Comments Regarding a NOAA Fisheries Proposal to Issue a 4d Rule for the Puget Sound Steelhead Distinct Population Segment (72 FR 5648, Feb 7, 2007)

[070123015-7015-01]

Submitted electronically on March 9, 2007 to
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General Comments

Wild Fish Conservancy appreciates the opportunity to respond to NOAA Fisheries' February 7 2007 request for comments regarding a proposal to issue a 4d Rule for the Puget Sound steelhead Distinct Population Segment (72 FR 5648, Feb 7, 2007). Please accept for the record and your consideration Wild Fish Conservancy's review of the proposal.

In general, we support the PS steelhead Proposed Listing, and the application of protective regulations under section 4(d) to conserve and recover PS steelhead. We concur with NOAA that the PS steelhead DPS is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range, and that present protective measures fail to adequately mitigate the factors currently threatening the DPS. However, we remain concerned and unconvinced regarding the tone and approach of the General 4d Rule, criteria for take-authorization that is likely inadequate, and a record since 2000 suggesting the 4d Rule has not been effective at creating or evaluating measures to adequately improve fisheries and hatchery management in listed steelhead DPSs. We are concerned that NOAA's decision to exclude resident *O. mykiss* from the PS steelhead DPS may jeopardize the recovery of some listed PS steelhead populations, and we suggest NOAA issue a final 4d Rule for PS steelhead that strongly considers resident *O. mykiss* and their interaction with anadromous PS steelhead in the application of take authorization. NOAA Fisheries should endeavor through promulgation and implementation of protective regulations, consultation, and the designation of critical habitat, to protect and conserve resident *O. mykiss* populations in the PS steelhead DPS with as much force of the ESA as possible.

Wild Fish Conservancy represents approximately 2000 members in the region. Many use and enjoy rivers, streams, and nearshore saltwater-bodies throughout the PS steelhead DPS for recreational, scientific, aesthetic, and commercial purposes, deriving benefits from robust wild-steelhead populations and healthy aquatic and marine habitats. Many WFC members take an active role in the conservation and recovery of PS steelhead and their habitats. Wild Fish conservancy conducts recovery related research on wild-fish populations and habitats, advocates for scientifically and legally responsible wild-fish management, and develops cutting edge habitat-conservation initiatives. Public and tribal agencies, scientific institutions, the business community, the environmental community, and the news media have all recognized Wild Fish Conservancy's credibility regarding wild-fish ecology and its specific experience in issues associated with PS steelhead conservation.

From 1989 to February 2007, the Wild Fish Conservancy operated under the name "Washington Trout." Wild Fish Conservancy (then Washington Trout) has responded to previous invitations from NOAA to participate in review-processes related to *O. mykiss* in and out of the PS steelhead DPS,

from both a policy and biological perspective, most recently submitting comments regarding NOAA Fisheries *Puget Sound Steelhead Proposed Listing* (Washington Trout, 2006A) Previously, Wild fish Conservancy (then Washington Trout) has submitted information to NOAA Fisheries regarding: NOAA's hatchery listing policy (69 FR 31354, June 3, 2004) (Gayeski and Vanden Brulle, 2004); Critical Habitat Designations for listed populations of steelhead and salmon (Gayeski, 2005A), and; presented information to the Puget Sound BRT in June 2005 (Gayeski, 2005B). In June 2000, Wild Fish Conservancy (then Washington Trout) submitted a substantive review of the general 4d Rule approach being proposed for the PS steelhead DPS, as it applied to PS chinook salmon, listed as a threatened species in 1999 (Washington Trout, 2000).

In addition, Wild Fish Conservancy has submitted reviews to the Washington Department of Fish and Wildlife regarding WDFW steelhead-management proposals, including: WDFW's Wild Salmonid Policy; Hatchery and Genetic Management Plans prepared by WDFW for steelhead hatchery programs in Puget Sound and the Columbia River Basin (Gayeski and Vanden Brulle, 2003) and; WDFW Sportfishing Rules Proposals regarding resident-trout fisheries in the Cedar River within the PS steelhead DPS (Washington Trout 2005). In 2006, Wild Fish Conservancy (then WT) submitted a review of WDFW's July 2006 public review draft of *Oncorhynchus mykiss:* Assessment of Washington State's Anadromous Populations and Programs (Washington Trout 2006B). In January 2007 Wild Fish Conservancy (then WT) submitted a review of WDFW's December 2006 public-review draft of *Washington Department of Fish and Wildlife Statewide Steelhead Management Plan* (Washington Trout 2007).

Much of the information prepared and submitted by Wild Fish Conservancy in the reviews cited above bear directly on an assessment of NOAA's proposal to apply the existing general steelhead 4d Rule to the PS Steelhead DPS. Where that information directly informs this review, we may summarize but will not repeat those comments here in detail, but instead incorporate the relevant parts by reference, for inclusion in the Administrative Record and NOAA's consideration.

Wild Fish Conservancy generally supports NOAA's proposal to list the PS steelhead DPS as a threatened species. Consistent with our submitted position re the hatchery listing policy (Gayeski and Vanden Brulle, 2004; *see also* Trout Unlimited et. al., 2004; Trout Unlimited et. al. v. NOAA, No. C05-1128JCC (W.D.Wa)), we do not support the proposal to list the Green River natural and Hamma Hamma winter-run hatchery steelhead populations as a threatened species along with natural origin steelhead from the PS steelhead DPS. Similarly, we remain concerned and unconvinced regarding NOAA's decision to exclude resident *O. mykiss* populations within the PS steelhead DPS from the proposed listing.

In our June 2000 review of the general 4d Rule as it applied to PS chinook salmon, Wild Fish Conservancy expressed concern over the tone and approach of the General 4d Rule. We remain unconvinced that it is necessary or advisable for NOAA Fisheries to place trust and responsibility for the formulation and implementation of recovery strategies with the very local agencies that have failed to meet their existing mandates to conserve the species in question. The local and state agencies in question have demonstrated an inability or unwillingness to enforce their own existing environmental regulations. It seems inappropriate and unrealistic to expect those agencies to now step forward and meaningfully implement new, more stringent conservation measures. In a broad sense this approach may be politically justifiable, but it may be inadequate to achieve recovery. We also found criteria for take-authorization for Fishery Management and Evaluation Plans and Hatchery and Genetic Management Plans often vague, unmeasurable, often inconsistent with VSP criteria, and likely inadequate to effectively achieve recovery of listed ESUs and/or DPSs.

Since 2000, the record demonstrates that the general 4d Rule has not been effective at creating or evaluating measures to improve fisheries and hatchery management for the recovery and conservation of listed steelhead. We believe NOAA Fisheries should consider revising and strengthening criteria in the 4d Rule for take limitations regarding impacts from hatchery and fisheries management.

Hatchery Management

The genetic and ecological impacts of hatchery influence are a legacy of WDFW's longstanding hatchery programs within the PS steelhead DPS, and have been identified as principal limiting factors for the PS steelhead DPS in both the 1996 and 2005 Status Reviews and in the 2006 listing proposal. Despite longstanding and credible evidence of the harmful genetic and ecological impacts from WDFW steelhead-hatchery programs, and the findings and recommendations of independent advisory panels, the 4d Rule being proposed for PS steelhead has so far not been an effective mechanism for encouraging, implementing, or evaluating changes in hatchery management to help recover and conserve steelhead in other listed DPSs. WDFW steelhead Hatchery Genetic Management Plans that have been submitted to NOAA for evaluation under the 4d Rule in general do not reflect or describe initiatives to follow specific reform recommendations, and in many instances to do not meet the criteria for approval under the 4d Rule. In any case, NOAA to date has reviewed and approved HGMPs for only a very few steelhead hatchery programs within any listed steelhead DPS.

Several federally convened review panels, including the Hatchery Science Review Group, Independent Science Advisory Board, and Salmon Recovery Science Review Panel have made specific recommendations to reform WDFW steelhead hatchery programs (ISAB, 2003; RSRP 2003); the ISAB 2003 *Supplementation Review* was executed in response to specific queries from NOOA Fisheries to assist in recovery management of ESA-listed salmon and steelhead populations in the Columbia Basin. The RSRP was convened by NOAA Fisheries specifically to advise the agency on scientific matters of salmonid-recovery management. Their findings and recommendations carry significant credibility and authority.

The ISAB has recommended the widespread use of unsupplemented "reference" streams (on a variety of spatial scales) to conduct ongoing, controlled comparisons between populations influenced and uninfluenced by hatchery intervention. The RSRP issued a report of Panel meetings held July 2003, to discuss "how modification or closure of hatcheries provides NOAA Fisheries with opportunities to investigate the experimental effects of hatcheries on wild populations." The RSRP specifically endorsed the findings and recommendations of the ISAB, and made several findings and recommendations of its own. The RSRP found, among other things, that "questions on the negative impact of hatchery fish on wild stocks abound… while scant progress has been made toward investigation and resolution of this major topic." The report noted, "In all examples that the RSRP has been able to locate, when experiments were conducted to test claims for the success of hatcheries in promoting the conservation of naturally spawning fish, the initial claims have been proven false."

In 2003 Wild Fish Conservancy (then Washington Trout) submitted to WDFW substantive reviews of HGMPS developed by WDFW for steelhead hatchery programs in Puget Sound (Gayeski and Vanden Brulle, 2003). Wild Fish Conservancy's reviews and WDFW responses are available at http://wdfw.wa.gov/hat/hgmp/#pugetsound.

In general, we found that the HGMPs fail to adequately describe clear program goals, justifications, performance standards and indicators, or adequately detailed monitoring and evaluation protocols or timetables. A number of erroneous and/or unsupported assumptions run throughout the HGMPs, and many contain critical deficiencies and omissions. The HGMPs consistently fail to quantify the

estimated take of listed Puget Sound Chinook (as required at the time). We found that the overall size of the steelhead hatchery programs in Puget Sound are far too large with respect to any reasonable "acceptable levels" of competition, predation, and ecological impacts upon indigenous wild Chinook (and with respect to any ecological or genetic impacts to PS steelhead). Finally, the HGMPs are often in direct conflict with critical elements of WDFW's own Wild Salmonid Policy, and they fail to incorporate in any meaningful way the findings and/or recommendations of the ISAB, RSRP, or HSRG (Gayeski and Vanden Brulle, 2003).

WDFW published responses to the public comments it received regarding the Puget Sound steelhead hatchery programs (see: http://wdfw.wa.gov/hat/hgmp/#pugetsound). In some instances, WDFW conceded the merits of Wild Fish Conservancy's comments and reviews, and pledged to make necessary revisions to the HGMPs during what it called the "iterative" ongoing development of a draft Environmental Impact Statement for Puget sound hatchery programs, due in spring 2005. To date, the iterative EIS process has not been completed, and WDFW's 2003 commitments notwithstanding, we are unaware of any meaningful revisions to the HGMPs or steelhead hatchery management in Puget Sound.

Data collected by Wild Fish Conservancy reinforce the suggestion that hatchery-management changes currently being contemplated by WDFW will not be adequate to remediate genetic and ecological impacts on PS steelhead. Specifically, WDFW appears to be considering the adoption of "wild-steelhead management zones" within the PS steelhead DPS, wherein off-station hatchery steelhead releases would be discontinued and/or all hatchery steelhead releases would be prohibited within specific watersheds. These changes would appear to be consistent with recommendations from the HSRG, ISAB, and RSRP, as well as the findings of several independent researchers. However, it appears that the scale and scope of the "wild steelhead management zones" being proposed by WDFW will likely be restricted to the sub-basin level. The discontinuation of hatchery-steelhead influence in specific subbasins could be valuable in the evaluation of specific hatchery programs. However, the adoption of "wild steelhead management zones" at large spatial scales, including entire watersheds, will likely be necessary to protect specific steelhead populations within the PS steelhead DPS from the genetic and ecological impacts of hatchery influence.

