February 17, 2006

To: Bill Gill
Washington Department of Fish and Wildlife

Re: Comments on the January 20, 2006 draft of
***Onchorhynchus mykiss*: Assessment of Washington Populations and Programs**
Eds. James Scott and William Gill

Dear Bill,

The contributors and editors have made a fine start at developing a comprehensive assessment of Washington's steelhead populations and programs, and I commend you all for the efforts put into writing this document. This is an important report because it provides an opportunity to lay out a comprehensive status review for our state's steelhead populations and programs, to provide a critical review of management practices and performance, and hopefully to shed some light on future management approaches that can improve the future for Washington's steelhead populations and steelhead fisheries. My review begins with a few general comments, and then proceeds with more specific comments and recommendations for each chapter.

I look forward to reading the next draft of this important report, and if you have any questions or comments about my review please contact me at your convenience.

Sincerely,

Nathan Mantua, Ph.D.
Vice President of Science and Education
Wild Steelhead Coalition
218 Main St., #264
Kirkland, WA 98033

General Comments:

This draft now has an excellent collection of pieces on aspects of wild and hatchery fish abundance, productivity, and interactions. However, the report suffers greatly from a lack of synthesis of information and critical evaluations of past, present, and future management practices. I believe that the first deficiency can be directly addressed by adding an "integration and synthesis" chapter that explicitly links findings from relevant chapters. For example, there is a clear dynamic between harvest and hatchery policies that poses risks for the life history diversity, abundance, and productivity of wild steelhead populations, yet this topic is not discussed in this draft. Likewise, there are clear links between habitat complexity, life history diversity, spatial diversity, productivity, and population resilience, yet again this integrative issue is not explicitly discussed.

The management chapter of this report would benefit from the addition of more explicit case studies of key issues, challenges, and options. The management chapter now describes management trade-offs in a general, almost in an academic fashion, yet it lacks clear case studies that reflect key management issues that the agency is now grappling with. Specifically, management sub-sections with explicit statewide, region-wide, and river-specific hatchery reform and harvest management options are needed to clarify the challenges and options facing WDFW managers. For example, a section on hatchery reform should acknowledge the HSRG's area wide recommendations, then evaluate those recommendations, and offer management alternatives. The Hatchery Scientific Review Group published their final report in 2004, then also wrote a short memo in 2005 that explicitly restated their general recommendations for steelhead management (attached). However their steelhead management memo is not cited in this report, and the recommendations from their reports seem to have had little impact on the contents of this draft. ***The scientists in the HSRG spent several years and over $20 million federal dollars developing their reports!*** The findings and recommendations of the HSRG and other federally-funded blue ribbon panels ought to be of great value for WDFW's efforts to reform their steelhead management programs. Additionallly, for the past several years there has been a raging debate about wild steelhead harvest policies in Washington state, yet inexplicably this debate is largely avoided in the current draft. Harvest policy options also deserve the same kind of challenges, evaluations, and alternatives presented for hatchery reform options. Finally, integrated hatchery, harvest, and habitat policies should be offered and evaluated at the end of this critical chapter.

Chapter 1, Introduction:

1. page 2: As part of the purposes of this report, it seems that an evaluation of management performance in meeting management goals would be valuable for informing future discussions about management issues. Likewise, an evaluation of the space-time changes in steelhead populations over the entire state for as long a period as possible would also be a valuable contribution.

2. page 2: As noted in comments to follow, stock status assessments in this report focus on the period since the early 1990s, and this short historical perspective fails to recognize the longer-term information and understanding for the status of Washington's steelhead populations. A more comprehensive appreciation for the status of Washington's steelhead populations would also benefit with some discussion of steelhead stock status in California, Oregon, Idaho, British Columbia, and Alaska. For example, a paragraph or two about steelhead ESU's listed as *Threatened* or *Endangered* with extinction under the Federal Endangered Species Act would help to provide a broader regional perspective for the status of Washington's steelhead populations. Frankly, I find it surprising that the introduction fails to convey the widely recognized fact that many of Washington's wild steelhead populations are in an extremely depleted state relative to that of just a few decades ago.

