

CHAPTER 16

Review of the Steelhead Supplement

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Introduction

Although a complete first draft of the Steelhead Supplement was not available, the state invited some individuals to conduct technical review of state agency measures, organized in five major issue areas. These groups include:

- Water Quality
- Physical Habitat
- Water Quantity, Fish and Fish Screening
- Fish Management
- Hydro Power

Clearly, it is awkward to ask reviewers to evaluate the effectiveness of this supplement to the Oregon Plan when each reviewer only examines a small portion of the state's strategy. Also, in many cases reviewers were limited to a very compressed time frame to respond. Nevertheless, the comments of the reviewers are considered to be very valuable as a guide to potential improvements that may be made to the Oregon Plan.

The state thanks all those who have contributed to this collaborative review process.

As part of Oregon's commitment to an open, collaborative effort to evaluate and improve the Oregon Plan over time, efforts have been made to provide public access to comments that have been received. In this section, organized by issue, are the comments received and, if available, the state's response to these comments.

In addition, comments on the state agency measures have been invited from the public, private landowners, industry representatives, conservation organizations, and other interested parties. These comments are provided as sixth general section. to the extent feasible and as time permits, the state will provide responses to the general comments.

This chapter is organized into six sections. The first five sections contain the invitation for comments letter for the issue area, the list of invitees, the received comments and the state's responses. The sixth section contains the general comments received.

SECTION 1: WATER QUALITY COMMENTS

Invitation for Comments Letter

October 3, 1997

Dear

I am writing to request your technical review of the Water Quality chapter of the Oregon Plan Supplement (Steelhead Supplement) for salmon and stream restoration. The document is organized by listing various factors of decline with associated biological objectives and state agency measures to address the factors of decline. In undertaking your review and comments, please assume that other non-water quality issues are addressed adequately in the Oregon Plan and Supplement. You are welcome to give your views on the adequacy of other parts of the Supplement and Plan, but to provide a common baseline for review of the Water Quality chapter please assume they are adequate. In order to aid in focusing the review, the state is very interested in your response to the following questions regarding this document:

1. Does the document list all relevant water quality factors of decline regarding steelhead? If there are additional significant factors regarding steelhead decline please list them.
2. Are the factors of decline described appropriately? If not, what improvements can you suggest.
3. Do the biological objectives address the factors of decline appropriately? Will achieving the biological objectives result in halting or reversing the decline of steelhead in the ESUs identified in the Supplement?
4. Are the agency management measures listed in the Supplement adequate to achieve the associated biological objectives? Do they move us in the right direction to address the factors of decline in a timely manner? In your opinion are the agency management measures able to be implemented within the identified time frames?
5. Are the analyses and conclusions in the Supplement consistent with the scientific literature, and does the analysis support the conclusions? Is more research needed in any area of water quality for the Supplement to be successful in protecting and restoring steelhead? If so, what areas require additional research?
6. Does it appear that the agency management measures listed in the Supplement will result in water quality improvements that are measurable, and over what period of time? Will the water quality improvements occur soon enough to recover the species?

7. Does the Supplement, in combination with the Oregon Plan, contain adequate water quality monitoring to determine the success of individual measures, to allow for adaptive management, and to assess success of the plan? If not, what additional water quality monitoring is necessary?
8. What should be our priorities for implementing the factors of decline, biological objectives, and agency management measures? In other words, what are the most effective elements of the Supplement? Are there agency management measures that will be ineffective and/or a waste of money?

Once again thank you for volunteering to review this document. Enclosed for your information is a list of all the reviewers. If you would like to review portions of the Oregon Plan it is available on our web site at: <http://www.das.state.or.us/salmon/> If you have any questions please contact Mike Downs at DEQ at 503-229-6790 or me at 503-378-6206. Please return your review comments by November 3rd to:

Mike Downs
Water Quality Division
811 SW Sixth Avenue
Portland, OR 97204
downs.michael.j@deq.state.or.us

Jay Nicholas
ODFW
28655 Highway 34
Corvallis, OR 97333
nicolaj@ccmail.orst.edu

Your comments may be submitted electronically via email, or in hardcopy with a copy on disk. Please submit the electronic version of your comments in Microsoft Word for Windows 6.0 or WordPerfect 5.1 format.

I look forward to your comments. I think they will help us strengthen the Supplement and improve our efforts to conserve steelhead and other salmonids. We plan to post all reviewers comments on our web site, as we did for the coastal coho plan, to make them available for public review.

Sincerely,

Paula Burgess
Governor's Assistant for Natural Resources

Enclosure

cc: Mike Downs, DEQ

List of Invitees

Dr. Leslie Bach
Jim Lenhart, PE
Eric Strecker, PE
Stuart McKenzie
Dr. Bill Krueger
Dr. John Tanaka
Dr. Bruce Rettig
Dr. Bob Beschta
Dr. Stan Gregory
Dr. James Karr
Mary Scurlock
Dr. Gary Chapman
Mike Bonoff
Dr. Robert Hughes
Dr. Tim Sullivan

Review Comments

Introduction

The state requested 16 water quality experts for their technical review of the Water Quality chapter of the Oregon Plan Supplement (Steelhead Supplement). In order to aid in focusing the review, the state requested each reviewer to respond to the following questions regarding the draft chapter:

1. Does the document list all relevant water quality factors of decline regarding steelhead? If there are additional significant factors regarding steelhead decline please list them.
2. Are the factors of decline described appropriately? If not, what improvements can you suggest.
3. Do the biological objectives address the factors of decline appropriately? Will achieving the biological objectives result in halting or reversing the decline of steelhead in the ESUs identified in the Supplement?
4. Are the agency management measures listed in the Supplement adequate to achieve the associated biological objectives? Do they move us in the right direction to address the factors of decline in a timely manner? In your opinion are the agency management measures able to be implemented within the identified time frames?
5. Are the analyses and conclusions in the Supplement consistent with the scientific literature, and does the analysis support the conclusions? Is more research needed in any area of water quality for the Supplement to be successful in protecting and restoring steelhead? If so, what areas require additional research?
6. Does it appear that the agency management measures listed in the Supplement will result in water quality improvements that are measurable, and over what period of time? Will the water quality improvements occur soon enough to recover the species?
7. Does the Supplement, in combination with the Oregon Plan, contain adequate water quality monitoring to determine the success of individual measures, to allow for adaptive management, and to assess success of the plan? If not, what additional water quality monitoring is necessary?
8. What should be our priorities for implementing the factors of decline, biological objectives, and agency management measures? In other words, what are the most effective elements of the Supplement? Are there agency management measures that will be ineffective and/or a waste of money?

Following are the comments of the 13 peer reviewers who provided comments, listed alphabetically by reviewer names:

Dr. Leslie Bach
Oregon Water Trust

Thank you for the opportunity to review the Water Quality chapter of the Oregon Plan Supplement. The state has shown strong leadership in the effort to recover salmon and steelhead in Oregon using a cooperative approach. I have attempted to address your specific questions regarding the Steelhead Supplement to the best of my ability. I hope that my comments will provide you with useful information that will help strengthen the recovery effort.

1. Does the document list all the relevant water quality factors of decline...

Two water quality factors that are not addressed in this portion of the supplement are habitat modification and flow modification. I realize that these are likely addressed in other sections that deal directly with fish habitat and water quantity. However, these two parameters are part of DEQ's water quality criteria, and are listed as factors on the 303d list. Since I did not have the opportunity to review these other chapters, I do not know how adequately they are addressed.

My general sense is that in the past these factors have not been the focus of water quality monitoring and protection by DEQ and EPA, however they are very significant factors impacting salmonids. Other agencies which may have more direct purview over these factors, e.g. ODFW and OWRD respectively, do not necessarily have the regulatory authority or agency mission that would allow them to actively influence the conditions associated with these parameters. I hope that in the future, more emphasis is given to these parameters in meeting the requirements of the Clean Water Act.

2. Are the factors of decline described appropriately?

The factors of decline are described in very general terms. The specific standards are not listed in the supplement, nor did I find them in the Water Quality chapter of the original plan. Without more specific information, it is hard to answer whether the factors are described appropriately. I think it would be helpful to provide a little more detail on the effects of the parameters on salmonids. For example, it would be helpful to know how temperature impacts steelhead during the different life history stages, and what the range of tolerance or target levels are. This might be helpful to the general public if one thinks of the document as an educational tool as well as a plan of action. The information could be included in the supplement as an appendix.

3. Do the biological objectives address the factors of decline appropriately?

In general, the biological objectives are laid out as a plan to evaluate the current conditions, meet the current standards, monitor the effectiveness of management measures and evaluate trends. I think these are critical pieces of an effort to recover steelhead in the ESUs identified in the supplement. However, the individual standards for some of the parameters may not be adequate. The temperature standard during the rearing portion of the life-cycle is 64⁰ F, which may not be adequate for recovery of steelhead. There are probably streams in the state that may not have been historically cooler than 64⁰ F during the summer rearing period, but probably many others that were. I am not sure I am comfortable with a statewide standard for temperature. I realize that the standard has been reduced from 68⁰ F in some areas and that will probably help improve conditions for steelhead, but it may not be enough. Since reference sites are also being monitored, perhaps future review of the numeric criteria should look at site-specific standards.

I am unfamiliar with how the new inter-gravel sediment standard is evaluated, and the document did not provide the specific numeric criteria, so it is hard to evaluate its effectiveness. The impacts of sediment are hard to quantify, and I commend the state for developing a standard that attempts to do so. Continuing to use information from habitat or stream surveys is probably a good idea as well. These surveys have not always used reliable methods for determining sediment impacts; recommendations have been made to use streambed particle size information (for example Wolman pebble counts), and I think that this should become the standard for habitat surveys. At the very least, it is a reliable way of determining trends in sediment over time.

The biological objective for Bio-criteria is also very general and perhaps too weak. The idea is to evaluate the species composition, etc. relative to reference sites. I am not sure how many biologically unimpaired reference sites one might find today, and I think that a standard that is applied as a relative measure may not result in the type of biological integrity necessary for halting or reversing the decline of steelhead.

As far as the selection of reference sites, will this be based on some sort of classification scheme? The document lists a proposed number of reference sites per ESU, but I would think that a reference site should be classified in some way to represent certain ecological, hydrological, landform or land use categories. I would think that each ESU would be too diverse to be represented in its entirety. Other than for the comparison of biological integrity, it was unclear to me what use the reference sites will have. Perhaps for the uses envisioned by the authors of the document, no classification scheme is needed.

4. Are the agency management measures adequate to achieve the biological objectives?

The agency management measures appear to lack a cohesive strategy for halting the decline of steelhead. In many cases we don't have an overall understanding of how all the pieces fit together, in other words, how do land use activities impact water quality, which in turn

alters fish habitat and therefore affects fish use and production. In order to design adequate measures, we need comprehensive watershed analysis that will identify those processes impacting the current conditions for steelhead and the specific land use activities that need to be modified. We need a link between current conditions and causal effects. Without that, we are just implementing whatever measures we have available to us, hoping they will address the (unidentified) problem. Watershed analysis should be the first step in the recovery effort, and should be performed with highly trained professionals from a variety of disciplines. Asking watershed councils to perform this role is not an adequate way to address the need (see below).

It also appears to me from the document that agency coordination is still a bit elusive. Some of the measures clearly indicated a working relationship among agencies, but others seem to be very agency specific. For example, both the Department of Forestry and the Department of Agriculture will be attempting to work with landowners to protect and improve riparian areas. What coordination has occurred between these departments to identify those areas with limited riparian function, determine their respective impacts on water quality, and launch a targeted effort to reverse the trend. What is the federal role in halting the decline of steelhead and how will those efforts be coordinated with the state? Using a watershed approach to recovery, as suggested above, requires involvement with all agencies and stakeholders including the federal government. Finally, which agency or agencies is ultimately responsible for insuring that the approach to recovery is targeted and thorough?

Many of the measures listed in the supplement were very general, making it difficult to determine if they are adequate. Many of the measures had statements such as "implementation plans will be developed for both point and nonpoint sources of pollution..." (pp. 61); "nonpoint sources of pollution will be minimized in the Oregon Coast ESUs through implementation of comprehensive state and local programs..." (pp. 69); "...protected stream miles have increased to approximately 30 percent. This will allow for more stringent rules to be applied to protect water quality" (pp. 93). I found myself wondering what would actually be done on the ground to make the necessary changes. Many of these measures are listed as ways of assuring non-degradation of waters that are currently not water quality limited. Again, the specifics of how these measures will protect high quality waters are not provided. It is unclear to me what implementation of the antidegradation water quality standard means.

In many ways this seemed to be an exhaustive list of all activities the agencies are involved with, often with nebulous ties to the biological objectives. Although not totally familiar with the Forest Practices Rules and Senate Bill 1010, my sense is that they are somewhat inadequate in their ability to fully protect upland and riparian areas and therefore may not be enough to achieve the biological objectives for factors such as temperature and sediment.

5. Are the analysis and conclusions in the Supplement consistent with the scientific literature... Is more research needed...?

I did not see a great deal of analysis performed in the Supplement. Again, I believe that what we need to do is, on a watershed basis, analyze the interaction of land use and land cover, determine the physical and biological processes associated with this interaction, identify the causal impacts, and determine the required changes necessary for halting the decline of steelhead. I believe this needs to be done by highly skilled experts representing a variety of disciplines, and the results should drive the agency management measures to achieve specific effects.

It appears as well that more research is needed on the effect of specific water quality parameters on steelhead and the standards required for stability and recovery. In particular, the impacts of sediment on the various life-stages of steelhead, and the appropriate metric to evaluate it needs further research. Other factors such as temperature and habitat requirements also appear to need further research and analysis.

There was also an analysis done in the beginning of the document categorizing water quality limited stream miles by land use. Having worked with the land use layer, I feel that the resolution is insufficient for determining the true land use along the riparian area. The results may therefore be somewhat misleading, as the actual land use along a water quality limited stream may be different from its category in the land use layer. In an era where it is not popular to point blame, the results of this analysis may be somewhat controversial.

6. Does it appear that the agency management measures will result in water quality improvements that are measurable, and over what period of time?

The approach seems to be fairly slow and cautious. While this is probably wise from the political and social standpoint, it may indeed be too slow to recover the species in a timely manner. Many of the management measures focus on developing plans, e.g. developing TMDLs and Water Quality Management Plans for water quality limited streams. The plans themselves will take some time to develop, and a plan does not fix the problem. I think we need to be more aggressive on implementation of specific on-the-ground measures. We are much further along in implementing control measures for point sources than we are for nonpoint sources. Two of the most significant parameters impacting steelhead are temperature and sediment. These factors are not easily addressed through discharge limits, as are parameters impacted by point sources. More specific land use controls are probably needed to address these factors, for example, riparian management areas for agricultural land.

Overall I believe there is too much reliance on watershed councils as a mechanism for accomplishing salmon recovery. While I strongly believe that local involvement and ownership is crucial to a successful recovery effort, I think that the state and federal government has ultimate responsibility to get the job done. There is limited oversight of

watershed councils to insure they are fully balanced and that they are accountable for their activities. The councils tend to want to move slowly, and are suspicious of assistance from agency personnel. The councils are being asked to conduct watershed analysis for their area, but lack the necessary resources and skills to accomplish the depth of analysis required to answer the difficult questions. I believe that these factors may cause the recovery effort to move slower than necessary from a biological prospective.

7. Does the Supplement contain adequate water quality monitoring?

The Supplement includes evaluating effectiveness of projects as a biological objective. I think that this should help elevate the importance of monitoring as critical to determining success and implementing adaptive management. However, the specifics of how monitoring will be implemented are limited in the document. The "watershed design" described in the management measures does not lay out a comprehensive analysis plan which identifies questions and targets data collection to answer those questions. The "strategic design" lists a number of parameters that will be measured, and states that a strategy will be developed for monitoring restoration projects. Without a clear idea of that strategy, it is hard to determine if it is adequate.

The monitoring component of the plan seems to heavily rely on watershed councils to develop plans and collect data. Watershed councils lack the needed expertise to design and implement a comprehensive monitoring strategy, and do not have the needed personnel to analyze and interpret the data. In addition, it is unclear who will fund these monitoring projects, as the councils do not have the financial resources to do so.

Other agencies besides DEQ are also responsible for providing monitoring data. ODFW's commitment to increased inventory and monitoring of steelhead habitat and distribution is very critical to the recovery effort. Identifying the use and needs of the fish is the first step in a comprehensive watershed analysis. The Department of Forestry is also providing support for fish habitat and distribution monitoring, which will help identify use on private and state forest land. However, many of the other monitoring measures listed by DOF appeared to be part of existing monitoring programs, and there was no clear link between some of those programs and the specific need for demonstrating success and allowing for adaptive management. It was also unclear to me how the Department of Agriculture would monitor the accomplishments of SB 1010.

8. What should be our priorities for implementing the factors of decline, biological objectives and agency management measures?

I believe the most significant water quality factors for decline for steelhead are temperature, sediment, habitat modification and flow modification. I think the most impact we can have is through measures that will protect and restore riparian areas on both forest and agricultural land. If we restore riparian areas and allow the stream systems to function under more natural hydrologic and hydraulic conditions, we reduce sediment inputs to the

stream, increase streamflows, reduce stream temperatures and create more complex fish habitat. I think this will be best accomplished through management activities that control and modify land use activities. Although unpopular, we must find ways to create riparian buffers in agricultural areas, and to increase the amount of riparian protection currently mandated on private forest land.

Please feel free to contact me if you have any questions or concerns regarding these comments. I look forward to continuing to be part of the state's salmon and steelhead recovery effort.

Dr. Bob Beschta

College of Forestry
Oregon State University

While I have had an opportunity to review the Draft Water Quality Chapter of the Steelhead Supplement to the Oregon Plan, it is apparent that to fully understand the content of this document would also require considerable additional time delving into various supporting documents. Unfortunately, I wasn't able to do that. However, based on a review of the Supplement I will attempt to respond to the 8 groups of questions in a concise manner.

1 . Does the document list all relevant water quality factors of decline regarding steelhead? If there are additional significant factors regarding steelhead decline please list them.

The document includes relevant water quality factors that might contribute to the decline of steelhead.

2. Are the factors of decline described appropriately? If not, what improvements can you suggest?

While Tables 1 through 8 appear to provide a reasonable overview of the number of stream miles associated with each of the water quality variables of concern and the general land uses within each of the provinces, little information is provide regarding the quality of the information represented in Tables 1-8 (e.g., is it based on short- or long-term monitoring efforts, local observations?). Although such tabular data is important to identify a general level of concern (e.g., number of stream miles of 303(d) listed streams or streams of potential concern).. the table provides little insights as to where in each basin the various water quality concerns occur, or which streams have multiple concerns. Without developing correlations or associations of the water quality variables in Tables 1-8 and presenting them on drainage basin maps, it is difficult to know where the most significant problem reaches, or non-problem reaches, occur in a given basin. In other-words, individual water quality variables should be combined into an integrated assessment of specific stream reaches so that the public can develop a better understanding as to the general location and extent of water quality degradation within each province.

It's not clear why the number of miles of streams identified as 303(d) listed for "sediment" often exceed the "total number of miles" of 303(d) listed streams. For example, for all Coastal HUCs in the Klamath Mountains Province the number of sediment 303(d) listed stream miles is 3105 while the total number of 303(d) listed streams is 3033. Similar situations occur elsewhere in these tables where the sediment stream miles in a given category will substantially exceed the total stream miles in that same category.

3. Do the biological objectives address the factors of decline appropriately? Will achieving the biological objectives result in halting or reversing the decline of steelhead in the ESUs identified in the Supplement?

The biological objectives seem to be mostly measures aimed at providing more information relative to status and trends. Improved information in each of the basins as to what water quality problems exist and where they exist is an important task that the State can and should undertake. The leadership of State agencies should be used to insure comparable levels of data quality across the diverse basins where steelhead are of concern.

While it would be nice to assume that if the biological objectives for water quality are met steelhead runs will improve, the complexity of anadromous fish runs indicates that there are numerous other environmental components that also need to be improved if the decline of steelhead is to be reversed. The importance of improving water quality relative to other factors is not known to me nor is it indicated in the Supplement.

4. Are the agency management measures listed in the Supplement adequate to achieve the associated biological objectives? Do they move us in the right direction to address the factors of decline in a timely manner? In your opinion are the agency management measures able to be implemented within the identified time frames?

As currently formulated, I'm concerned that some of the biological objectives are likely to be unachievable. For example, the selection of 225 potential reference sites (unimpaired or least impaired) are proposed under the Temperature Biological Objective #2. These sites are to be randomly chosen and apparently 20 % of them will be monitored each year. The natural variability in stream temperature from year to year would indicate that this type of sampling approach may not provide a good perspective of temperature patterns and problems in the various basins. Instead, I would recommend fewer sites be selected whereby summertime temperatures will be monitored each year for at least 5 years. After 5-years, a decision could be made regarding the necessity of discontinuing individual sites, adding more., etc. Furthermore, the "unimpaired or least impaired" sites will likely consist of small headwater streams because they will most often fit the criteria for reference sites. As a result, larger streams and rivers are unlikely to be selected and their status and trends unmonitored. Such a situation is untenable.

I have some similar concerns with regard to the Temperature Biological Objective #3. Randomly selecting 450 sites and then monitoring them only once every 5 years is not adequate for establishing trends. For example, to monitor trends in summertime stream temperatures, continuous monitoring during each summer is needed over at least a decade to potentially identify and/or confirm a trend. Periodic monitoring will not work. Furthermore, the reliance on random sampling is totally inadequate. Drainage basins and stream systems do not occur in random fashion across the watershed and systematic temperature patterns in a downstream direction are the norm in all basins. Thus, a stratified (by stream order, elevation, land use, etc.) sampling scheme, with a random component, would be much more enlightening regarding temperature trends.

The Temperature Biological Objective #4 attempts to address "effectiveness" questions and intends to rely on watershed councils or other agencies for obtaining these data. The assessment

of “effectiveness” of various land use treatments or other management programs is generally not a simple task. It requires high quality information and an important reliance on "controls and reference reaches". Stream temperatures are influenced not only by management practices but also by a wide range of natural environmental variables and conditions. For the DEQ to rely on watershed councils and other agencies to do a good job of assessing "effectiveness" is, in my opinion, inappropriate (a similar concern exists for Sediment Objective Number 3) and unlikely to be successful. It is important to approach effectiveness monitoring from a rigorous perspective that involves stratification, controls, replication, and randomization of treatments. Effectiveness assessments essentially require a significant research effort.

Under Sediment Objective Number 3, the Oregon Department of Forestry has a number of measures they propose on implementing. The scientific literature in forestry has a fair amount of published information on the forest practices and stream temperatures. This information in conjunction with ongoing forest practices regulations may provide long-term improvement in stream temperatures for forested streams. However, in many portions of the chapter, the Department of Agriculture measures are so briefly discussed or nonexistent that they provide little confidence that they may accomplish any temperature improvements. In addition, almost no research regarding stream temperatures and agricultural practices has been conducted in Oregon.

The Biological Objectives for Sediment also have a number of concerns. For example.. Objective Number 1 indicates 225 randomly located reference sites will be have their "sediment conditions" identified. What exactly is entailed in these measurements? Does it entail suspended sediment samples during a large number of storm events, estimates of surface fines, percent fines in gravel substrates, or some other technique? Characterizing "sediment conditions" is not a simple task and without knowing the specifics of the monitoring program I'm not sure to what extent this objective will provide usable or useful information. Similarly., the assessment of "status and trend" is identified in Objective Number 2 for sediment. / have no idea what will be measured at the 450 randomly chose sites and / have grave concerns that little will be learned about the status and trend of "sediment conditions" and anthropogenic influences after 5 years.

While the ODF&W and ODF have listed a fair number of measures for some of the biological objectives, what is noticeable in the Supplement is a lack of specificity and clarity by the Department of Agriculture. Where measures of the Oregon Department of Agriculture are mentioned, they usually include a general comment about SB1010 or CAFO programs. Without additional information about the intent of those programs, their level of funding, their likelihood to be implemented (e.g., are these programs voluntary or regulatory?), etc., it is not possible to know how successful they might be.

5. Are the analyses and conclusions in the Supplement consistent with the scientific literature, and does the analysis support the conclusions? Is more research needed in any area of water quality for the Supplement to be successful in protecting and restoring steelhead? If so, what areas require additional research?

The chapter identifies a large number of water quality factors that are likely to affect steelhead. If all of these are significantly improved, / suspect it will have a beneficial (but unknown) effect on steelhead productivity. For many of the forestry issues, historical research studies have provided a basis for addressing many of the listed water quality variables. Unfortunately a comparable level of research history for streams draining agricultural lands, rangelands, or urban areas is not available.

For some of the water quality variables, an improved information base is needed to help understand the potential gravity of a problem. For example, the topic of "toxics " could be addressed by an extensive and expensive water quality sampling program. However.. the development of an annual reporting program by landowners using herbicides, insecticides.. or other non-point chemicals would provide an important perspective of the potential magnitude of the toxics issue. Alternatively, producers of agricultural and forestry chemicals could be required to report the amount of such chemicals sold within the State each year. / would highly recommend that the State begin to compile and publicly report on an annual basis the quantities of chemicals being used in each of the major steelhead basins.