Each year between 1989 and 2004, Wild Fish Conservancy conducted an annual summer steelhead snorkel-census in the Tolt River watershed, a tributary in the Snohomish watershed, one of the largest and most important basins in the PS steelhead DPS. The Tolt is the largest tributary to the mainstem Snoqualmie River, flowing from the Cascade foothills west into the Snoqualmie River at the city of Carnation. This Wild Fish Conservancy research project was the most spatially and temporally comprehensive snorkel survey in Washington. Field crews conducted snorkel surveys monthly, from May through October as conditions permitted, to observe and document steelhead distribution, abundance, and origin (hatchery vs. wild) in the Tolt River. Surveys were performed primarily within two study index reaches, one in the North Fork Tolt (1.5 miles) and one in the South Fork Tolt (1.6 miles). In most project years, teams also surveyed the entire anadromous reaches of both forks during the month of September.

All surveys were conducted under a specific protocol.

- Teams of two or three surveyors, lead by a Wild Fish Conservancy biologist, snorkeled in a downstream direction, attempting to physically observe all fish within the survey reach.
- Qualified volunteer surveyors were trained in the project protocol and supervised by Wild Fish Conservancy staff.
- Teams snorkeled 160 meters (0.10 mile), teams discussed observations and reached consensus; team lead recorded species, numbers, and size classes of fish observed.

- Presence or absence of adipose fin on adult steelhead was recorded.
- Comments recorded re condition and health for all fish species observed.

Under protocol, data were collected for each index reach re abundance and distribution of steelhead, rainbow trout, brook trout, bull trout, whitefish, and chinook, coho, and pink salmon. The protocol has been standardized, all surveyors trained and professionally supervised; data collected are extremely high quality, and provide the means to compare spatial and temporal trends in the status of Tolt River fish populations.

In recent project-years, surveyors have observed and recorded the abundance and distribution of stray hatchery steelhead interacting with wild adults. Recording and analyzing these data provides useful information for evaluating the performance of local hatchery programs and their impact on wild populations.

Despite the discontinuation of direct plants of hatchery summer steelhead into the Tolt River in 1993, significant numbers and proportions of hatchery steelhead continued to interact with natural origin steelhead in the subbasin at least through 2003 (Table 1 and Figure 2). From 1985 through 1989, WDFW made regular off-station hatchery summer steelhead releases in the Tolt River. In 1990 "Sultan HS" planted 8708 at RM 5. The most recent planting of hatchery summer steelhead occurred in the Tolt watershed in 1993, when the "Skykomish Sportsman" planted 8047 smolts at river mile 0.1. However, since 1993, WDFW has continued to plant significant numbers of winter and summer hatchery steelhead in the mainstem Snoqualmie River. For example, in both 2005 and 2006, WDFW released more than 50,000 summer steelhead smolts in the mainstem Snoqualmie. The confluence of the North and South Fork Tolt occurs 8.5 miles upstream from the confluence of the Tolt and Snoqualmie Rivers.

Adult hatchery steelhead present in the Tolt after 1995/96 are apparently strays from other hatchery programs, within and/or without the Snoqualmie and/or Snohomish basins. A decade after the discontinuation of direct hatchery planting in the Tolt, the subbasin still failed to function as an effective "wild steelhead management zone." This finding suggests that discontinuation of hatchery influence will have to be implemented at a broader spatial scale, perhaps even the full-basin (Watershed Resource Inventory Area) scale, in order to effectively isolate natural-origin steelhead populations from the genetic and ecological impacts of hatchery influence.

Similar observations from a subbasin outside the PS steelhead DPS suggest that the Tolt is not an isolated case. As part of a long-term ecological monitoring program, Olympic National Park staff perform snorkel surveys of a 5km long reach in the South Fork Hoh River on the Washington Coast. The South fork is the major tributary of the Hoh River, which drains to the Pacific Ocean, and joins the Hoh at RM 28. Surveys occur every seven to ten days between June and September, as flows permit. During the surveys fish are enumerated and adipose presence or absence is documented (Figure 3) (Sam Brenkman, pers. com.).

Preliminary Olympic National Park data from the 2005 and 2006 surveys suggest a trend consistent with what the Wild Fish Conservancy has documented in the Tolt River basin; specifically, the occurrence of clipped summer steelhead despite the absence of hatchery-steelhead releases in the Hoh basin. The closest known hatchery summer steelhead releases to the S.F. Hoh occur from the Bogachiel hatchery complex in the Quillayute River Basin.

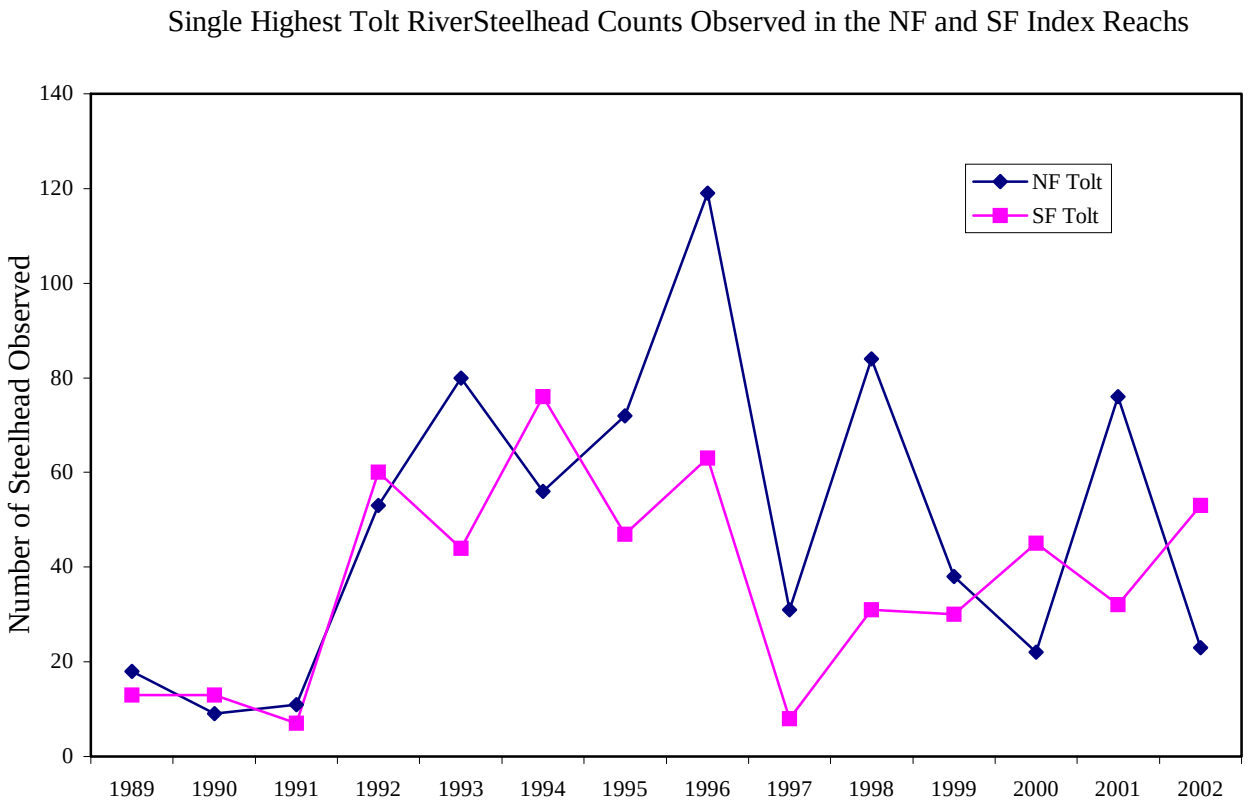

Figure 1. The single greatest adult steelhead count observed in the North and South Fork Tolt River index reaches between 1989 and 2002.

Year	total unclipped	total clipped
1989	14	5
1990	2	1
1991	3	4
1992	29	56
1993	16	85
1994	15	17
1995	34	22
1996	40	84
1997	5	22
1998	25	34
1999	12	34
2000	18	18
2001	16	61
2002	30	34
2003	8	12

Table 1. WFC adult summer steelhead counts in the North Fork Tolt index reach. Unclipped fish had an intact adipose fin, clipped fish did not.

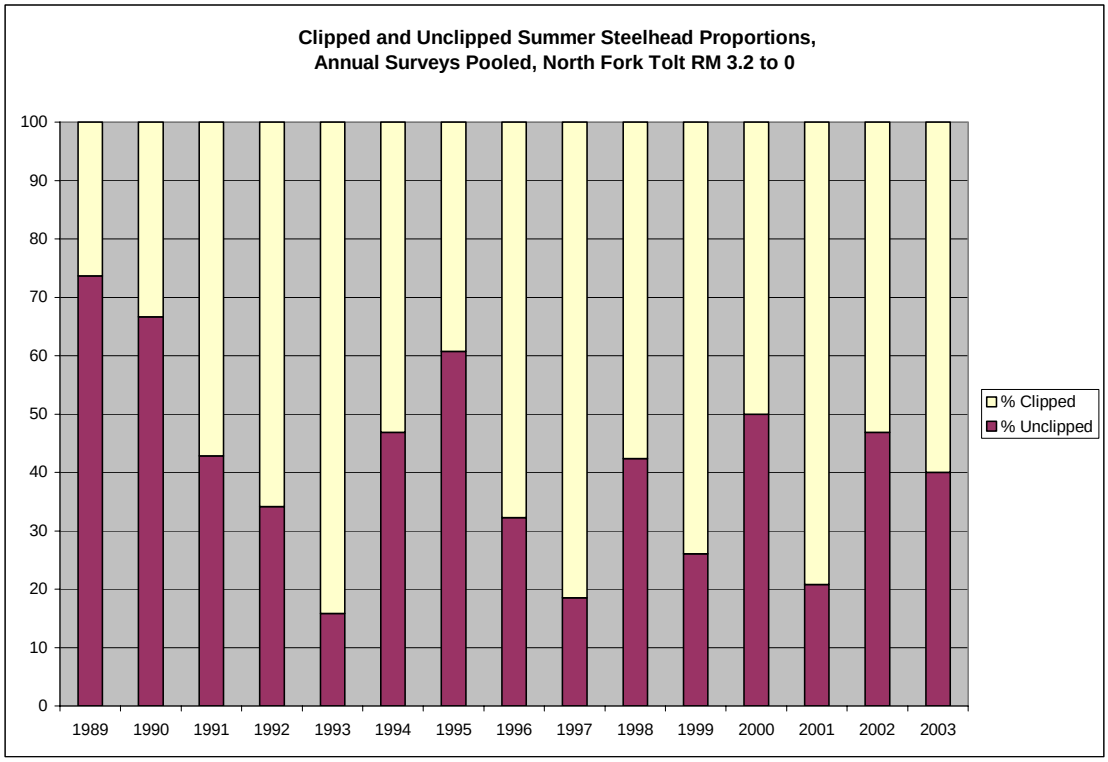

Figure 2. Wild Fish Conservancy summer steelhead snorkel survey results for the North Fork Tolt River index reach, RM 3.2 to RM 0.0.

