YAKIMA BASIN JOINT BOARD

A Partnership of Public Entities Promoting the Multiple Uses of the Yakima Valley's Water Supply

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CERTIFIED RETURN RECEIPT

June 29, 2006

Ms. Carol Joyce
National Marine Fisheries Service
Salmon Recovery Division
1201 N.E. Lloyd Blvd., Ste. 1100
Portland, OR 97232

Subject: Comments on Draft Yakima Salmon Recovery Plan

Dear Ms. Joyce:

The Yakima Basin Joint Board would like to thank you for the opportunity to provide comments on the draft recovery plan. Upon review, we have serious reservations about the current draft of the recovery plan. Our comments are provided below, and supporting documents are attached.

In summary, the plan has three major weaknesses: (1) the recovery plan does not recognize that rainbow and steelhead trout are the same species, that the two forms interbreed when mature, or evaluate the biological consequences of those interactions; (2) the plan does not contain a scientifically rigorous viability analyses, and the viability analysis that is presented contradicts other scientific reports on the subject; and (3) the recovery plan does not develop scientifically sound recovery criteria, in part because it recommends using steelhead redd counts, which are an unreliable measure of steelhead abundance and distribution.

Due to these problems the Yakima Basin Joint Board cannot support the Yakima Subbasin Salmon Recovery Plan. Because the scientific foundation of the plan is inadequate, we suggest developing a larger group of scientists to help in the peer review of the fisheries science portions of the plan. Given more time and opportunities to participate drafting the plan, we believe the current draft plan provides a beginning point from which a scientifically sound recovery plan for Yakima Subbasin steelhead populations might be developed.

Sincerely,

Jim Trull, President

Encs: 1) Viability of the Middle Columbia Steelhead ESU (S.P. Cramer & Associates)

2) Review of Abundance Trends, Hatchery and Wild Fish Interactions, and Habitat Features for the Middle Columbia Steelhead ESU (S.P. Cramer & Associates)

Steelhead and Rainbow Trout Interactions

We have enclosed copies of two reports (Cramer et al. 2003; Cramer et al. 2004) that examined steelhead and rainbow trout habitat requirements, interactions, and population characteristics. Many observations have been reported of steelhead and rainbow trout spawning together, supported by genetic evidence (Pearsons et al. 1998). Because these are two life-history forms of the same species, the viability analysis,

> "...needs to consider gene flow between forms, its resulting impact on fitness, and the role of each form in metapopulation processes. This assessment must recognize that the two forms may or may not be reproductively isolated. The assessment of abundance as a viability parameter must integrate individual population abundances of both forms," (ISAB 2005).

In developing the draft plan, the recovery planning effort needs to focus on describing a scientifically rigorous evaluation of steelhead and rainbow trout life-history and habitat requirements. Once habitat requirements for these species are fully developed, they can be linked directly to habitat conditions in the Yakima Basin. Doing so would allow planners to more specifically identify areas and projects that, when restored, will produce steelhead populations *over and above the current conditions found in the Yakima Basin*.

For example, rainbow trout are numerically dominant to steelhead in the upper Yakima River. The upper Yakima has a recovery goal of 2,250 adult steelhead. Numerical recovery goals will not be scientifically sound unless they are linked directly to habitat conditions that will be able to support 2,250 adult steelhead. The current recovery plan does not describe the links between goals, actions, and scientific uncertainties.

Recovery Goals and Criteria

1) Abundance and productivity

The Salmon Recovery Plan establishes steelhead abundance and productivity criteria which must be met for delisting to occur. These criteria include a total abundance target for Yakima River populations amounting to 5750 steelhead spawners, including fish of both wild and hatchery origin. This abundance criterion, which is the combined total for the 4 Yakima Basin populations, is quite ambitious in relation to population levels measured at Prosser Dam over the last 20 years (Table 1). The criterion exceeds the maximum annual steelhead spawning escapement of 4497 fish in 2002, and it is 4.3

times the geometric mean number of spawners (1332), wild and hatchery origin, during 1985-2005.