Chapter 2, Biology:

1. pages 8-9: Following Finding 2-2, it seems that a strong recommendation to protect the diversity of life history types in *O. mykiss* populations is warranted. There are a number of management actions that have the potential to improve protections for resident forms of *O. mykiss*, including the increased use of selective gear rules to reduce the negative impacts of bycatch, and the elimination of "trout fisheries" in anadromous fish streams.

Chapter 3, Hatcheries:

1. page 2, 2nd paragraph: It might be worth noting that the average annual production of steelhead is actually "steelhead smolts", and that the statewide averages listed in this paragraph do not necessary represent regional or program specific performance measures. Large project-to-project and region-to-region variations in the performance of hatchery programs deserve to be mentioned here, since the risks and benefits of hatchery programs vary across a wide spectrum of spatial scales.

2. page 7, middle paragraph: There is an abundance of evidence that environmental variations in freshwater, estuaries, and the ocean play an important role in the observed space-time variability in smolt-to-adult survival rates, and this should be noted in this paragraph.

3. page 7, last paragraph: recent studies by Kostow (probably not yet published?) indicate that NATURES rearing programs with native broodstock in Hood River are producing smolts that share many phenotypical traits with non-local Hood River hatchery smolts, especially when released fish are later captured downriver in smolt traps. Perhaps this new work could be discussed in the revised version of this report.

4. page 8, 3rd paragraph: In discussing the performance of Cowlitz hatchery rearing strategies, it might be worth noting that 0.43% adult recoveries is well below the state average of about 1.1% (based on 8.8 million smolts released each year, and about 90,000 hatchery adults harvested each year),

5. page 8, 4th paragraph: What are the estimated SARs for the Marblemount hatchery steelhead from earthen versus asphalt lined ponds? From the recent data I've seen from Skagit basin hatchery programs, typical return rates are extremely low. What are the "significantly improved return rates" for smolts reared in the earthen pond? If they remain substantially below the statewide average of 1.1%, it would suggest (to me at least) that this change in tactics fails to result in a truly significant improvement in the performance of this hatchery effort.

6. page 11, figure 3-2: It would be informative to see a figure showing the history of annual steelhead smolt releases for programs in Puget Sound, and how those compare with the history of SAR indices. It is my understanding that there is a strong negative correlation between total numbers of smolts released and SAR indices for Puget Sound steelhead hatcheries, and this should be noted and discussed. A longer historical perspective on hatchery programs in Puget Sound would also be of interest. Data for smolt releases, at least, should go back to earlier decades.

7. page 34: In what year was the genetic material used in the Currens study collected? It is not clear what is meant by "current" in table 3-5.

8. page 38, middle paragraph: It should be worth noting that hatchery-wild steelhead smolt interactions in small and large estuaries, inland waters, and the coastal and open ocean are largely unknown, but potentially important (see, for instance, Levin et al. 2001). It might be interesting to estimate the ratios of natural to hatchery smolt production for river basins having significant hatchery programs. For example, in the Skagit Basin recent hatchery smolt releases average around 500,000 per year. Is that significantly more, similar to, or significantly less than the natural smolt production in the Skagit Basin? Assuming 100 smolts per wild spawner in the Skagit basin (likely an overestimate) with approximately 3000 wild spawning females, there are many more hatchery than wild steelhead smolts produced in the Skagit Basin. What are the ecological implications for such an imbalance in the lower Skagit estuaries, the inland waters of the Whidbey Basin, and the rest of Puget Sound where these smolts co-mingle? If there are carrying capacity limitations in the different environments used by steelhead, it seems highly likely that large smolt releases during times of poor SARs leads to major negative impacts on wild and hatchery steelhead SARs. A history of steelhead smolt releases for all Puget Sound programs, compared with the annual SAR indices shown in Figure 3-2, would also be of value for considering the possibility of strong negative interactions between smolt release sizes and SAR rates, especially during periods of especially low marine survival.