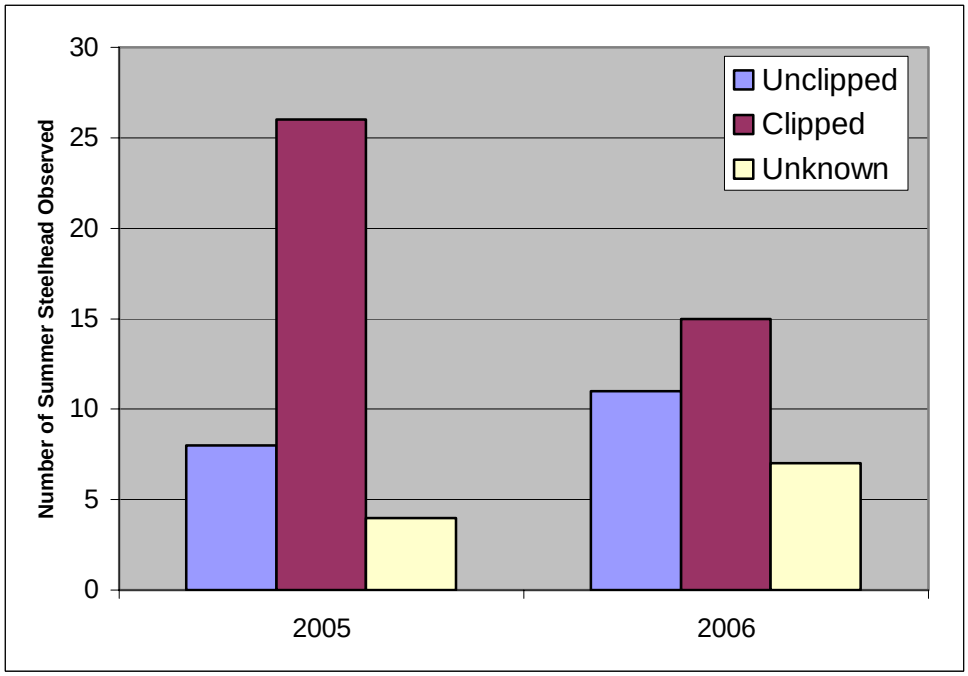

Figure 3. South Fork Hoh index reach snorkel survey data collected by the Olympic National Park. Survey data are pooled for each year (Sam Brenkman, pers. com.)

Other *O. mykiss*

We concur with the Puget Sound Biological Review Team's conclusion that resident *O. mykiss* populations within the PS steelhead DPS are unlikely to significantly reduce the risk of extinction of the PS steelhead DPS. However, we believe available evidence cited in the PS Steelhead Proposed Listing (71 FR, 15666), the 1996 Status Review for West Coast Steelhead (Busby et all, 1996), and the 2005 Status Review Update for Puget Sound Steelhead (NMFS, 2005) demonstrates that some resident *O. mykiss* populations may be essential to the recovery of some of the most threatened anadromous populations in the PS steelhead DPS. We remain concerned that NOAA's application of the joint DPS policy may jeopardize the recovery of some listed PS steelhead populations.

A Progress Report prepared by WDFW staff, *Genetic relationships among anadromous and non-anadromous Oncorhynchus mykiss in Cedar River and Lake Washington – implications for steelhead recovery planning* (Marshall, et al 2004), provides significant information supporting the hypothesis that *O. mykiss* exhibiting resident life histories in the Cedar River downstream and upstream of the fish passage barrier at Landsburg Dam contribute to the production of progeny to the anadromous life history form of *O. mykiss*. This contribution may be direct, in cases in which mating between resident or anadromous males and resident females produce progeny that become out-migrant smolts, or indirect, in cases in which mating between resident males and anadromous females produce smolts.

Among other findings, Marshall et al reported that: "In smolt assignment tests we found that 25% of *O. mykiss* smolts were estimated to originate from the below-dam (resident) population. … These results indicate that resident *O. mykiss* are probably contributing to the anadromous population."

The results presented in Marshall et al appear to provide credible information about the interaction between resident and anadromous *O. mykiss* in at least one watershed, suggesting that abundant, productive resident *O. mykiss* populations may be essential for the recovery of listed PS steelhead. Data collected by Wild fish Conservancy in the Tolt River summer steelhead snorkel-census suggest the occurrence of a distinct and relatively rare life-history component within the Tolt summer-steelhead population. Wild Fish Conservancy surveyors have observed small (14"-21") adult steelhead distributed throughout the overall population, too large to be resident *O. mykiss*, but significantly smaller than average anadromous *mykiss* in the population (Figure 4.). We hypothesize that these individuals may be locally adapted *mykiss* that emigrate to the mainstem Snoqualmie, the Snohomish estuary, or associated nearshore areas for one or two years before returning to the Tolt River to spawn and interact with the fully anadromous *mykiss* spawning population. This hypothesis has not yet been tested, but evidence of an intermediate *mykiss* life-history form associated with a PS steelhead population suggests a complex, dynamic, and potentially important relationship between all sympatric *mykiss* forms in the PS steelhead DPS.

We appreciate and acknowledge the jurisdictional complexities of delineating DPSs and proposing listings that include both anadromous and resident life-history forms of *O. mykiss*. We further appreciate NOAA's acknowledgment of the significant uncertainties associated with the ecological, reproductive, and evolutionary relationships between sympatric resident and anadromous *O. mykiss* populations within the PS steelhead DPS. However, we believe NOAA should amend its application of the joint DPS policy to accommodate listing resident *O. mykiss* populations where evidence suggests those populations could be essential for the recovery of listed anadromous steelhead populations. In a final 4d Rule for PS steelhead, and in application of take authorization, NOAA Fisheries should strongly consider resident *O. mykiss* and their interaction with anadromous PS steelhead, and should endeavor, through promulgation and implementation of protective regulations, consultation, and the designation of critical habitat, to protect and conserve essential Puget Sound resident *O. mykiss* populations with as much force of the ESA as possible. Much more research is

necessary to determine the relationship between resident and anadromous *O. mykiss* within the PS steelhead DPS. We recommend that NOAA require applicants for take authorization to undertake efforts to identify those relationships and incorporate the findings into management actions.

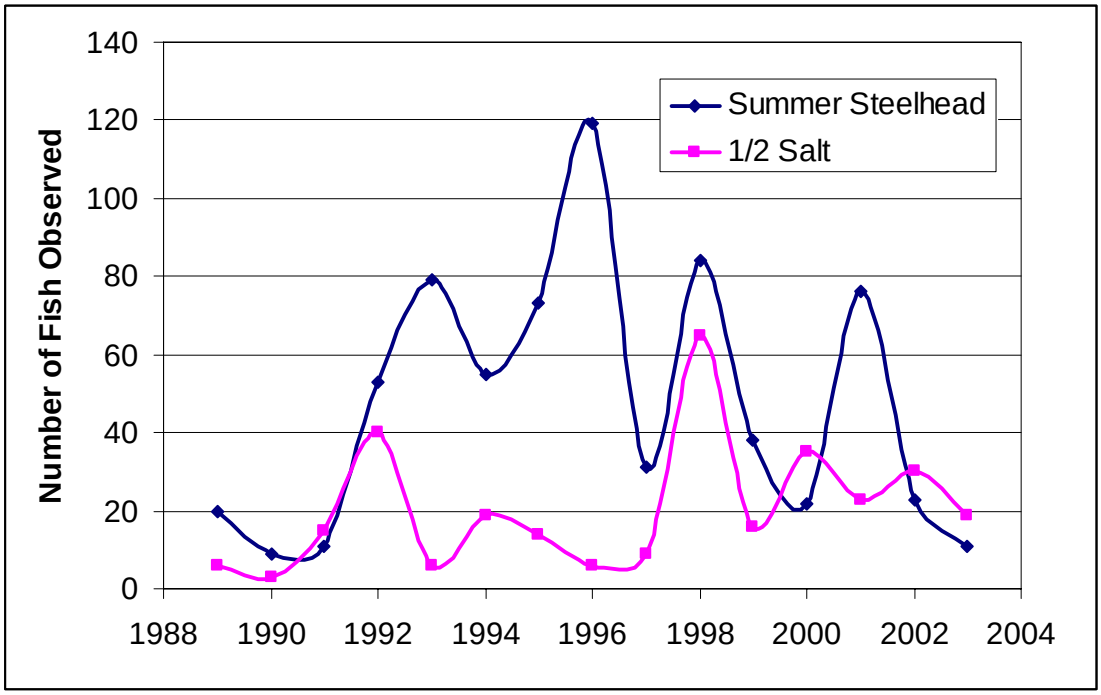

Figure 4. Numbers of *O. mykiss* counted in North Fork Tolt River index reach, by suspected life-history types. “Half salts” are adult *mykiss* in the 14 - 21 inch size range.

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Washington Trout, 2005; Comments on WDFW Sportfishing Rule Proposals; Washington Trout, November 17, 2005. **(Attachment A)**

Washington Trout 2006A; COMMENTS REGARDING NOAA FISHERIES *PUGET SOUND STEELHEAD PROPOSED LISTING* (71 FR 15666); Submitted to Branch Chief, Protected Resources Division, National Marine Fisheries Service; Washington Trout, June 2006.

Washington Trout, 2006B; COMMENTS REGARDING THE PUBLIC REVIEW DRAFT OF *Oncorhynchus mykiss:* Assessment of Washington State's Anadromous Populations and Programs; Washington Trout, September 15, 2006. **(Attachment B)**

Washington Trout, 2007; COMMENTS REGARDING A PUBLIC-REVIEW DRAFT: *Washington Department of Fish and Wildlife Statewide Steelhead Management Plan; Volume 1. Statewide Policies, Strategies, and Actions;* Washington Trout, January 12, 2007. **(Attachement C)**

ATTACHMENT A

Comments on WDFW Sportfishing Rule Proposals
Submitted by Washington Trout
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November 17, 2005

#33. Yakima River Bass Rule
Would change rule to: no daily limit, no minimum size, only three bass over 15" may be retained.

Washington Trout has suggested in the past that no conservation-limits be placed on exotic fish species where they occur with native wild fish. We have specifically suggested removing conservation limits in the Yakima River on smallmouth bass. WDFW's own "Explanation" for proposal #33 fairly accurately summarizes the rationale Washington Trout has presented for our suggestion to remove all conservation limits for smallmouth bass in the Yakima:

> "Fall chinook salmon populations are declining in the Yakima River. Predation by bass on rearing and out-migrating juvenile fall chinook is a major contributor to their decline. Recent changes in fall chinook spawning distribution and smallmouth bass population structure are making the predation problems worse."

WDFW maintains confidence that the rule change will increase harvest on what it calls an "extremely dense" population of exotic smallmouth bass, a population the department acknowledges is having significant predation impacts on declining native-chinook in the basin. A goal to allow "more smaller fish to be kept" should be expanded to allow more bass of all sizes and ages to be removed from the river.

Regarding any exotic species in native-fish habitat, WDFW's highest management priority should be the control and removal of those exotic species. Any benefit derived from recreational bass angling in the Yakima River is far outweighed by the acknowledged costs to native-fish populations and habitats. There is no defensible reason to continue managing the Yakima River for the conservation of smallmouth bass.

We recommend that the proposal be amended to remove all conservation limits on smallmouth bass in the Yakima River.

#35. Canyon Creek Closed Waters
Would close to fishing the portion of Canyon Creek from its mouth to the Canyon Creek Road Bridge at RM 5.5.

Washington Trout supports this proposal. In May 2005, WT submitted a request to WD FW to consider an emergency closure on Canyon Creek during the 2004 fishing season, to reduce all fishing related mortality-impacts on a subpopulation of ESA listed Puget Sound chinook, a population already stressed by inhibited spawning opportunity caused by the impaired fish-passage referenced in the Explanation for proposal #35. On July 7, WDFW imposed an emergency closure from the mouth of Canyon Creek to Canyon Creek Road Bridge at river mile 5.5.

Adoption of the permanent closure will contribute to the conservation of listed chinook and native char, and could create an incentive to resolve fish-passage and other habitat issues on Canyon Creek.