I find it disappointing that additional research efforts are not identified in the Supplement. Surely, there are numerous research questions that need to be addressed if improvements in water quality are to be beneficial to improving fish runs. Such research could be used to confirm the importance of various water quality variables relative to steelhead productivity; it could be used to identify which land uses are creating the greatest water quality problems; it could also be useful to help establish priorities for management programs designed to improve water quality. If additional research is supported by the State, a significant component should be in the form of competitive grants and not simply a reallocation of State monies to various agencies.

6. Does it appear that the agency management measures listed in the Supplement will result in water quality improvements that are measurable, and over what period of time? Will the water quality improvements occur soon enough to recover the species?

Hopefully the listed agency measures will help improve water quality through the steelhead region. However, because so many of them are voluntary and the extent to which actual improvements in water quality are likely to occur is not known, / am unable to make a prediction as to what improvements in steelhead populations will occur, when they will occur, or their likelihood of occurring. Again, a wide range of factors other than water quality are influencing steelhead populations in the state, and in many locations water quality may not be the major factor.

7. Does the Supplement, in combination with the Oregon Plan, contain adequate water quality monitoring to determine the success of individual measures, to allow for adaptive management, and to assess success of the plan? If not, what additional water quality monitoring is necessary?

In my opinion, the monitoring sections needs to be entirely reworked. The simple use of randomization for selecting monitoring stations in river systems that have systematic

characteristics and varying responses to land uses is too simplistic. It is also unlikely to achieve the desired objectives. To gain accurate insights about the water quality of Oregon's streams and rivers through a monitoring program requires a great deal more thought and effort than is entailed in a simple random selection of sites. Water quality data are often expensive to obtain and thus it behooves the DEQ to do their utmost in maximizing the efficiency of any monitoring program. The brevity of write-up associated with each of the proposed "monitoring efforts" indicates that this task needs much more work. While watershed councils and other agencies may provide some useful data, it will be necessary for the DEQ to maintain a tight control on data quality for those water quality variables that will be compared across basins. Based on what is proposed in the Supplement, it seems highly likely to me that after 5 years of monitoring randomly selected sites that the State will be able to say much about trends in water quality.

I really doubt if watershed councils or even state agencies will be up to the challenge of doing "effectiveness monitoring". Such monitoring is not easy, requires a rigorous design, and cannot be applied to all water quality variables in all basins. Thus, some selectively of the most important variables of concern and the prioritizing of efforts will be necessary.

From a monitoring perspective, I would suggest that the establishment of one or more benchmark sites for long-term monitoring of flows, stream temperatures, turbidity, and selected other water quality variables should be a high priority in each basin. Each basin should have at least one main-stem station that continuously records turbidity. It's important to realize that basins with degraded water quality will not be improved immediately regardless of what management changes are implemented. However, it is important to begin to establish baseline conditions and to be able to demonstrate sometime in the future that water quality is improving. Long term stations (with companion flow information at each) will provide a better basis for confirming and understanding changes in water quality than the random distribution of periodically sampled stations proposed in the Supplement.

8. What should be our priorities for implementing the factors of decline, biological objectives, and agency management measures? In other words, what are the most effective elements of the Supplement? Are there agency management measures that will be ineffective and/or a waste of money?

From the perspective of water quality, perhaps the most important single thing the State can do is to provide the citizens of the State and watershed councils with high quality information regarding the status of water quality across the various basins. Without having accurate information, the development of well-intended action programs may be counter-productive and ineffective. Thus, a rigorous monitoring program that provides important information on the status and trends relative to at least some of the important water quality variables is a fundamental concern.

It was interesting to see that Watershed Analysis of Forestry practices was listed for some of the DOF measures. What was noticeably lacking were similar listings of Watershed Analyses for watersheds with Agricultural land use practices, Rangeland practice, Estuarine land use practice,

or Urban development. Without consistently and fairly addressing all land uses contributing to water quality degradation, the implementation of voluntary or regulatory programs to improve water quality may ultimately appear arbitrary, capricious, and unfair from a social context; they may also be ineffective from an ecological perspective.

Finally, it is possible that all of the proposed measures in this plan could move "forward" in some fashion but after 5 or 10 years we will be not be much closer to understanding functional relationships between land uses and the status of steelhead, particularly for agricultural, range, and urban stream systems. The lack of previous, current, or future research efforts directed at those land uses will continue to be a major shortcoming for improving the status of Steelhead stocks.

I trust that the above comments will be useful as you revise and refine your proposals for improving the quality of the waters of the State.

Mike Bonoff
Harza Northwest

1. Does the document list all relevant factors of decline regarding steelhead? If there are additional significant factors regarding steelhead decline, please list them.

Factors for decline of steelhead listed in the document include the following:

- Temperature
- Sediment
- Dissolved Oxygen
- Total Dissolved Gas
- Biological Conditions
- Toxics
- pH
- Stream Fertility.

The above list, with the exception of stream fertility and biological conditions, are parameters for which state standards exist. While this list is nearly comprehensive (it also needs ocean conditions), it seems to me that the perspective for developing factors for decline should not be tied so directly to the standards, but should reflect more thinking about causal mechanisms for declining steelhead runs. The standards are there to protect a variety of beneficial uses; the water quality section of the Plan has only one purpose: halt declining steelhead stocks and recover the species. Thus the framework of the standards as factors for decline fails to demonstrate any depth of analysis, with respect to water quality, that has gone into the recovery plan. A key sentence in the Water Quality Chapter of the Oregon Coastal Salmon Restoration Initiative illustrates this problem (p17B-1). “Water quality is usually thought of in terms of the water quality standards the state has adopted under the Clean Water Act (33 U.S.C. 466 et seq.)”. This approach of compartmentalizing and numerically evaluating various stream reaches is fine for reporting ambient monitoring program results. However, for purposes of the Steelhead Supplement, a more integrated approach is necessary. Water quality should be approached as a component of habitat quality. For example; temperature, dissolved oxygen, and pH are directly linked to nutrient loading and ultimately to stream fertility. The separation of these individual elements is convenient for purposes of document organization, but does little to demonstrate new thinking and redoubled efforts to reverse water quality degradation that should be the hallmark of the Plan.

2. Are the factors of decline described appropriately? If not, what improvements can you suggest?

As discussed above, the major improvement I would suggest is a more integrated presentation of factors for decline. The factors for decline are in the document, but there is scant acknowledgment that these factors are interrelated, which is why many of the measures are

presented more than once. One suggestion would be to reorganize the section with two major headings: physical factors and biological factors. Text linking the two would still be necessary, but an introduction to each section would serve to illustrate the linkages between factors, and the significance of the factors to steelhead. The only discussion of significance of the factors now in the Supplement is relative to the number of 303(d) listed stream miles as a percentage of the total miles in the ESU for a particular factor, i.e., temperature. Subheadings within the section could address the individual factors, and the corresponding measures would follow.

If the document is reorganized as discussed above, the current factor of Biological Conditions would not be necessary. This factor is too broad, and contains several elements that could stand on their own in either the physical or biological sections. For example, flow alteration and pesticide application are distinct physical factors, and removal of riparian vegetation is a biological factor. With regard to the sediment factor, the Supplement should note that *lack* of spawning gravels could also be limiting steelhead populations in some ESUs due to dams or other diversions.

3. Do the biological objectives address the factors of decline adequately? Will achieving the biological objectives result in halting or reversing the decline of steelhead in the ESUs identified in the Supplement?

The biological objectives appear comprehensive and more than adequate to address the factors of decline listed in the Supplement. Whether improvement in habitat and steelhead numbers results is dependent on the degree of implementation of measures (see #4 below).

4. Are the agency management measures listed in the supplement adequate to achieve the associated biological objectives? Do they move us in the right direction to address the factors of decline in a timely manner? Are the agency management measures able to be implemented within the identified time frames?

It appears that achieving many of the biological objectives is dependent on significant levels of effort by watershed councils and other agencies and organizations. No assurance that the Supplement will meet the objectives can be given due to these uncertainties. If DEQ is to rely on watershed councils or other community-based efforts, measures to help ensure the success of these efforts seems warranted. For example, development of printed materials and an outreach capability to help focus activities of watershed councils would be beneficial (this may already exist).

The timing of implementation of management measures seems ambitious, but an ambitious program is what is needed. I cannot offer meaningful input at this point regarding whether the identified time frames, e.g., to determine trends in the ESUs for temperature, are doable given current staffing, budgets, etc.

5. Are the analyses and conclusions in the Supplement consistent with the scientific literature, and does the analysis support the conclusions? Is more research needed in any area of water

quality for the Supplement to be successful in protecting and restoring steelhead? If so, what areas require additional research?

The Supplement appears to be well founded on current research. An area in need of additional research, with respect to water quality, is potential nitrogen limitation of streams in some ESUs, particularly the Klamath and OR Coast ESU. N limitation is apparently the case in the North Umpqua River. Management implications of this are increased productivity of streams in response to trace nitrogen additions, leading to greater biomass of stream periphyton, higher pH, DO problems, etc.

6. Does it appear that the agency management measures listed in the Supplement will result in water quality improvements that are measurable, and over what period of time? Will the water quality improvements occur soon enough to recover the species?

In most cases, it is unlikely that responses to the measures proposed will be statistically measurable due to the variance that exists in water quality data, and the lack of baseline data for several parameters and/or geographic areas. However, biological responses (improvements) could occur well within the time period required to establish statistical certainty in trends in water quality or temperature. For this reason, biological variables such as escapement, and measures such as macroinvertebrate densities and abundance should be relied on to gauge success. Improvement in these parameters will provide immediate feedback on the success of recovery measures.

7. Does the Supplement, in combination with the Oregon Plan, contain adequate water quality monitoring to determine the success of individual measures, to allow for adaptive management, and to assess success of the Plan? If not, what additional water quality monitoring is necessary?

The monitoring described under *DEQ19S - Water Quality Monitoring and Assessment*, appears adequate. However, there is no indication that the sampling program will be able to meet specific monitoring objectives. For example, will the monitoring program be able to detect a 2 °F decrease in temperatures within sites or within a ESU over a 5-year period? Some bounds on the expected resolution of the monitoring would be useful. But again, biological measures, particularly those that incorporate a number of “metrics”, such as Bob Wisseman’s index for macroinvertebrates, should be an integral piece of the monitoring program. Adaptive management based on water quality data alone is not realistic.

8. What should be our priorities for implementing the factors of decline, biological objectives, and agency management measures? In other words, what are the most effective elements of the Supplement? Are there agency management measures that will be ineffective and/or a waste of money?

I believe the monitoring measure (*DEQ 19S*) is one of the most effective elements of the Supplement. All three components of this measure (Randomized Design, Strategic Data, and

Watershed Design) are critical to understanding the extent of water quality problems in the steelhead ESUs. Targeted monitoring is particularly important, although I'm concerned that DEQ is relying too heavily on Watershed Councils for these data.

It appeared that the list of measures in the Supplement was "padded" with projects that would have occurred regardless of the steelhead recovery efforts, e.g., *DEQ24S - Implementation of Portland CSO Consent Order*, and *DEQ27S - Willamette River Basin Study*. The appearance is that every project the State of Oregon has considered that could have water quality implications has been included, however; none of the measures listed appear to be "a waste of money".

The challenge that is most evident from the Supplement is coordination among the various agencies in conducting the studies. How quickly can the State respond to the information collected? What mechanisms exist to share data and make management decisions? A management/response framework is needed to ensure that data are not lost or ignored in this process.

Dr. Gary Chapman
Paladin Water Quality Consulting

I had essentially completed my review when I received the additional materials sent out on October 13. Rather than delete materials from my earlier review, I merely appended some additional comments or retractions on the basis of the additional materials. I do thank you for sending out these other materials, as I function better with hard copy than with electronic copy on the screen.

I admit to being almost completely overwhelmed by the various management measures outlined in the chapters. [I was definitely suffering from Agency, Program and Statute Acronym and Number Syndrome (APSANS).] Overall management (at least oversight) of all these various measures should be carried out as expeditiously as possible. Effective dialogue with, and cooperation front, federal agencies also seems a vital factor in achieving the final goal of salmonid recovery.

Some of my confusion in dealing with the review was an uncertainty as to what level of resolution was required before a watershed could be labeled as meeting various monitoring goals. I could not tell whether this was a statistical, or an absolute, monitoring coverage definition. If the latter, I missed a specific definition of coverage required to attain completeness in a watershed. In either case, I found the number of biological monitoring sites insufficient. In the final analysis, the total of the various management efforts, which is difficult to pull together from the plan, might produce the coverage necessary for successful implementation of the plan. However, I am not convinced that such is the case.

Successful completion of the goals will probably depend to a great extent on the timeliness and effectiveness of the oversight and review processes, and subsequently on the responsiveness and flexibility of the various agencies. Continuing political and financial support, often in the face of easy-out solutions based on subjective perspectives by various parties, is critical. Perhaps the greatest technical problem in programs such as that outlined in the recovery plan is the decision on when to change program parameters. This is usually manifested in the analysis of short-term data trends and making decisions having long-term programmatic consequences. Usually it is best to perform in-depth review and analysis at the first of the project (as appears to be the case here) and then stick to the plan for the long haul. There will almost certainly be exceptions to this general guideline, and this becomes a problem. This fact merely emphasizes the need for timely and effective oversight by an experienced and objective steering committee.

I thank you for the opportunity to have reviewed the plan. If any of my comments require my additional input, I'd be happy to help clarify them.

Sincerely,

Gary A. Chapman, Ph.D.

1. I believe that the supplement lists all of the important water quality factors that have contributed to the decline of steelhead populations in Oregon waters. It is apparent to me that although there may be specific toxic materials that are adversely affecting steelhead (and other species), these are probably not widespread, either in location or influence.

2. In general the factors are adequately described. In order to focus upon the most critical factors it would be valuable to include in the analytical process an overlay of factors and habitat importance. Thus, a watershed with 303(d) listing as a result of slight water quality exceedence of a single factor and of minimal value as steelhead habitat should not be weighted the same as a critical watershed with significant temperature, physical habitat, and sedimentation problems. A simple pass/fail watershed scorecard is very much inadequate.

The discussions of Biological Criteria as a factor in the decline of salmonids contains a circular argument for some situations. Certainly a change in macroinvertebrate communities can directly affect salmonid production, but usually the macroinvertebrate communities are responding to other of the identified factors of decline (e.g. temperature, sediment, etc.). Even more circular is the tie-in between fish index of biological integrity (IBI) and salmonid abundance; salmonid absence or scarcity would contribute directly to a low IBI score. In this latter case, the Biological Criteria would be saying that the absence of salmonids is a factor in the decline of salmonids. Aside from diseases, introduced species, and natural cycles, a decline in Biological Criteria should be examined for probable causative factors from among those identified as factors of decline.

3. The biological objectives are sensible and may be appropriate. It is obvious that most of the objectives deal with data collection, which, by itself, will not reverse the decline of steelhead populations. It is axiomatic that if the water quality problems have been appropriately defined, safe standards set for these problem parameters, and then these standards met, then the objectives should be attained. This assumes that appropriate sediment standards can be established and met; failing that aspect alone may doom the recovery plan. It is difficult to separate temperature, sediment, and biological conditions from structural habitat characteristics such as depth, woody debris, and overhead cover. In-as-much as these features are all inter-related and influenced by land management practices, one is tempted to optimistically assume that attainment of all water quality objectives will be accompanied by comparable improvement in structural habitat characteristics. If this parallel improvement in habitat does not occur, it is possible that recovery would not occur, or would occur at a much slower rate than would otherwise be the case.

4. The agency management measures listed in the Supplement are probably not adequate to achieve the associated biological objectives. It is clear that these measures are a necessary collage of new and existing programs. However, the level of detail provided (or more precisely, its absence) seems to indicate that the coverage of the various monitoring programs cannot attain both the geographic breadth and geographic level of resolution required to define existing water quality. For example, temperature objectives include measurements at 225 reference sites, 450 random sites, at an unspecified number of sites of restoration activity or BMP application, and presumably at sites representing special study areas (e.g. TMDLs for temperature on Lower Columbia and Lower Snake Rivers). This sampling does not appear adequate to properly define conditions in 311 fifth field watersheds or, viewed another way, the 40,000 stream miles specified for all the fourth field hydrological units identified in the plan. There is nothing in the plan to give confidence that the monitoring coverage will provide the necessary detail implied by the objectives.

Developing monitoring plans for trends, especially appropriate random site selection techniques and statistics, is notoriously difficult. In addition, it is difficult to mesh the goals and requirements for this random type of monitoring with what are considered (often incorrectly) more knowledge-based reference sampling site selection. This plan attempts to use both procedures, but the specifics of the selection processes are not given in sufficient detail for rational evaluation. Regardless of the selection procedures, the number of monitoring sites appears inadequate unless other data collection efforts are planned but not clearly defined.

It is not possible to conclusively assess the timeliness of the management measures in attaining the listed biological objectives. Too much uncertainty exists regarding the efficacy of the various land management and restoration activities to be confident regarding attainment of the objectives. I believe that the measures proposed will move the process in the correct direction and that no major areas of concern have been ignored. The overall implementation would profit from a specific coordination and analysis objective with the goal of achieving rapid synthesis of status for the overall recovery plan. I did not notice mention of any such specific coordination responsibility in the supplement. Is this the role of the Salmon Strategy Team that is mentioned in the salmon recovery plan?

There appears to be no rational for the allocation of the numbers of reference and random sites per ESU. The number of sites per ESU indicates a heavy bias towards sampling stations in the SW Washington and Lower Columbia ESU. There are 331 5th field watersheds and 675 total sampling stations (pooling reference and random sites). The current selection allows one reference site per 1.47 watersheds, i.e. there could be a single reference station in 2/3rds of the watersheds. The current allocation ranges from a low of 56% of the watersheds in the Klamath and Oregon Coastal ESU to almost 2 reference sites per watershed in the SW Washington/Lower Columbia River ESU. Obviously a headwater reference site can't apply to a downstream site and visa-versa, therefore reference sites data will have to apply across similar watersheds. The current allocation of reference sites (and random sites) appears too arbitrary to have been well reasoned. How were the allocation and number of reference sites and monitoring sites selected? It is unclear, but logical, that the same sites will be used for the salmon recovery plan.

Wouldn't it be better to allot the number of sites on the basis of stream miles and perhaps by weighting on the basis of historic presence/absence with some consideration of run size? How is a site defined? Are stretches identified and numbered and then selected, or are longitudinal loci selected and then sites placed to include the locus? Some parameters can be measured at a single point, but others require some length of stream. Is it possible for reference sites and randomly selected monitoring sites to overlap?

What is a watershed as related to objectives no. 1? For example, an objective for temperature is to identify, by 2002, 50% of the watersheds not meeting the standards and, by 2007, to identify 95% percent of such watersheds. There are already 303(d) listed, temperature impaired, stream miles for 18 of the 19 hydrological units in the Klamath/Coastal ESU. This implies that 95% of the impaired hydrological units have already been identified. Obviously then, a watershed is smaller than a hydrological unit. However, these data must be decomposable into smaller units (e.g. watersheds, however defined). What proportion of watersheds have already been identified as impaired? Can a watershed be called unimpaired until it is sampled in its entirety? There is nothing in the supplement that defines the level of monitoring detail that constitutes complete sampling for a watershed (e.g. sites per stream mile, sites per watershed, etc.). In some cases one site may be assumed to adequately represent the entire watershed, for other cases considerably more sites may be required. This specific detail is necessary before attainment probability can be judged.

The percentage goal typical of the various objectives no. 1 seems a little simplistic. If, for example, there are 500 watersheds and 50 are, in fact, impaired, one would have to sample at least 475 watersheds before one could be assured of identifying at least 50% of the impaired watersheds. However, if 450 of 500 watersheds are, in fact, impaired, one would have to sample only 275 watersheds to be assured of identifying 50% of the impaired watersheds. In other words, one can plan ahead to collect data on a specified percentage of watersheds by a particular time, but one cannot plan ahead to identify a specified percentage of impaired watersheds.

The biological objective 1 for TDG will depend upon spill and flow conditions for the rivers in question. The extent of excessive TDG levels depends upon these conditions. Therefore, all one can do is achieve measurements in 100% of the reaches specified under the spill and flow conditions extant at the time of sampling. Data from low water years would not apply to high water years.

Details in DEQ19S regarding the Strategic Design don't seem to clearly apply to the specific water quality objectives in all cases. The latter clearly include reference and random sites, but other agencies will primarily provide data for restoration-type sites. However, the Strategic Design states that sites will be selected where restoration projects have been implemented, where a TMDL or Agriculture WQMP will be completed, and in areas identified as core or critical habitat. Except for the latter, none can be considered as logical reference sites and certainly cannot be counted on for random site selection. This is quite confusing. The discussion of Biological Communities in this same section seems to have no application except to reference

sites selected in core or critical habitat areas for salmonid populations. I could not mentally overlay the sampling sites mentioned in the various biological objectives with those mentioned in the Strategic Design section.

5. There are no specifically identified conclusions listed in this chapter. I assume that the question about analyses and conclusions refers to the general discussion regarding the factors of decline, collection of data, and activities leading to recovery. I found no egregious errors with respect to the supplement and the current state of knowledge of steelhead environmental needs.

Three areas of research appear to me to need additional attention, or at least more specific detail within the plan. First, in the analysis of biological communities, the only specific metric mentioned is the calculation of an Index of Biological Integrity (IBI). I associate the IBI with fish populations only. Certainly an index should be used that includes macroinvertebrate data. Although there are such indices in existence, one wonders if any are presumed to be adequate for our waters. Is the intent of the term IBI to include macroinvertebrates? Has a decision been made to use another (unspecified) index for macroinvertebrates? If not, some "research" should be undertaken to select such an index. [I retract this as a research area if the metric included in the salmon plan figure titled "Remap Erosional Samples" is deemed adequate.]

Second, there is no mention of the specific "biological assessments" that will be used as indicators of potential toxic chemical contamination. Is the intent here to couple results of such indices as the IBI with potential toxic chemical problems? Frankly, I would not expect to see such problems except in rare instances, but I am unaware of any biological assessment tools that will flag toxicity problems specifically as opposed to other habitat problems. I would not recommend research in this area, but if some types of "biomarkers" are implied, there needs to be research into their sensitivity and veracity.

Third, there is a pressing need to develop a good procedure to monitor intergravel dissolved oxygen (DO). Throughout the section dealing with sediment, the problem of intergravel DO is highlighted, but there is no mention of monitoring intergravel DO. There is no question in my mind that this could be a major problem in some watersheds. However, there is the possibility that this concern is a red herring. I believe that collection of data to answer this question is of the utmost importance. Research should include method development and evaluation as well as sample site selection procedures. [I note that the salmon recovery plan includes mention of monitoring of 20 inter-gravel DO sites/year. Because the current intergravel DO standard is treated as a spatial median, single sampling points cannot be used for compliance. A reliable means of sampling for intergravel DO is required that does not require semi-permanent installation of expensive or sophisticated sampling equipment. In addition, because salmonids clean gravel in the process of spawning, samples outside of redds may bear no clear relationship to samples inside of redds. At least some research is needed on this point.]

6. I believe that the measures proposed will result in water quality improvements that are measurable. I have long believed that salmon and steelhead decline (excluding periodic cycles due to broader scale climatic and oceanic conditions) was caused by habitat modification and fish

stock over-harvest (plus the effect of hydro projects on the Columbia and Snake Rivers). The rate of recovery from these habitat modifications depends upon both anthropogenic and natural activities. In general I believe that the improvements will be slow and be affected by the status of the various natural climatic and oceanic cycles. Such factors as in-stream cover can be improved, rapidly by man (with varied success), or slowly by nature. Sedimentation recovery depends upon vegetation growth, bank stabilization, flushing flows, etc. Some of these take considerable time. Even if measurable improvements are seen in such parameters as temperature or sediment, it may take considerable additional time before steelhead population improvement is apparent. I think it could take at least the 30-year period of the plan (based upon goals out through 2027) to see significant improvement in some cases. Logically, where most improvement might be possible, the worst conditions probably exist and the most water quality and habitat improvement is needed. As a result, where we might be best able to measure recovery, that recovery could also be expected to take the longest time.

Even such factors as habitat partitioning among the various salmonid species could affect the relative recovery rates of the salmon and steelhead in any given watershed; differences in oceanic migration patterns might also favor one salmonid species' recovery over that of another. In other words, measurement of success can be a complicated business and we should not expect too much, too soon. However, the objectives and activities of the supplement are the right medicine and they will eventually succeed in recovering the species if we do not introduce another major impediment (e.g. an introduced species or disease, a major alteration of the marine food web, or reckless over-harvest). This also assumes that if monitoring indicates that current land management or other practices are not sufficiently protective of habitat, that more stringent measures will be adopted by the responsible parties.

7. Except for two items, the water quality monitoring proposed should achieve the goals of the supplement. These two exceptions (noted previously) are a probably insufficient number of sampling sites (e.g. too few sites for the number of watersheds and river miles), and failure to adequately measure intergravel dissolved oxygen.

8. Highest Priority:

1. evaluating temperature and sedimentation in conjunction with land activities;
2. evaluating biological indices with respect to temperature and sedimentation as well as to other physical habitat features (stream flow, cover, etc.);
3. measuring intergravel dissolved oxygen as a function of sedimentation and stream flow;

Lowest Priority:

1. concern regarding toxic chemicals;
2. measuring water column **DO**;
3. pH.