Levin, P. S., R. W. Zabel, J. G. Williams. 2001. The road to extinction is paved with good intentions: negative effects of fish hatcheries on threatened salmon. Proceedings of the Royal Society of London. Series B, 268:1153-1158.

9. page 43, finding 3-1: A note on the regional and program-specific texture of economic and conservation benefits of hatchery programs should be added here. For example, it is difficult to

argue that the statewide average metrics cited in this chapter apply to programs in Puget Sound that have realized extremely low SARs over the past decade. This issue is raised in finding 3-6, but it would benefit from a more explicit discussion in finding 3-1.

10. page 45, recommendation 3-4: An additional alternative to different types of hatchery programs for Puget Sound that deserves consideration is complete elimination of underperforming hatchery programs and/or hatchery programs that pose significant risks to depleted wild stocks. The money saved from closing underperforming hatchery programs could be redirected to habitat enhancement, enforcement, and/or monitoring programs.

11. Hatchery programs typically create mixed-stock fisheries, and the history of steelhead exploitation should be reviewed in this chapter with a focus on the role that hatchery programs have played in harvest management and harvest impacts on wild fish. Among the key concerns here are fisheries with planned harvest rates that are appropriate for hatchery programs but extremely inappropriate for wild stocks and the increased by-catch of non-target stocks (resident *O. mykiss*, cutthroat, char, etc.) when hatchery programs induce intense harvest fisheries. For winter steelhead, for example, typical harvest plans allow for very high and often non-selective harvest rates in the months of November-February, and these fisheries have clearly resulted in extremely strong selection pressures against November-February returning wild steelhead, and likely strong selection pressures against resident *O. mykiss* occupying the "hatchery fish corridors" during these same months. The hatchery-harvest dynamic is one of the most important management issues facing WDFW, and deserves carefully consideration in this chapter and in the management chapter.

12. The recently completed Hatchery Scientific Review Group (HSRG) made a number of steelhead specific area-wide recommendations, and I believe that this chapter would benefit from a new section discussing the merits of those recommendations. Especially notable in their recommendations is their call for Wild Steelhead Management Zones in order to protect and preserve the genetic integrity of wild steelhead populations. Such management zones may be especially important and politically feasible in regions like Puget Sound where hatchery programs have failed to produce adults for vibrant fisheries, and where wild stocks are experiencing exceptionally low productivity. A copy of the HSRG's May 2005 memo on steelhead recommendations is attached.

Chapter 4, Management:

1. pages 19-21: Figures showing catch data for Washington steelhead would be improved with data series that extend as far back in time as possible. Focusing on just the past decade of information provides a very short historical perspective, and feeds directly into what some fisheries scientists have dubbed "the shifting baseline syndrome". See the attached journal article for a brief discussion of this syndrome in fisheries management.

2. page 34: Perhaps more could be said about Ricker's (1958) conclusions about constant escapement maximizing average catch if the 3 listed conditions are met:

i. The population is a single homogenous unit;
ii. the initial population size at the start of fishing is known without error; and
iii. the stock-recruit relation is stationary.

Based on the information contained in this report and many others, it is clear that **none of those 3 conditions apply to wild steelhead populations in Washington state**, yet a "maximum sustained harvest" constant escapement policy **is the guiding policy** for harvest fisheries on the Olympic Peninsula. The management section would greatly benefit from a much expanded discussion and critique of the MSH policies now used on the few remaining systems that remain open for wild steelhead harvest fisheries.

