0.33
b	Calculated	Parameter from Scott and Gill (2008)	0.0004	0.003	0.0005	0.006
Gene flow	**Scott et al. 2008**	**Estimate of Gene flow**	**0.009**	**0.009**	**0.01**	**0.019**

[1] *Parameters where possible were taken from HSRG (AHA) analyses. Estimates for O_h, O_n, and k_2 were based on professional opinion.*

[2] *Gene flow was estimated under four scenarios with high and low overlap of wild and hatchery spawners and high empirical evidence as support. Yellow shading represents parameters based on professional opinion or estimated and low relative reproductive success of hatchery x wild (HxW) crosses. Green shading represents parameters with from AHA model.*

The analyses in Tables 4a-7 was also conducted using the number of wild spawners from the HSRG report and the 3-year average. Table 4a shows gene flow estimates ranging from 3.4%-6.6%, for the EF Lewis wild winter steelhead population (60,000 fish release), based on the 10-year average number of wild spawners. Using the HSRG values the range is 3.9%-7.5% and using the 3-year average the range is 3.9%-7.6%.

Table 4b shows gene flow estimates ranging from 2.2%-4.5%, for the EF Lewis wild winter steelhead population (38,000 fish release) based on the 10-year average number of wild spawners. Using the HSRG values the range is 2.3%-4.6% and using the 3-year average the range is 2.6%-5.2%.

Table 5 shows gene flow estimates ranging from 0.7%-1.1%, for the EF Lewis wild summer steelhead population (15,000 fish release), based on the 10-year average number of wild spawners. Using the HSRG values the range is 2.0%-3.2% and using the 3-year average the range is 0.5%-0.8%.

Table 6 shows gene flow estimates ranging from 1.6%-2.5%, for the SF Toutle wild summer steelhead population (20,000 fish release), based on the 10-year average number of wild

spawners. Using the HSRG values the range is 1.3%-2.0% and using the 3-year average the range is 3.1%-4.9%.

Table 7 shows gene flow estimates ranging from 0.9%-1.9%, for the Coweeman wild winter steelhead population (12,000 fish release), based on the 10-year average number of wild spawners. Using the HSRG values the range is 0.9%-1.9% and using the 3-year average the range is 0.9%-1.8%.

All of the programs shown above meet the 2% gene flow standard of the SSMP based on the parameters shown in Tables 4a-7, with the exception of the EF Lewis winter steelhead program. WDFW realizes many parameters used in the modeling to estimate pHOS and gene flow lack empirical data. WDFW is proposing to implement a monitoring program to measure genetic introgression (gene flow) from segregated steelhead programs for key populations. Until results of the genetic introgression monitoring program are known, a reduction from 60,000 to 38,000 smolts for the EF Lewis winter program is necessary to meet the requirements of the SSMP.

Population Monitoring

WDFW conducts stream surveys annually to estimate the wild steelhead populations. Redd counts are used to estimate wild winter steelhead populations and a mark/resight program is used for wild summer steelhead. Tables 8 and 9 show the wild winter steelhead population estimates for select LCR populations from 2000 to 2011, the current WDFW escapement goals and the Recovery Plan (LCSRP) abundance targets. Table 10 shows the wild summer steelhead population estimates for LCR populations from 2001 to 2011, the current WDFW escapement goals and the Recovery Plan (LCSRP) abundance targets.

Table 8. Wild Winter Steelhead Escapement Estimates for Select SW Washington DPS Populations.

WDFW Escapement Goal	**Grays** **1486**	**Elochoman/Skamokawa** **853**	**Mill/Abernathy/Germany** **508**
LCSRP Abundance Target	**800**	**600**	**500**
2000	1064	650	380
2001	1130	656	458
2002	724	370	354
2003	1200	668	342
2004	1132	768	446
2005	396	376	274
2006	718	632	398
2007	724	490	376
2008	764	666	528
2009	568	222	396
2010	422	534	398
2011	318	442	270
3-year average	**436**	**399**	**355**
5-year average	**559**	**471**	**394**
10-year average	**697**	**517**	**378**

Table 9. Wild Winter Steelhead Escapement Estimates for Select Lower Columbia DPS Populations.