Early emphasis should be on establishing a good data base for minimally impacted reference sites (in good steelhead habitat) and for recovery/restoration sites where one would expect to find conditions similar to reference sites if land management activities are successful in attaining environmental goals. I have already questioned the allocation of reference (and random) sampling sites without apparent consideration of where the better habitat and most fish stocks should exist. I salute the apparent decision not to conduct extensive water chemistry analyses for toxic chemicals which I believe would be a major waste of resources. I would look for chemical causes and conduct ambient sample bioassays if biological criteria indicated poor conditions, but where no other of the identified factors of decline appeared to be in evidence.

Dr. Robert Hughes

Dynamac

Here is my review focused around your 8 questions plus some specific comments.

General Comments

1. Not knowing what the other chapters are in the Steelhead Supplement I am wondering whether issues such as barriers (especially dams, culverts, dewatered streams), disease, fish stocking, estuarine and near coastal water quality and physical habitat, alien stocks and species, physical habitat, and instream flows are covered as relevant water quality factors.

More importantly, the driving social factors are ignored, like institutional resistance to change, human overpopulation and overconsumption, continued population and economic growth, lack of an ecological ethic, limited leadership and vision from agency heads and the legislature, and an emphasis on individualism vs. communitarianism (greed vs sharing, present vs future, humans vs. ecosystems, materialism vs. service). Technological fixes and rules do not substitute for the great social conversion that must occur if we are to make a place for salmon in a world evermore dominated by humans. I can provide citations of the scientific literature making these connections if you wish.

2. I think land use must be more precisely and accurately evaluated.

3. The biological objectives do not appropriately address the declining factors for the reasons mentioned in 1. Also, few of the biological objectives are biological. For example, even in the biocriteria bio-objectives 1 is a habitat objective, 2 is a set of monitoring milestones for general biological conditions, 3 is an expectation that watershed councils will assess biological conditions, 4 is a very general objective that could be met with weak steelhead populations, and 5 is a water quality objective. Nowhere is there an objective of producing sustainable populations of wild steelhead that can also support a high quality fishery. Although the stated objectives are necessary, they are not sufficient. Somewhere some grander over-arching objectives, goals, or assessment endpoints are needed for steelhead. Therefore many of the objectives could be met without halting or reversing steelhead declines.

4. I am uncertain whether the listed management measures are adequate or not. My guess is not. There is insufficient information on each to judge the probability of meeting even the limited objectives listed. It would have been useful (and might have saved paper) to have seen a matrix or table indicating the management measures vs. the objectives; as is, the redundancy made it only appear that much was being done. Very few time frames were presented so it is unclear whether they can be implemented within those time frames. Also, without some sense of funding and staffing levels implementation dates are guesses. The lack of such information does not inspire confidence in management or the likelihood of success in restoring steelhead.

5. I did not read any analyses or conclusions, nor were there clear linkages to the scientific literature. A supplement cannot protect and restore steelhead. I think the proposals have potential for improving conditions. The major areas requiring additional research are the effects of ocean condition--including management & harvest of other marine & estuarine resources--and the social issues presented in 1. Since people are the problem, we need to know much more about how to manage us as opposed to fish and their habitats. The connections between land use (resource exploitation), population growth, and salmon response need to be clarified and communicated to the public. I think many people still believe we can continue to devegetate the landscape and fill it with people yet have salmon as long as we leave a green strip near streams. This is folly.

6. Some of the measures should result in measurable improvements some will not, or only indirectly. Many of the measures will require decades or centuries to result in improved steelhead populations; this is all the more reason to start soon. As stated in 4, recovery rate is a function of \$ and staff--if the investments planned do not exceed or at least compare favorably with those invested in destroying natural resources there will be no improvement, let alone enough to recover steelhead.

7. There are some very good parts to the proposed monitoring, especially DEQ's idea of a systematic random sample for site selection. Here again the \$ and staff are not proposed; without them this is just pieces of paper. A major shortcoming is the apparent lack of any coordination among state monitoring agencies in terms of design, indicators, measurements, data management, or data analysis and reporting. There is also no clear statement of overall objectives, assessment questions, or assessment endpoints of interest to decision makers. Without knowing what we want to know, we cannot know it.

8. The most impressive part of the Supplement is the sense that several independent agencies are beginning to try to collaborate. This should be furthered to the maximum degree possible. The historical differences among agencies developed as persons interested in exploiting and protecting specific resources recognized the need for some state authority. Now we know, as salmon continuously remind us, that all these resources and actions are interconnected. We should try to make our agencies and legislation recognize that fact through close collaboration and reorganization at some levels, especially monitoring. If the agencies cannot cooperate, a separate monitoring and reporting agency should be established. We do this at the federal level to assess the human population; it is far more important to have high quality data about natural resources and anthropogenic stressors.

Specific Comments (by page)

4. How are results from biased sampling designs helpful in planning and focusing resources? Mightn't they simply distort both?

5. Numbers of stream miles assessed via a biased sampling design should not be used to make projections about entire populations of streams. If you sampled only your colleagues would you

expect high accuracy in predicting election results? Political pollsters have recognized the need for unbiased sampling at least since Truman v. Dewey; why do you suppose our profession has been so sluggish?

16. There are a number of monitoring measures by DEQ and DF listed here, wouldn't it be nice to coordinate them in terms of design, indicators, measurements, and database management?

How are watershed analyses related to temperature standards?

17. DEQ is proposing some good stuff here!

18. There are a number of monitoring measures by DEQ and DF listed here, wouldn't it be nice to coordinate them in terms of design, indicators, measurements, and database management?

How are watershed analyses related to temperature standards?

Who will be developing and implementing monitoring strategies? Is temperature the only indicator of restoration? What is the frequency and history of restoration projects and ag plans?

19. This is another area where a statistical sampling design would be essential.

24. How will reference sites be defined and found? My sense is that only a few small high gradient reference sites exist. Are they representative of the habitats occupied by steelhead?

Wouldn't it be worthwhile to develop collaboration with DF and DFW in the sediment monitoring covered under objectives 1 & 2?

25. There are a number of monitoring measures by DEQ and DF listed here, wouldn't it be nice to coordinate them in terms of design, indicators, measurements, and database management?

Who will be developing and implementing monitoring strategies? Is sediment the only indicator of restoration? What is the frequency and history of restoration projects and ag plans?

26. Are the estuary & hydropower programs listed really relevant to steelhead spawning gravels?

28. Are SB1010 and CAFO relevant to areas exceeding DEQ water quality standards?

30 & 31. Wouldn't it be worthwhile to develop collaboration with DF and DFW in the DO monitoring covered under objectives 1 - 3?

32. Who will be developing and implementing monitoring strategies? Is DO the only indicator of restoration? What is the frequency and history of restoration projects and ag plans?

34. Are SB1010 and CAFO relevant to areas exceeding DEQ water quality standards?

35. Might not TDG also be an issue in streams, especially those in ag and range areas receiving excessive nutrients and lacking shade?

37. I think alien species and stocks should be added to the list of adverse alterations.

What sort of community is NOT balanced, integrated, or adaptive? They wouldn't persist for years if they were not. This phrase sounds nice but it has little basis in ecology. The remainder of the footnote is fine.

38. Who will be developing and implementing monitoring strategies? Is biocondition the only indicator of restoration? What is the frequency and history of restoration projects and ag plans? How will biological condition be evaluated by watershed councils?

Do all the activities listed here and on p. 39 have a biological component? If so, what is it?

39. What sort of community is NOT balanced, integrated, or adaptive? They wouldn't persist for years if they were not. This phrase sounds nice but it has little basis in ecology.

An ecoregion, subcoregion, or channel type would also be preferable to sub-basins as stratification units. Catchments are too variable to use for this purpose.

41. I am doubtful that riparian and instream improvements can counter intensive and extensive catchment disturbances. There are several publications indicating that stream responses are driven as much or more by catchment land uses as by riparian condition. I can provide them if you wish.

44. Is there any evidence that physiological markers will separate stress from multiple toxins vs. capture and handling stress? Which specific toxins are detected physiologically?

45. How are the listed measures related to physiological monitoring of toxins?

50. Who will be developing and implementing monitoring strategies? Is pH the only indicator of restoration? What is the frequency and history of restoration projects and ag plans?

52. What is the relevance of SB1010 and CAFO to sites better than pH standards?

61. Is there sufficient \$ to complete catchment assessments and TMDLs?

Since watersheds are continuous entities varying in size and complexity with each additional stream reach, their general size must be defined to make statements about them. What sampling design will be employed for sampling and listing all watersheds not meeting standards?

Has DEQ received its Healthy Streams budget? If so, is it likely to be continued? Without more predictable budgets, this measure and others in the supplement are mere wishes.

62. The wetland research group at the EPA lab in Corvallis has an interesting set of publications documenting the sorry state of 401 permit reviews and enforcement. I can provide them if you wish.

Has DEQ received its Healthy Streams budget? If so, is it likely to be continued? Without more predictable budgets, this measure and others in the supplement are mere wishes.

63. Since watersheds are continuous entities varying in size and complexity with each additional stream reach, their general size must be defined to make statements about them. What sampling design will be employed for sampling and listing all watersheds not meeting standards?

66. I like the proposed randomized design. Some questions remain: When will sampling occur? How will it and the indicators be linked with those of other agencies? What stream sizes will be sampled? Does DEQ have integrity indices for fish and benthos? How do they relate to steelhead integrity? What sort of database management system and staff is available to handle and report on the data collected?

The "Strategic" Design reads more like a 'Site-Specific' Design. The randomized design mentioned above sounds much more strategic. I see only two designs: randomized and site specific. The former can be used to extrapolate to the population sampled; the latter offers information about the site sampled only. This distinction makes one cost-effective and the other costly.

67. What criteria will be used to select reference sites?

You might consider using fish tissue to monitor contaminant loadings; we've found them more sensitive than sediment or water samples at detecting organic toxins and heavy metals.

68. I believe TDG may be a problem in productive agricultural streams also.

I think DEQ should run a cost-effectiveness analysis of its ambient water quality monitoring. There are far more effective ways to monitor trends.

What sort of sampling design will be used to monitor watersheds? What data are available and how comparable are they? In Tetra Tech's evaluation for DEQ of the available data on the Willamette River, they concluded it did not meet data quality standards for multiple reasons. I suspect these other sources will have similar shortcomings.

Completing 384 TMDLs by 2007 means 38 per year--what is the number DEQ normally completes per year? Are they of comparable complexity, i.e., do they involve loads for temperature and sediment from diffuse sources?

69. I agree that citizen monitoring can produce low quality data--but I think it can be corrected with training and supervision. If water quality data are of low quality, I believe biological data will be also. How will site measurements be converted to watershed values?

74. A similar permit system should be implemented to ag and grazing on private lands. Streams and salmon/steelhead don't know they are only to be protected on federal lands.

76. What is surveyed in the DFW surveys and with what sampling design? How realistic is it to survey all streams in an entire ESU or all ESUs?

86. From the preceding 10 pages it appears that DFW has weak monitoring designs and enforcement activities; it doesn't seem to be a full partner.

87-97. As with DFW, DF appears to lack any sort of monitoring design.

Given the amount of effort and \$ expended it is negligent of the DEQ, DFW, DA, & DF at a minimum to not have a collaborative monitoring design (preferably with a strong random component), a set of common indicators and measurements, and a common data base management system. There is also a clear need for implementing more remote sensing. This monitoring should cover ambient instream conditions, implementation of recovery plans, and ambient landuse practices. If the State truly wants to restore salmon, it cannot conduct business as usual. I can provide references outlining such a monitoring program if you like.

Dr. James Karr

University of Washington

As with the Coastal Oregon Plan that I reviewed earlier this year, this document clearly reflects a thoughtful approach to protecting and restoring the salmonids of the region. The conceptual framework of the process of protecting water quality is stronger than has been used through most of this century. I am especially pleased by the effort to frame the issue in terms that emphasize the importance of biological endpoints.

Let me first react to the first two questions:

1. **Are all relevant factors of decline included?**
2. **Are the factors of decline described appropriately?**

TOXICS (page 44): An important effect of the presence of toxic materials is increased susceptibility of fish or other organisms to other stressors, organisms in a toxic environment may be more susceptible to disease.

STREAM FERTILITY (page 53): Several causes of decline are wisely mentioned here but one major one is not included. Livestock grazing in many watersheds significantly degrade rivers by the direct and indirect influences of livestock wastes in and near the stream channel.

BIOLOGICAL CONDITIONS (page 37): During the past 25 years, we have identified five major ways that humans degrade the biological condition of rivers: 1. chemical pollution, 2. flow alteration, 3. physical habitat alteration, 4. alteration of energy and nutrient supplies, and 5. alteration of biotic interactions. The list as presented in your document covers segments of four of those five. The missing item is biotic interactions, an effect that is usually stimulated by introduction of exotics or the overharvest of sport and commercial fishers. The addition of that aspect to this list and the organization of the list into a coherent framework would be useful as an aid to understanding the complex of important human influences. Let me react to each of the items in your list, including the number it corresponds to in my organization of five classes.

Habitat degradation: this implies everything when I suspect you intend physical habitat (3).

Flow alteration: good (2).

Nutrient and sediment inputs: good. (Includes aspects of both 1. nutrients and 3. physical habitat).

Removal of riparian vegetation: Influences components of all five.

Pesticide applications: (1)

Discharges from point sources: (1)

Channel modification: Text implies it is from landscape. But also influenced by channelization and riparian corridor as well as upland activities.

This structure leaves out many other chemical effects from industrial and other effluents. Personally I prefer an organized list to which we can add or incorporate factors in groups rather than a long laundry list without that organization.

The other questions are less clear to me and harder to answer because they require a broader framework for evaluation. For example, the water quality objectives are outlined but without knowing how the monitoring to track resource condition will be implemented it is hard to know if the program will be a success. Rather than follow your questions, I will provide a few reactions to my reading of the document.

Draft Water Quality Chapter

Page 4 - You acknowledge mid-page that the results of the 303(d) list do not necessarily represent conditions or the magnitude of the problem. I agree that the 303(d) process is fundamentally flawed in several ways, Yet in the next sentence you suggest they suggest what water quality parameters are helpful in determining where the state should focus. In a fundamental way, this conflict illustrates a central flaw of the organization of this document. The list of parameters ranges over a variety of conventional water quality parameters (DO, toxics, sediment, temperature, etc.) but oddly mixes biological condition as one of the members of the list. Biological condition is the endpoint of interest to society and the physical and chemical parameters are factors that may be important in indicating (and causing) the degradation in biological condition. But there are factors in addition to that range of chemical water quality parameters that also play a major role in degrading biological condition. See the list of five factors above and explore the human activities that relate to them. They go well beyond the present short list of conventional "water pollution" measures.

Further the tabulations and figures that go along with this text seem to focus narrowly on these parameters rather than considering the broader framework of human induced degradation. It is more a bean-counting classification of problems than a reflection of the situation. Rather than trying to classify the frequency of problems from single sources, it might be better to see each place as being influenced by nearly all of them. It is the cumulative impacts of these many factors and others that are causing degradation at each site. The challenge is teasing out which set is responsible at each site and by how much.

By fragmenting the problem into a set of conventional water quality issues (pollutants), we sustain the view of the problem that has limited our ability to respond with effective protection and restoration strategies in the past. Simply put, a broader strategy for diagnosis of the causes of degradation in each watershed is critical if the restoration efforts are to properly target the causes of degradation in each watershed.

The listing of parameters given here as a series of coequals should be reevaluated. Some are the direct results of human actions, and thus the causes of degradation in biological condition. But biological condition is not a cause of degradation in water quality. It is the primary measure of

interest to society. It is why we focus on chemical water quality parameters as one set of indicators of biological degradation. Biological condition is not a factor for decline.

Targets are established in percentage reduction but little guidance is provided as to how those tasks will be accomplished. What is known about the translation of change in miles of water with changed water chemistry to direct improvement in biological condition, the desired endpoint. How will the diagnostics procedures operate to evaluate these issues? How were those targets established and why? Why are they not too slow? Too much of this is left aside or unspoken, making it impossible to evaluate the likelihood of success.

On page 39, for example, the standards are set pretty low. A 20% reduction in impaired stream miles in the next 2 decades seems a token accomplishment given what needs to be done and how easy it is to make improvement in biological condition in a large proportion of stream miles.

On page 37, a sampling plan that has from 50 to 75 reference sites in each of the major watersheds seems an extremely high set of numbers, in part because it is too ambiguous how many kinds of systems will require reference sites. How many reference sites are sought for each stream classification group to be evaluated? How many groups are there? It is excessive too when one consider that reference sites are supposed to represent the best sites, the sites minimally disturbed by the past actions of human society. In my experience in the Pacific Northwest, it will be nearly impossible to find that many truly reference sites for each of the rivers types in each of the watersheds. But I can't really tell because the language is not adequately defined and described for me to understand what will really be done.

One final comment to reiterate a point made earlier. It is critical that you see biological condition as the endpoint of interest to society in the implementation of both the Endangered Species Act and the Clean Water Act. By making biological condition a water quality parameter, rather than that endpoint, you keep the door open to the same class of mistakes that we have made in water resource management and endangered species protection (or lack thereof) in the past.

As usual, my schedule is so full and I have not had adequate time to digest this document and prepare as extensive set of comments as I would like. I am off to Australia to give a talk at a River Health conference tomorrow so must hurry this letter along before my departure. I would welcome an opportunity to contribute to this developing plan in the future if that would be of help to you. In the meantime, congratulations on breaking the bonds of the past in many of the activities involved in this effort. My comments are simply designed to urge you break more of those bonds.

Dr. Bill Krueger

OSU Department of Rangeland Resources

This is my review of the Water Quality Chapter of the Steelhead Supplement to the Oregon Plan.

1. Are all relevant water quality factors included? The coverage seems adequate.
2. Are the factors of decline described appropriately? No. It is impossible to sort out scientific principle, site specific results and opinion since statements are not fully documented as to the basis.
3. Since scientific data concerning the results of achieving biological objectives are not presented, this question cannot be answered.
4. Are agency measures adequate? The programs will probably move some aspects of water quality towards improved water quality for fish. Since how science will be used is not clear, it is impossible to provide a firm answer to this without a firmer basis in sciences and less on general views of the authors.
5. Are conclusions consistent with scientific literature? In some ways this is true and in others it is difficult to tell. For example, page 15 water temperatures are too warm or too cold. The literature suggests that there are thresholds of ecological change that are pertinent with respect to the nature of biological response. Achievable thresholds for fish survival or potential to reduce anchor ice formation are not referenced. It sounds like the authors consider ecological change to be fully manageable and does not consider that when thresholds are crossed, management cannot reverse a response. When anchor ice is forming, there may be a temperature threshold through which shade could prevent anchor ice formation but if it gets cold enough no shade can prevent the formation of anchor ice. The dynamic nature of ecological responses seems to be minimized in the document.
6. Are water quality improvements measurable and over what time period? The monitoring is possible. Designs for monitoring need careful and site/location specific intensity and focus. This detail is beyond the plan but is critical to future interpretation of ecological parameters monitored. If DEQ protocols are followed there probably will not be sufficient funds to meet their current protocols. If an overall, well designed, statewide monitoring plan is designed that is not hierarchically linked to local sites and local management areas, it is feasible to monitor the parameters listed in a statistically reliable way over a 3-4 year time frame. This will accurately reflect what is being done in the state but it cannot be used to evaluate basins, reaches, etc.

Will water quality improve soon to recover species? I do not know but I do know water quality is not the only factor related to current steelhead population sizes.

7. Is water quality monitoring adequate as described? No. See answer to 6 above.
8. Priorities? I think there should be a clearer prioritization of the relative roles of all the factors of decline and this should all be made public. The solvable problems should be clearly identified and if they will restore salmon/steelhead they should be implemented. If they won't, we should not pursue them. Finally, monitoring is very expensive. Design a system to monitor that will answer the questions that are of highest priority (probably statewide success) and don't waste money on something that cannot be interpreted.

Section 1. Water Quality Document (17B1-63)

Page 17-B4, paragraph 6. REMAP project. The 57 sites if sampled randomly can be used to estimate the status and its value will be described by the confidence limits you can put on the estimate made from the data sets.

Page 17-B8, paragraph 4. "with such large..." This statement from the Botkin report is purely speculative and has no basis beyond the guess of Botkin.

Page 17-B9, paragraph 3. Sedimentation is not suggested as important in the physical habitat document. Be sure your chapters agree. This is difficult when standards come from viewpoints not scientific data.

Page 17-B28, paragraph 6. Research reports clearly show that irrigation withdrawals do not always cause an increase in water temperature. In some cases irrigation reduces ambient water temperatures.

Page 17-B61. I do not believe ODFW has the ability to define conditions that cause streams to exceed temperature criteria.

Oregon Department of Agriculture Description of Programs.

This document explains the ODA processes well. It doesn't discuss how agricultural practices will be managed by ODA. Monitoring protocols are not included.

Jim Lenhart, PE

Vice President of Research & Engineering
Stormwater Management

General Comments:

1. It seems that the document can be reduced to about 10% of it's size by organizing the factors, ESU's and Agency Management Measures into a matrix or tabular format. This would also allow the authors to recognize duplications or missing agency management measures easily.
2. The water quality summary is a written presentation of a lot of numbers. The reader quickly loses a sense of what is being said.
3. Some formatting is inconsistent.
4. Some acronyms are not defined.
5. It would be good to include a map of the ESU's to gain an understanding of where they are and a general idea of the presence of cities, dams, mountains, state parks etc.
6. The document continuously states that DEQ will rely on other agencies and watershed councils to provide technical assistance. My interpretation is that DEQ does not have the funds and is hoping that some one else will carry what promises to be a heavy economic burden. My question is "is it realistic to assume that others will collect these data, coordinate and deliver it to the state for some future compilation." I would also question the motives of a multiplicity of people collecting these data to serve their own interest, whether they view environmental protection as a need or an obstacle. In addition, these data will be collected with different instruments, data collection error and data collection techniques. It has been my experience that when you attempt to compile and analyze data from many different sources, it can be very difficult.

Technical Comments.

1. I do not understand the basis for the selected number of sites. It appears these numbers are arbitrary i.e. in quantities of 50 and 100. I would seek to select the number of sites based on the diversity and statistical variance in stream reach characteristics. This will allow an optimization of the number of monitoring sites.
2. I do not think that randomly selecting the monitoring sites is a good approach. It seems a better approach would be to take a random sampling to establish both the variance and different population characteristics. Once these statistical parameters are understood then carefully select the site locations to best represent the diversity of each stream reach. This allows carefully controlled data collection. For example: monitor temperatures on the upstream and downstream

borders between land uses. Monitor for toxics above and below agricultural watersheds. Also try to select sites that are easily accessible to reduce data collection costs.

3. When objectives are outlined I assume that there is a timeline or chronological order to the objectives. In many cases one objective can not be started until the previous one is achieved.

If this is the case then the management of non-degraded systems should be paramount and listed as objective number one rather than number six.

4. Each factor is given a time line for percent completion. Again these numbers seem arbitrary. I do not understand the basis. In addition the paper states that the 95th percentile will be reached some time in the future. This is 1.65 standard deviations to the right for a normally distributed population. Think about what it takes to bring something more than 2 standard deviations from the mean. If we assume that, at best, the variance in a water quality parameter is normally distributed then getting the 84th percentile (1 standard deviation) may be more realistic.

My opinion is that if we are overly optimistic about the goals and they are not reached, then the whole effort is set back because the goals have lost their meaning.

Stuart McKenzie
Hydrologist, retired
USGS, Water Resources Division

Thank you for asking me to review the water-quality chapter of the steelhead supplement to the Oregon Plan. I found it most interesting and the plan to be challenging.

This response will include general comments to the questions addressed in the cover letter from Ms. Paula Burgess and some specific questions and suggestions related to specific pages or programs listed in the document.

Question 1 -- We need to recognize that this plan only lists water-quality conditions for stream miles that have been assessed. One has to wonder about the areas that have yet to be assessed. A summary of the assessed stream miles are listed below:

Geographic area	Total stream miles assessed	Stream miles	Percent assessed
Klamath Mts. and Oregon Coast	18,138	6,089	34
SW Washington Lower Columbia	4,902	1,628	34
Upper Willamette Snake River Basin	11,248	2,768	25
	5,565	1,404	25

This table suggests that as much as 67 to 75 percent of the water-quality problems are yet to be found. Note later that the stream miles assessed may not be a good measurement of what we have looked at.

Question 2 -- I would like to see more emphasis on habitat measurements and assessment. Such a program might include the following:

1. Determine what is appropriate habitat for the different ecoregions with emphasis on reference sites.
2. Establish specific protocols for measuring elements of habitat.
3. Establish methods to assess habitat, chemical, and biological data to determine the likely improvement to biota if specific habitat improvements were made.
4. Ensure that this monitoring and assessment program is compatible with Federal agencies and their management of Federal lands.

Question 3. The plan does not address factors of decline, rather it addresses factors as they have been measured (including 25 to 34 percent of the stream miles) relative to standards that have been set for water uses including spawning, rearing, and passage of cold water fish. This plan is conceived on the premise that the populations of steelhead will not be limited by water-quality conditions if water-quality conditions of most of the stream miles meet water-quality standards.