#36. Cedar River Fishery

Would allow (from June 1- August 31) anglers to retain two trout per day between 10 and 16 inches from the mouth (of the Cedar River) to the State Highway 18 Bridge, and allow a catch-and-release fishery from the State Highway Bridge to the Landsburg Road Bridge. Selective gear rules and a night closure would apply to each section.

Washington Trout is concerned that increasing the mortality impacts on resident rainbow trout in the Cedar River will compromise the conservation and recovery of wild Cedar River steelhead, and is inconsistent with current management practices to conserve *O. mykiss* spawning populations in other PS watersheds. We recommend that the proposal not be adopted, and that the department either develop a specific management plan to monitor the impacts from current Cedar River fishery regulations on resident *O. mykiss,* or consider a closure of the Cedar River Catch and Release Fishery.

In 2004, WDFW opened the Cedar River catch-and-release fishery in response to a proposal to open a harvest fishery in the Cedar River for resident rainbow and cutthroat trout. In the *Concise Explanatory Statement Regarding 2004-2005 Sportfishing Rule Proposals* (March, 2004), WDFW called the Cedar resident-trout population "abundant," but expressed concern that subjecting it to a harvest-fishery would create undue risk to the anadromous component of the Cedar River *O.mykiss* population:

> "Studies are on-going to learn the density of resident trout in the system as well as the interaction between the rainbow and steelhead population. Current thinking is that the two groups are just one population with fish exhibiting different life histories. At least in some parts of the species range the resident portion of the population have produce (sic) anadromous smolts. Until more is learned about this interaction, a significant reduction in the resident part of the population may create a risk to the steelhead population."

At the time, Washington Trout expressed concern that opening a C&R fishery was inconsistent with the above statements. While WDFW acknowledged that a "significant reduction" in the resident population would impose an unacceptable risk to the anadromous population, it provided no specific management proposals to identify an impact-threshold that would risk a "significant reduction" in the resident population, or how fishery related impacts would be monitored or evaluated.

After only two fishing seasons, without identifying any impact thresholds or initiating any serious attempt to monitor of evaluate fishery impacts on resident rainbow trout in the Cedar, WDFW appears to have abandoned its concern that significant reductions in the resident trout population could impose risks on the Cedar River's anadromous *O.mykiss* population. The Explanation for Proposal #36 only characterizes the "trout population" as healthy; no mention is made of the relationship or interaction between the Cedar's resident rainbow trout and anadromous steelhead. WDFW's initial caution was provoked by uncertainty regarding the breeding interaction between resident and anadromous *O.mykiss* in the Cedar, and WDFW deferred a harvest fishery "until more is learned about this interaction." It is particularly confusing that WDFW is now considering a harvest fishery when it has learned more, and what it has learned should actually reinforce its original caution.

Link Between Resident and Anadromous O.mykiss in the Cedar River

A Progress Report prepared by WDFW staff, *Genetic relationships among anadromous and non-anadromous Oncorhynchus mykiss in Cedar River and Lake Washington – implications for steelhead recovery planning* (Marshall, et al 2004), provides significant information supporting the hypothesis that *O. mykiss* exhibiting resident life histories in the Cedar River downstream and upstream of the fish passage barrier at Landsburg Dam contribute to the production of progeny to the anadromous life history form of *O. mykiss*. This contribution may be direct, in cases in which mating

between resident or anadromous males and resident females produce progeny that become out-migrant smolts, or indirect, in cases in which mating between resident males and anadromous females produce smolts. The results of the assignment tests reported on pp. 11-12 and summarized in Table 7 (page 26) of the report are consistent with all of these scenarios.

Among other findings, Marshall et al reported that: "In smolt assignment tests we found that 25% of *O.mykiss* smolts were estimated to originate from the below-dam (resident) population. …a smaller percentage of Ballard Locks steelhead originated from resident populations. These results indicate that resident *O.mykiss* are probably contributing to the anadromous population."

The results presented in Marshall et al appear to provide credible information about the interaction between resident and anadromous *O. mykiss* in the watershed, presenting specific evidence to support the "current thinking" that an abundant, productive resident Cedar River rainbow population may be essential for the recovery of Cedar River steelhead. While these results are preliminary, they are nonetheless robust regarding the conservation implications for Cedar River steelhead. Uncertainties associated with the results reported by Marshall et al. provide no valid reason for discounting much less for ignoring their significant conservation implications. In fact any uncertainties associated with the suggested important relationships between resident and anadromous Cedar River *O. mykiss* should urge caution in managing mortality impacts or other angling-related stress on resident trout in the river, particularly when anadromous escapements are significantly depressed.

While the Explanation to proposal #36 makes no mention of the assertion, some proponents of proposal #36 have suggested that resident trout in the Cedar River are imposing intolerable predation impacts on anadromous *O.mykiss* juveniles. While this phenomenon has been described in other watersheds, and some level of predation from resident adults on anadromous juveniles is likely to be occurring in the Cedar, there is little evidence that the level of predation in the Cedar is significant. Certainly any predation that is occurring must be weighed against a 25% contribution from the resident population to anadromous–smolt production. Even if a reduction in predation impacts could help Cedar steelhead, WDFW and the Commission should carefully consider whether it is appropriate to attempt to recover one component of a native wild population by risking harmful impacts to another wild native population.

Marshall et al found that: "The among-sample comparative analyses showed clearly that Cedar River resident *O.mykiss* represented a native gene pool and were not the result of exotic hatchery trout introductions."

Risk From a Cutthroat Fishery

A significant portion of the resident trout population in the Cedar River is made up of native coastal-cutthroat trout (*Oncorhynchus clarki).* It could be suggested that a harvest fishery targeting only resident *O.clarki* could reduce predation impacts on anadromous *O.mykiss* juveniles without risking intolerable impacts on the resident *O.mykiss* population or its interactions with the anadromous population, and provide a meaningful angling opportunity. This would again beg the important question of whether it is appropriate to risk significant reductions to a native cutthroat population to conserve Cedar steelhead. But a harvest fishery targeting cutthroat would appear to also impose a high risk of mortality impacts on resident rainbows.

Marshall et al reported that of 32 fish sampled in their study and identified in the field as coastal cutthroat, only 12 were actually genetic *O.clarki.* Some of the remainder were rainbow-cutthroat hybrids, but a high percentage were genetically identified as *O.mykiss.* Marshall et al reported that investigators were "surprised by the presence of *O.mykiss* that, in the field, had enough phenotypic similarity to cutthroat that they were identified as such." If trained field biologists cannot make accurate distinctions in the field between adult cutthroat and rainbows, it is unreasonable to expect a majority of recreational anglers to perform better. It appears likely that many resident rainbows could be harvested in a fishery targeting resident cutthroat.

Inconsistency with Current Management Priorities

A partial harvest fishery on the Cedar River would be inconsistent with other WDFW management priorities in the Puget Sound Basin (see below, re proposals # 41 and #42). The closure of catch and release fisheries targeting adult winter steelhead during March and April is intended to eliminate fishery impacts on Puget Sound steelhead populations projected to gather less than 80% of their wild escapement goal. That intention is significantly compromised by allowing even limited fishery impacts on the resident component of the Cedar River *O.mykiss* population, while spawning escapement of the anadromous component is currently about 3% of its goal.

As you are aware, the abundance of anadromous *O.mykiss* in the Cedar River has been severely depressed since the 2000 brood year with total escapements to the entire Lake Washington system of fewer than 50 individuals for all five years from 2000 to 2004 (WDFW SASSI update, 2002) considerably below the nominal escapement goal of 1600. The aggregate Lake Washington winter steelhead stock of which the Cedar River population is the dominant component is presently classified as Critical by the Department.

Many other streams and rivers in the Puget Sound region are open for resident trout fishing during the summer, some under harvest regulations, including rivers and streams closed to all steelhead angling in March and April to protect anadromous spawners. Wherever wild steelhead escapement or productivity is depressed, particularly to levels that require steelhead-angling closures, WDFW should seriously consider implementing more conservative angling regulations relative to resident *O.mykiss* fisheries. But in this case, WDFW has specific information linking the conservation and recovery of the anadromous and resident components of the Cedar River *O.mykiss* population, and the Cedar anadromous spawning-population is at critically low levels. Anecdotal evidence suggests that angler effort for resident *O.mykiss* is significantly higher on the Cedar than on rivers like the Skykomish, mainstem Snoqualmie, Stillaguamish, or Nooksack, resulting in higher overall mortality impacts. On the Cedar, WDFW has every justification and responsibility to act as conservatively as possible.

Conclusion

Three things are clear:

- It appears likely that resident *O. mykiss* provide an increasingly important contribution to the productive capacity of the Cedar River steelhead population;
- Spawning escapements of anadromous *O. mykiss* in the Cedar are and have been critically depressed;
- Current angling activity is already imposing an unmonitored level of mortality impacts on the resident population.

Given the department's stated aversion in 2004 to a significant reduction in the resident population from fishery impacts, and its acknowledgement of the three factors listed above, it should have defined what it considered a significant reduction, set specific impact thresholds, and developed a monitoring plan adequate to evaluate the performance of the fishery relative to the thresholds, including surveys of angler effort, resident spawning activity, and resident-population size and distribution. WDFW should take seriously Marshall et al: "A tentative conclusive from our first year's work is that conservation of Cedar River resident *O.mykiss* populations is an important component of restoring the native steelhead resource."

While the Cedar River may have potential for a "quality fishery," the stakes for the native fish populations in the watershed are high; WDFW cannot afford to punt here. A partial harvest fishery for resident trout on the lower Cedar River can be expected to have a harmful impact on the survival and recovery of Cedar River steelhead. Washington Trout respectfully urges that the proposal be rejected, and that the department either develop a specific management plan to monitor and evaluate

the impacts from current Cedar River fishery regulations on resident *O.mykiss*, or consider a closure of the Cedar River Catch and Release Fishery.

#41. Skykomish River Catch-and-Release Fishery
Would close the March 1- April 30 catch-and-release, selective-gear-rules fishery for game fish.

#42. NF Stillaguamish Catch-and-Release Season
Would close the March 1 – November 30 catch-and-release (up to 2 hatchery steelhead may be retained), flyfishing-only fishery for game fish from March 1 – May 31, making that fishery open from June 1 – November 30.

Washington Trout supports these proposals. We continue to support WDFW's conservative management of fisheries for wild winter steelhead in Puget Sound river systems. The closure of catch-and-release steelhead fisheries to conserve spawning populations is an appropriate if unfortunate response to chronic under-escapement in most PS steelhead populations.

ATTACHMENT B

COMMENTS REGARDING THE PUBLIC REVIEW DRAFT OF
Oncorhynchus mykiss: Assessment of Washington State's Anadromous Populations and Programs;
Washington Department of Fish and Wildlife, July 2006

Submitted on September 15, 2006 to
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Introduction

Washington Trout appreciates the opportunity to respond to the Washington Department of Fish and Wildlife's request for comments regarding the public review draft of *Oncorhynchus mykiss:* Assessment of Washington State's Anadromous Populations and Programs. Washington Trout analysts and advocates have read and discussed the public review draft, many of its references, and other supporting literature. Please accept for the record and your consideration Washington Trout's review, including our recommendation for some significant revision.

Washington Trout represents approximately 2000 members in the region. Many use and enjoy rivers, streams, and nearshore saltwater-bodies throughout the Puget Sound, Washington coast, and Columbia River basins for recreational, scientific, aesthetic, and commercial purposes, deriving benefits from robust wild-steelhead populations and healthy aquatic and marine habitats. Many Washington Trout members take an active role in the conservation and recovery of Washington's steelhead and their habitats. Washington Trout conducts recovery related research on wild-fish populations and habitats, advocates for scientifically and legally responsible wild-fish management, and develops habitat-conservation initiatives. We keep our members informed of these activities through regular electronic and printed communication. Public and tribal agencies, scientific institutions, the business community, the conservation community, and the news media have all recognized Washington Trout's credibility in wild-fish ecology and its specific experience in issues associated with steelhead conservation in Washington.