As the Recovery Plan's abundance criterion exceeds recently observed population levels, it is also prudent to consider whether the aggregate population is likely to achieve the required productivity criteria (1.2 – 1.3 wild spawners per parent spawner). For comparison, mean productivity of Yakima steelhead (as measured at Prosser Dam) was 1.23 spawner recruits per parent spawner from a parent spawner population averaging 1279 fish during 1985-2000. Analysis of existing spawner and recruit data for the aggregate Yakima population, using a Ricker model, also suggests the productivity objectives would be difficult to achieve with the existing habitat capacity. There is a strong negative relationship between the number of wild steelhead recruits and the number of parent spawners in the 1985-2000 brood years (Figure 1). The model indicates that approximately 1270 spawners provide maximum recruitment (i.e., this is the number of spawners required to seed the habitat to capacity), and spawning populations greater than 1400 fish do not tend to replace themselves (spawner recruits per parent:spawner are less than 1.0).

The Recovery Plan spawner abundance criterion for the Upper Yakima population (2250) is also substantially higher than recently observed steelhead escapements above Roza Dam (Table 1), and U.S. Fish and Wildlife Service counts at Roza Dam during 1940-1965 (Ward et al. 1969). Considering the length of time that steelhead access to the Upper Yakima River has been available at Roza Dam, it is unclear why adult returns have remained so low in both absolute numbers and as a percentage of the total Yakima River population (e.g., 6.6% in 2005). Constraints to expansion of the Upper Yakima steelhead population are likely related to presence of an abundant and widely distributed resident rainbow trout population (Ham and Pearsons 2000) which is a potential competitor for space and food resources during the juvenile rearing phase. Gene flow between resident and anadromous *O. mykiss* has also been documented in the upper Yakima River system (Pearsons et al. 1998). The role of resident *O. mykiss* in restricting distribution and production of steelhead appears to have received little, if any, consideration in setting steelhead recovery criteria (ICTRT 2005).

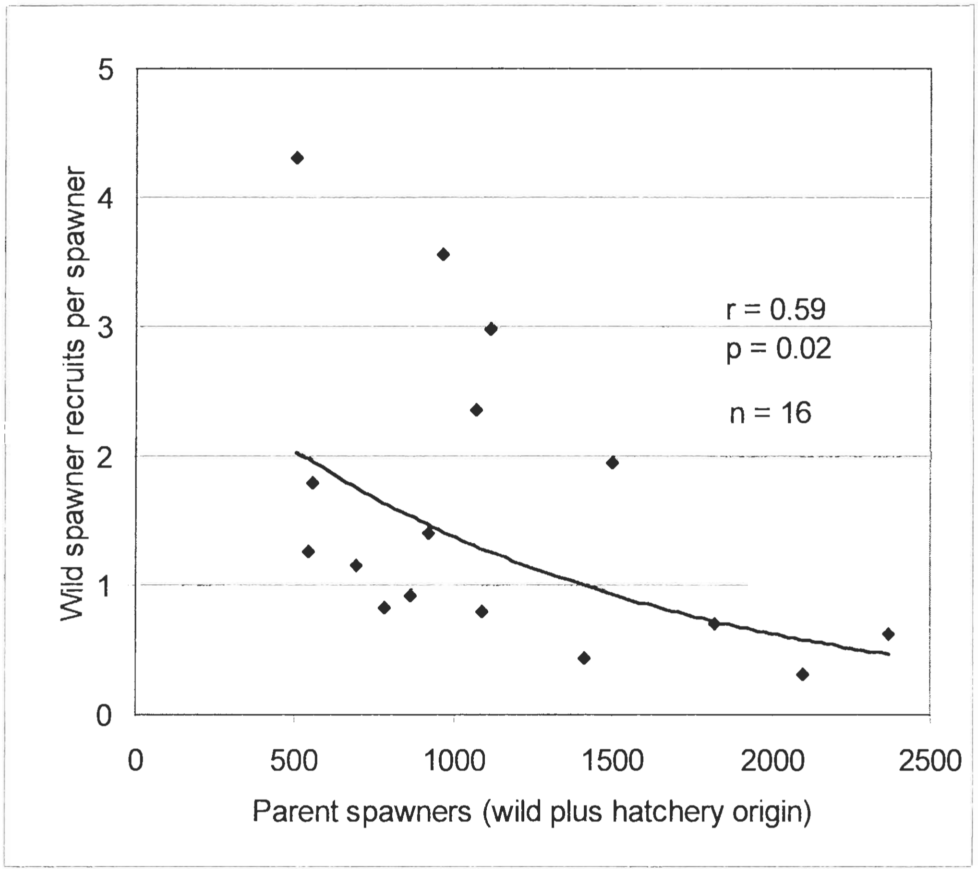

Figure 1. Yakima steelhead productivity in relation to parent spawning population size, 1985-2000 brood years

Table 1. Adult steelhead dam counts and redd counts, and estimated total spawning escapements, Yakima River Basin, 1985-2005 spawning years.