For this plan to be effective, the State needs to continue to update water-quality standards and this program relative to research findings for cold-water uses to ensure the most benefit for expended resources. I suggest a technical review of this program after 10 years.

Question 4, 5, and 6 -- It would seem that this plan does use current understandings associated between water-quality conditions and cold-water fish. Because any improvement in water-quality conditions should be conducive to improving fish reproduction, rearing, and transport, it is generally accepted that this is a rational approach. However, the specific benefit of any specific activity or program listed in this plan is likely to be highly variable. The bottom line on this one is that I am not sure this effort will make a measurable change.

Question 7 -- Some of the big unknowns in the recovery of salmon and steelhead are as follows:

- o What effect is "El Nino" having on the fishery?
- o What effect is ocean fishing having on the fishery?
- o What are the water-quality problems in the 67 to 75 percent of the stream miles that have not been assessed?

The Monitoring program in this plan calls for visiting 1/5 of the monitoring (environmental and reference) sites each year and for the following 4 years and repeating the sampling every five years. How will future assessments be accomplished if there are large differences in rainfall and runoff between 5 year samplings? I suggest that some percent of the sites be sampled each year; this is particularly true of the reference sites, which are hopefully going to quantify effects due to climatic factors.

Question 8 -- Hopefully, the 10 year review mentioned above will identify those elements that are effective, those that are ineffective or having such a minimal effect (over the time period measured) to cause no measurable difference, and new elements to be added.

Specific questions and suggestions are listed below: To aid in this presentation, I have suggested the [deletion] and ADDITION of specific words.

Page 5 -- The first paragraph says that 6,089 stream miles have been assessed, but in the second paragraph, only 3,403 stream miles have been assessed for temperature. This make the 6,089 stream miles assessed rather meaningless, since it is not representative of any one or group of parameters. I suggest deleting this value in tables 1,3,5,and 7 and in the text. The same problem occurs in following sections.

Page 7 -- Because fecal coliform bacteria are not directly related to salmon and steelhead habitat, I suggest deleting it from this report. This report is already complicated enough without this information.

Page 13 -- o Nutrients - includes [nutrients] NITROGEN and phosphorus
o Toxics - includes pesticides and OTHER toxics

Page 15 -- Under the Temperature discussion and Factors for decline:
Suggest adding GROUND-WATER PUMPAGE at the end of the paragraph.

Page 17 -- Temperature Biological objective 2:

I assume that the proposed number of reference sites will be in addition to those listed in Temperature Biological Objective 3? It is clear that random sites sampled under DEQ19S will be continuously monitored for temperature for 2 to 3 months. Is this also true for the reference sites? Your presentation of 1998 sampling 20 percent of the reference sites, then in 1999 sampling 40 percent of the reference sites is misleading. As I understand your monitoring plan, it calls for sampling at a different 20 percent of the reference sites for the first five years and then repeating this effort every 5 years. This means that you will not have resampled sites and the ability to assess climatic effects until 2003. I suggest first that the presentation of your sampling plan be changed to show better what you plan (See table below) and secondly to consider sampling a few sites each year for at least the first 5 years so you can determine the annual effects of climate. The table format shown below should be considered for all of the schedules of reference sites and for random sites.

Suggested table format:

Year	Sites sampled	Total sites sampled
1998	First 20%	20%
1999	Second 20%	40%
2000	Third 20%	60%
2001	Forth 20%	80%
2002	Last 20%	100%
2003	Repeat cycle by resampling the first 20%	

Page 19, 22, 33, 52, and 57 list DEQ25S "Three Basin Rule" and implementation of this program in Clackamas River Basin. Why only in Clackamas Basin? Why not in Santiam and McKenzie Basins as well?

Page 23, last paragraph, second line -- Suggest it read -- emerging fry have been filled or covered by excessive FINE sediment

Page 26 -- Sediment Biological objective 4: refers to DEQ's water-quality standards for inter-gravel dissolved oxygen. It would be helpful to list this standard somewhere in the document. If it is in the larger document, then this is great and it should be referenced here for the reader.

Page 31 -- Dissolved Oxygen Biological objective 2: In most cases, there have been 75 reference sites listed for Klamath Mountains and Oregon Coast ESU. I suggest that this objective also include 75 sites rather than the 50 listed.

Page 32 -- Dissolved Oxygen Biological objective 5:

Relative to tables 1, 3, 5, and 7, about 80 percent of the stream miles assessed currently are meeting this objective. Assuming that this is representative of all stream miles, your milestone

suggests that the State would not need to show any improvement until the year 2017. Is this what you mean to say? I suggest you provide an estimate of 80 percent for the year 1997 and list tables 1, 3, 5, and 7 in this document as the source of this estimate and then have the following milestones:

- 2007 -- 85%
- 2017 -- 90%
- 2027 -- 95%

Page 35 -- TDG Biological objective 2: How does DEQ ensure that an average of 80% of the smolts pass the dams (fish passage efficiency)?

When you address the TDG standard, do you mean the 110 percent of saturation (State standard) or the larger amount that is now allowed when the COE is spilling water at the dams?

Page 45 and 55 -- Toxics Biological Objective 3 and Stream Fertility Biological objective 6: Presently, about 82 percent of the stream miles assessed have toxics problems (tables 1, 3, 5, and 7 in this document). With the milestones you listed, the State would not need to show any improvement until the year 2017, assuming the percent of sites with problems is the same as those asses to date. Is this what you mean? I suggest making the milestone as follows:

- Present -- 82% (estimated after assessing 1,370 stream miles)
- 2007 -- 85%
- 2017 -- 90%
- 2027 -- 95%

A similar schedule might be considered for similar reasons on page 55, but with a different percentage for present condition.

Page 48 and 53-- pH Biological objective 1, Stream Fertility Biological objective 2: This schedule seems to be slow. I suggest the following schedule, and allow the determination to be done by correlation in addition to direct measurements.

- 2002 -- 75%
- 2007 -- 98%

Page 49 -- pH Biological Objective 2: I suggest using the same number of reference sites as listed for the other elements. In my mind, this is one of the most sensitive tests and one which is very likely to be affected by annual changes in climatic effects.

Page 62 -- DEQ8S -- A date for starting and ending the next cycle is needed.

DEQ9S -- Why are only the TMDLs related to biological criteria, pH and toxics being considered in this effort? It seems an inefficient way of completing this effort. Have biological criteria, pH and toxics been found to be most problematic for steelhead? If so, say so.

Pages 65 - 69 -- DEQ19S -- On the three goals at the top of page 66, should not one of the goals be to monitor all reaches that are now listed by 303(d) as "Need data or potential concern"?

I very much like the monitoring of temperature continuously for two to three months.

Dissolved oxygen and pH -- the 3 to 5 continuous days of monitoring should include at least 3 consecutive days with <10 percent cloud cover during daylight hours.

Biological Communities -- need to add at the end AND CORRECTED FOR ANNUAL CLIMATIC EFFECTS BY USING REFERENCE SITES.

Toxics -- this item says that the biological assessments will be used as indicators of potential toxic chemical contamination. I assume this relationship is well established? You might want to include a reference to this knowledge.

Stream Fertility -- This item needs to address the following:

- o Frequency of sample collection, and
- o Hydrologic and climatic conditions to be targeted for sampling.

Should you also be looking at the biological communities and try to make a measure of bioproductivity?

Under Strategic Design -- Temperature, Sediment/Turbidity, and toxics: It says that DEQ will rely largely on data collected by watershed councils or other agencies for these data. I suggest the following for this effort:

- o DEQ provide protocols for other agencies to use.
- o The protocols should include some quality control activities that will allow DEQ to determine the quality (bias and variability) associated with these environmental data.
- o If other agency programs are to provide data useable by DEQ to address concerns listed in this document, DEQ will need to identify some staff to ensure that these monitoring activities carry out the first two items listed above.

Dissolved Oxygen and pH -- Suggest deleting diurnal and replacing it with diel. Diurnal can mean daylight hours; if you mean over 24 hours, diel is the preferred term.

Assessment of these data for trend information -- Do you wish to address decadal, annual, seasonal, or monthly trends? What method of analysis will be used to assess trends? How much data is needed? Should I assume the data will be compared with reference sites to ensure that climatic effects are removed? Why are DEQ lab personnel only to audit and move equipment?

Biological Communities -- There needs to be a reference to use of reference sites to remove climatic effects. Is there a reason that algae are not being considered as part of biological communities? It is my understanding that fish will show effect over years, macroinvertebrates over months, and algae over weeks. I can provide a reference to this timeline if you need it. I very much like the reference to duplicate samples being collected to evaluate sampling and natural variability.

Toxics -- I suggest deleting herbicides and replacing it with pesticides, a more generic term that includes herbicides. When you speak about sampling, are you using water, streambed or suspended sediment, fish tissue, semi-impermeable membrane devices, or a combination of these media? I suggest providing a guideline as to the percent of identified sites that will be sampled.

Total Dissolved Gas -- What about downstream of Willamette Falls and Lost Creek Dam?

Ambient Water Quality -- Would total suspended solids and temperature be included in the sample analysis?

The TMDL table showing TMDLs at fifth and sixth field scale -- are these numbers addable? Are there 213 plus 384 or 597 TMDLs that DEQ will need to complete by 2007? WOW!! Do you have a job ahead for you. What happens if you are not able to accomplish this task?

I like your listing of data quality for citizen groups. For DO, pH and sediment/turbidity, I suggest that the citizen data could be high in quality because of being able to make measurements or collected samples during critical hydrologic/climatic times.

Page 73 -- DEQ28S -- next to the last line -- do you mean "removed" or some other word?

Page 76 -- ODFW 1B2S -- When would phase 1 be completed?

Page 88 and 89 -- ODF 10S, 11S, 12S, 13,S,14S, 15S, and 17S, -- There was too little information provided to evaluate what would be done, what geographic areas would be affected, and the timelines for completion.

I hope these suggestions and questions have been helpful. Please call me or send me email if you have any questions.

Dr. Bruce Rettig

OSU Department of Agriculture & Resource Economics

I have reviewed the water quality chapter of the steelhead supplement to the Oregon Plan, but I regret that I have no constructive comments to provide on this important element of the plan.

With that caveat and with apologies for not being able to provide the detailed review requested, please let me share two observations. First, much of the water quality material in both the original Oregon plan and the steelhead supplement is an expression of hope, often optimistically phrased. For example, the actions to reduce non-point pollution from agricultural lands are based on the success of watershed-based best management practices, as directed by Senate Bill 1010. How well this will work is yet to be seen. I share the hopes of ODA, but not their stated optimism. However, we have few alternatives until this approach is attempted.

Second, the steelhead supplement, like the original Oregon plan, requires provision of careful monitoring and enforcement. In turn, refinements of future measures and enforcement hinges on much needed research and liaison between agencies and their clients. As the steelhead supplement expands the geographical coverage of the Oregon plan, the cost of these activities will rise. We must hope that the taxpaying public will provide a mandate to future legislatures to fund this work adequately.

Thank you for letting me read your work in progress. I look forward to reading other components of the plan. Placing them on the World Wide Web is gratefully appreciated by many people, but especially those of us who use these materials to teach students to prepare themselves how to face the growing challenges of sustainable development.

Eric Strecker, PE

National Stormwater Practice Leader
Woodward-Clyde Consultants

I appreciate very much the opportunity to provide a technical review of the Water Quality Chapter of the Oregon Plan Supplement (Steelhead Supplement) for salmon and stream restoration. The perspective I bring to this review is that of a water quality specialist. My work over the past 13 years has been focused on water quality and quantity management, primarily providing technical and project management services on urban runoff and watershed management to municipal, state, federal and private clients. I am a registered Civil and Environmental Engineer and a trained fisheries biologist. Early in my career, I performed stream surveys for the US Forest Service on the Coquille, Sixes and Elk River systems in southern Oregon.

Below, I have attempted to address each of the questions that were posed by you to focus the review. I would like to note that some of the questions are not completely answerable (at least by me).

- 1. Does the document list all relevant water quality factors of decline regarding steelhead? If there are additional significant factors regarding steelhead decline, please list them.*

I suggest that flow modification not only address flow diversion (removal), but also land-use change effects on the volume of runoff and resulting changes in soil erosion and within-stream erosion and sedimentation. When forest land is developed or logged, the volume of runoff increases. This increase in runoff usually results in an increase in soil erosion, transport of soil and emission of biochemical oxygen demanding substances and other pollutants. The hydrology impacts on habitat are, I assume, addressed by other elements of the plan.

The document should specifically identify that some (and sometimes many) water quality standards exceedances are natural.

The land use descriptions are confusing. If the land use figures presented in the supplement are actual land use adjacent to streams, this should be clearly stated. I would suggest that land use based upon watershed percentage would often be a more relevant indicator of potential water quality concerns for many of the factors. Pie charts could be used to display land use percentages.

The ESU unit discussions seem to be overlapping. For example, the lower Willamette River information is discussed in both the Lower Columbia and Upper Willamette discussions.

- 2. Are the factors of decline described appropriately? If not, what improvements can you suggest?*

I would add to potential causes of temperature changes those changes that can occur from removing the watershed vegetative canopy and converting land to developed land uses. As watersheds are converted to other land uses (urban, for example), the entire watershed can be warmed. In addition, short-term temperature changes can occur from rainfall on hot pavements. These impacts are in addition to those caused by riparian canopy degradation.

The reliance on the 303D listings of water quality limited streams may not adequately present the total stream miles that are in fact impacted. I recognize that there is limited availability of actual water quality data to assess all streams in the ESUs. However, there are some potential approaches that could be used to evaluate other stream segments where data is not available. GIS could be used to evaluate watershed conditions in those watersheds where water quality data is available to determine if these conditions can be used to predict where problems would likely be present in other areas. For example a number of studies in the US have identified that, when an urban watershed reaches between 15 and 25 percent impervious area, the macro-invertebrate community is severely degraded. It is likely that other watershed factors, such as logged areas per acre, miles of forest roads per acre, number of cattle grazed per square mile, etc., could be explored to assess whether these factors correspond to noted water quality impacts. These factors could be used to evaluate other watersheds.

It should be pointed out more strongly that an exceedance of a water quality standard does not necessarily mean that negative impacts are occurring; it is only an indicator, especially given that many of the standards were not originally developed to assess salmonid species (and even their typical forage species).

Each of the standards that DEQ used to assess streams should be briefly described (e.g., what temperature criteria values were utilized) and their applicability to steelhead explained. For example, it should be noted whether the criteria were expressly based upon evaluations of steelhead (or salmonids) or other actual associated biota (food source, etc.). The linkages between the factors and impacts to steelhead should be discussed. At a minimum, some of the studies should be presented in which water quality impacts have been shown to be detrimental to steelhead and at what life stages. This would strengthen the case for specific actions.

ODA should have a role in defining potential problems, rather than just be involved in permitting of CAFOs and facilitating SB1010 watershed plans, which are only developed in response to a DEQ TMDL listing.

3. Do the biological objectives address the factors of decline appropriately? Will achieving the biological objectives result in halting or reversing the decline of steelhead in the ESUs identified in the Supplement?

I believe that they provide an adequate description of the factors of decline as overall categories. As noted above, I would add some additional sub-factors.

4. *Are the agency management measures listed in the Supplement adequate to achieve the associated biological objectives? Do they move us in the right direction to address the factors of decline in a timely manner? In your opinion are the agency management measures able to be implemented within the identified time frames?*

I believe that the management measures are an appropriate first step in attempting to reverse the decline of steelhead. One of the concerns I have, however, is whether we can expect a program that relies on so many voluntary programs to be successful. We should, I believe, make an attempt to solve the problem this way first, but be prepared with “next steps”. The document should include potential measures that would be implemented in the future if the proposed measures are found to be inadequate. This would provide responsible agencies with additional support for aggressive implementation of the measures.

In addition, many of the measures will only reduce and/or slow the increase in degradation that occurs with land use activities. This is especially true when land use changes and the land is to be more intensively used. This increase (even with management measures) must be more than balanced, by reducing existing problems to achieve overall reductions in degradation.

I see problems with the fact that the ODA measures simply primarily rely on the CAFO and SB1010 programs. Although the CAFO sites are obvious choices for control, focusing only SB1010 activities on water quality limited streams will result in many areas not being addressed (or at least not being addressed for a long time), solely due to a lack of monitoring data (rather than problems). I believe that ODA should develop a set of best management practices to be applied throughout the ESAs to address such key problems as protection of stream banks from grazing activities, direct agricultural runoff, etc. In addition, this approach does not address how ODA will ensure that high quality streams are not degraded in the future.

DEQ should provide some technical guidance to ODF on how the planned stream surveys can be used to gather water quality information relative to 303D listing and potential water quality problems. With this added information, DEQ could then evaluate those sections of streams which will be surveyed.

I would recommend that DEQ review its overall auditing of permit compliance and consider how it might be improved to meet water quality goals for steelhead. This could mean increased frequency of facility inspections, increased reviews of annual compliance reports for NPDES permits, and more focus on review of BMP implementation in all programs, permit-driven and voluntary. An annual report on the progress of implementation of the measures would be a good tool to combine with monitoring data to assess the effectiveness of the program.

DEQ15S should list which cities might be subject to the Phase II program within the ESUs. These cities should be notified regarding their possible inclusion in the program. This may help assist local governments in developing the support they need to participate in the various measures.

DEQ should review the significant land use data collected under the industrial and municipal stormwater programs to identify specific concerns for steelhead (DEQ19S).

The US Forest Service and BLM are not represented in the plan. Given that they are such large land owners in the watershed, I have concerns about the overall success of this program without their participation.

ODF35S could be problematic in that increasing the capacity of culverts could, if not done correctly, increase problems. One potential problem is that flows could be more shallow and cause a decrease in fish passage. In addition, if flows are slowed, sedimentation could occur, also reducing passage. If culverts are to be enlarged, they should be “fish friendly” (e.g., ODF 34S).

ODF59S should be expanded to include hydrology (volume of runoff) changes relating to forestry practices to assess potential affects on water quality (sediments, biochemical oxygen demanding materials, and temperature) and the need for measures to address these affects.

ODF should consider having a management measure to develop a plan for post-fire erosion control. Forest and rangeland fires, especially in areas where fire suppression has been practiced, cause extensive damage including significantly increasing erosion potential. A plan for post-fire mitigation measures would help ensure that impacts to salmonid streams are minimized following fires. If there are such plans in place, they should be reviewed in terms of minimizing impacts to steelhead.

The municipal and industrial NPDES stormwater program should be listed under all of the appropriate biological objectives.

The potential problem of water quality impacts from fish hatchery discharges (including viruses) should be addressed.

Temperature impacts of reservoirs and dams (including smaller facilities) should be considered for all facilities, not just those that are listed for re-licensing (DEQ30S).

Under DEQ 20 and 22S, new development controls (CZARA Management Measure Guidance, Chapter 4, II Urban Runoff, A. New Development Management Measure) should also be a key component of DEQ’s efforts. New development would likely be a larger source of water quality problems than ODOT roadways alone.

DOGAMI or another appropriate agency should be addressing in-stream gold dredging as a source of water quality problems. This activity occurs somewhat frequently on some of the south coast streams.

5. Are the analyses and conclusions in the Supplement consistent with the specific literature, and does the analysis support the conclusions? Is more research needed in any area of

water quality for the Supplement to be successful in protecting and restoring steelhead? If so, what areas require additional research.

In general, yes. However, as stated above, the supplement should specifically cite studies and literature reviews to strengthen its assertions (as noted above).

6. *Does it appear that the agency management measures listed in the Supplement will result in water quality improvements that are measurable, and over what period of time? Will the water quality improvements occur soon enough to recover the species?*

If in fact the many volunteer programs are implemented, we will see in some watersheds improvements, and in others a decrease in the rate of decline of water quality. This will depend highly on whether or not a watershed is undergoing land use changes (e.g., land clearing, development, etc.). I believe that we are talking in terms of a fairly long time period, except in watersheds where there are obvious sources of problems that can be remediated quickly.

7. *Does the Supplement, in combination with the Oregon Plan, contain adequate water quality monitoring to determine the success of individual measures, to allow for adaptive management, and to assess success of the plan? If not, what additional water quality monitoring is necessary?*

I do not believe that the limited monitoring suggested in the plan will give us the ability in most cases to differentiate what individual measures are actually contributing to reducing water quality problems. It is unlikely that there will be very many situations where a measure is implemented separately from other measures in the watershed. Thus it would be very difficult to evaluate the results produced by individual measures, especially statistically valid ones. And attempting to monitor the effectiveness of each measure separately could be more expensive than simply implementing many of the measures. There should be an evaluation of the appropriate level of monitoring (cost/effort) in relation to the magnitude of the resulting costs of management measures implementation and considering potential savings from altering the measure.

Monitoring the “performance” of best management practices is problematic. Nationally, there has been little consistency in either the actual monitoring methods employed or the analytical analysis approaches. Even more problematic is the lack of consistent information on watershed characteristics and management practice design information. This has made it very difficult, if not impossible, to utilize study information on a broader scale in order to improve the selection and design of measures. To address this problem, EPA is currently in a cooperative agreement with the American Society of Civil Engineers to develop a set of monitoring protocols for urban stormwater management practices. I would suggest that DEQ develop a set of monitoring protocols (standards) for individual management practice studies, so that it is more likely that it will be able to assess the effectiveness of measures in varying locations.

8. *What should be our priorities for implementing the factors of decline, biological objectives, and agency management measures? In other words, what are the most effective elements of*

the Supplement? Are there agency management measures that will be ineffective and/or a waste of money?

Given the level of information in the plan, this is a difficult question to address. I believe that the priorities for individual management measures for problem prevention should focus on those land uses and activities that are the largest potential sources of problems. I believe that those measures which reduce hydrologic impacts (volume of runoff) will also likely be very effective at reducing water quality problems. As the main uses of the developed areas of watersheds are forestry, agriculture, industrial and urban, the management measures should be focused on these activities.

General Comments

One way to improve this supplement relates to the selection and prioritization of management measures. I believe that this planning process could benefit from a more formal and comprehensive decision analysis. It appears that the coordination among agencies was minimal and that each agency was asked for individual input, rather than participation in a formal group planning process. A process where all the potential measures were evaluated together, utilizing a set of well chosen criteria, would result in a much more comprehensive and defensible plan, as well as assist with prioritization. An example of this approach is the stormwater management plans developed for the municipal stormwater NPDES programs, where multiple agencies worked together to suggest, evaluate, select (and not select), and prioritize management measures. (See Portland, Eugene, Gresham, Unified Sewerage Agency plans, for example).

Another improvement I would suggest, would be undertaking a more comprehensive watershed planning approach. The plan as it stands now includes measures which focus on source control (widespread and/or activity-specific) and reference to various different kinds of watershed planning and implementation efforts. One approach would be to develop a more comprehensive watershed planning approach that would combine some of the efforts with a more limited focus (TMDLs for example). In the end, I believe this would be more cost-effective. In addition, I believe that many of the watershed improvement efforts that have been conducted have been somewhat light on planning in favor of implementation (getting things done). While I agree that planning can go on forever, in many cases we may be jumping to solutions before we have developed enough of an understanding about what is needed. I suggest that one of the management measures be a prioritization and scheduling of comprehensive watershed planning efforts.

I thank you for the opportunity to review the plan. If you have any questions or comments regarding my comments, please do not hesitate to contact me at (503) 948-7253.

Dr. Tim Sullivan

E&S Environmental Chemistry, Inc.

I have reviewed the draft Water Quality chapter of the Steelhead Supplement to the Oregon Plan (June 1997) and would like to offer the following comments. Overall, I thought that the draft contained useful material and provided reasonable descriptions of the relevant water quality factors associated with the decline of steelhead in Oregon waters. I did note a number of problems with the draft, however, and these are discussed below.

I thought that the overall organization of the chapter and text format were of poor quality. The chapter is not presented in a clear and easy to follow fashion, and it is difficult to navigate through it. The major and minor headings should have a hierarchical structure. It is too difficult to figure out what section you are in at various points in the chapter. For example, see page 15 of the draft; the bold headings have no logical nesting sequence and it is difficult to piece it together.

The summary graphics (i.e., significant water quality parameters, significant land use) were very useful, as were the accompanying tables (e.g., 303d data summaries).

The listings of Agency Management Measures (e.g., pg. 16, pg. 18, pg. 19-21, etc., etc.) were of no value whatsoever and seriously detracted from the chapter. I understand the purpose: to demonstrate that agencies are actually doing things. My response to these lists is, however, "means nothing; so what?" If you want to list programs, do it in a table with check offs for temperature, sediment, etc. If you want to discuss programs in the text, then *discuss* them; don't list them. I would suggest discussing the ones that really matter and having a big table in an appendix.

Other comments are addressed below as bullets:

- Figure 1 legend - include Klamath Mt. in title
- Page 5, second paragraph, line 4 - give % after 298 stream miles: (9%)
- Same comment elsewhere, e.g., pg. 6, bottom two paragraphs; page 8, bottom paragraph
- Page 16, top paragraph - the statement "according to the following milestones (% of watersheds identified:
2002 - 50%
2007 - 95%"
is ambiguous. Some readers will not understand what you mean. State more clearly. (Same comment elsewhere, e.g., pg. 17 top and bottom of page).