Washington Trout has previously responded to invitations from WDFW to participate in review-processes related to *O. mykiss* management-proposals, including: WDFW's Wild Salmonid Policy; Hatchery and Genetic Management Plans prepared by WDFW for steelhead hatchery programs in Puget Sound and the Columbia River Basin (Gayeski and Vanden Brulle, 2003), and; WDFW Sportfishing Rules Proposals. Washington Trout has submitted information to NOAA Fisheries regarding: NOAA's hatchery listing policy (Gayeski and Vanden Brulle, 2004) and; Critical Habitat Designations for listed populations of steelhead and salmon (Gayeski, 2005B). In June 2005, Washington Trout submitted and presented information to the Puget Sound BRT (Gayeski, 2005A), regarding the extinction risk for the PS steelhead DPS. Most recently, WT prepared and submitted comments regarding NOAA Fisheries' proposal to list the PS steelhead DPS as a threatened species under the Endangered Species Act (Washington Trout, 2006). Information prepared and submitted by Washington Trout in the reviews cited above relates to the assessment of anadromous *O. mykiss* populations, as well as *O. mykiss* programs being managed or proposed by WDFW. We in some places summarize but do not repeat those comments here in detail, but instead hereby incorporate all relevant parts by reference.

In that context, Washington Trout generally supports WDFW's initiative to develop comprehensive and coordinated steelhead-management plans for Washington state. A thorough and current scientific assessment of Washington steelhead populations and programs will form an important foundation for those management plans. We acknowledge and appreciate the effort undertaken to prepare this public review draft, and we appreciate the inclusion of the public and its advocates in the development process. We encourage WDFW to continue the development of new steelhead-management paradigms, founded on sound science, with the highest priority on the recovery and conservation of declining, threatened, and endangered wild populations.

The public review draft includes valuable information and frank insight regarding the status of Washington's wild-steelhead resource, some sources of its decline, and current threats to its conservation and recovery. The impacts and risks of various management programs are in some places frankly discussed. However, Washington Trout is concerned about several significant weaknesses in the public review draft.

Washington Trout agrees with other reviewers that WDFW's assessment of the current status of many populations suffers from an inadequate and inaccurate historical perspective, leading it to underestimate the historical abundance, diversity, and spatial structure of some populations, and the potential current capacity of some populations and habitats. These deficiencies will lead the Department to underestimate appropriate abundance and diversity targets required to recover many of Washington's wild steelhead population. We also agree with some other reviewers that the public review draft is uneven in tone and substance, that it sometimes allows long-held, internal management assumptions and objectives to influence assessments and findings that should more appropriately be based on scientifically objective evidence and procedure, and; that it omits and ignores some available scientific recommendations. We agree with reviewers who encourage WDFW to seek extensive peer-review of the public review draft by a qualified, independent scientific review panel. (*See comments from:* Bill McMillan; Native Fish Society; Wild Salmon Center; Wild Steelhead Coalition; Sam Wright.)

WDFW's management mandate gives it limited opportunity to regulate land-use and even water-use practices on landscape and even relatively local scales. WDFW will have only limited influence on the direction, scope, and pace of ecosystem recovery and land/water-use reform necessary to recover and conserve steelhead populations in Washington. Of course WDFW still must exercise its enormous responsibility to manage the recovery and conservation of steelhead. It must begin by acknowledging and managing *for* the ecological conditions that exist and can be reasonably expected to obtain over different time scales, not trying to manage for internal priorities *around* changing conditions it can not control, and by recognizing and acknowledging that the department's essential role in the recovery and conservation of wild-steelhead ecosystems is to preserve intact the actual animal (populations and individuals) central to the sustainable function of those systems.

Specifically, WDFW must manage its hatchery and harvest programs so they do not jeopardize or defer the recovery and conservation of declining, threatened, and endangered steelhead populations. The quality of the science guiding actions in these central areas of WDFW's management mandate will have the most impact on the success of WDFW's essential role in steelhead recovery and conservation. Because of it's significant importance, our experience and history with WDFW regarding the issues discussed, and our confidence in some other reviewers' analyses of the Biology, Management, Diversity, Abundance, and other sections of the public review draft, Washington Trout will focus the substance of these comments on its review of Chapter 3 in the public review draft, "Artificial Production."

While Chapter 3 includes valuable information and frank acknowledgements regarding some of the risks and impacts imposed by hatchery practices, WDFW's analyses of artificial production is largely incomplete and unconvincing. WDFW fails to acknowledge fundamental management failures that should be included in an evaluation of the potential risks and benefits of artificial production. The assessment is dominated by biased assumptions and unsupported assertions. Finally, available scientific information, findings, and recommendations that would tend to undermine WDFW's analysis and apparent management priorities are all but ignored.

Specific Comments

Chapter 3: Artificial Production

Chapter 3 includes valuable information. We are encouraged by frank and some new acknowledgements regarding the risks and impacts of past and current hatchery practices. However, it occurs to us that WDFW fails to close some important circles in its analyses of the potential ecological and genetic impacts of artificial production, failing to acknowledge or evaluate in any meaningful way the scientific and management implications of the fact that many of the riskiest conditions associated with artificial production have indeed obtained in the overwhelming majority of steelhead hatchery programs in Washington for a significant and dangerous period of time.

Tone and language throughout the chapter sometimes suggests a bias in favor of artificial production (of course specific management priorities may have legitimate influence in the final development of a management plan, but a fundamental scientific assessment is not an appropriate place to begin down that slope). Some assumptions employed by WDFW rely on assertions that have never been satisfactorily supported.

WDFW relies on supporting information and independent scientific recommendations that appear to some degree to have been cherry picked to support findings more compatible with status quo management. Specifically, the federally appointed Independent Science Advisory Board and Salmon Recovery Science Review Panel have published findings and recommendations that tend to undermine some findings in Chapter 3 and potentially require more significant management changes than WDFW appears to contemplate (ISAB, 2003; RSRP 2003); those published reports are all but unmentioned in Chapter 3, and none of the specific findings, concerns, or recommendations of the ISAB or RSRP are identified or addressed in any way. This is a significant and troubling omission. The ISAB 2003 *Supplementation Review* was executed in response to specific queries from NOOA Fisheries to assist in recovery management of ESA-listed salmon and steelhead populations in the Columbia Basin. The RSRP was convened by NOAA Fisheries specifically to advise the agency on scientific matters of salmonid-recovery management. Their findings and recommendations carry significant credibility and authority; WDFW has a responsibility to include those findings and recommendations in its assessment of steelhead artificial production in Washington, and to address how/why it will or will not incorporate them into it's own management-science paradigm.

Key Questions and Introduction

An essential bias in favor of artificial production is suggested or at least encouraged from the very beginning of Chapter 3. The first of four "Key Questions" the chapter proposes to address is worded, "what are the potential benefits of artificial production programs?" A more objective and appropriate question in view of the available evidence should be, *are there any* potential benefits from artificial production? Given the preponderance of evidence and the historical performance of WDFW steelhead hatchery programs, the answer to that question is not self-evidently yes. The Introduction acknowledges that the nine million steelhead juveniles released in 2000 represents a four-fold increase over a forty-year period. It is hard to imagine who might argue that the health of Washington's steelhead resource or even steelhead fishing opportunities have improved since 1960.

The introduction continues the suggestion of bias when it proposes an evaluation of the economic and conservation “benefits” of artificial production and the “potential” risks it “may” pose to declining wild populations. Again it is fallacious and inappropriate to suggest that conservation and economic benefits have been established as fact and that the risks of artificial production may only be “potential.”

The rhetoric of "risk assessment" is employed all too loosely in this Chapter and throughout the public review draft. The proper approach to risk assessment is succinctly described by Daniel Goodman in a contribution to a recent American Fisheries Society symposium on the risks of artificial production:

> Quantitative risk assessment consists in determining the array of possible outcomes of a contemplated action, and then associating with each outcome a measure of the net cost (or benefit) of its occurrence and a calculation of the probability that it will occur. The *risk*, then, is the sum of the products of net cost times the probability, over the exhaustive list of possible outcomes. (Goodman, D. 2004 "Salmon supplementation: demography, evolution, and risk assessment". Am. Fish. Soc. Symp. 44: 217-232.)

Goodman goes on to describe what is required to provide a risk assessment of the trade-offs between wild population fitness and harvest objectives that are involved when supplementation (or integrated hatchery production) is considered as a possible tool for attaining the dual objectives of insuring wild population health and providing harvest:

> Evidently, a non-emergency justification for supplementation would rest on a policy mandate which gave high enough priority *both* to harvest goals and to conservation goals so that the quantitative trade-off between the two might decide the balance. In order to complete the risk assessment in such a context, the policy mandate would need to state explicitly the quantitative weights for valuing harvest relative to natural spawning fitness of the supplemented stock (ibid.).

Explicit statements of the quantitative weights to be assigned to wild-population fitness and to harvest objects -- which are still for all intents and purposes the fundamental drivers of hatchery production -- should be one of the principle goals of any credible Steelhead Management Plan. Only clear policy-mandated weights can underpin a *bone fide* quantitative risk assessment. The wild steelhead resource is ill-served by loose talk of risk assessment that disguises the absence (for whatever reasons) of clear policy mandates and associated quantitative standards that alone can inform decisions regarding the critical trade-offs involved when such dual objectives are at issue.

These rhetorical constructions are concerning for at least two reasons. They appear to set a tone that continues through Chapter three, and they are the first of several instances where WDFW’s failure to acknowledge and address ISAB and RSRP findings appears to compromise WDFW’s analyses of artificial production. In 2003 the ISAB found that no conservation benefit has been established for *any* hatchery program, that no hatchery programs are even monitoring for the correct parameters or with scientifically credible procedures to adequately establish any conservation benefit, that at least some artificial-production programs “*almost certainly* impose a large cost on the affected natural populations” (emphasis added), and that scientific theory and evidence “clearly” indicate that even conservation or “supplementation” (or integrated) hatcheries pose “substantial risks” to wild populations. The ISAB found that, “even after many years of conducting various supplementation ‘experiments’, *the question still remains*, is supplementation an effective strategy to avoid extinction or assist recovery?” (Emphasis added.)

WDFW would be on more objective and scientifically firmer ground to speak about the "potential" benefits and "established" risks of artificial production.

Section 3.2.1 Program Types and Benefits

Washington Trout finds WDFW's economic analysis of steelhead hatchery-program benefits unconvincing, self serving, and scientifically incomplete. In establishing the economic activity provided by the steelhead hatchery program in Washington, WDFW fails to incorporate various public costs of the state steelhead fishery (road maintenance, traffic, air and water pollution, property damage, etc). Costs attributed to the hatchery program appear to only cover primary production and facility maintenance; It is unclear whether WDFW acknowledges ongoing research costs or the costs of managing the fishery itself. Moreover, as noted above, such putative benefits are at best only one side of the risk assessment coin in the over-riding context of developing (or helping to lay the groundwork for) a management policy to secure the preservation and recovery of Washington's wild steelhead populations.

When evaluating the state-wide economic impact of the steelhead fishery, WDFW should acknowledge and address how much of the economic activity attributable to the steelhead fishery is redistributable among other currently ongoing recreational activities that might not carry the ecological costs of providing steelhead-angling opportunity through artificial production. Finally, the analysis does not appear to evaluate the value of the current hatchery-fueled fishery relative to previous fisheries provided by a mostly wild-fish resource, or the value of the current hatchery fishery relative to the lost value represented by the severe decline in wild-steelhead populations in Washington. For instance, the loss of wild steelhead abundance in Washington may be robbing it of significant tourism income that may not be replaceable with a hatchery fishery.