Brood year	Prosser Dam wild[a] Naches	Roza Dam wild[a]	Spawning escapement: Wild spawners[b]	Spawning escapement: Wild + hatchery spawners[b]	Redd counts[a]: Satus		Redd counts[a]: Toppenish	Redd counts[a]: Ahtanum
1985	2191	6	692	692	.	.	.	.
1986	2230	3	1413	1413	.	.	.	.
1987	2424	.	1822	1822	.	.	.	.
1988	2601	.	2365	2365	445	.	.	.
1989	1066	.	864	864	404	45	.	.
1990	727	.	539	539	289	26	.	.
1991	730	.	721	782	125	.	.	.
1992	2012	107	2014	2097	.	.	.	.
1993	1104	15	1089	1089	73**	.	.	.
1994	540	28	540	554	114	.	.	.
1995	838	22	820	918	85***	.	.	.
1996	450	90	451	505	148	.	.	.
1997	961	22	819	964	76	5**	.	.
1998	948	51	948	1113	190	13**	.	.
1999	1018	14	1018	1070	130	78	.	.
2000	1571	14	1448	1500	169	185	11	.
2001	3032	133	2885	2939	102	355	8	.
2002	4491	236	4463	4497	240	111***	13***	.
2003	2190	128	2147	2191	319	161***	16***	.
2004	2739	211	2639	2654	93	56***	12***	94
2005	3377	224	3377	3451	108	99	16	140

[a] From Table 2.1 of Fredenthal et al. (2005).
[b] From Berg (2001) and Yakama Nation (unpublished data). Numbers include corrections for angler harvest and hatchery broodstock removals.
** Partial survey.
***Survey affected by poor redd visibility.

2) Spatial structure and diversity

Another major recovery criterion for Yakima steelhead is the requirement that naturally-produced steelhead must use the currently occupied major spawning areas in the Basin. The Recovery Plan lists those areas for each of the 4 populations. Included in listed Upper Yakima steelhead spawning areas is the upper Cle Elum River above Cle Elum Dam. As the upper Cle Elum River has not been accessible to steelhead or salmon since construction of Cle Elum Dam in 1933, it does not appear to qualify as a "currently occupied" spawning area and therefore does not fit the spatial structure and diversity criterion as defined in the Recovery Plan

Biological Monitoring

The Salmon Recovery Plan indicates in Section 7 that the monitoring program will include measures of abundance of the four Yakima steelhead populations to assess responses to recovery actions. Roza Dam counts of adults would apparently be used to measure returns of the Upper Yakima population, and redd counts would be used to determine abundance of the Satus, Toppenish and Naches populations (see Table 7.1 of the Plan).

To date, however, redd counts have not proven to be particularly valuable as an indicator of steelhead spawner abundance in the Yakima River Basin. Reliable redd count data are quite limited for the Toppenish and Naches populations (Table 1). In 5 of 11 years, Toppenish Creek redd counts failed to provide useful data.

More success appears to have been experienced at Satus Creek, where apparently reliable counts were obtained in 15 of 17 years (Table 1). As noted in the Recovery Plan, however, Satus Creek redd counts are not strongly correlated with overall run size as measured at Prosser Dam. Considering that the Satus Creek population comprises a significant portion of the Yakima River steelhead population (48%; Hockersmith et al. 1995), there should be a significant positive correlation between Satus redds and Prosser counts of wild adults in the same spawning year. In fact, there is essentially no correlation between these variables (Figure 2).