- The formatting here is awful! For example, page 17, what are the principal headers?: Temp Biol. Objective 2, Agency Mgmt Measures, DEQ 19S, Temp Biol. Obj. 3, Agency Mgmt Measures, or DEQ Measures Summary??
- The numbers (percentages) listed on Page 17 (and elsewhere) are unclear. For example "1998 - 20%" will be interpreted by some readers as 20% unimpaired, whereas I think you mean 20% surveyed. Be more specific.
- Page 17, middle of page. The Temperature Biological Objective 3 (and all analogous objectives for all other parameters) has a major problem. You propose random site selection as per the REMAP approach. This is great for documenting current status, but CANNOT BE USED FOR TRENDS. This whole salmon/steelhead effort is (and appropriately so) a "go in and find where the problems are, and then fix them" kind of an effort. As soon as you pick a "random" site, you cannot go back and resurvey every five years because that site will NO LONGER BE REPRESENTATIVE of the population. This is because you will want to fix it. If you do, it is no longer representative. If you decide to leave it alone, it is also no longer representative because you are fixing things elsewhere! This is a major flaw. You need a monitoring approach for trends, but the one you have will not work.
- Page 18, top paragraph. Monitoring after remediation is *not sufficient* - Need to also monitor before and need to monitor "reference" sites that you don't try to fix. Relying on watershed councils to develop monitoring strategies to address the effectiveness of remediation efforts is totally unrealistic. You need a statistically-rigorous approach that can be modified by the councils to fit their situation, but they will not be able to devise it. I view this as a big problem. There is no adequate plan in place with which to determine regional trends. This problem extends to all parameters discussed in this chapter.
- Page 19, top of page. "or have historically supported steelhead" - How determined and by whom?

"See Figure 9" - took long time to find the figure 40 pages later!

If 1997 is "unknown", how in the world do you aim for 35% by 2007? If you have an estimate for 1997, give it here. Need to set some realistic goals, by region. These broad percentages are meaningless.

- Page 25, Objective 3. It is very difficult to monitor changes in sediment yield because of its dependence on climatic and hydrological conditions which vary within and between years. You need to monitor for changes in the *parameter values* of the observed relationships between sediment yield (i.e., TSS loading) and the principal external forcing functions: discharge, precipitation intensity, antecedent moisture conditions, etc. Watershed councils will not be able to do that.

- Page 30, D.O. Need to discuss connection between D.O. and temperature. Also, D.O. is not expected to be a significant problem in most areas. It will be a localized problem where 1) point sources contribute to very high BOD and/or 2) where temperatures are very high. For the most part, watershed councils should focus on temperature; it is a lot easier to measure and it's more generally important.
- Page 37, Objective 1. This is really fuzzy. "watersheds used by steelhead" is of little value; could be excellent habitat quality or quite marginal and still be used by steelhead.
- Page 39, Objective 4. Very unrealistic. There is no way to restore all steelhead waters to pristine conditions. Objective should focus on realistic, attainable goals that will really help the fish.
- Page 44, Objective 1. This program *does not need to know what background levels of toxins are*. This knowledge is 1) irrelevant to the health of steelhead populations throughout the state, 2) expensive and difficult to collect, and 3) not conducive to watershed council activities. Toxins are not a steelhead problem, with few exceptions. Deal with these exceptions through other programs. If you must include toxics, then 1) identify what levels constitute a hazard (it's usually for human consumption rather than fish health), and 2) monitor for exceedances. Don't bother with background levels. I hate to see the effort diluted. You need to focus squarely on the Big Regional Issues: temperature, sediment, stream channel complexity.
- Page 53, Objective 1. I question whether there is any real scientific basis for this issue of nutrient availability being an important, regional problem for steelhead. Again, it's a matter of diluting the effort with relatively unimportant issues. I can picture every watershed council in the state running around the countryside with dead fish! Focus on the known big problems and you can perhaps make a real difference.
- Page 59. This is a good way to handle the program descriptions, not the earlier lists.
- Page 69, middle of the page. This is really important information. You need to spell out what monitoring watershed councils will be able to do in a rigorous fashion. According to DEQ (and I agree), it's temperature and turbidity. There is a big disconnect between this reality and what everyone (including this plan) is expecting of the councils.

I hope you find these comments useful. I think this is an important effort and has the potential to really improve the situation. Good luck.

Dr. John Tanaka

OSU Department of Agriculture & Resource Economics

Ballard Hall 221

Corvallis, OR 97331

(541) 737-1440

tanakaj@cmail.orst.edu

Attached is my review of the Water Quality chapter of the Oregon Plan Supplement for salmon and streams restoration. I have no particular expertise regarding specific water quality factors of decline to offer more than a lay opinion on whether all factors are listed, whether there are additional factors that should be considered, or whether the factors are ranked appropriately.

Let me begin my review with the observation that on the whole, I think the chapter supplement is fairly well done. I am not sure the presentation is the best since it appears that each factor is merely a repeat of the previous ones with only a few key words substituted in (e.g., sediment for temperature in each objective). The overall sampling design referred to in each of the factors does not fit together until you get to the details on pages 65-69. This seems to be the key to monitoring that is proposed. I do have some specific concerns over whether the data are adequate to really tell us what is proposed and the actual commitment to continue to collect the data. This is not an indictment of the plan, just a statement on political realities of biennial funding for long-term programs. I also believe that if you want to validate the impact of treatments on the factors of interest, that you need to contract that work to a research organization and let them design, implement, and interpret the data. Finally, I am concerned over the reliance on watershed councils and other volunteer groups to collect significant, coordinated data over a long time period without significant funding for that activity (for personnel, equipment, and analysis). I also think that unless there is some level of agreed upon standardization of protocols, the data will only be marginally useful to really understanding what is occurring. The agreement has to be among the councils and the agencies statewide, not just among the agencies and forced upon the local groups.

As an economist, I think you also need to be realistic in this plan. What are the priorities for monitoring should full funding not be available? For example, does the whole plan fall apart if the watershed councils don't do the monitoring for you in the format you desire for statewide aggregation? If the monitoring outlined in the chapter is fully implemented with adequate quality controls, it will provide useful information.

I am not convinced, however, that we know enough about each of the factors of decline (especially the very broadscale ones such as temperature) and their relationship to management practices in either the uplands or riparian areas to document the cause and effect. This is an area where much more research is needed if we really want to understand it. This is not to suggest that nothing happen while the research is conducted, but that researchers be involved (funded) to work with management agencies and watershed councils so that practices can be adequately evaluated as they are on-going. A series of unrelated case studies, while interesting, will not be

nearly as useful as an integrated, replicated study of the effects of a practice on the factor of interest.

Assuming that the factors of decline are correct, the biological objectives are somewhat meaningless as currently stated. Meeting monitoring objectives will not result in halting or reversing decline of steelhead. The only true biological objective seems to be to manage so further degradation is avoided. The last one or two objectives for each factor seem to state that you will comply with EPA regulations and continue to review the factors and incorporate new information. Again, while this is good bureaucratic work, it does not seem likely to halt or reverse steelhead decline.

I was also asked to review the Physical Habitat chapter. I provided many comments on specific agency programs in that review and will not repeat them here. In general, some of the main points I made there included that agencies should not expend funds to develop their own education programs when the OSU Extension Service and other groups are already in place with appropriate expertise and infrastructure; that if agencies want voluntary compliance and cooperation, then the agencies need to operate to build trust and not use project cooperation as a way to enter private lands in order to turn someone in; to separate out scientific, peer reviewed results from documents that are opinions (however good) of scientists; to allow enough flexibility in standards so that short-term impacts are acceptable on a watershed basis if they lead to long-term improvement; and to remember that these systems are dynamic. Additionally, there needs to be a careful review of all programs and interpretations to ensure that personal values and biases do not enter into decisions under the guise of science. For example, many believe that there is a dogmatic bias against cattle grazing (the activity I am most familiar with) and that any research results or observations that go against the “common wisdom” must be discredited.

Specific Comments

Page 6, Figure 2 – I think this figure needs to be clarified in its heading. This implies that a very small percentage of forested stream miles is 303(d) listed. Isn't this due to a lack of assessment rather than what may actually be occurring as suggested in the text (top of page 5)?

Page 15, Factors for decline – I think you also ought to include upland conditions here. There is evidence that the capture, storage, and safe release of water within the watershed may have a significant impact on water temperatures. That is, getting the water into the ground and allowing it to percolate to the stream will result in lower temperatures reaching the stream. Riparian and stream physical and biological conditions will change the rate of heating, but cannot cool the water.

Page 17, obj. 2 – These reference areas need to be carefully selected and adequate sampling conducted to understand the hydrology and watershed conditions in order to extrapolate the results to other stream reaches.

Page 17, obj. 3 – Hopefully a statistician has been consulted on how to analyze these data? While the random selection makes the results statistically valid, using repeated measures will require you to control for interyear variations.

Page 18, obj. 4 – It seems that if you are trying to evaluate the effects of specific practices, the monitoring protocol is going to be critical. There is also the question of collecting baseline data to understand the natural variability for that site. This is probably not going to happen in many sites due to the way funding requirements have been established to implement projects (i.e., one cannot get funding this year and then wait 2-3 years to collect the baseline data before implementing the project). At the same time, relying on watershed councils or others to collect the data is passing the buck and will likely result in a failure to achieve this objective. Adequate funding must be provided to monitor the effectiveness of projects and to validate the assumptions involved in their design.

Page 19, obj. 5 – Is there a basis for these timelines? That is, is there some research results, monitoring results, or a reach by reach evaluation of the potential rates of recovery given some assumed changes in management practices and land uses in order to set these timelines?

ODA Measures – I was not aware that CAFO addressed temperature issues or that confined animal feeding operations had a significant impact on water temperature factors.

OEDD Measures – The same thing related to the dairy industry and nonpoint source pollution.

Page 21, obj. 6 – This seems to be an obvious objective. I'm not sure more regulations/standards are necessary here. It seems that if a system is currently working and existing rules and standards are met, this should be adequate. I am also concerned that items such as DEQ6S would only focus on short-term changes that may have temporary negative impacts but may result in long-term benefits to water quality. For example, after viewing some of the large fires in eastern Oregon forests over the past few years, where landowners were able to manage the timber stand to reflect historical species composition and densities, the fire did not completely burn all riparian vegetation. In the short term, there would be some impacts from thinning but in the longer term, conditions would be maintained.

Page 23, obj. 7 – This seems to be a non-objective since it is required under current statute. All this says is that DEQ will follow the EPA requirements. While the intent in here is to use the “most current scientific information,” care must be taken to separate scientific information that is developed through the scientific process from numbers that are collected without such consideration. To qualify as “scientific information” the results are generally developed through rigorous statistical methods and evaluated and validated by peers. For example, just because someone sticks a temperature sensor in the water somewhere in a stream will generally not qualify as scientific information.

Page 23-24 – Regarding sediment loading, while it undoubtedly does all of the things listed in the introductory paragraph, the Physical Habitat chapter of the Oregon Plan Supplement indicates that there is little known regarding the effects of sedimentation on physical habitat and that many experts rate it as a low to moderate problem. This paragraph seems to imply the opposite is true. If you are going to base the plan on the best scientific information available, then this inconsistency must be reconciled or recognized and the appropriate research program funded and implemented.

Page 24, obj. 1 – Same comments as temperature objective 2.

Page 24, obj. 2 – Same comments as temperature objective 3.

Page 25, obj. 3 – Same comments as temperature objective 4.

Page 26, obj. 4 – Same comments as temperature objective 5.

Page 28, obj. 5 – Same comments as temperature objective 6.

Page 30, obj. 6 – Same comments as temperature objective 7.

Page 30, obj. 7 – This seems to be calling for the funding of research. If the current level of knowledge is not sufficient to determine impacts on beneficial uses, manipulating existing data will not lead to better decisions than currently exist.

Page 39, obj. 4 – The objective of “organization comparable to that of the natural habitat of the sub-basin” is good and probably relatively achievable if comparable in ecological structure and function of the components is the interpretation. If the interpretation is that success is only achieved by going back to pre-European settlement conditions (if we knew what those were), then the objective is likely to fail.

Page 48, pH Factors for Decline – This seems like a create a problem issue. It appears from the wording that there is no good information on which to base decisions, only someone’s supposition that it may have an impact on steelhead. If elevated pH may be detrimental, why wouldn’t lowered pH? Can steelhead tolerate more acidic conditions? While some of the causes are plausible, I have a hard time how wide, shallow stream beds can be linked to pH changes. If the claim is that sedimentation automatically leads to wide, shallow stream beds in and of itself, then the sedimentation would need to be above some naturally occurring variable rate or coming from an area that naturally would not contribute sediment to the system. I have some of the same concern with the altered riparian vegetation factor. Is there documentation that sunlight in and of itself will cause significant pH changes? How does the change from filtered sunlight differ from direct sunlight?

Page 53, Stream Fertility Factors for Decline – The discussion states salmon. Isn’t this the steelhead supplement?

The Pacific Rivers Council
921 SW Morrison, Suite 531, Portland, Oregon 97205
(503) 294-0786, Fax (503) 294-1066, WWW.PACRIVERS.ORG

1 December 1997

Mike Downs
Senior Policy Analyst
Water Quality Division
Department of Environmental Quality
811 SW 6th Avenue
Portland, OR 97204-1390

Jay Nicholas
ODFW
28655 Highway 34
Corvallis, OR 97333

Re: Review of Water Quality Chapter of Steelhead Supplement to OCSRI

Dear Mike and Jay:

Thank you for the opportunity to provide input on the Water Quality Chapter of the Steelhead Supplement to the Oregon Coastal Salmon Recovery Initiative.

I regret that my review is late. I am afraid that I underestimated the extent of my prior commitments during October and November. I hope that you will continue to keep me informed of significant changes, particularly if there are revisions prior to sending the supplement out for legislative review.

My comments go primarily to Questions 3 (will achievement of the stated biological objectives halt or reverse steelhead decline?); Question 4 (are management measures adequate/implementable in a timely manner?); Question 6 (will measures lead to measurable improvements/improvements soon enough to recovery steelhead?); and Question 8(what priorities should be set for implementation?).

I. BIOLOGICAL OBJECTIVES

A. Objectives are not “biological” objectives.

Most of the stated “biological objectives” are less biological than administrative or status-assessment types of objectives. In terms of recovery priorities, these types of objectives, while inherently important to understanding status and trend, should take a backseat to those objectives

which actually constitute goals for habitat conditions and which help to detect habitat degradation and recovery.

As currently stated, the objectives do not enunciate a set of target physical and biological conditions which must exist on the ground to ensure the survival and recovery of steelhead. Rather, they read more like a laundry list of information-gathering tasks with target milestones which are not capable of painting a picture of the conditions we are aiming for. Exceptions include objectives like Temperature #5 which aims to actually meet the temperature standard by a time certain: 35% meeting by 2007 and so on. Other objectives should be similarly grounded.

I also note the objectives include random site monitoring to determine status and trend of temperature and other water quality standards as factors for decline. This monitoring must go to more than measurement of parameters formally included as water quality standards. Rather, as per page 17B-1 of the OCSRI, full protection of the beneficial use (here, steelhead) requires us to protect and restore physical habitat elements such as riparian vegetation, channel morphology, and stream flows. We strongly urge that Biological indicators of instream and riparian condition and trend must be added to this to make monitoring ecologically worthwhile.

B. Complete Suite of Ecological Objectives Needed

I strongly suggest that the state should independently adopt a set of ecological objectives which are capable of providing a more informative measure of the status and trend of aquatic ecosystems than water quality standards parameters alone. These should include, as per existing federal policies and NMFS Biological Opinions for federal plans, objectives for habitat components for life stages affected by land management, including at least objectives for sediment delivery, fine sediment, cobble embeddedness, and bank stability (in addition to the temperature standard). The objectives endorsed in the Biological Assessment of Forest Service and BLM land use plans for Snake River and Upper Columbia River steelhead by the Level 1 Team (September 1997) are:

- Sediment Fines (<20% surface fine sediment for spawning habitat)
- Cobble embeddedness (e.g. <30% cobble embeddedness for rearing habitat)
- Bank stability (e.g. 90% streambank stability standard or natural bank stability according to best available data)
- Pool frequency (stratified by Rosgen Stream Type, 9 to 96 pools per mile)
- Depth to width ratio (<10, by channel type)
- Large woody debris (>20 pieces/mile of >12" and >35' long)

These objectives should be used pending watershed assessment information to validate or refine them. In our view, the above habitat objectives have been validated as applicable within the range of steelhead proposed for listing and we suggest that these standards should be applied to all areas where salmonids are protected beneficial uses.

Beyond the parameters proposed as measures in the federal lands Steelhead BA, however, there is also a need for the state to employ:

- At least one biological indicator for riparian vegetation. (*See e.g.* 60% similarity to site potential riparian vegetation proposed by the ICBEMP Eastside and Upper Columbia EISs).
- Instream biological indicator such as benthic macroinvertebrate populations and species richness. (*See e.g.* Karr et. al.)

Addition of physical and biological riparian indicators and biological instream indicators also would address the insensitivity of the management objectives to early signs of degradation. While physical indicators are important and relevant, most of them are habitat features that change relatively slowly making it difficult or impossible to detect changes over months or even several years. But riparian vegetation can be affected in a matter of days by activities such as inappropriate livestock grazing. Measures of changes in riparian vegetation should be used in conjunction with the longer term variables.

A. Details needed to make no degradation a meaningful biological objective

Objectives such as Temperature 6, Sediment 5 state that in ESU watersheds that supported steelhead, and where water quality is currently equal to or better than the relevant standard the state should “manage activities such that water quality is not degraded.” I strongly agree with this general proposition but note that this objective essentially restates (though only partially) the requirements of existing law. This is not unnecessary or trivial, given that the antidegradation requirement currently is largely ignored in management decisions, but neither does this objective nor the management measures stated below it appear to help matters much.

This objective can be given meaning only if the state clarifies its interpretation of “degradation” in the numerous contexts where this will be necessary. Adoption of a set of ecological indicators, as discussed above, will help. But more is needed. For example, will the state extend (as it should) the prohibition on further degradation of impaired water bodies from point sources to nonpoint sources? (I suggest that this be done by rule). A clear plan for implementing this policy through available mechanisms and/or creating new ones should be of the highest priority – conserving the anadromous resources we still have is the first step towards recovery. This plan should be a main component of the management measures.

In sum, details are needed to ensure meaningful implementation of the nondegradation requirement of the Clean Water Act. The antidegradation component of the Act supplies to all waters, with a hard and fast nondegradation policy applicable to 303(d) streams and ONRWs and a presumption against degradation (with a required showing to overcome it) on those which meet or exceed standards. Regardless of whether streams have actually been listed under 303(d), given the precarious status of steelhead it is safe to say that the first priority for steelhead recovery in watersheds where they still exist should be no further degradation of habitat, including but not limited to habitat parameters which are directly linked to numeric water quality standards.

One key point which the state has yet to clarify with respect to a “no degradation” policy is the extent to which activities may impede recovery towards meeting standards. We hope that in this respect the state will adopt a policy consistent with that of the federal land managers and their the interim aquatic conservation policies for the Interior Columbia Basin. The intent of Pacfish (and Infish) is no degradation of habitat conditions for anadromous and resident salmonid fishes, a goal that the policy states must equate to a constraint on land management to that which does not "retard or prevent attainment” of stated Riparian Management Objectives. We believe that this is the appropriate standard which should apply under the CWA antidegradation mandate for streams where objectives, i.e. water quality standards and full protection of beneficial uses currently are not being attained. *See e.g.* Pacfish definition of retard attainment of Riparian Management Objectives (to “measurably slow” recovery of any feature that is worse than the objective level).

I. AGENCY MANAGEMENT MEASURES

My initial observations are that:

1. The management measures are stated so generally as to preclude evaluation of the impact each measure is expected to have on conservation and recovery of steelhead and associated aquatic resources. (e.g. “implement new water quality standards”).
2. The measures do not appear to be prioritized in any way according to their importance to conservation/recovery of steelhead. (A problem which you have already recognized but that may be difficult to overcome until the measures are spelled out in more detail).
3. The measures should be linked whenever appropriate to those areas already identified as the most critical for steelhead conservation and recovery.
4. It is my hope that the state has fully utilized the work of the Aquatics Team of the Interior Columbia Basin Ecosystem Management Project in identifying “salmonid strongholds” at the 5th/6th field HUC level (those rare areas where salmonid populations are strong). Strongholds occur both on and off federal lands and should be targeted for priority implementation of a nondegradation standard in this plan.
5. TMDL Priorities: We suggest that the priorities for TMDL development be explicitly stated as part of the state’s overall anadromous fisheries conservation and recovery plan.
6. Commit state to an enforcement role in 401 certifications for all federal permits, including grazing. I note that the OCSRI (17B-25) included “enhanced review and enforcement” for the existing 401 certification program, but that DEQ has not committed to a strong enforcement role in 401 certification of federal grazing permits as of yet (rules in drafting process now). I suggest that if the State is to follow through on its efforts to

lead in recovery efforts to anadromous resources that it must take a strong oversight role with respect to all of its 401 certifications.

I suggest this Plan should explicitly state as a priority, at least categorically, “those projects which have the greatest potential to adversely effect salmonids” (See e.g. OSCRI 17B-25). This is not only possible based on current knowledge, it is necessary if the plan is to lead to more than another stage of assessment and planning.

I. PRIORITIES

I strongly support the infusion of this plan with a very clear overlay regarding priorities.

To be effective, all aspects of this plan must be spatially explicit about important places for targeting limited resources. It is critical that his plan take on the job of setting priorities rather than deferring to later stages of planning. To its credit, the plan does acknowledge that an effective prioritization has to be more than targeting 303(d) streams – priorities must be set based on an integration of factors. I suggest that these should, at first cut, be ecological factors. Next, institutional capabilities and political realities can be factored in to determine the best implementation strategy.

The state should consider elevating the importance of implementing appropriate management measures in watersheds which have been preliminarily assessed as priority areas for steelhead recovery and which are threatened with imminent or declining ecological integrity.

Thank you again for the opportunity to review the plan. Please do not hesitate to call with any questions or concerns.

Sincerely yours,

Mary Scurlock
Senior Policy Analyst
Pacific Rivers Council
c/o 10575 NW Skyline Boulevard
Portland, OR 97231
503-283-1395
mscurlock@worldnet.att.net

cc: Paula Burgess, Governor’s Natural Resources Office

Water Quality Responses

Introduction

The state requested 16 water quality experts for their technical review of the Water Quality chapter of the Oregon Plan Supplement (Steelhead Supplement). In order to aid in focusing the review, the state requested each reviewer to respond to the following questions regarding the draft chapter:

1. Does the document list all relevant water quality factors of decline regarding steelhead? If there are additional significant factors regarding steelhead decline please list them.
2. Are the factors of decline described appropriately? If not, what improvements can you suggest.
3. Do the biological objectives address the factors of decline appropriately? Will achieving the biological objectives result in halting or reversing the decline of steelhead in the ESUs identified in the Supplement?
4. Are the agency management measures listed in the Supplement adequate to achieve the associated biological objectives? Do they move us in the right direction to address the factors of decline in a timely manner? In your opinion are the agency management measures able to be implemented within the identified time frames?
5. Are the analyses and conclusions in the Supplement consistent with the scientific literature, and does the analysis support the conclusions? Is more research needed in any area of water quality for the Supplement to be successful in protecting and restoring steelhead? If so, what areas require additional research?
6. Does it appear that the agency management measures listed in the Supplement will result in water quality improvements that are measurable, and over what period of time? Will the water quality improvements occur soon enough to recover the species?
7. Does the Supplement, in combination with the Oregon Plan, contain adequate water quality monitoring to determine the success of individual measures, to allow for adaptive management, and to assess success of the plan? If not, what additional water quality monitoring is necessary?
8. What should be our priorities for implementing the factors of decline, biological objectives, and agency management measures? In other words, what are the most effective elements of the Supplement? Are there agency management measures that will be ineffective and/or a waste of money?

Following are the comments of the 13 peer reviewers who responded, listed alphabetically by reviewer names, and the state's response to the comments:

Dr. Leslie Bach
Oregon Water Trust

Thank you for the opportunity to review the Water Quality chapter of the Oregon Plan Supplement. The state has shown strong leadership in the effort to recover salmon and steelhead in Oregon using a cooperative approach. I have attempted to address your specific questions regarding the Steelhead Supplement to the best of my ability. I hope that my comments will provide you with useful information that will help strengthen the recovery effort.

1. Does the document list all the relevant water quality factors of decline?

Bach Comment 1:

Two water quality factors that are not addressed in this portion of the supplement are habitat modification and flow modification. I realize that these are likely addressed in other sections that deal directly with fish habitat and water quantity. However, these two parameters are part of DEQ's water quality criteria, and are listed as factors on the 303d list. Since I did not have the opportunity to review these other chapters, I do not know how adequately they are addressed.

My general sense is that in the past these factors have not been the focus of water quality monitoring and protection by DEQ and EPA, however they are very significant factors impacting salmonids. Other agencies which may have more direct purview over these factors, e.g. ODFW and OWRD respectively, do not necessarily have the regulatory authority or agency mission that would allow them to actively influence the conditions associated with these parameters. I hope that in the future, more emphasis is given to these parameters in meeting the requirements of the Clean Water Act.