WDFW's initial description of its two basic types of hatchery programs, isolated or integrated (or recovery/conservation and harvest), while acknowledging the essential risks of isolated programs, fails to acknowledge in a meaningful way the implications of WDFW's significant failure to effectively segregate hatchery and wild steelhead populations, an essential operational goal and risk-management measure of isolated hatchery programs. WDFW's initial and subsequent descriptions and explanations of integrated programs are rather over optimistic and irreconcilable with ISAB and RSRP findings. For instance, in describing conservation-hatchery programs for upper Columbia River steelhead, WDFW cites a NOAA Fisheries Biological Opinion supporting the program as boosting population abundance, while "maintaining or increasing" genetic diversity. A biological opinion is a management process, not a scientific review, and the findings implied by the reference are at significant odds with the ISAB's independent, more credible and authoritative review.

Section 3.2.2 Survival Rates of hatchery Fish

This discussion is generally complete. However, we are concerned that WDFW's encouraging description of the potential benefits of NATURES and Semi-natural rearing techniques may be premature. Some of the studies cited appear to show little effect, and other experiments have failed to yield particularly successful results. See the Yakima River spring-chinook supplementation program. The findings regarding the low and crashing survival rates for Puget Sound hatchery steelhead are alarming. The Puget Sound program appears to be neither working nor paying. This is a good example of WDFW's failure to close a circle and examine the scientific implications of actual conditions relative to its hatchery programs. If the Puget Sound program is not providing adequate "benefit," then the calculation of its relative risks, and the weight of it's impacts on wild populations should be reconsidered.

Section 3.3 Genetic Effects on Natural Populations

The discussion s on genetic impacts are generally thorough. However, in several instances, WDFW again fails to relate specific conditions obtained in its hatchery program to its analyses of hatchery risks and impacts. For instance, in the discussion on outbreeding depression, WDFW acknowledges the conclusion of a NOAA-sponsored panel on the impacts of hatchery straying that, "significant losses might occur" at gene-flow rates under 5%. The discussion fails to acknowledge that WFW's complete failure to effectively segregate hatchery and wild steelhead has likely resulted in gene-flow rates considerably higher than 5%.

The discussion of the genetic risks of isolated programs is by and large frank. We appreciate WDFW's acknowledgement of the complete domestication of Chambers Creek and Skamania hatchery stocks, and the management failure associated with its reliance on these stocks. However, we are concerned over the assertion that the risks to wild populations from domestication are dependent on (implying that they can be ameliorated by) the level of domestication and non-locality in the hatchery stock, and on the level of gene flow. The ISAB and RSRP have concluded that hatchery proponents have not provided enough credible information to make informed judgments about relative risks or their potential for amelioration. We are not convinced that information is available to make a determination on which if any level of gene flow is "safe" relative to other levels.

In an attempt to illustrate the connection between hatchery straying and gene flow, WDFW employs a model that demonstrates how a stray rate of 15% (20 hatchery-origin spawners among 150 natural-origin spawners) results in a gene-flow rate of 6.4%, significantly higher than the "recommended" 5%. However, WDFW again fails to close the circle and relate its analysis to the reality of its hatchery program. It is extremely likely that the rate of hatchery-origin recruits spawning in the wild exceeds 15% by a considerable margin in many watersheds. Beyond ignoring this reality, WDFW immediately notes how gene flow can be minimized in a "well run isolated program," without acknowledging that these "well run" conditions are not obtained anywhere within the overall steelhead hatchery program. The discussion acknowledges that when gene flow rates exceed the "selection coefficient" (thought to be low), the "immigrant" genetic material will replace the native material, and that it does not take much gene flow to replace undomesticated, native genetic material with domesticated material. But again, WDFW fails to acknowledge that this condition has already likely obtained throughout most if not all steelhead hatchery programs. A frank acknowledgement and discussion of these issues should at least inform any evaluation of the actual likelihood of developing a "well run" program capable of effectively minimizing the risks of artificial production.

The discussion on the genetic risks of integrated programs is dominated by biased assumptions, unsupported assertions, a reliance on too few sources, and outright wishful thinking. The discussion is introduced with the statement that integrated programs, "avoid the ecological and genetic risks… for isolated programs." This assertion is unsupported by available evidence and is contrary to ISAB findings. Among other relevant findings, the ISAB concluded in 2003:

- For hatchery programs where the hatchery and natural population are integrated, the empirical basis is inadequate for determining the cost to the natural population.
- Supplementation [integrated] programs carry the risk of causing decreases in the genetic variation present within their target populations, which can lead to inbreeding depression.
- Supplementation [integrated] programs carry the risk of homogenizing previously distinct gene pools, thereby causing a decrease in the genetic variation among salmon populations.
- Supplementation can result in decreased fitness of the target population.
- Current monitoring and evaluation efforts are inadequate to estimate either benefit or harm from ongoing supplementation projects. The correct parameters are not being consistently measured.

- Columbia River Basin supplementation projects are considered to be "experimental". Unfortunately, inadequate replication and widespread failure to include unsupplemented reference streams coupled with a lack of coordination among projects make it unlikely that these projects (as currently conducted) will provide convincing quantification of the benefits or harm attributable to supplementation.
- Many hypotheses and conjectures concerning supplementation are largely unevaluated.

The ISAB findings make clear that WDFW's assertions regarding the potential benefits and reduced risks of integrated hatchery programs are at best premature, likely over optimistic, and at worst disingenuous.

In its discussion on the genetic risks of integrated programs, WDFW focuses on the relative fitness of the hatchery and natural components of the integrated, "composite" population. The discussion appears to ignore some fundamental considerations. By using integrated breeding to improve the fitness of the hatchery component relative to the natural (target) component of the composite population, the fitness of the target wild population will likely be depressed relative to its condition pre supplementation. In other words, as the hatchery and wild populations become more similar, fitness of the hatchery population may improve, but the fitness of the wild population will likely decline. Rather than the hatchery population simply becoming more like the wild population, they are likely to become more like each other. As WDFW acknowledges, its analysis deals only with relative, not overall fitness. The fitness of the hatchery and wild components of the integrated population relative to each other is irrelevant compared to the overall fitness of the population relative to the original unsupplemented population. The significant danger, unacknowledged in WDFW's assessment, is that the "new" composite population is likely to become reliant on the hatchery environment, unable to sustain itself without continual anthropogenic intervention.

The genetic resources germane to the ecological and genetic diversity of a species are the resources directly related to the fitness of individuals within populations over multiple generations. Measures of genetic relatedness between populations or stocks of fish and genetic markers that are used to measure or to estimate gene flow between individuals and populations are rarely related to the fitness of individuals and populations. Estimates of the amount of gene flow between an indigenous naturally spawning salmonid population and a hatchery population, for example, provide no direct information about either the fitness of the natural population or the impact of the genetic exchange with the hatchery population on the fitness of the indigenous population (See, for example, the discussion of introgression between subgroups within major ancestral lineages in Utter 2001).

Directional selection for adaptation to the hatchery environment and to the life cycle of which hatchery production is a systemic component is widely acknowledged to be an inevitable result of hatchery programs.(Waples 1999, Reisenbichler and Rubin 1999, Goodman 2005). The fact that a hatchery population was founded from members of the local indigenous population and regularly incorporates progeny of natural spawning members of that population as hatchery broodstock therefore provides no assurance that reproductive interactions in the wild between hatchery and naturally spawned fish do not have harmful impacts on the fitness of the local naturally spawning population. Such a hatchery population would be a Category 1a in the lexicon of the SSHAG 2003 report. Category 1a hatchery populations and local wild populations can be identical at loci of neutral markers used to measure gene flow and to characterize genetic "similarity," yet be divergent in characters relevant to fitness in the wild. Both theoretical genetic considerations (O'Hely and Lynch 2001, Ford, 2002, Goodman 2005) and empirical data (Reisenbichler and McIntyre 1977, Resienbichler and Rubin 1999, Utter 2001, Waples 1999, Chilcote, 2003,) attest to this. Selectively neutral genetic markers will provide evidence only of gene flow, not fitness impacts.

A claim about the fitness of a hatchery fish relative to members of the wild population from which it was derived, is likely to be true only for the progeny of first-generation hatchery fish in a captive broodstock program. Such a statement would have to be silent with regard to the ability of such hatchery fish to contribute to the recovery of the wild population from which they had been directly derived in the immediate past, particularly if the hatchery is to remain a regular component of the life cycle of the fish.

The assertion that genetic impacts in hatchery and wild components of an integrated populations can be controlled through regulated gene flow misleadingly implies that neutral markers providing evidence of significant gene flow between hatchery and local wild populations or that show genetic similarity between hatchery and local wild fish also provide evidence that the fitness of the hatchery fish in the wild is identical or similar to fish in the wild population. That implication is false. WDFW should take great care to explain in considerably greater detail what is intended by such assertions and should cite the specific scientific literature that supports them.

WDFW fails to adequately address that it lacks the capability to accurately determine the relative value of the genetic resources related to fitness that may be available in integrated hatchery/wild populations. The findings of the ISAB support the conclusion that WDFW has no current scientific basis for determining the fitness of hatchery salmon relative to wild salmon, or for evaluating any beneficial impacts to wild populations from genetic interactions with hatchery populations. WDFW has no foundation for any claim that the genetic resources available in hatchery populations offer any potential value to the recovery, conservation, or sustainability of naturally spawning wild steelhead populations, particularly in the face of overwhelming scientific evidence of the ecological and genetic risks hatchery steelhead pose to wild populations, and the poor procedures and performance of existing programs documented in the ISAB review.

Of the eight principal Findings presented in the review, six deal directly with the “substantial risks” presented by hatchery supplementation, or the lack of any adequate “empirical basis” for determining either the costs or the benefits to natural populations of even the best planned and executed hatchery supplementation efforts currently being operated. The review finds that evaluation efforts are “inadequate,” that the correct parameters are not being measured, that current hatchery programs are “unlikely” to provide “convincing quantification” of hatchery impacts, that key hypotheses have been left “unevaluated,” and that any risk/benefit analysis of hatchery impacts would be “*dominated* by the high level of scientific uncertainty” (emphasis added).

The ISAB summarizes the substance of the review in a single sentence: “Currently available empirical information is inadequate to predict the outcome of *a thoughtful conservative supplementation effort* for any potential target population or on collective populations….” (Emphasis added. It should be noted that the bulk and substance of the review describes how few such “thoughtful conservative” efforts currently exist, which WDFW fails to acknowledge.)

This fundamental issue of the fitness of the composite population that is the intended outcome of supplementation programs (and more generally of "integrated" programs that have been described by WDFW thus far) relative to the baseline fitness of the wild population prior to the initiation of supplementation has been explored in considerable detail by Goodman in the AFS symposium contribution quoted above and in a recent article in the Canadian Journal of Fisheries and Aquatic Sciences (Goodman 2005). The approach employed by Goodman in these two articles provides a clear description of seriousness of the risk that integrated production can pose to the fitness of wild populations, and the factors under management control that directly contribute to such fitness impacts. The risks to wild populations are considerable and are increased by the uncertainty caused

by our lack of detailed knowledge about key genetic and ecological factors that can affect wild spawning fitness. These articles should be read by relevant WDFW staff and cited in revisions to the public review draft.

WDFW acknowledges that integrated hatchery programs put target populations, "through a program of adaptation to a mixed hatchery-natural environment." When we speak of a hatchery "environment," we don't mean buckets and concrete raceways or "naturalized" rearing channels; we mean near universal survival to smolt stage, and to smolt at an improved condition relative to smolts reared in the natural "environment." Early life-history survival above 80% cannot obtain in the wild. A population "adapted" to the mixed hatchery-natural "environment" will likely become reliant on continued exposure to the hatchery environment, turning a likely viable (if struggling) population into a population that requires perpetual hatchery intervention.