3. From my (perhaps poorly informed) perspective, the 2 areas in which WDFW has the greatest management levers are hatchery and harvest policies. The management section would benefit from an expanded discussion and critique of hatchery and harvest policies of the past and present, and the potential benefits of new hatchery and harvest policies that incorporate lessons learned from the experience of management agencies within and beyond the boundaries of Washington state. The focus, I think, should be integrating hatchery and harvest policies to meet the commendable stated management goals to ... *"protect, restore and enhance the diversity and long-term productivity of Washington's steelhead and their habitats in order to sustain ... fisheries and provide for cultural, economic, and ecological benefits for the residents of Washington state"* (page 35). The legal and institutional capacity to meet these goals should also be critically evaluated, because there are likely many cases where key obstacles to success stem from an inability to deal with important factors like instream flows, floodplain habitat protection, or other habitat issues. Identifying such obstacles must be an initial step on the road to developing strategies and plans for overcoming them. If it seems likely that WDFW cannot successfully meet their stated management goals because of legal or institutional constraints, it is important to convey this message to the Governor's office, the Legislature, the Fish and Wildlife Commission, the Tribes, and the citizens of Washington state. If such obstacles exist but are not identified and confronted, there seems to be little hope that WDFW can successfully achieve their stated management goals.

Chapter 6, Diversity and Spatial Structure:

1. This is an important topic, but as it is now written it lacks key information about population-specific life history diversity parameters and the impacts of habitat loss and degradation on life history diversity and spatial structure. Detailed information on the diversity and spatial structure of steelhead populations is clearly hard to come by, but there are some reports that can be cited to bolster this chapter. Specifically, information should be drawn from McLachlan's (1994) report and a report by WDFW staff to the F&W Commission (1996) that examine changes in the run-timing for Quillayute system wild winter steelhead, and Washington Department of Game

catch data from the 1940s, 1950s, 1960s, and 1970s that indicate a systematic depletion of early returning wild winter steelhead in several of Washington's winter steelhead streams.

McLachlan, B. 1994. Historical Evidence Indicating the Natural Return Timing of Quillayute Winter Steelhead with Reference to the Present Return Timing. A Preliminary Report to the Washington Wildlife Commission. January 22, 1994.

WDFW, 1996. WDFW Staff. An Analysis of the Natural Return Timing of Wild Steelhead in the Quillayute River System. Report to the Washington Fish and Wildlife Commission, December, 1996.

2. page 7, 2nd paragraph: In addition to the 3 characteristics listed here as metrics for evaluating spatial structure and diversity, an additional metric that may be useful is an index of habitat complexity, and how habitat complexity has changed over time. For example, the loss of off channel, floodplain, and estuary habitat has been extensive in many Washington streams, and these losses generally represent a simplification of steelhead habitat. Diverse, complex, and connected habitat clearly plays an important role in supporting life history diversity in steelhead populations, and it should be possible (I think) to develop metrics of habitat diversity and/or complexity changes as one index for the potential for life history diversity in steelhead populations. Measures for accessible stream miles may be misleading measures of habitat capacity for steelhead if those stream miles lack productive habitat features. Perhaps this point is being made in chapter 7 where "loss of potential production" is estimated using habitat measures and the EDT model, and if this is the case the Chapter 7 habitat-related changes in potential production might be better linked with diversity and spatial structure issues in this chapter.

Chapter 7, Abundance and Productivity:

1. A general comment on this chapter is that it suffers from the "shifting baseline syndrome", meaning that assessments of recent abundance trends are seriously lacking longer-term historical reference points (see the attached article by Daniel Pauly). Perhaps the steelhead catch data collected by the Washington Department of Game are not directly comparable to escapement and catch estimates from the past few decades, but they do provide valuable insights into the relative abundance of today's steelhead populations with respect to those from the 1940s-1970s. Perhaps WDG catch data could be plotted with WDFW run-size reconstructions for a few indicator steams from each ESU to better provide this longer-term historical perspective.

2. A second general comment is that this report, and this chapter, would both benefit from a greater use of the WDFW steelhead run-size reconstruction records. WDFW has a great deal of stream specific run-size, harvest, and escapement data that would clearly add value to this chapter. I recommend that graphs showing the run reconstruction data from a few index streams in each ESU or management zone be shown in this chapter in order to better inform readers about the abundance, harvest, and escapement histories for different steelhead populations.