State Response 1:

Habitat modification and flow modification are addressed in the Physical Habitat and Water Quantity, Fish Passage and Fish Screening sections of the Supplement. As noted, DEQ has listed streams on the 303(d) List where available data show that beneficial uses are being impaired due to habitat or flow modification. Thus, DEQ will be addressing these issues as it develops TMDLs for water quality limited waterbodies on the 303(d) List.

2. Are the factors of decline described appropriately?

Bach Comment 2:

The factors of decline are described in very general terms. The specific standards are not listed in the supplement, nor did I find them in the Water Quality chapter of the original plan. Without more specific information, it is hard to answer whether the factors are described appropriately. I think it would be helpful to provide a little more detail on the effects of the parameters on salmonids. For example, it would be helpful to know how temperature impacts steelhead during the different life history stages, and what the range of tolerance or target levels are. This might

be helpful to the general public if one thinks of the document as an educational tool as well as a plan of action. The information could be included in the supplement as an appendix.

State Response 2:

Agreed. Appendix 2 has been added to the Water Quality section providing a summary of state water quality standards. A summary of how each water quality parameter affects steelhead in each of its life stages and the associated tolerance limits is not available at this time. However, DEQ's 1992-1994 Water Quality Standards Review Final Issue Papers, June 1995 has been added as a reference. It contains an extensive review of the effects of temperature on salmonids for each of the life stages.

3. Do the biological objectives address the factors of decline appropriately?

Bach Comment 3:

In general, the biological objectives are laid out as a plan to evaluate the current conditions, meet the current standards, monitor the effectiveness of management measures and evaluate trends. I think these are critical pieces of an effort to recover steelhead in the ESUs identified in the supplement. However, the individual standards for some of the parameters may not be adequate. The temperature standard during the rearing portion of the life-cycle is 64⁰ F, which may not be adequate for recovery of steelhead. There are probably streams in the state that may not have been historically cooler than 64⁰ F during the summer rearing period, but probably many others that were. I am not sure I am comfortable with a statewide standard for temperature. I realize that the standard has been reduced from 68⁰ F in some areas and that will probably help improve conditions for steelhead, but it may not be enough. Since reference sites are also being monitored, perhaps future review of the numeric criteria should look at site-specific standards.

State Response 3:

DEQ is committed to review the state water quality standards every three years under the Clean Water Act to ensure they continue to be based upon the best scientific information currently available. In the future it may be appropriate to have temperature standards that are more specific to geographic areas than the current standards. However, additional information will be required to identify the appropriate criteria for each unique geographic area of the state that will adequately protect the resident and anadromous aquatic species found there.

Bach Comment 4:

I am unfamiliar with how the new inter-gravel sediment standard is evaluated, and the document did not provide the specific numeric criteria, so it is hard to evaluate its effectiveness. The impacts of sediment are hard to quantify, and I commend the state for developing a standard that attempts to do so. Continuing to use information from habitat or stream surveys is probably a good idea as well. These surveys have not always used reliable methods for determining sediment impacts; recommendations have been made to use streambed particle size information (for example Wolman pebble counts), and I think that this should become the standard for habitat surveys. At the very least, it is a reliable way of determining trends in sediment over time.

State Response 4:

The Intergravel dissolved oxygen standard is now summarized in Appendix 2. In addition, DEQ has committed in measure DEQ5S to undertake a major review of its sediment standard with the intent of significantly upgrading it to better address stream attributes related to sediment loads

such as cobble embeddedness, particle size distribution and residual pool volume. This review will be undertaken during the next Triennial Review beginning this biennium.

Bach Comment 5:

The biological objective for Bio-criteria is also very general and perhaps too weak. The idea is to evaluate the species composition, etc. relative to reference sites. I am not sure how many biologically unimpaired reference sites one might find today, and I think that a standard that is applied as a relative measure may not result in the type of biological integrity necessary for halting or reversing the decline of steelhead.

As far as the selection of reference sites, will this be based on some sort of classification scheme? The document lists a proposed number of reference sites per ESU, but I would think that a reference site should be classified in some way to represent certain ecological, hydrological, landform or land use categories. I would think that each ESU would be too diverse to be represented in its entirety. Other than for the comparison of biological integrity, it was unclear to me what use the reference sites will have. Perhaps for the uses envisioned by the authors of the document, no classification scheme is needed.

State Response 5:

Reference sites are generally referred to as streams which represent unimpaired or “least” impaired conditions (EPA, 1990). This recognizes that finding streams in natural conditions, with no anthropogenic disturbance (unimpaired), may not always be possible. In such cases streams that represent areas with the least human disturbance or minimal impairment may be used as reference sites.

The biological communities from such reference sites are used in two ways: 1) To set criteria by which the biological condition of streams in a region can be evaluated, and 2) to allow variability due to annual climatic changes and fluctuations in streamflows, temperature, etc. to be taken into account when assessing streams over multiple years. For example, changes in macroinvertebrate and fish communities may occur between years due to differences in weather conditions which are unrelated to changes in land management, restoration activities, or human disturbance. By sampling reference streams each year these natural fluctuations can be accounted for, making it more likely human caused changes will be detected.

Will reference site selection be based on some sort of classification scheme? Just as the random selected sites will cover a range of stream types (different stream orders, gradient, and flow characteristics), we will attempt to select reference sites from a similar range of streams within each ESU. The primary factors we plan to use to classify streams into different types are stream gradient (3 gradient classes: 0-2%; 2-4%; > 4%) and bank-full width (3 width classes: 0-5 meters; 5-10 meters; > 10 meters). It is most difficult to find reference sites in low gradient, wide stream categories, since these usually occur in the lower segments of river systems where a greater variety of disturbance factors often occur. The least disturbed streams in these categories will still be identified and sampled even though some disturbance is occurring. While this may not represent the best attainable conditions for streams in a certain category, it still provides a valuable benchmark to compare changes in other similar types of streams to over time. We are also exploring the idea of developing a “reference community” based on historical information

for streams types that have no suitable reference sites available (ex. low elevation valley segments). As the reference site data set grows over time the “reference conditions” will become better defined.

EPA. 1990. Biological Criteria – National Program Guidance for Surface Waters. EPA, Washington

4. Are the agency management measures adequate to achieve the biological objectives?

Bach Comment 6:

The agency management measures appear to lack a cohesive strategy for halting the decline of steelhead. In many cases we don't have an overall understanding of how all the pieces fit together, in other words, how do land use activities impact water quality, which in turn alters fish habitat and therefore affects fish use and production. In order to design adequate measures, we need comprehensive watershed analysis that will identify those processes impacting the current conditions for steelhead and the specific land use activities that need to be modified. We need a link between current conditions and causal effects. Without that, we are just implementing whatever measures we have available to us, hoping they will address the (unidentified) problem. Watershed analysis should be the first step in the recovery effort, and should be performed with highly trained professionals from a variety of disciplines. Asking watershed councils to perform this role is not an adequate way to address the need (see below).

State Response 6:

Agreed. This is the approach the state intends to follow in implementing the Oregon Plan. Watershed Councils are not being expected to perform the role of completing in depth watershed analyses unless they have the expertise, capacity, resources and desire to do so. State and federal agencies will be working closely with watershed councils as watershed assessments are done, whether the state or federal agency or watershed council has the lead.

Bach Comment 7:

It also appears to me from the document that agency coordination is still a bit elusive. Some of the measures clearly indicated a working relationship among agencies, but others seem to be very agency specific. For example, both the Department of Forestry and the Department of Agriculture will be attempting to work with landowners to protect and improve riparian areas. What coordination has occurred between these departments to identify those areas with limited riparian function, determine their respective impacts on water quality, and launch a targeted effort to reverse the trend. What is the federal role in halting the decline of steelhead and how will those efforts be coordinated with the state? Using a watershed approach to recovery, as suggested above, requires involvement with all agencies and stakeholders including the federal government. Finally, which agency or agencies is ultimately responsible for insuring that the approach to recovery is targeted and thorough?

State Response 7:

The state has several levels of agency coordination it is using to ensure the necessary coordination is occurring. First there is the Salmon Strategy Team (SST) which meets monthly in the Governor's Office to coordinate the overall efforts of all the state and federal agencies responsible for implementing the conservation plan. It is comprised of the heads of the state

natural resource agencies, policy-level representatives of federal natural resource agencies, local government representatives, state legislators, tribal representatives and representatives of the Governor's Office. Second, there is the Salmon Implementation Team (SIT) that meets biweekly to discuss and resolve implementation and coordination issues. It has the same representation as the SST, but at the senior staff level, and it is chaired by a representative of the Governor's Office. Third, by working through watershed councils to implement the Plan, the responsible state and federal agencies are intending to ensure that all stakeholders are involved. Finally, the Legislature has established the Independent Multidisciplinary Science Team (IMST) to serve as an independent scientific peer review panel to oversee implementation of the Oregon Plan. They will meet regularly to review implementation progress and to assess whether the Plan really is resulting in the established recovery goals. Their recommendations will be directed to the Governor and Legislative Oversight Committee.

Federal agency management measures will be added to the Supplement before it is finalized. Unfortunately, only state agency measures were available and included in the draft Supplement that was sent out for peer review.

Bach Comment 8:

Many of the measures listed in the supplement were very general, making it difficult to determine if they are adequate. Many of the measures had statements such as "implementation plans will be developed for both point and nonpoint sources of pollution..." (pp. 61); "nonpoint sources of pollution will be minimized in the Oregon Coast ESUs through implementation of comprehensive state and local programs..." (pp. 69); "...protected stream miles have increased to approximately 30 percent. This will allow for more stringent rules to be applied to protect water quality" (pp. 93). I found myself wondering what would actually be done on the ground to make the necessary changes. Many of these measures are listed as ways of assuring non-degradation of waters that are currently not water quality limited. Again, the specifics of how these measures will protect high quality waters are not provided. It is unclear to me what implementation of the antidegradation water quality standard means.

In many ways this seemed to be an exhaustive list of all activities the agencies are involved with, often with nebulous ties to the biological objectives. Although not totally familiar with the Forest Practices Rules and Senate Bill 1010, my sense is that they are somewhat inadequate in their ability to fully protect upland and riparian areas and therefore may not be enough to achieve the biological objectives for factors such as temperature and sediment.

State Response 8:

The details of how state and federal agencies will implement the measures identified in the Supplement are included in the work plans developed for each measure. Each work plan includes the following elements: tasks, deliverables, responsible staff, and completion dates. Unfortunately, these work plans were not available at the time the Water Quality section was sent out for peer review. They will be added to the final Supplement. Additionally, many of the programs referenced in agency measures in the Supplement are explained in detail in other program documents. For example, the Coastal Nonpoint Pollution Control Program, the Tillamook Bay National Estuary Program, the Lower Columbia Estuary Program, and the

Willamette River Project all have extensive program documentation and water quality information and studies not included in the Supplement.

The antidegradation water quality standard requires that waterbodies that are currently cleaner than state water quality criteria would allow must not be allowed to degrade without the approval of the Environmental Quality Commission, based upon satisfaction of a specific set of criteria contained in the antidegradation rules. This requirement applies to facilities that have NPDES permits from DEQ, as well as, forest and agricultural practices managed by ODF and ODA and federal land management agencies. The purpose of the antidegradation standard is to protect high quality waters, and since a primary goal of conservation planning is to protect the good habitat that still remains as a first order of business, the antidegradation standard has a very important role to play in implementation of the Oregon Plan.

If the state Forest Practices Act and SB1010 do prove to be inadequate in their ability to fully protect upland and riparian areas, as the comment suggests, then they will be appropriately amended as necessary to achieve the biological objectives. The IMST will be analyzing implementation of the Plan and making recommendations for adaptive management where they believe it is necessary.

5. Are the analysis and conclusions in the Supplement consistent with the scientific literature... Is more research needed...?

Bach Comment 9:

I did not see a great deal of analysis performed in the Supplement. Again, I believe that what we need to do is, on a watershed basis, analyze the interaction of land use and land cover, determine the physical and biological processes associated with this interaction, identify the causal impacts, and determine the required changes necessary for halting the decline of steelhead. I believe this needs to be done by highly skilled experts representing a variety of disciplines, and the results should drive the agency management measures to achieve specific effects.

State Response 9:

Agreed. This is the approach the state intends to use in implementing the Plan.

Bach Comment 10:

It appears as well that more research is needed on the effect of specific water quality parameters on steelhead and the standards required for stability and recovery. In particular, the impacts of sediment on the various life-stages of steelhead, and the appropriate metric to evaluate it needs further research. Other factors such as temperature and habitat requirements also appear to need further research and analysis.

State Response 10:

Agreed. DEQ is working with USEPA to get additional research done in these areas. Also, more work is needed on the effects of nutrients (nitrogen and phosphorus) on salmonids and other aquatic species. EPA does not currently have water quality criteria for sediment or nutrients. Hopefully, these will be forthcoming in the next few years.

Bach Comment 11:

There was also an analysis done in the beginning of the document categorizing water quality limited stream miles by land use. Having worked with the land use layer, I feel that the resolution is insufficient for determining the true land use along the riparian area. The results may therefore be somewhat misleading, as the actual land use along a water quality limited stream may be different from its category in the land use layer. In an era where it is not popular to point blame, the results of this analysis may be somewhat controversial.

State Response 11:

We agree the land use/land cover layer is limited in resolution and the data is old. However, at the macro scale it is useful to help us determine the major nonpoint categories in steelhead watersheds so we know our programs are generally targeted appropriately. The purpose is not to point fingers or assess blame, but to help us determine if we are on the right track in terms of our management measures. More detailed information on actual riparian land use will become available as watershed assessments are done. Then the specific details of water quality management plans can be targeted at the appropriate land management activities.

6. Does it appear that the agency management measures will result in water quality improvements that are measurable, and over what period of time?

Bach Comment 12:

The approach seems to be fairly slow and cautious. While this is probably wise from the political and social standpoint, it may indeed be too slow to recover the species in a timely manner. Many of the management measures focus on developing plans, e.g. developing TMDLs and Water Quality Management Plans for water quality limited streams. The plans themselves will take some time to develop, and a plan does not fix the problem. I think we need to be more aggressive on implementation of specific on-the-ground measures. We are much further along in implementing control measures for point sources than we are for nonpoint sources. Two of the most significant parameters impacting steelhead are temperature and sediment. These factors are not easily addressed through discharge limits, as are parameters impacted by point sources. More specific land use controls are probably needed to address these factors, for example, riparian management areas for agricultural land.

State Response 12:

Agreed. SB1010 and SB502 give ODA the authority it needs to address water quality impairment from agricultural practices. SB1010 agricultural water quality management plans will be prepared for agricultural lands in each watershed not meeting water quality standards. ODA has committed to complete these plans within four years. It will take some time after that for the plans to be fully implemented and for the beneficial effects on water quality and steelhead to accrue.

Bach Comment 13:

Overall I believe there is too much reliance on watershed councils as a mechanism for accomplishing salmon recovery. While I strongly believe that local involvement and ownership is crucial to a successful recovery effort, I think that the state and federal government has ultimate responsibility to get the job done. There is limited oversight of watershed councils to insure they are fully balanced and that they are accountable for their activities. The councils tend

to want to move slowly, and are suspicious of assistance from agency personnel. The councils are being asked to conduct watershed analysis for their area, but lack the necessary resources and skills to accomplish the depth of analysis required to answer the difficult questions. I believe that these factors may cause the recovery effort to move slower than necessary from a biological perspective.

State Response 13:

Agree that state and federal government have the ultimate responsibility to see the job gets done. Watershed councils are not being asked to assume that responsibility, but to work with state and federal agencies on watershed assessments, identification and prioritization of restoration projects, and development of water quality management plans. They will be provided guidance and assistance on how to conduct acceptable watershed assessments to guide prioritization of watershed restoration efforts. A draft guidance manual is currently being reviewed prior to finalization and distribution to watershed councils. More complex assessments necessary for TMDL development or other water quality management planning will be conducted by the appropriate agencies with the assistance of watershed councils, or if the council has the technical capability, capacity, resources and desire they may take the lead on these assessments.

7. Does the Supplement contain adequate water quality monitoring?

Bach Comment 14:

The Supplement includes evaluating effectiveness of projects as a biological objective. I think that this should help elevate the importance of monitoring as critical to determining success and implementing adaptive management. However, the specifics of how monitoring will be implemented are limited in the document. The "watershed design" described in the management measures does not lay out a comprehensive analysis plan which identifies questions and targets data collection to answer those questions. The "strategic design" lists a number of parameters that will be measured, and states that a strategy will be developed for monitoring restoration projects. Without a clear idea of that strategy, it is hard to determine if it is adequate.

State Response 14:

Agreed. It is stated in the plan that watershed monitoring will be most likely carried out by other agencies (USFS or BLM for example) or watershed councils. Because objectives will vary between watershed councils and for agencies within different watersheds, we can't predict how the monitoring designs will vary. DEQ personnel are expected to be providing technical assistance to watershed councils to help them develop an appropriate strategy to answer their specific questions.

Bach Comment 15:

The monitoring component of the plan seems to heavily rely on watershed councils to develop plans and collect data. Watershed councils lack the needed expertise to design and implement a comprehensive monitoring strategy, and do not have the needed personnel to analyze and interpret the data. In addition, it is unclear who will fund these monitoring projects, as the councils do not have the financial resources to do so.

State Response 15:

DEQ personnel have been hired to provide technical assistance to watershed councils to help them develop appropriate monitoring strategies and provide training to council members so they

will be able to collect acceptable data. The 20 million dollars allocated to GWEB will be the primary funding source for watershed councils to undertake and complete monitoring activities.

Bach Comment 16:

Other agencies besides DEQ are also responsible for providing monitoring data. ODFW's commitment to increased inventory and monitoring of steelhead habitat and distribution is very critical to the recovery effort. Identifying the use and needs of the fish is the first step in a comprehensive watershed analysis. The Department of Forestry is also providing support for fish habitat and distribution monitoring, which will help identify use on private and state forest land. However, many of the other monitoring measures listed by DOF appeared to be part of existing monitoring programs, and there was no clear link between some of those programs and the specific need for demonstrating success and allowing for adaptive management. It was also unclear to me how the Department of Agriculture would monitor the accomplishments of SB 1010.

State Response 16:

SB 1010 plans will be reviewed by DEQ and are closely linked to DEQ's TMDL assessments. Monitoring needs will be identified within TMDL plans. Specific monitoring objectives will likely vary from plan to plan, and the personnel responsible for monitoring may also vary from different agencies (including DEQ) to watershed councils.

8. What should be our priorities for implementing the factors of decline, biological objectives and agency management measures?

Bach Comment 17:

I believe the most significant water quality factors for decline for steelhead are temperature, sediment, habitat modification and flow modification. I think the most impact we can have is through measures that will protect and restore riparian areas on both forest and agricultural land. If we restore riparian areas and allow the stream systems to function under more natural hydrologic and hydraulic conditions, we reduce sediment inputs to the stream, increase streamflows, reduce stream temperatures and create more complex fish habitat. I think this will be best accomplished through management activities that control and modify land use activities. Although unpopular, we must find ways to create riparian buffers in agricultural areas, and to increase the amount of riparian protection currently mandated on private forest land.

State Response 17:

Agreed. ODA and ODF have committed to ensure that agricultural and forest practices will protect riparian areas such that water quality is protected and restored. That is their mandate under the SB1010 and the state Forest Practices Act.

Dr. Bob Beschta
Professor of Forest Hydrology
Oregon State University

While I have had an opportunity to review the Draft Water Quality Chapter of the Steelhead Supplement to the Oregon Plan, it is apparent that to fully understand the content of this document would also require considerable additional time delving into various supporting documents. Unfortunately, I wasn't able to do that. However, based on a review of the Supplement I will attempt to respond to the 8 groups of questions in a concise manner.

1. *Does the document list all relevant water quality factors of decline regarding steelhead? If there are additional significant factors regarding steelhead decline please list them.*

Beschta Comment 1:

The document includes relevant water quality factors that might contribute to the decline of steelhead.

State Response 1:

Agreed.

2. *Are the factors of decline described appropriately? If not, what improvements can you suggest?*

Beschta Comment 2:

While Tables 1 through 8 appear to provide a reasonable overview of the number of stream miles associated with each of the water quality variables of concern and the general land uses within each of the provinces, little information is provided regarding the quality of the information represented in Tables 1-8 (e.g., is it based on short- or long-term monitoring efforts, local observations?). Although such tabular data is important to identify a general level of concern (e.g., number of stream miles of 303(d) listed streams or streams of potential concern) the table provides little insights as to where in each basin the various water quality concerns occur, or which streams have multiple concerns. Without developing correlations or associations of the water quality variables in Tables 1-8 and presenting them on drainage basin maps, it is difficult to know where the most significant problem reaches, or non-problem reaches, occur in a given basin. In other-words, individual water quality variables should be combined into an integrated assessment of specific stream reaches so that the public can develop a better understanding as to the general location and extent of water quality degradation within each province.

State Response 2:

Agreed. DEQ placed its 303(d) database on the Internet where the public can perform searches of the data by watershed, by stream segment, by water quality parameter, by type of waterbody, and by listing status. Information is provided in the database on the sources of water quality data used to perform the assessment for each waterbody in the database. In the future DEQ hopes to also include maps of the watersheds on the Internet showing the status of water quality for the waterbodies in the watershed. There is too much detail to include all of this information in the

Steelhead Supplement. A reference to the Internet site has been added to the text for those who wish to drill down more deeply into the water quality data. Of course, watershed assessments will need to be done for many of the watersheds to obtain more complete and accurate information on the status of water quality and the sources of the impairment. These assessments will be completed as necessary during the TMDL/Water Quality Management Plan development process.

Beschta Comment 3:

It's not clear why the number of miles of streams identified as 303(d) listed for "sediment" often exceed the "total number of miles" of 303(d) listed streams. For example, for all Coastal HUCs in the Klamath Mountains Province the number of sediment 303(d) listed stream miles is 3105 while the total number of 303(d) listed streams is 3033. Similar situations occur elsewhere in these tables where the sediment stream miles in a given category will substantially exceed the total stream miles in that same category.

State Response 3:

Thank you for pointing this discrepancy out. Upon review we determined our database query contained an error. A new query has been run and the numbers in Tables 1, 3, 5, and 7 have been corrected.

3. Do the biological objectives address the factors of decline appropriately? Will achieving the biological objectives result in halting or reversing the decline of steelhead in the ESUs identified in the Supplement?

Beschta Comment 4:

The biological objectives seem to be mostly measures aimed at providing more information relative to status and trends. Improved information in each of the basins as to what water quality problems exist and where they exist is an important task that the State can and should undertake. The leadership of State agencies should be used to insure comparable levels of data quality across the diverse basins where steelhead are of concern.

While it would be nice to assume that if the biological objectives for water quality are met steelhead runs will improve, the complexity of anadromous fish runs indicates that there are numerous other environmental components that also need to be improved if the decline of steelhead is to be reversed. The importance of improving water quality relative to other factors is not known to me nor is it indicated in the Supplement.

State Response 4:

A number of the biological objectives under each factor for decline address monitoring to determine water quality status, trends and whether measures are effecting water quality improvements. However, two biological objectives associated with each factor for decline address protecting water quality where it currently exceeds standards and restoring water quality where it fails to meet standards. These objectives are the key to improving and protecting water quality. While improving water quality alone won't result in recovery of steelhead it is one of the keys along with measures to address physical habitat, water quantity, fish passage, fisheries management and dams and hydropower projects. It is hoped that all of these measures taken together can halt or reverse the decline of steelhead in Oregon.

4. *Are the agency management measures listed in the Supplement adequate to achieve the associated biological objectives? Do they move us in the right direction to address the factors of decline in a timely manner? In your opinion are the agency management measures able to be implemented within the identified time frames?*

Beschta Comment 5:

As currently formulated, I'm concerned that some of the biological objectives are likely to be unachievable. For example, the selection of 225 potential reference sites (unimpaired or least impaired) are proposed under the Temperature Biological Objective #2. These sites are to be randomly chosen and apparently 20 % of them will be monitored each year. The natural variability in stream temperature from year to year would indicate that this type of sampling approach may not provide a good perspective of temperature patterns and problems in the various basins. Instead, I would recommend fewer sites be selected whereby summertime temperatures will be monitored each year for at least 5 years. After 5-years, a decision could be made regarding the necessity of discontinuing individual sites, adding more., etc. Furthermore, the "unimpaired or least impaired" sites will likely consist of small headwater streams because they will most often fit the criteria for reference sites. As a result, larger streams and rivers are unlikely to be selected and their status and trends unmonitored. Such a situation is untenable.

I have some similar concerns with regard to the Temperature Biological Objective #3. Randomly selecting 450 sites and then monitoring them only once every 5 years is not adequate for establishing trends. For example, to monitor trends in summertime stream temperatures, continuous monitoring during each summer is needed over at least a decade to potentially identify and/or confirm a trend. Periodic monitoring will not work. Furthermore, the reliance on random sampling is totally inadequate. Drainage basins and stream systems do not occur in random fashion across the watershed and systematic temperature patterns in a downstream direction are the norm in all basins. Thus, a stratified (by stream order, elevation, land use, etc.) sampling scheme, with a random component, would be much more enlightening regarding temperature trends.