In its discussion on empirical studies of genetic changes from hatchery impacts, WDFW acknowledges the limitations of existing studies and discusses the difficulty in obtaining material to analyze the genetic characteristics of wild steelhead populations before they may have been influenced by hatchery impacts. This is a clear example of how acknowledgement of and reliance on ISAB and RSRP findings and recommendations could strengthen WDFW's analyses and management.

The ISAB has recommended the widespread use of unsupplemented "reference" streams (on a variety of spatial scales) to conduct ongoing, controlled comparisons between populations influenced and uninfluenced by hatchery intervention. The RSRP issued a report of Panel meetings held July 2003, to discuss "how modification or closure of hatcheries provides NOAA Fisheries with opportunities to investigate the experimental effects of hatcheries on wild populations." The RSRP specifically endorsed the findings and recommendations of the ISAB, and made several findings and recommendations of its own. The RSRP found, among other things, that "questions on the negative impact of hatchery fish on wild stocks abound… while scant progress has been made toward investigation and resolution of this major topic." The report noted, "In all examples that the RSRP has been able to locate, when experiments were conducted to test claims for the success of hatcheries in promoting the conservation of naturally spawning fish, the initial claims have been proven false."

The public review draft touts new selectively-neutral genetic monitoring tools (particularly singular nuclear elements or SNPs) that may have application to mixed-stock fisheries management, but fails to discuss new genetic techniques such as DNA arrays that will enable direct and indirect measurements of gene expression that can be extremely valuable to addressing fitness questions. The Department appears poised to commit considerable financial resources in SNPs to the detriment of investments in cutting edge genetics technologies that could have direct application to understanding wild population fitness. (See for example, Roberge et al 2006, and Aubin-Horth et al 2005, Rise et al., 2004 and references therein.)

Sections 3.4 and 3.5 Competition and Predation

The discussions on competition and predation are generally thorough and frank. Washington Trout expressed its concern regarding these potential impacts of artificial production in reviews of Hatchery and Genetic Management Plans prepared by WDFW for Puget Sound and Columbia Basin steelhead hatcheries. The public review draft goes much further in its acknowledgements of the likely impacts and risks from competition and predation than WDFW did in its published responses to Washington Trout's reviews of the HGMPs, wherein the department largely dismissed or minimized Washington Trout's concerns regarding competition and predation. In response to other concerns summarized in Washington Trout's HGMP reviews, WDFW committed to making

substantive changes to some HGMPS. We anticipate that the new insights discussed in the public review draft regarding these impacts will influence the revision of relevant HGMPs.

Section 3.7 Discussion

The discussion section begins with the same biased language and assumptions that weaken all of Chapter 3. WDFW repeats the blanket assertion that hatchery production *can* be used to "conserve at-risk natural populations." As noted above, this assertion is unsupported by available evidence and incompatible with the findings of independent researchers and review panels. The discussion describes ongoing hatchery reform, but appears to rely principally on findings from the HSRG, while absolutely ignoring the findings and recommendations of the ISAB and RSRP that would encourage more management change than WDFW appears willing to consider.

When WDFW acknowledges the importance of healthy habitat as it relates to steelhead conservation and the "effective" use of artificial production, it ignores the significant risk that hatchery influences may create "wild" populations that will not be able to sustain themselves without hatchery intervention, no matter the habitat quality.

In discussing goals and strategies, WDFW asserts that integrated programs *can* increase the number, distribution, and productivity of natural spawners, and that isolated programs *can* minimize interactions with natural spawners. As noted in our discussions above, it has not been clearly demonstrated that any of those conditions *can* obtain (see ISAB, 2003). It is also again worth noting that what is certain is that none of those conditions *have* obtained to date, the implications of which are again left completely unaddressed by WDFW's analyses.

In its discussion of a "balanced portfolio" approach of artificial production coupled with habitat improvement initiatives, WDFW acknowledges the need for these programs to be implemented and "tested." There is no adequate discussion on how these programs will be monitored, evaluated, "tested," and adjusted. Here again, acknowledgement and utilization of ISAB and RSRP findings and recommendations would be useful. The ISAB's recommendations for the establishment of unsupplemented reference streams, and the RSRP's recommendation to use hatchery closures to create paired comparative experiments between unsupplemented and supplemented populations should be adopted.

Conclusion

In the context of this review, we find WDFW's analyses in Chapter 3 generally unconvincing and incomplete. We recommend that WDFW significantly revise Chapter 3, relying more heavily on the findings and recommendations of the ISAB, RSRP, and other independent researchers cited above.

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ATTACHMENT C

COMMENTS REGARDING A PUBLIC-REVIEW DRAFT:
Washington Department of Fish and Wildlife Statewide Steelhead Management Plan; Volume 1. Statewide Policies, Strategies, and Actions, December 21, 2006

Submitted January 12, 2007 to
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Introduction

Washington Trout appreciates the opportunity to respond to Washington Department of Fish and Wildlife's request for comments regarding the December 12, 2006 draft of the *Washington Department of Fish and Wildlife Statewide Steelhead Management Plan; Volume 1. Statewide Policies, Strategies, and Actions*. We acknowledge the time and effort devoted by WDFW staff in preparing the draft SMP, and we appreciate WDFW's efforts to engage the public in this process through significant stakeholder involvement and this review and comment period.

Washington Trout has reviewed the December 21 draft, as well as relevant scientific literature, and the reports of independent scientific review bodies (including cited references). Enclosed for the record and your consideration is Washington Trout's review of the Draft Steelhead Management Plan. Based on our review, the references cited, personal communication with WDFW employees, and consultation with other scientists and professionals, we believe WDFW has taken an important first step in developing a needed new management paradigm for Washington's wild steelhead resources. However, we agree with other reviewers that the draft still lacks significant detail, relies too heavily on some unsupported assertions, and does not adequately acknowledge or address some important information and its implications.

Washington Trout represents approximately 2000 members in the region. Many use and enjoy rivers, streams, and their associated riparian areas throughout Washington for recreational, scientific, aesthetic, and commercial purposes, deriving benefits from robust wild-steelhead populations and healthy aquatic habitats. Many WT members take an active role in the conservation and recovery of Washington's wild-steelhead ecosystems. Washington Trout conducts recovery related research on wild-fish populations and habitats, advocates for scientifically and legally responsible wild-fish management, and develops cutting edge habitat-conservation initiatives. Public and tribal agencies, scientific institutions, the business community, the environmental community, and the news media have all recognized WT's credibility regarding wild-fish ecology and its specific experience in issues associated with wild-steelhead conservation.

Washington Trout has previously responded to invitations from WDFW to participate in review-processes related to the conservation and recovery of wild-steelhead populations in Washington. Washington Trout has submitted reviews regarding: WDFW's Wild Salmonid Policy; Hatchery and Genetic Management Plans for steelhead hatchery programs in Puget Sound and the Columbia River Basin (Gayeski and Vanden Brulle , 2003; Washington Trout, 2005), and most recently; the Public

Review draft of *Oncorhynchus mykiss: Assessment of Washington State's Anadromous Populations and Programs* (Washington Trout, 2006A). In addition, Washington Trout has submitted reviews to NOAA Fisheries regarding: NOAA's hatchery listing policy (69 FR 31354, June 3, 2004) (Gayeski and Vanden Brulle, 2004); Critical Habitat Designations for listed populations of steelhead and salmon (Gayeski, 2005); the Puget Sound Steelhead Proposed Listing (Washington Trout, 2006B), and most recently; the Proposed Upper Columbia Spring Chinook Salmon, Steelhead, and Bull Trout Recovery Plan (Washington Trout, 2006C). Where these comments may inform this review, we will not repeat those comments here, but instead include them for consideration by reference.

In addition, Washington Trout has already submitted substantive input on the development of the Draft Steelhead Management Plan through oral comment at several stakeholder meetings organized by WDFW. We want to acknowledge here that WDFW staff has been extraordinarily open and responsive in accepting, recording, and in some cases incorporating the input of Washington Trout and other stakeholders in the development of the draft. In some cases those comments have been repeated in this review; in some cases they have not. However, the absence of previously submitted oral input in this review should not be interpreted as a dismissal or reconsideration of that input, and we anticipate that WDFW will continue to give due consideration to all input previously submitted by Washington Trout during this process.

In general, we continue to be concerned by a lack of detail in the Draft Steelhead Management Plan, particularly regarding the need to incorporate specific management and performance thresholds, timetables, and triggers in subsequent regional management plans. Regarding artificial-production management, we continue to be concerned that WDFW fails to acknowledge or address the findings and recommendations of federally appointed review bodies, specifically the Independent Science Advisory Board and the Salmon Recovery Science Review Panel. The ISAB and RSRP have both published reports that tend to undermine some of WDFW's fundamental management assumptions, and that could potentially require more significant management changes than WDFW appears to contemplate (ISAB 2003; RSRP 2003). We recommend that the Draft Steelhead Management Plan specifically cite the reports of the ISAB and the RSRP, and incorporate many of the findings and recommendations of the reports into its new artificial-production management policies and practices. Finally, we agree with other reviewers that WDFW must acknowledge evidence of much higher historical abundance, productivity, and diversity in native steelhead populations than WDFW currently estimates, and accordingly adopt much more ambitious recovery goals.

Specific Comments

1. Plan Introduction, page 1. The first paragraph should highlight the depressed status of most wild steelhead populations and emphasize that the point of departure for the RMP is the preservation and recovery of the diversity, resilience, and long-term fitness of the state's wild steelhead populations. The statement that "substantial variation now exists among the status of steelhead stocks" obfuscates the serious state of the majority of the state's wild populations and avoids stating directly that the RMP is needed to guide a recovery process.

2. Page 1, second paragraph. The reference to the White Paper implies that the original version on which the public commented is a valid scientific guidance document. This is disputable, as there considerable substantive public comments were made on the document and currently it is presumably under revision in light of some of those comments, and in any case the public commenting on this RMP has not seen the final version of the White Paper.

3. Page 1, last 5 lines. This again obfuscates the key issue. ESA is needed to facilitate/insure *recovery* of populations, not mere "avoidance of extinction". The RMP needs to clearly emphasize *recovery* of depressed, at-risk populations, be clear about how great a proportion of

the state's original wild steelhead populations and life history components have been lost, how many remain, and how many are at risk. As many others in addition to Washington Trout have emphasized, starting early in the document (and in its Introduction) with a robust reference point of historical steelhead abundance is essential to adequately framing a recovery-based perspective and management approach.

4. Goals and Policies. Page 3. Key terms employed in the goal statement and the following text should be defined soon after their first occurrence or perhaps immediately prior to their first significant occurrence.. Here, "healthy" as applied to population condition, and "abundance" in the goal statement (restore and maintain) should be defined/explicated. To what levels of abundance is it the goal of the RMP to restore depressed population? What are the fundamental features of stock/population health and what are the measurable and monitorable biological indicators of healthy stock conditions? The RMP must also go considerably beyond the features and indicators used in SASSI (or provide a substantive discussion of why those are valid).

5. Page 3, Fishery Management. What are the "conservation objectives" that will be (or currently are) established for natural production? A fundamental issue with the statement as a whole is that the several objectives listed are likely to be in conflict, even in the case of populations that currently appear healthy (have significantly positive productivity parameters based upon good, long-term data) but are either of small absolute size and/or face significant habitat threats. Statements such as this one again fail to confront the key issues associated with preservation and recovery and the attendant hard choices that must be made in order to achieve a recovery goal. As a long-term, post-recovery objective, the statement is fine, but this is not the context that the RMP needs to be addressing.