WDFW Escapement Goal	Coweeman 1064	SF Toutle 1058	NF Toutle/ Green NA	Kalama 1000	EF Lewis 1243	Washougal 520
LCSRP Abundance Target	**500**	**600**	**600**	**600**	**500**	**350**
2000	530	490		921	NA	NA
2001	384	348		1042	377	216
2002	298	640		1495	292	286
2003	460	1510		1815	532	764
2004	722	1212		2400	1298	1114
2005	370	520	388	1856	246	320
2006	372	656	892	1724	458	524
2007	384	548	565	1050	448	632
2008	722	412	650	776	548	732
2009	602	498	699	1044	688	418
2010	528	274	508	961	336	232
2011	408	210	416	622	308	204
3-year average	**513**	**327**	**541**	**876**	**444**	**285**
5-year average	**529**	**388**	**568**	**891**	**466**	**444**
10-year average	**487**	**648**	**588***	**1374**	**515**	**523**

*7 yr Avg for NF Toutle/Green

Table 10. Wild Summer Steelhead Escapement Estimates for Lower Columbia DPS Populations.

WDFW Escapement Goal	Kalama 1000	EF Lewis NA	Washougal NA	Wind 1557
LCSRP Abundance Target	**500**	**500**	**500**	**1000**
2001	286	271	184	457
2002	454	440	404	680
2003	817	910	607	1096
2004	632	425	NA	861
2005	400	673	608	587
2006	387	560	636	632
2007	361	412	681	737
2008	237	365	755	614
2009	308	800	433	580
2010	370	602	787	788
2011	534	1084*	956*	1468
3-year average	**404**	**829**	**725**	**945**
5-year average	**362**	**653**	**722**	**837**
10-year average	**450**	**627**	**652**	**804**

*preliminary estimates

As can be seen from Tables 8-10, the average wild summer and winter steelhead escapements in many of these tributaries are near or exceeding the LCSRP abundance targets. Since development of the existing WDFW escapement goals (mid-1980s), several key LCR steelhead populations have been monitored for both adult and juvenile (smolt) abundance. These monitoring programs provide valuable spawner-recruit data that can be used to assess key biological reference points (BRP). An update of WDFW escapement goals is being proposed as part of the watershed planning process and will incorporate an analysis of the spawner-recruit data and BRPs for these populations. Preliminary results suggest that, based on available habitat, many of these systems are currently fully seeded.

Recycling Programs

Kalama and Washougal are the only Lower Columbia programs where this is occurring for steelhead. Recycling programs were modified to a one time effort. Fish are recycled one time – upon second capture they are removed. There is currently a steelhead recycling study operating on the Cowlitz River with the intent of trying to estimate what happens to the steelhead that are recycled. This study is being conducted by US Geological Survey (USGS) using WDFW Columbia River Endorsement Fee funds. Preliminary results from the first year of the study show that about 18% are harvested, 68% returned to the hatchery, and the other 14% are undetermined at this point, although no fish have been captured at any of the three weirs in the lower Cowlitz tributaries. Additional information is still being collected.

Mitchell Act Program

- All hatchery steelhead programs in the Lower Columbia, outside of the Cowlitz and North Fork Lewis systems, are funded by the Mitchell Act.
- The Mitchell Act supports Northwest fishing economies – particularly coastal and Native American -- that have relied on Columbia River production both before and after dam construction.
- Catches of hatchery fish sustain the economies of local communities while keeping the harvest of ESA-Listed fish at approved levels.
- Value of hatchery production and benefit to local economies will be further increased by implementing fisheries that increase harvest of hatchery produced fish, as expected through implementation of the LCSRP.

References

Scott, J. and W. Gill. 2008. *Oncorhynchus mykiss:* Assessment of Washington State's Steelhead Populations and Programs. Edited by James B. Scott, Jr. and William T. Gill. Washington Department of Fish and Wildlife. Olympia, Washington. February 1, 2008

Washington Department of Fish and Wildlife (WDFW) Response to Comment #8

Comment #8

WE NEED TO STOP ALL COMMERCIAL NETTING ON THE COLUMBIA RIVER !, IT is so out of hand, our future depends on it. Please don't wait until it's too late. Thank you!

WDFW Response to Comment #8

The Columbia River commercial fishery is highly regulated by WDFW and the Oregon Department of Fish and Wildlife. The commercial fisheries, as well as the sport fisheries, are managed to meet the limits of the Endangered Species Act, the *U.S. v Oregon* Management Agreement and are consistent with the WDFW policies. The Washington Fish and Wildlife Commission is reviewing a policy to implement changes to fisheries in the Columbia River, including eliminating gill net usage in the mainstem Columbia River non-Indian commercial fishery. The draft policy can be found at the WDFW website.