State Response 5:

Some of the monitoring details are not clearly stated in the plan which relate to some of your concerns. For example, reference sites are not randomly selected. They will be selected based on available information on human disturbance. Reference sites are generally referred to as streams which represent unimpaired or "least" impaired conditions (EPA reference site info?). This recognizes that finding streams in natural conditions, with no anthropogenic disturbance ("unimpaired"), may not always be possible. In such cases streams that represent areas with the least human disturbance or minimal impairment may be used as reference sites. We plan to group reference streams into categories using channel gradient and bankfull width categories. Categories are currently being assessed by EPA using data previously collected from sites in the Oregon Coast Range. Possible categories include: 3 gradient classes (0-2%; 2-4%; >4%) and 3 bank-full width classes (0-5 meters; 5-10 meters; >10 meters).

The number of reference sites listed in the plan are based on our best ideas of how many sites will be needed to provide a sufficient data set over several size and gradient categories. The final

number may be less if that number can't be located. Temperature will be sampled continuously from approximately July 1 through October 1 at all sites. There will also be a subset of sites (10 to 15%) that are sampled every year to provide information on yearly climatic effects on temperature and other parameters.

Random site selection will be stratified by stream order and include 1st through 3rd order wadable streams. While this will leave out large river systems from the random sampling approach it covers the majority of stream sizes utilized by steelhead for spawning and rearing. As with the reference sites a subset of sites will be sampled every year. Finally the trends we will be trying to evaluate are not trends within a specific river segment, but trends over a broader geographic area (ESU, basin, or sub-ecoregion for example). For example, say in 1998, 40% of the random sites within a certain region and stream class exceed temperature standards. Then five years later 20% of the same random sites exceed the standard. This would indicate temperature problems have declined. This decline could be entirely due to weather changes or restoration efforts or a combination of the two, and will require analysis of weather patterns and data collected from sites with yearly data to interpret. The random design was chosen because it has been identified by the EPA, EMAP program as an effective method for establishing status and trends of environmental conditions (EPA, 1994).

EPA. 1990. Biological Criteria – National Program Guidance for Surface Waters. EPA, Washington DC. EPA-440/5-90-004.

EPA Region 10. 1994. 1994 Field Operations and Methods Manual for Streams in the Coast Range Ecoregion of Oregon and Washington. EPA, Seattle, WA.

Beschta Comment 6:

The Temperature Biological Objective #4 attempts to address "effectiveness" questions and intends to rely on watershed councils or other agencies for obtaining these data. The assessment of "effectiveness" of various land use treatments or other management programs is generally not a simple task. It requires high quality information and an important reliance on "controls and reference reaches". Stream temperatures are influenced not only by management practices but also by a wide range of natural environmental variables and conditions. For the DEQ to rely on watershed councils and other agencies to do a good job of assessing "effectiveness" is, in my opinion, inappropriate (a similar concern exists for Sediment Objective Number 3) and unlikely to be successful. It is important to approach effectiveness monitoring from a rigorous perspective that involves stratification, controls, replication, and randomization of treatments. Effectiveness assessments essentially require a significant research effort.

State Response 6:

Identifying specific measures that are resulting in reducing water quality problems like temperature will no doubt be difficult. The intent of the monitoring effort is focused more on documenting if water quality problems are declining or not rather than specific causes of change. Some effort however, is targeted at evaluating the effectiveness of restoration projects and BMPs. These studies will occur in the actual vicinity of restoration projects. For example, data would be collected before and after restoration in stream reaches above, within and below the restoration activity. In this way we hope to develop a set of data that provides some measure of

effectiveness on a project by project basis. This project monitoring will likely be carried out by other agencies as well as watershed councils who have implemented the restoration activities. Having watershed councils participate in restoration and monitoring activities has been a key element of the Oregon Plan, and was not decided by DEQ. We also agree that careful study designs will be necessary and we plan to be directly involved in the development of monitoring study designs by watershed councils.

Beschta Comment 7:

Under Sediment Objective Number 3, the Oregon Department of Forestry has a number of measures they propose on implementing. The scientific literature in forestry has a fair amount of published information on the forest practices and stream temperatures. This information in conjunction with ongoing forest practices regulations may provide long-term improvement in stream temperatures for forested streams. However, in many portions of the chapter, the Department of Agriculture measures are so briefly discussed or nonexistent that they provide little confidence that they may accomplish any temperature improvements. In addition, almost no research regarding stream temperatures and agricultural practices has been conducted in Oregon.

State Response 7:

It is true that very little research has been conducted on the affects of agricultural practices on stream temperatures, but based on the information which has been gathered and building on information gathered to determine the effects of forest practices on stream temperatures, it should be possible to promote implementation activities on agricultural lands which will produce improvements in stream temperatures. Analogous situations exist on both forested and agricultural lands which should enable us to take positive actions on the landscape without the benefit of solid experimental history.

In addition, the Oregon Department of Agriculture (ODA) will continue to work with the Natural Resources Conservation Service (NRCS) on ensuring that the best technology currently available is being provided to agricultural landowners as it pertains to conserving and protecting natural resources. NRCS has developed Field Office Technical Guides (FOTGs) which provide the technical guidance necessary to develop individual farm conservation plans. Conservation practices have been identified which address natural resource issues, and ODA will work with NRCS on developing practices which specifically address temperature issues.

Beschta Comment 8:

The Biological Objectives for Sediment also have a number of concerns. For example.. Objective Number 1 indicates 225 randomly located reference sites will be have their "sediment conditions" identified. What exactly is entailed in these measurements? Does it entail suspended sediment samples during a large number of storm events, estimates of surface fines, percent fines in gravel substrates, or some other technique? Characterizing "sediment conditions" is not a simple task and without knowing the specifics of the monitoring program I'm not sure to what extent this objective will provide usable or useful information. Similarly, the assessment of "status and trend" is identified in Objective Number 2 for sediment. I have no idea what will be measured at the 450 randomly chosen sites and I have grave concerns that little will be learned about the status and trend of "sediment conditions" and anthropogenic influences after 5 years.

State Response 8:

Sediment measurements will be based on percent surface fines collected from erosional and depositional areas within designated stream reaches. The response to comment #5 would apply here as well in regards to the use of reference and randomly selected sites for documenting changes in sediment conditions. Turbidity will also be monitored at selected sites during winter storm events to help characterize possible sediment problems. Sediment is clearly one of the more variable and difficult parameters to measure. We have found, however, measures of percent surface fines correlate strongly with biological data (fish and invertebrate community results), and feel it is useful in interpreting biological results.

Beschta Comment 9:

While the ODF&W and ODF have listed a fair number of measures for some of the biological objectives, what is noticeable in the Supplement is a lack of specificity and clarity by the Department of Agriculture. Where measures of the Oregon Department of Agriculture are mentioned, they usually include a general comment about SB1010 or CAFO programs. Without additional information about the intent of those programs, their level of funding, their likelihood to be implemented (e.g., are these programs voluntary or regulatory?), etc., it is not possible to know how successful they might be.

State Response 9:

The primary intent of Senate Bill 1010 is to provide for the Department of Agriculture to assist producers in addressing those agricultural activities in watersheds known to have the most problems with water quality, to prevent pollution problems wherever possible, and to manage any existing problems. The overall goal is to develop and implement Agricultural Water Quality Management Area Plans to help reduce water pollution from agricultural sources and to improve overall conditions in a watershed. Plans developed under this process will provide an outline on how landowners in a local area can prevent and control water pollution resulting from agricultural activities and soil erosion. In terms of the intent of the Confined Animal Feeding Operations (CAFO) program, the law is quite clear - No discharges of manure to waters of the state are allowed. Through a program of aggressive compliance assurance, we expect improvements in nutrient, bacteria and dissolved oxygen levels.

Funding for ODA's water quality program received a significant boost when the Governor's \$30 million dollar budget for implementing the Oregon Plan was approved by the legislature. It has allowed the Oregon Department of Agriculture to hire 19 new staff positions, and with the enhanced staffing capabilities, ODA expects to develop agricultural water quality management area plans across the state within the next 4-5 years. ODA will also be working with and supporting its local management agencies (LMAs) with a combination of general fund and other funds as specified in our budget to provide training, staffing and operational funding for the LMA to carry out its responsibilities to implement the plan. The department will also be adding three new Confined Animal Feeding Operation (CAFO) inspectors, including two regional enforcement inspectors to augment compliance assurance efforts and one courtesy inspector to provide voluntary compliance assistance opportunities to CAFO operators. We anticipate that increased staffing in the CAFO program will allow the department to establish periodic inspections of all permitted CAFOs in the state.

Furthermore, additional assistance will be available to landowners both in terms of technical and financial assistance. \$2.4 million has been allocated to provide Soil and Water Conservation Districts (SWCDs) with technical staffing assistance for individual farm/ranch plan development. The SWCD technicians will be working with NRCS staff on developing plans that meet Field Office Technical Guide standards, as well as meeting the standards for ODA's agricultural water quality management area plans. Financial assistance for landowners implementing practices will also be available through the USDA Farm Services Agency cost-sharing program and the Governor's Watershed Enhancement Board grant programs.

ODA will continue to take the approach of implementing its water quality program with voluntary initiatives up front by providing technical assistance and financial incentives, but a regulatory backstop with swift and clear enforcement provisions will be utilized when necessary.

5. Are the analyses and conclusions in the Supplement consistent with the scientific literature, and does the analysis support the conclusions? Is more research needed in any area of water quality for the Supplement to be successful in protecting and restoring steelhead? If so, what areas require additional research?

Beschta Comment 10:

The chapter identifies a large number of water quality factors that are likely to affect steelhead. If all of these are significantly improved, I suspect it will have a beneficial (but unknown) effect on steelhead productivity. For many of the forestry issues, historical research studies have provided a basis for addressing many of the listed water quality variables. Unfortunately a comparable level of research history for streams draining agricultural lands, rangelands, or urban areas is not available.

For some of the water quality variables, an improved information base is needed to help understand the potential gravity of a problem. For example, the topic of "toxics" could be addressed by an extensive and expensive water quality sampling program. However, the development of an annual reporting program by landowners using herbicides, insecticides, or other non-point chemicals would provide an important perspective of the potential magnitude of the toxics issue. Alternatively, producers of agricultural and forestry chemicals could be required to report the amount of such chemicals sold within the State each year. I would highly recommend that the State begin to compile and publicly report on an annual basis the quantities of chemicals being used in each of the major steelhead basins.

State Response 10:

Although it is true that a comparable level of research history for streams draining agricultural lands and rangelands is not currently available, we do know that reductions of upland erosion through improved cropland and grazing management will reduce sediment delivery to streams, which is expected to lead to improved conditions for fish. We do know that certain practices are effective for controlling erosion, and that it is possible to quantify the reductions in sediment delivery which would be expected as a result of changing from one practice or set of practices to another for a specific field or allotment.

It becomes even more difficult to quantitatively predict in-stream changes or effects on fish populations as a result of implementing best management practices on agricultural lands because the industry is so highly segmented, but as a result of the *Healthy Streams Partnership* agriculture has pledged a firm commitment to strongly support protecting and improving water quality in Oregon's streams.

Relative to steelhead populations, the real question here is on the effects of chemicals, including pesticides, on the species. As far as we know, there is no evidence to indicate that runoff of pesticides is affecting mortality of steelhead or other fish species. A reporting system on statewide or even regional purchase or use would not shed any light on this question. At the present time, resources would best be directed at assisting landowners with on-farm strategies to minimize delivery of materials to waterbodies.

Applicators of restricted use pesticides currently are required to keep records on the use of these materials. These are not public records unless they are part of an investigation about misuse of the materials. Additionally, in Oregon, quarterly reporting to the Oregon Department of Agriculture on the nature and quantity of fertilizer materials is required of the first purchaser of such materials. These are not public records, but the department develops quarterly and annual summary reports, which are public record.

Beschta Comment 11:

I find it disappointing that additional research efforts are not identified in the Supplement. Surely, there are numerous research questions that need to be addressed if improvements in water quality are to be beneficial to improving fish runs. Such research could be used to confirm the importance of various water quality variables relative to steelhead productivity; it could be used to identify which land uses are creating the greatest water quality problems; it could also be useful to help establish priorities for management programs designed to improve water quality. If additional research is supported by the State, a significant component should be in the form of competitive grants and not simply a reallocation of State monies to various agencies.

State Response 11:

Agreed. The fact that the section does not include identification of needed research in water quality and its relationship to protection of salmonids is a significant shortcoming. A section has been added that identifies research needs in the water quality arena suggested by the peer reviewers. At this point the research needs identified are incomplete, but a start towards a comprehensive prioritized listing of needed research. Future supplements to the Oregon Plan may be able to address research needs more comprehensively.

6. Does it appear that the agency management measures listed in the Supplement will result in water quality improvements that are measurable, and over what period of time? Will the water quality improvements occur soon enough to recover the species?

Beschta Comment 12:

Hopefully the listed agency measures will help improve water quality through the steelhead region. However, because so many of them are voluntary and the extent to which actual improvements in water quality are likely to occur is not known, I am unable to make a prediction

as to what improvements in steelhead populations will occur, when they will occur, or their likelihood of occurring. Again, a wide range of factors other than water quality are influencing steelhead populations in the state, and in many locations water quality may not be the major factor.

State Response 12:

Agree that a wide range of factors in addition to water quality is impairing steelhead populations. Other sections of the Supplement address physical habitat, water quantity, fish passage, fish screening, fisheries management, and dams and hydropower projects.

7. Does the Supplement, in combination with the Oregon Plan, contain adequate water quality monitoring to determine the success of individual measures, to allow for adaptive management, and to assess success of the plan? If not, what additional water quality monitoring is necessary?

Beschta Comment 13:

In my opinion, the monitoring sections needs to be entirely reworked. The simple use of randomization for selecting monitoring stations in river systems that have systematic characteristics and varying responses to land uses is too simplistic. It is also unlikely to achieve the desired objectives. To gain accurate insights about the water quality of Oregon's streams and rivers through a monitoring program requires a great deal more thought and effort than is entailed in a simple random selection of sites. Water quality data are often expensive to obtain and thus it behooves the DEQ to do their utmost in maximizing the efficiency of any monitoring program. The brevity of write-up associated with each of the proposed "monitoring efforts" indicates that this task needs much more work. While watershed councils and other agencies may provide some useful data, it will be necessary for the DEQ to maintain a tight control on data quality for those water quality variables that will be compared across basins. Based on what is proposed in the Supplement, it seems highly likely to me that after 5 years of monitoring randomly selected sites that the State will be able to say much about trends in water quality.

I really doubt if watershed councils or even state agencies will be up to the challenge of doing "effectiveness monitoring". Such monitoring is not easy, requires a rigorous design, and cannot be applied to all water quality variables in all basins. Thus, some selectively of the most important variables of concern and the prioritizing of efforts will be necessary.

From a monitoring perspective, I would suggest that the establishment of one or more benchmark sites for long-term monitoring of flows, stream temperatures, turbidity, and selected other water quality variables should be a high priority in each basin. Each basin should have at least one main-stem station that continuously records turbidity. It's important to realize that basins with degraded water quality will not be improved immediately regardless of what management changes are implemented. However, it is important to begin to establish baseline conditions and to be able to demonstrate sometime in the future that water quality is improving. Long term stations (with companion flow information at each) will provide a better basis for confirming and understanding changes in water quality than the random distribution of periodically sampled stations proposed in the Supplement.

State Response 13:

The monitoring design followed here is that recommended by the EPA, EMAP program (Environmental Monitoring & Assessment Program). One of the primary objectives of the EMAP program is to "Estimate the current status, extent, changes and trends in indicators of the condition of the nation's ecological resources on a regional basis with known confidence" (EPA Region 10, 1994). This objective is also true of the monitoring plan for the steelhead ESUs. To accomplish this objective a probabilistic sampling design based on a random selection of monitoring sites has been developed by numerous ecologists and statisticians working on EMAP. By selecting a sufficient number of random sites across a specified region (a region could be a watershed, a basin, an ecoregion, etc.), an estimate of the current status for the measured parameters can be determined. By repeating the sampling at the same sites on a specific frequency (every 5 years for example) trends in conditions can also be estimated. The minimum number of sites for an effective estimate is considered to be 50 (Allen Herlihy personal comm., 1997). More sites provide a more robust estimate and are able to discern smaller changes and trends. Given that 50 sites is considered a minimum, the 100 to 150 sites per ESU identified in this plan was considered sufficient to provide a good measure of status and trends over each of the areas (some sites will also be repeated each year to help evaluate annual differences due to shifts in weather patterns). A similar approach has been selected for monitoring the status and trends of stream conditions in the Oregon Coast Range for the State of Oregon's salmon recovery plan. This monitoring plan was developed with numerous agency biologists and statisticians, including EPA, over a nine month period, which included many discussions about the proposed design. Therefore, while it is agreed that the steelhead supplement doesn't provide much detail on the rationale for the proposed methods much discussion and thought has gone into its development.

We agree that the establishment of long-term monitoring sites for flow, temperature, turbidity, etc., at main-stem sites in specific basins could provide useful information over a long period of monitoring. This concept will be explored further.

8. What should be our priorities for implementing the factors of decline, biological objectives, and agency management measures? In other words, what are the most effective elements of the Supplement? Are there agency management measures that will be ineffective and/or a waste of money?

Beschta Comment 14:

From the perspective of water quality, perhaps the most important single thing the State can do is to provide the citizens of the State and watershed councils with high quality information regarding the status of water quality across the various basins. Without having accurate information, the development of well-intended action programs may be counter-productive and ineffective. Thus, a rigorous monitoring program that provides important information on the status and trends relative to at least some of the important water quality variables is a fundamental concern.

It was interesting to see that Watershed Analysis of Forestry practices was listed for some of the DOF measures. What was noticeably lacking were similar listings of Watershed Analyses for

watersheds with Agricultural land use practices, Rangeland practice, Estuarine land use practice, or Urban development. Without consistently and fairly addressing all land uses contributing to water quality degradation, the implementation of voluntary or regulatory programs to improve water quality may ultimately appear arbitrary, capricious, and unfair from a social context; they may also be ineffective from an ecological perspective.

Finally, it is possible that all of the proposed measures in this plan could move "forward" in some fashion but after 5 or 10 years we will be not be much closer to understanding functional relationships between land uses and the status of steelhead, particularly for agricultural, range, and urban stream systems. The lack of previous, current, or future research efforts directed at those land uses will continue to be a major shortcoming for improving the status of Steelhead stocks.

State Response 14:

Agreed.

Mike Bonoff
Harza Northwest

1. Does the document list all relevant factors of decline regarding steelhead? If there are additional significant factors regarding steelhead decline, please list them.

Bonoff Comment 1:

Factors for decline of steelhead listed in the document include the following:

- Temperature
- Sediment
- Dissolved Oxygen
- Total Dissolved Gas
- Biological Conditions
- Toxics
- pH
- Stream Fertility.

The above list, with the exception of stream fertility and biological conditions, are parameters for which state standards exist. While this list is nearly comprehensive (it also needs ocean conditions), it seems to me that the perspective for developing factors for decline should not be tied so directly to the standards, but should reflect more thinking about causal mechanisms for declining steelhead runs. The standards are there to protect a variety of beneficial uses; the water quality section of the Plan has only one purpose: halt declining steelhead stocks and recover the species. Thus the framework of the standards as factors for decline fails to demonstrate any depth of analysis, with respect to water quality, that has gone into the recovery plan. A key sentence in the Water Quality Chapter of the Oregon Coastal Salmon Restoration Initiative illustrates this problem (p17B-1). “Water quality is usually thought of in terms of the water quality standards the state has adopted under the Clean Water Act (33 U.S.C. 466 et seq.)”. This approach of compartmentalizing and numerically evaluating various stream reaches is fine for reporting ambient monitoring program results. However, for purposes of the Steelhead Supplement, a more integrated approach is necessary. Water quality should be approached as a component of habitat quality. For example; temperature, dissolved oxygen, and pH are directly linked to nutrient loading and ultimately to stream fertility. The separation of these individual elements is convenient for purposes of document organization, but does little to demonstrate new thinking and redoubled efforts to reverse water quality degradation that should be the hallmark of the Plan.

State Response 1:

True, the organization of the Supplement into sections on water quality, water quantity, physical habitat, fisheries management and dams/hydropower doesn't lend itself to integrated planning. The leaders of each of these topic areas have attempted to coordinate their efforts to ensure all issues are covered, and not duplicated, but an overall integrated planning effort has not occurred. Within the water quality section the approach used of organizing the factors for decline on the

basis of state water quality standards fails to address the interrelationship of many water quality parameters. A discussion of how the factors of decline (i.e.; water quality parameters) are interrelated has been added to the text. However, most of the work integrating water quality parameters occurs at the watershed assessment/water quality management planning stage of implementation. For example, when DEQ undertakes a TMDL it looks at all water quality parameters of concern in a watershed. As Mr. Bonoff points out, temperature, dissolved oxygen, and pH are directly linked to nutrient loading and ultimately to stream fertility. Therefore, to prepare an adequate TMDL the interrelationships between the various water quality parameters must be understood and appropriately addressed.

2. Are the factors of decline described appropriately? If not, what improvements can you suggest?

Bonoff Comment 2:

As discussed above, the major improvement I would suggest is a more integrated presentation of factors for decline. The factors for decline are in the document, but there is scant acknowledgment that these factors are interrelated, which is why many of the measures are presented more than once. One suggestion would be to reorganize the section with two major headings: physical factors and biological factors. Text linking the two would still be necessary, but an introduction to each section would serve to illustrate the linkages between factors, and the significance of the factors to steelhead. The only discussion of significance of the factors now in the Supplement is relative to the number of 303(d) listed stream miles as a percentage of the total miles in the ESU for a particular factor, i.e., temperature. Subheadings within the section could address the individual factors, and the corresponding measures would follow.

If the document is reorganized as discussed above, the current factor of Biological Conditions would not be necessary. This factor is too broad, and contains several elements that could stand on their own in either the physical or biological sections. For example, flow alteration and pesticide application are distinct physical factors, and removal of riparian vegetation is a biological factor. With regard to the sediment factor, the Supplement should note that *lack* of spawning gravels could also be limiting steelhead populations in some ESUs due to dams or other diversions.

State Response 2:

Agree that a more integrated presentation of the factors for decline would be beneficial. However, the organization of the factors for decline is one that NMFS is familiar with and comfortable with and we are reluctant to change it without their participation. This is an improvement that may be possible when the next supplement is prepared to the Oregon Plan.

The biological conditions factor for decline is included to address biological conditions that are impairing steelhead recovery. This factor for decline is based upon the state water quality standard for biological criteria. By its nature this water quality standard integrates the effects of all stressors on the biological community and allows identification of problems that can be overlooked by merely checking individual water quality parameters. Therefore, the biological conditions factor for decline is being retained in the water quality section even though biological conditions are also addressed in the physical habitat section.

3. Do the biological objectives address the factors of decline adequately? Will achieving the biological objectives result in halting or reversing the decline of steelhead in the ESUs identified in the Supplement?

Bonoff Comment 3:

The biological objectives appear comprehensive and more than adequate to address the factors of decline listed in the Supplement. Whether improvement in habitat and steelhead numbers results is dependent on the degree of implementation of measures (see #4 below).

State Response 3:

Agreed.

4. Are the agency management measures listed in the supplement adequate to achieve the associated biological objectives? Do they move us in the right direction to address the factors of decline in a timely manner? Are the agency management measures able to be implemented within the identified time frames?

Bonoff Comment 4:

It appears that achieving many of the biological objectives is dependent on significant levels of effort by watershed councils and other agencies and organizations. No assurance that the Supplement will meet the objectives can be given due to these uncertainties. If DEQ is to rely on watershed councils or other community-based efforts, measures to help ensure the success of these efforts seems warranted. For example, development of printed materials and an outreach capability to help focus activities of watershed councils would be beneficial (this may already exist).

The timing of implementation of management measures seems ambitious, but an ambitious program is what is needed. I cannot offer meaningful input at this point regarding whether the identified time frames, e.g., to determine trends in the ESUs for temperature, are doable given current staffing, budgets, etc.

State Response 4:

Agree that support of watershed councils is essential to successful implementation of the Plan. DEQ3S is a commitment by DEQ to provide technical support to watershed councils as they address water quality issues. Other agencies have made similar commitments. Also, the state has retained a contractor to develop guidance for watershed councils on how to conduct adequate watershed assessments. This document is currently in draft form and undergoing review before it is finalized. These are just two examples of the extensive support the state plans to provide watershed councils.

5. Are the analyses and conclusions in the Supplement consistent with the scientific literature, and does the analysis support the conclusions? Is more research needed in any area of water quality for the Supplement to be successful in protecting and restoring steelhead? If so, what areas require additional research?

Bonoff Comment 5:

The Supplement appears to be well founded on current research. An area in need of additional research, with respect to water quality, is potential nitrogen limitation of streams in some ESUs, particularly the Klamath and OR Coast ESU. N limitation is apparently the case in the North Umpqua River. Management implications of this are increased productivity of streams in response to trace nitrogen additions, leading to greater biomass of stream periphyton, higher pH, DO problems, etc.

State Response 5:

Agreed.

6. Does it appear that the agency management measures listed in the Supplement will result in water quality improvements that are measurable, and over what period of time? Will the water quality improvements occur soon enough to recover the species?