6. Page3, Artificial Production (AP). See the comment above on Fishery Management. The same fundamental issues apply here. Both sub-statements imply that there are no inherent conflicts between objectives of the two uses of AP and the VSP criteria for natural production and, further, imply that there is good scientific evidence for these assertions. This latter is, to say the least controversial. We believe it is simply false. The RMP must honestly acknowledge the significant uncertainties associated with AP and wild stock health and recovery. Further, it must go on to address the issue of how the key uncertainties are going to be addressed by management and program changes, including addressing the key recommendations of not only the HRSG, but more importantly of the ISAB/RP in its 2003 review of supplementation programs in the Columbia Basin and the reports and recommendations of the RSRP on hatcheries. The public (including future generations) is simply not well served by vague assertions that all status quo desires can and are going to be satisfied.

7. Natural Production (NP), Page 5. The specification of a healthy natural stock should be referenced to historical abundance in addition to the conditions listed.

8. NP Strategies, page 5. "sufficient diversity and numbers of natural spawners" should be explicitly referenced to biological parameters, and to management model parameters such as maximum sustained yield (MSY/MSH) and other stock-recruit reference points. We note here and in general that we do not believe that MSY is an appropriate management reference point for either healthy populations or those in need of recovery. Among other reasons, MSY harvest even if consistently achieved by management fails to sustain life history diversity within populations and this diversity is fundamental to the long-term viability and adaptability of wild populations.

   It is important to note that unfished populations subjected to significant harvest will in general be reduced to their most productive components. The life-histories and sub-populations that are

least productive (those using marginal habitats and/or particularly variable habitats, for example) will be the first to be lost. Stock-recruit model measurements of population productivity will actually *increase* after harvest relative the global productivity of the initial pre-harvest population. These lost components of population complexity and diversity need to be recovered, and this likely will require several generations with harvest rates well below any robust estimate of MSH for the extant population. Setting escapements at the current MSH point estimate, even if that estimate is very accurate, will considerably under-escape the population with regard to the needed rebuilding.

9. NP Actions, page 5. The controversy regarding MSH as a reference point should not be glossed over. As noted already in these comments, the context of recovery and wild population rebuilding should be central to the RMP and it is directly relevant to the issues of harvest reference points and escapement goals. MSH arguably has little place in this context -- but the controversy should at least be honestly discussed.

10. NP Actions, #4), page 5. This policy is inadequate and unnecessarily vague. While rebuilding numbers is a central recovery objective and therefore a trend of increasing abundance is one indicator of rebuilding, there must also be a minimum, threshold target level of abundance and diversity established for each depressed population against which trends in abundance can be evaluated.

11. Habitat , Strategies -- provide technical expertise -- and Actions #4, page 7. The RMP should acknowledge the need (and call) for a comprehensive *independent* (non-agency) audit and review of the HPA process. While WDFW possesses considerable technical expertise at higher levels to evaluate HPA application, such expertise is all too often not present on the part of or available to field staff who actually issue HPA permits. Field staff requires more and better support from management at both the local level and from Olympia. Qualified field staff too often do not receive management support when they judge that an HPA should not be issued or that terms and conditions have been violated and an extant HPA should be revoked, particularly where land development is concerned. Only an independent audit can assess the magnitude of the problem and provide sound recommendations for improvement.

12. Fisheries Management, Policy Statement, page 9. As noted regarding the Introduction, this statement ignores the inherent conflict among several of the objectives enumerated. It would also be improved by having been preceded by a clearer and stronger statement regarding the primary need and purpose for the RMP (recovery) that would make clear what in general the "conservation objectives of natural production" mean and are likely to entail with regard to escapement goals and harvest policies.

13. Fisheries Management , Actions, page 10. #3a) diversity. The statement ignores the issues of loss of early run-time components of wild populations resulting from harvest directed at Chambers Creek winter-run stock and the need to recover and rebuild these components. At a minimum closure/abandonment of the use of early-returning hatchery winter-run stocks should be added to the list of potential management actions.

14. Fisheries Management, Actions, #3b), page 10. The statement is vague. What counts as a level of abundance that is inconsistent with watershed goals? How long is "long-term abundance"? How long will a population within a management unit be allowed to suffer such an inconsistent level of abundance before assessment and/or remedial action is taken. The RMP should outline clear measurable and monitorable standards that will trigger specific kinds of detectable management actions to promptly redress undesirable harvest impacts on wild populations.

15. Fisheries Management, Actions, #6), page 11. Washington Trout believes that an estimate of 10% catch-and-release mortality for steelhead caught in all seasons is a reasonable and risk-averse standard, in view of present information. We endorse the employment of this standard for the purpose described in the statement.

16. Artificial Production (AP) , Policy statement, page 12. See comments of AP in the Introduction.

17. AP, Strategies, Network of Natural Stock Reserves, page 12. This statement is too vague. At a minimum a more substantive idea of the spatial scale and structure (e.g., hierarchical at several nested geographic scales) should be provided. In addition, the meaning of "largely protected from the effects of hatchery programs" should be spelled out in some detail. Moreover, the purpose of such a policy cannot be made clear without a detailed acknowledgment of the dangers AP poses to wild populations. The reserve network policy should be clearly motivated from this perspective. The reserve network policy should also be clearly linked to a policy to implement the kind of evaluation of the conservation AP (supplementation, captive brood) hypothesis that has been called for by the ISAB/RP and the RSRP as noted previously in these comments.

18. AP, Strategies, Implement Rescue Programs for At-Risk Stocks, page 12. A discussion of the risks of conservation AP and a statement of the need to evaluate the *hypothesis* that there is such a thing as conservation AP should be included. Simply put, if the hypothesis is false then by the time "limiting factors are addressed" an at-risk wild population may have been turned into an AP-dependent remnant of the wild population that was the target of the intended rescue operation.

19. AP, Strategies, Adaptive Management (AM) Programs , page 12. Discussions of AM in the context of salmon and steelhead management in general are entirely too vague, and this draft RMP is no exception. AM of actions and policies affecting at-risk populations requires specification of clear objective (measurable and monitorable) risk-averse threshold standards that trigger clearly specified procedures and actions in response to threshold crossing. Absent a specification of these, AM is nothing more than the statement of the intention to collect some data and think about what the data means for the at-risk population and perhaps discuss what, if anything, ought to be done relative to the status quo. This will not preserve or recover the state's wild steelhead populations.

20. AP, Actions, page 13. Closure and reduction of hatchery programs should be included as the first or second specific action. There is little evidence the Department can put all of its eggs in the "manage harvest and tamper with hatchery run-/spawn-timing" basket as the sole means of addressing adverse hatchery-wild interactions. Closure and reduction should be discussed and planned in conjunction with Wild Steelhead Reserve Networks. This document still strongly reflects the department's history of placing harvest interests in front of wild stock preservation and recovery.

21. AP, Actions, #4) page 13. Here is another place in which the recommendations of the ISAB/RP and RSRP regarding supplementation and other so-called "conservation hatchery" practices should be mentioned. The risks mentioned in this action item cannot be adequately understood and evaluated in the absence of a comprehensive, statistically sound field-based study design.

22. AP, Actions, #5), Segregated Harvest, page 13. The RMP should note the poor track record of segregation and develop a plan for evaluating (quantifying) the efficacy of specific segregated

hatchery programs pose or likely pose significant risk to specific wild populations of concern. The segregation strategy should be considered a *hypothesis* that is in need of testing.

23. AP, Actions, #5a) page 13. This point should be expanded into a plan for systematic wild-population genetic sampling. A Wild Steelhead Genetics Baseline Inventory should be called for, designed, and implemented. This should be fundamental to the RMP. With regard to the specifics of this action item, it is not clear that an estimate of the potential range of gene flow of returning hatchery adults is adequate unless it specifically includes field sampling across the entire wild-run timing. For example, it cannot simply be assumed that HxW reproductive interactions do not occur based on the timing of milt and egg development and spawning in the hatchery.

24. AP, Actions, #6), Integrated Programs, page 13. Loss of diversity: the several critical kinds of diversity should be stated: genetic diversity measured at neutral markers, diversity at QTL (quantitative trait loci) and other markers directly related to fitness in the wild (but rarely measured and/or hitherto difficult to measure -- but less so in the age of genomics using microarrays), and diversity in phenotypic traits related directly or indirectly to fitness in the wild. There is simply little, if any, evidence and considerable *bone fide* scientific uncertainty about whether Integrated Programs will significantly reduce the harmful consequences of HvW interactions. Washington Trout is not convinced that PNI is a reliable parameter for assessing this issue. Specifically, PNI does not address the fitness-related consequences of selection for a mixed life-history, which is the consequence of interactions under an integrated program. Selection a compromised wild-fitness profile can occur (and is in fact likely to occur) under high PNI levels. This has been shown by Goodman ("Selection equilibrium for hatchery and wild spawning fitness in integrated breeding programs", CJFAS, February 2005,pp.374-389) and has been discussed in the ISAB/RP 2003 review of supplementation.
25. AP, Actions, #8), Adaptive Management page 13. See comment # 19 above.

26. Regulatory Compliance (RC), Actions, #1,3 and 6, pages 15-16. See discussion under comment # 11 above. A statement is required that there is a need on the Department's part to insure that field staff have adequate expertise and management support for evaluating HPAs. Management support at the level of the regional office and from Olympia is often lacking for knowledgeable and responsible field staff that wish to deny or severely condition HPA's from developers and agricultural interests. Again, the magnitude of this kind of problem cannot be adequately assessed and remedied without and independent performance audit of the HPA process. The RMP should state the need for and request such an audit.

27. Monitoring, Evaluation, and Adaptive Management (MEAM), Policy Statement, page 17. The statement should be rephrased and stated in terms of wild population health and recovery. Measurable, monitorable, and biologically appropriate wild population parameters should be the key parameters with respect to which hatchery and harvest programs, policies, and actions are to be evaluated and constrained. It is not simply a matter of restricting undesirable impacts of these activities; rather, it is a matter of promoting and securing wild population, health, resiliency, and recovery.

28. MEAM, Strategies, page 17, Develop comprehensive steelhead adult and smolt monitoring. Washington Trout strongly supports this. However, we recommend that an array of healthy (or relatively healthy) wild populations be included in a comprehensive smolt and adult monitoring program. This should be associated with Wild Reserve Networks and implementation of the recommendations of the ISAB/RP and RSRP for evaluating AP.

29. MEAM, Actions, #1), page 17. In addition to employing neutral genetic markers (mircosats, SNPs) studies should be planned for measuring QTLs and gene expression in selected wild populations. This would best be done as part of a field-based evaluation of the supplementation hypothesis that we have noted elsewhere in these comments.

30. Outreach and Education (OE), Strategies (Capitalize on existing programs), Actions, #6, Work with salmon in the classroom), page 22-23. The implementation of Salmon in the Classroom requires substantive revision and improvement in order to educate students about the biology and ecology of real, wild salmonids. This requires providing both materials and knowledge support to teachers. The overwhelming majority of teachers responsible for salmon in the classroom do not know salmon biology and certainly are unaware of the serious issues regarding hatchery-wild interactions. The practice of releasing fry hatched in the classroom into local streams should be terminated in most cases, and certainly vastly revised and protocols for evaluating the release of such fish incorporated into the salmon-in-the-classroom curriculum. It is simply mis-education and a public disservice to students and the public at large to provide the message that if incubating eggs fail they can be replaced by another order from a hatchery and that salmon preservation and recovery is being served (or at least not harmed) by planting hatchery progeny into local waters with no systematic understanding of what is required for a released individual to survive and return as an adult. The Department should take the lead in this process and the RMP should note the deficiencies of the current program and call for its revision.

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