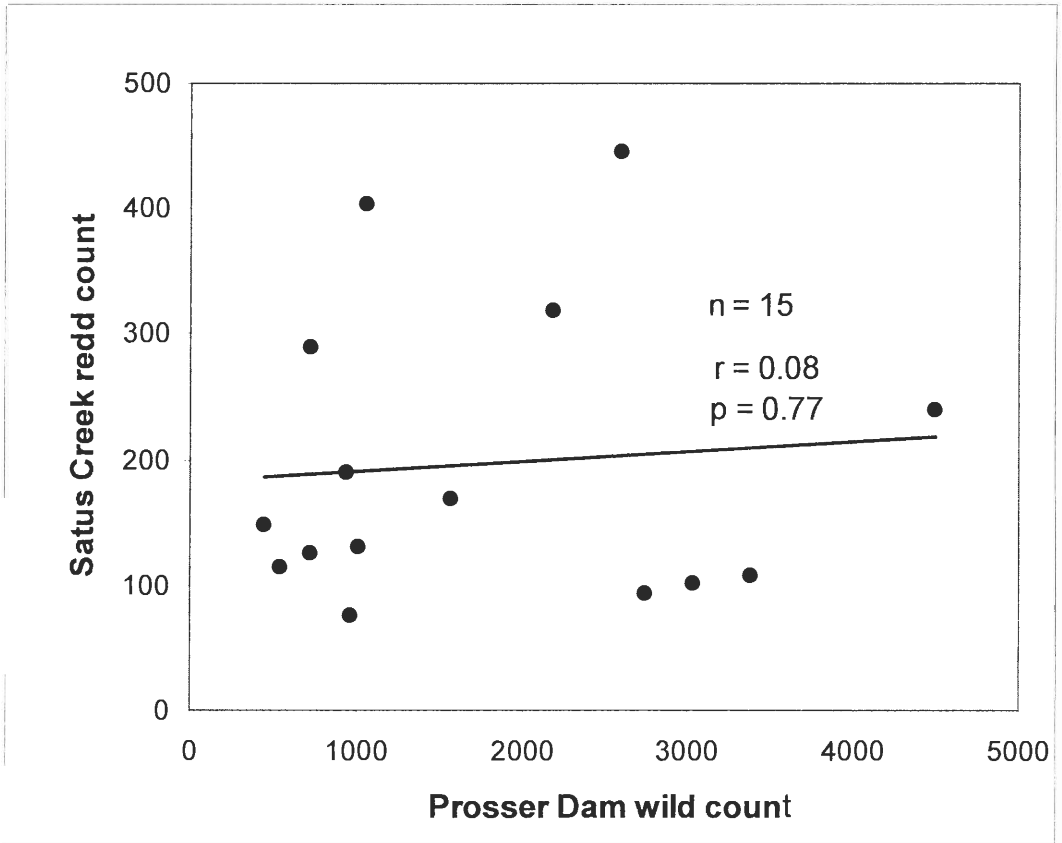

Figure 2. Satus Creek steelhead redds relative to Yakima wild run at Prosser in same spawning year. Data are from Table 1. Redd surveys affected by poor visibility were not included.

Another characteristic of the Yakima steelhead redd count data is that it accounts for only a minor portion of the population counted at Prosser Dam. For example, in 2005 (a year of favorable conditions for redd counts) the total redd count in Satus Creek, Toppenish Creek, Ahtanum Creek and Naches River tributaries represented only 19% of the wild population estimated to be available for spawning in those tributaries (Table 2).

In summary, Yakima steelhead redd count data do not appear capable of providing reliable estimates of either (1) the magnitude of tributary steelhead escapements, or (2) year-to-year variation in population abundance.

Table 2. Steelhead redd counts relative to dam counts, and percentage of population accounted for by redd counts, Yakima River, 1999 spawning year. [a]

Dam counts	
Prosser wild count	3377
Roza wild count (Upper Yakima)	-224
No. spawning outside Upper Yakima R.	3153
Redd counts	
Satus Cr.	108
Toppenish Cr.	99
Ahtanum Cr.	16
Naches R. tributaries	140
Total redds	363
Redd count estimate of spawners outside Upper Yakima R. (363 redds x 1.67)[b]	606

[a] Data from Table 2.1 of Freudenthal et al. (2005).
[b] Conversion factor (no. of adults per redd) from ODFW (2001).

The plan could be improved by removing Chapter 2 containing the "viability analysis," as the analysis does not appear to be scientifically sound. For example, the conclusion that the Satus and Toppenish creek steelhead populations are not viable seems to be odds with other reports examining the health of these populations. According to the Yakima Subbasin Summary (2004): "Satus and Toppenish steelhead populations are healthy, [and] could act as a source of broodstock/genetic material for reintroduction efforts," (Ch. 2-193). The conclusion these populations are not viable does not seem consistent with a healthy population that can sacrifice adult spawners for hatchery programs.

In another effort, Cramer et al. (2004) evaluated the viability of many of the middle Columbia basin, including the Yakima River populations. Based on their analyses they concluded that the Yakima Basin and other steelhead populations are viable, writing:

> "Available evidence on Mid Columbia Steelhead strongly substantiate that survival increases as abundance decreases. Survival at extreme low densities is estimated to be 3.5 times higher than at the un-fished equilibrium level (near recent escapement levels). Given that survival changes as abundance changes, "lambda" analyses are only useful as a "red-flag" indicator of population trend, and "lambda" should not be used as an indicator or predictor of extinction risk. Present spawner abundances appear healthy and in the vicinity of the estimated carrying capacity for each subbasin. Mid Columbia steelhead populations share similar habitats, and consequently, appear to have very similar productivities."1

The recovery plan even seems internally inconsistent in this regard: for example, there are nine parameters related to the abundance, productivity, spatial structure, and diversity of Satus Creek steelhead. The parameters were ranked according to their contribution to the risk of the populations going extinct. The ranking categories were very low risk, low risk, moderate risk, or high risk. For the Satus Creek population, two parameters warranted a "very low risk," four parameters were ranked for "low risk," three were of "moderate risk," and none of the parameters were considered to contribute to a "high risk" for extinction. Given this distribution of risk, it is not clear how the conclusion that Satus Creek steelhead populations are "not viable" and at "moderate risk" of extinction are supported by the draft recovery plan.

The steelhead viability analyses appear to be conducted using as little as 1-5 years worth of population data, although the text is too vague to determine the actual methods. The abundance and productivity of steelhead populations seems to be based upon averaging 5 years of data (redd counts collected in years 2000-2004), which may represent less than a single generation of steelhead production for these populations. In the Naches Basin, steelhead productivity and abundance is assessed using only a single years' data (2004), via the application of "expansion rates and survival estimates," but the methods employed to develop these estimates are not explained.

If the Yakima Basin population of steelhead is not viable then that is a serious concern. However, the subbasin summary has not demonstrated that the populations are not viable, and it is not consistent with other evaluations of these populations.

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1 Cramer et al. 2004 is available for download here:
http://www.spcramer.com/docs/reports/2005/MidColSthdReportFinal18Mar2005.pdf

Conclusions

The specific population abundance recovery criteria for steelhead are not well connected to habitat conditions and recovery actions in the Yakima Basin. For example, the plan defines recovery for the Naches River basin as supporting a population of 1,500 spawning steelhead at equilibrium conditions. Unfortunately the plan does not evaluate whether or not this goal is feasible. Does the Naches Basin actually have the capacity to produce 1,500 adult spawning steelhead at equilibrium conditions? If not, will actions described in the plan create enough new habitat to achieve this level of production in the Naches Basin?

The current recovery goals for population abundance should be rejected for steelhead trout until habitat-based recovery goals can be developed. The plan needs to more firmly link recovery to objectives that are achievable, and demonstrate that the recovery actions recommended in the plan will allow steelhead populations to meet the recovery criteria.

Information in the plan is dated. The plan should not rely on outdated and inaccurate information. For example, water quality improvements that have been made in the lower Yakima River in the last decade remain unrecognized in the plan. On p. 48 the plan states: "The lower Yakima River receives large volumes of warm, sediment- and pollutant-laden water from irrigation effluents." The study cited by that statement refers to conditions that were present in the 1970's and 1980's, but it is not an accurate description of current conditions. We are aware of a large body of studies, data, and information that could have been used to develop a scientifically sound, up-to-date recovery plan.

Damaging assertions are made throughout the report without scientific evidence to support them. There are too many assertions made to point out in these comments, but an example follows: at one point the plan (Section 3.4.5) suggests few steelhead spawn near the base of Tieton and Bumping dams "because upstream migration coincides with reservoir filling and low river discharge." The report does not try to explain how reservoir operations affect migration and spawning habitat conditions. Further, the statement is not accurate. Both Bumping and Rimrock reservoirs have high recharge ratios: in almost all water years these reservoirs refill, and are operated for flood control in the spring. Cle Elum is most frequently operated for refill in the spring, yet salmon and steelhead spawn below it.

In the same paragraph, the plan speculated that steelhead may not spawn in the Tieton River because the river is nearly devoid of spawning gravel and because of "year-round flow manipulations." Is there evidence the Tieton River is devoid of spawning gravel? Would the Tieton River Canyon, with almost no tributaries entering it, have been prime spawning habitat without the dam in place, or under a different flow regime? The plan contains numerous unsupported assertions, but fails to consider alternative explanations for what appear to be untested theories. This is another symptom of the lack of a species-specific biological foundation.

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