Bonoff Comment 6:

In most cases, it is unlikely that responses to the measures proposed will be statistically measurable due to the variance that exists in water quality data, and the lack of baseline data for several parameters and/or geographic areas. However, biological responses (improvements) could occur well within the time period required to establish statistical certainty in trends in water quality or temperature. For this reason, biological variables such as escapement, and measures such as macroinvertebrate densities and abundance should be relied on to gauge success. Improvement in these parameters will provide immediate feedback on the success of recovery measures.

State Response 6:

Agreed. These parameters are addressed in the monitoring chapters of the Oregon Plan and the Steelhead Supplement.

7. Does the Supplement, in combination with the Oregon Plan, contain adequate water quality monitoring to determine the success of individual measures, to allow for adaptive management, and to assess success of the Plan? If not, what additional water quality monitoring is necessary?

Bonoff Comment 7:

The monitoring described under *DEQ19S - Water Quality Monitoring and Assessment*, appears adequate. However, there is no indication that the sampling program will be able to meet specific monitoring objectives. For example, will the monitoring program be able to detect a 2 °F decrease in temperatures within sites or within a ESU over a 5-year period? Some bounds on the expected resolution of the monitoring would be useful. But again, biological measures, particularly those that incorporate a number of “metrics”, such as Bob Wisseman’s index for macroinvertebrates, should be an integral piece of the monitoring program. Adaptive management based on water quality data alone is not realistic.

State Response 7:

Agreed. Biological measures proposed in this plan incorporate "metrics" for assessing biological condition and follow an approach very much like Bob Wisseman's. This information will be an integral part of the monitoring results as it will be calculated for all reference and randomly selected sites identified in the study plan.

8. What should be our priorities for implementing the factors of decline, biological objectives, and agency management measures? In other words, what are the most effective elements of the Supplement? Are there agency management measures that will be ineffective and/or a waste of money?

Bonoff Comment 8:

I believe the monitoring measure (*DEQ 19S*) is one of the most effective elements of the Supplement. All three components of this measure (Randomized Design, Strategic Data, and Watershed Design) are critical to understanding the extent of water quality problems in the steelhead ESUs. Targeted monitoring is particularly important, although I'm concerned that DEQ is relying too heavily on Watershed Councils for these data.

It appeared that the list of measures in the Supplement was "padded" with projects that would have occurred regardless of the steelhead recovery efforts, e.g., *DEQ24S - Implementation of Portland CSO Consent Order*, and *DEQ27S - Willamette River Basin Study*. The appearance is that every project the State of Oregon has considered that could have water quality implications has been included, however; none of the measures listed appear to be "a waste of money".

The challenge that is most evident from the Supplement is coordination among the various agencies in conducting the studies. How quickly can the State respond to the information collected? What mechanisms exist to share data and make management decisions? A management/response framework is needed to ensure that data are not lost or ignored in this process.

State Response 8:

The list of measures does include many water quality programs that are being implemented regardless of the steelhead recovery efforts. Where these programs are beneficial to steelhead they are included to ensure that NMFS and other reviewers understand the full extent of state water quality programs that are benefiting steelhead recovery. Therefore, new programs only need to be developed where there are real holes in the coverage of existing programs rather than perceived shortcoming based upon inadequate information. A key assertion of the state is that, for the most part, existing water quality programs are adequate to recover steelhead if they are fully and timely implemented. What is often needed is political support, additional resources and public understanding to allow successful implementation.

Also, see state response to Bach comment 7 above for a discussion of management decision mechanisms.

Dr. Gary Chapman
Paladin Water Quality Consulting

I had essentially completed my review when I received the additional materials sent out on October 13. Rather than delete materials from my earlier review, I merely appended some additional comments or retractions on the basis of the additional materials. I do thank you for sending out these other materials, as I function better with hard copy than with electronic copy on the screen.

Chapman Comment 1:

I admit to being almost completely overwhelmed by the various management measures outlined in the chapters. [I was definitely suffering from Agency, Program and Statute Acronym and Number Syndrome (APSANS).] Overall management (at least oversight) of all these various measures should be carried out as expeditiously as possible. Effective dialogue with, and cooperation from, federal agencies also seems a vital factor in achieving the final goal of salmonid recovery.

State Response 1:

Agreed that the state needs to work closely with federal agencies in order to be successful in achieving salmon recovery. The state has been working closely with federal agencies throughout the development of the Supplement. Federal agency measures will be incorporated into the final draft of the Supplement. Ongoing cooperation and coordination with federal agencies will continue throughout the implementation phase. See State Response 7 under Bach Comment 7 above for further details on the process set up to coordinate with federal agencies.

Chapman Comment 2:

Some of my confusion in dealing with the review was an uncertainty as to what level of resolution was required before a watershed could be labeled as meeting various monitoring goals. I could not tell whether this was a statistical, or an absolute, monitoring coverage definition. If the latter, I missed a specific definition of coverage required to attain completeness in a watershed. In either case, I found the number of biological monitoring sites insufficient. In the final analysis, the total of the various management efforts, which is difficult to pull together from the plan, might produce the coverage necessary for successful implementation of the plan. However, I am not convinced that such is the case.

State Response 2:

See state response to Chapman comment 11.

Chapman Comment 3:

Successful completion of the goals will probably depend to a great extent on the timeliness and effectiveness of the oversight and review processes, and subsequently on the responsiveness and flexibility of the various agencies. Continuing political and financial support, often in the face of easy-out solutions based on subjective perspectives by various parties, is critical. Perhaps the greatest technical problem in programs such as that outlined in the recovery plan is the decision on when to change program parameters. This is usually manifested in the analysis of short-term data trends and making decisions having long-term programmatic consequences. Usually it is best to perform in-depth review and analysis at the first of the project (as appears to be the case

here) and then stick to the plan for the long haul. There will almost certainly be exceptions to this general guideline, and this becomes a problem. This fact merely emphasizes the need for timely and effective oversight by an experienced and objective steering committee.

State Response 3:

The Independent Multidisciplinary Science Team (IMST) has been established by the Legislature, and appointed by the Governor and Legislature, to serve as an independent scientific peer review panel to oversee the implementation of the Oregon Plan. The state is counting on the IMST to provide the type of objective, expert oversight Mr. Chapman suggests is needed.

Chapman Comment 4:

I believe that the supplement lists all of the important water quality factors that have contributed to the decline of steelhead populations in Oregon waters. It is apparent to me that although there may be specific toxic materials that are adversely affecting steelhead (and other species), these are probably not widespread, either in location or influence.

State Response 4:

Agreed.

Chapman Comment 5:

In general the factors are adequately described. In order to focus upon the most critical factors it would be valuable to include in the analytical process an overlay of factors and habitat importance. Thus, a watershed with 303(d) listing as a result of slight water quality exceedence of a single factor and of minimal value as steelhead habitat should not be weighted the same as a critical watershed with significant temperature, physical habitat, and sedimentation problems. A simple pass/fail watershed scorecard is very much inadequate.

State Response 5:

Agreed. Prioritization of watersheds for action will be based upon the degree of water quality problems identified in a watershed assessment and the significance of the water quality impairment to steelhead recovery.

Chapman Comment 6:

The discussions of Biological Criteria as a factor in the decline of salmonids contains a circular argument for some situations. Certainly a change in macroinvertebrate communities can directly affect salmonid production, but usually the macroinvertebrate communities are responding to other of the identified factors of decline (e.g. temperature, sediment, etc.). Even more circular is the tie-in between fish index of biological integrity (IBI) and salmonid abundance; salmonid absence or scarcity would contribute directly to a low IBI score. In this latter case, the Biological Criteria would be saying that the absence of salmonids is a factor in the decline of salmonids. Aside from diseases, introduced species, and natural cycles, a decline in Biological Criteria should be examined for probable causative factors from among those identified as factors of decline.

State Response 6:

Agreed

Chapman Comment 7:

The biological objectives are sensible and may be appropriate. It is obvious that most of the objectives deal with data collection, which, by itself, will not reverse the decline of steelhead populations. It is axiomatic that if the water quality problems have been appropriately defined,

safe standards set for these problem parameters, and then these standards met, then the objectives should be attained. This assumes that appropriate sediment standards can be established and met; failing that aspect alone may doom the recovery plan. It is difficult to separate temperature, sediment, and biological conditions from structural habitat characteristics such as depth, woody debris, and overhead cover. In-as-much as these features are all inter-related and influenced by land management practices, one is tempted to optimistically assume that attainment of all water quality objectives will be accompanied by comparable improvement in structural habitat characteristics. If this parallel improvement in habitat does not occur, it is possible that recovery would not occur, or would occur at a much slower rate than would otherwise be the case.

State Response 7:

Agreed. The Physical Habitat, Water Quantity, Fish Passage and Fish Screening and the Dam and Hydropower sections of the Supplement deal with these issues in depth. So, successful implementation of the Supplement will address water quality, water quantity, and physical habitat in a coordinated, holistic fashion. It's the State's belief that all of these factors have to be dealt with appropriately to achieve recovery of steelhead.

Chapman Comment 8:

The agency management measures listed in the Supplement are probably not adequate to achieve the associated biological objectives. It is clear that these measures are a necessary collage of new and existing programs. However, the level of detail provided (or more precisely, its absence) seems to indicate that the coverage of the various monitoring programs cannot attain both the geographic breadth and geographic level of resolution required to define existing water quality. For example, temperature objectives include measurements at 225 reference sites, 450 random sites, at an unspecified number of sites of restoration activity or BMP application, and presumably at sites representing special study areas (e.g. TMDLs for temperature on Lower Columbia and Lower Snake Rivers). This sampling does not appear adequate to properly define conditions in 311 fifth field watersheds or, viewed another way, the 40,000 stream miles specified for all the fourth field hydrological units identified in the plan. There is nothing in the plan to give confidence that the monitoring coverage will provide the necessary detail implied by the objectives.

State Response 8:

See state response to Chapman comment 11.

Chapman Comment 9:

Developing monitoring plans for trends, especially appropriate random site selection techniques and statistics, is notoriously difficult. In addition, it is difficult to mesh the goals and requirements for this random type of monitoring with what are considered (often incorrectly) more knowledge-based reference sampling site selection. This plan attempts to use both procedures, but the specifics of the selection processes are not given in sufficient detail for rational evaluation. Regardless of the selection procedures, the number of monitoring sites appears inadequate unless other data collection efforts are planned but not clearly defined.

State Response 9:

See state response to Chapman comment 11.

Chapman Comment 10:

It is not possible to conclusively assess the timeliness of the management measures in attaining the listed biological objectives. Too much uncertainty exists regarding the efficacy of the various land management and restoration activities to be confident regarding attainment of the objectives. I believe that the measures proposed will move the process in the correct direction and that no major areas of concern have been ignored. The overall implementation would profit from a specific coordination and analysis objective with the goal of achieving rapid synthesis of status for the overall recovery plan. I did not notice mention of any such specific coordination responsibility in the supplement. Is this the role of the Salmon Strategy Team that is mentioned in the salmon recovery plan?

State Response 10:

See State Response 7 under Bach Comment 7 above for a discussion of the role of SST and other coordinating and oversight groups.

Chapman Comment 11:

There appears to be no rationale for the allocation of the numbers of reference and random sites per ESU. The number of sites per ESU indicates a heavy bias towards sampling stations in the SW Washington and Lower Columbia ESU. There are 331 5th field watersheds and 675 total sampling stations (pooling reference and random sites). The current selection allows one reference site per 1.47 watersheds, i.e. there could be a single reference station in 2/3rds of the watersheds. The current allocation ranges from a low of 56% of the watersheds in the Klamath and Oregon Coastal ESU to almost 2 reference sites per watershed in the SW Washington/Lower Columbia River ESU. Obviously a headwater reference site can't apply to a downstream site and visa-versa, therefore reference sites data will have to apply across similar watersheds. The current allocation of reference sites (and random sites) appears too arbitrary to have been well reasoned. How were the allocation and number of reference sites and monitoring sites selected? It is unclear, but logical, that the same sites will be used for the salmon recovery plan.

Wouldn't it be better to allot the number of sites on the basis of stream miles and perhaps by weighting on the basis of historic presence/absence with some consideration of run size? How is a site defined? Are stretches identified and numbered and then selected, or are longitudinal loci selected and then sites placed to include the locus? Some parameters can be measured at a single point, but others require some length of stream. Is it possible for reference sites and randomly selected monitoring sites to overlap?

State Response 11:

This response addresses Chapman comments 2, 8, 9, and 11. These four comments all seem related and therefore will be addressed together. Each of the above comments question the adequacy of the number of random and reference sites and the approach used to determine the number of sites. First, the monitoring design followed here is that recommended by the EPA, EMAP program (Environmental Monitoring & Assessment Program). One of the primary objectives of the EMAP program is to, "Estimate the current status, extent, changes and trends in indicators of the condition of the nation's ecological resources on a regional basis with known confidence" (EPA Region 10, 1994). This objective is also true of the monitoring plan for the steelhead ESUs. To accomplish this objective a probabilistic sampling design based on a random

selection of monitoring sites has been developed by numerous ecologists and statisticians working on EMAP. By selecting a sufficient number of random sites across a specified region (a region could be a watershed, a basin, an ecoregion, etc.), an estimate of the current status for the measured parameters can be determined. By repeating the sampling at the same sites on a specific frequency (every 5 years for example) trends in conditions can also be estimated. The minimum number of sites for an effective estimate is considered to be 50 (Allen Herlihy personal comm., 1997). More sites provide a more robust estimate and are able to discern smaller changes and trends. Given that 50 sites is considered a minimum, the 100 to 150 sites per ESU identified in this plan was considered sufficient to provide a good measure of status and trends over each of the areas (some sites will also be repeated each year to help evaluate annual differences due to shifts in weather patterns). A similar approach has been selected for monitoring the status and trends of stream conditions in the Oregon Coast Range for the State of Oregon's salmon recovery plan. This monitoring plan was developed with numerous agency biologists and statisticians, including EPA, over a nine-month period, which included many discussions about the proposed design. Therefore, while it is agreed that the steelhead supplement doesn't provide much detail on the rationale for the proposed methods much discussion and thought has gone into its development.

The selection of reference sites present a slightly different problem. First, it is not known how many sites within each ESU may be appropriate as reference sites. Also as you point out headwater reference sites cannot be used as reference sites for larger stream segments. Therefore, streams will need to be classed according to some size or stream order categories. We plan to group streams according to channel gradient and bankfull width. Categories are currently being assessed by EPA using data previously collected from sites in the Oregon Coast Range. The number of reference sites listed in the plan are based on our best ideas of how many sites will be needed to provide a sufficient data set over several size and gradient categories. Your comments concerning the different size of each ESU are well taken and will be considered.

The basic monitoring "site" is a stream reach approximately 40 times the average wetted width (on the day of sampling) in length. Is it possible for reference sites and randomly selected monitoring sites to overlap? Theoretically yes, it is possible, but not likely. If it were to occur we would only sample the site once.

EPA Region 10. 1994. 1994 Field Operations and Methods Manual for Streams in the Coast Range Ecoregion of Oregon and Washington. EPA, Seattle, WA.

Chapman Comment 12:

What is a watershed as related to objectives no. 1? For example, an objective for temperature is to identify, by 2002, 50% of the watersheds not meeting the standards and, by 2007, to identify 95% percent of such watersheds. There are already 303(d) listed, temperature impaired, stream miles for 18 of the 19 hydrological units in the Klamath/Coastal ESU. This implies that 95% of the impaired hydrological units have already been identified. Obviously then, a watershed is smaller than a hydrological unit. However, these data must be decomposable into smaller units (e.g. watersheds, however defined). What proportion of watersheds have already been identified as impaired? Can a watershed be called unimpaired until it is sampled in its entirety? There is

nothing in the supplement that defines the level of monitoring detail that constitutes complete sampling for a watershed (e.g. sites per stream mile, sites per watershed, etc.). In some cases one site may be assumed to adequately represent the entire watershed, for other cases considerably more sites may be required. This specific detail is necessary before attainment probability can be judged.

State Response 12:

A watershed is defined in the Supplement as a 6th field watershed unless 5th field is more appropriate. There is an estimate of the number of 5th field and 6th field watersheds in the steelhead ESUs in DEQ19S. DEQ19S also includes the number of 5th and 6th field watersheds that contain water quality limited streams, i.e. how many watersheds will require preparation of TMDLs. Agree more detail is necessary on the sampling that will be done in each watershed.

Chapman Comment 13:

The percentage goal typical of the various objectives no. 1 seems a little simplistic. If, for example, there are 500 watersheds and 50 are, in fact, impaired, one would have to sample at least 475 watersheds before one could be assured of identifying at least 50% of the impaired watersheds. However, if 450 of 500 watersheds are, in fact, impaired, one would have to sample only 275 watersheds to be assured of identifying 50% of the impaired watersheds. In other words, one can plan ahead to collect data on a specified percentage of watersheds by a particular time, but one cannot plan ahead to identify a specified percentage of impaired watersheds.

State Response 13:

Agreed. Wording will be changed to, % of watersheds measured

Chapman Comment 14:

The biological objective 1 for TDG will depend upon spill and flow conditions for the rivers in question. The extent of excessive TDG levels depends upon these conditions. Therefore, all one can do is achieve measurements in 100% of the reaches specified under the spill and flow conditions extant at the time of sampling. Data from low water years would not apply to high water years.

State Response 14:

The factors affecting TDG are even more complicated than the changing spill and flow conditions because TDG is also affected by the dam operations, i.e., the number of turbine units on-line and the flow of water through the dams. TDG in the mainstem Columbia is primarily affected by the amount of spill occurring at the dams. Therefore, spill events of the same flow during low river flows and high river flows will have the same effect on initial TDG levels, However, longitudinal TDG levels may be different during high and low river flows do to dilution and dissipative effects. TDG monitoring should occur in low and high flow years.

Chapman Comment 15:

Details in DEQ19S regarding the Strategic Design don't seem to clearly apply to the specific water quality objectives in all cases. The latter clearly include reference and random sites, but other agencies will primarily provide data for restoration-type sites. However, the Strategic Design states that sites will be selected where restoration projects have been implemented, where a TMDL or Agriculture WQMP will be completed, and in areas identified as core or critical habitat. Except for the latter, none can be considered as logical reference sites and certainly cannot be counted on for random site selection. This is quite confusing. The discussion of

Biological Communities in this same section seems to have no application except to reference sites selected in core or critical habitat areas for salmonid populations. I could not mentally overlay the sampling sites mentioned in the various biological objectives with those mentioned in the Strategic Design section.

State Response 15:

Agreed. Wording will be reviewed to clear up possible confusion. Data collected within the strategic design are not intended to be random or reference sites, except where reference sites are located at core or critical habitat areas

Chapman Comment 16:

There are no specifically identified conclusions listed in this chapter. I assume that the question about analyses and conclusions refers to the general discussion regarding the factors of decline, collection of data, and activities leading to recovery. I found no egregious errors with respect to the supplement and the current state of knowledge of steelhead environmental needs.

State Response 16:

No response necessary.

Chapman Comment 17:

Three areas of research appear to me to need additional attention, or at least more specific detail within the plan. First, in the analysis of biological communities, the only specific metric mentioned is the calculation of an Index of Biological Integrity (IBI). I associate the IBI with fish populations only. Certainly an index should be used that includes macroinvertebrate data. Although there are such indices in existence, one wonders if any are presumed to be adequate for our waters. Is the intent of the term IBI to include macroinvertebrates? Has a decision been made to use another (unspecified) index for macroinvertebrates? If not, some "research" should be undertaken to select such an index. [I retract this as a research area if the metric included in the salmon plan figure titled "Remap Erosional Samples" is deemed adequate.]

State Response 17:

Macroinvertebrate data has been previously collected from 57 random sites and 26 reference sites in the Oregon Coast Range. These data have been used to develop a macroinvertebrate IBI for coastal streams.

Chapman Comment 18:

Second, there is no mention of the specific "biological assessments" that will be used as indicators of potential toxic chemical contamination. Is the intent here to couple results of such indices as the IBI with potential toxic chemical problems? Frankly, I would not expect to see such problems except in rare instances, but I am unaware of any biological assessment tools that will flag toxicity problems specifically as opposed to other habitat problems. I would not recommend research in this area, but if some types of "biomarkers" are implied, there needs to be research into their sensitivity and veracity.

State Response 18:

Three approaches will be used to assess the presence of possible toxic contaminants. First, the macroinvertebrate communities will be looked at for possible changes in the presence of taxa known to be sensitive to toxic contaminants such as metals or pesticides. Second, fish collected during routine fish sampling will be viewed for the presence of lesions or other body malformities that indicate toxic contaminants. Finally, fish will be kept at a certain percentage of

sites (number not yet known) for enzyme analysis, which can a useful indicator of toxics contamination.

Chapman Comment 19:

Third, there is a pressing need to develop a good procedure to monitor intergravel dissolved oxygen (DO). Throughout the section dealing with sediment, the problem of intergravel DO is highlighted, but there is no mention of monitoring intergravel DO. There is no question in my mind that this could be a major problem in some watersheds. However, there is the possibility that this concern is a red herring. I believe that collection of data to answer this question is of the utmost importance. Research should include method development and evaluation as well as sample site selection procedures. [I note that the salmon recovery plan includes mention of monitoring of 20 inter-gravel DO sites/year. Because the current intergravel DO standard is treated as a spatial median, single sampling points cannot be used for compliance. A reliable means of sampling for intergravel DO is required that does not require semi-permanent installation of expensive or sophisticated sampling equipment. In addition, because salmonids clean gravel in the process of spawning, samples outside of redds may bear no clear relationship to samples inside of redds. At least some research is needed on this point.]

State Response 19:

DEQ staff began collecting inter-gravel dissolved oxygen (IGDO) samples in the spring of 1995. Since that time, staff has developed a guidance document entitled Intergravel Dissolved Oxygen (IGDO) Field Sampling Protocol to standardize field procedures for the collection of water samples for analysis of intergravel dissolved oxygen concentration. This document was originally intended as a stand-alone reference for field crews, but it has also been incorporated as Appendix C into Methodologies and Quality Assurance Procedures For Collecting Dissolved Oxygen Concentration Data In Surface Waters, a more comprehensive guidance document for collecting all types of dissolved oxygen samples.

Intergravel Dissolved Oxygen (IGDO) Field Sampling Protocol includes criteria for selecting sample locations, identifying and marking individual salmonid spawning redds, and collecting supplemental water quality data. The guidance includes a complete list of required sampling equipment, and defines the step-by-step procedure for collecting and analyzing IGDO water samples. The copies of this document are available upon request. However, a word of caution should be noted here. The sampling method described in this document is considered by DEQ staff to be experimental. Other sampling methods will be researched as time allows so that method comparison can be done to determine the most effective and informative method for long-term use.

DEQ has also begun implementing the IGDO guidance for point source permitting, and in Coastal Stream NPS related test cases. To date, DEQ staff have generated IGDO data from water samples collected from the Salmonberry, South Umpqua, Miami, Kilchis and Wilson Rivers, and Bear Creek and Calapooya Creek. These data have been used to develop baseline information on the IGDO characteristics of salmonid spawning areas in surface waters of Oregon, and to determine existing or potential impacts from specific point and non-point source inputs. For example, the work done in the South Umpqua Basin in the fall of 1996 was directly targeted at

determining the impacts on the spawning population of Fall Chinook salmon stemming from biological oxygen demand loads coming from the Winston-Green Wastewater Treatment Plant.

In 1996, the Winston-Green Sanitary District initiated a design process to upgrade its wastewater treatment facility. DEQ was asked to review and approve the Winston-Green Wastewater Treatment Plant Predesign Report, submitted by Carollo Engineers. During that review process, DEQ raised concerns about the impacts of increased BOD loading on the river's DO levels and the subsequent impact on salmon spawning areas downstream of the WWTP outfall. A field survey of IGDO concentrations in those spawning areas was conducted by DEQ Laboratory and Regional staff in November 1996. A description of the survey design, study area, sampling method, results and discussion was written up in a summary report entitled Intergravel Dissolved Oxygen Survey of Fall Chinook Salmon in the South Fork of the Umpqua River and In Cow Creek.

More recent IGDO work relating to point source impacts was done in early November 1997 on Bear Creek in the Rogue Basin and on Calapooya Creek in the Umpqua Basin. In Bear Creek, IGDO samples were collected from potential spawning areas in the stream reach between Ashland and Medford to determine existing IGDO conditions. In Calapooya Creek, IGDO samples were collected from existing and potential spawning areas above and below the wastewater treatment plant outfalls of the cities of Oakland and Sutherland. Data results from both creeks indicated IGDO concentrations below 6 mg/L, the absolute minimum basin standard for dissolved oxygen during salmonid spawning.

With reference to non-point source impacts on salmonid spawning populations, the 1997 Coastal Watershed Assessment Project included a late winter/spring IGDO survey in Tillamook Basin streams to determine impairment resulting from sedimentation and fibrous organic material deposits. IGDO sample collection was done by DEQ staff from March through June 1997 in the upper forested reaches of the Miami, Kilchis and Wilson Rivers. This work is being continued by DEQ staff during the 1997 fall season in the lower agricultural reaches of these same rivers during Fall Chinook salmon spawning season.

DEQ staff is developing a database of all IGDO data gathered so far. This data will also be uploaded to the EPA STORET database system, and will be available for review upon request.

Chapman Comment 20:

6. I believe that the measures proposed will result in water quality improvements that are measurable. I have long believed that salmon and steelhead decline (excluding periodic cycles due to broader scale climatic and oceanic conditions) was caused by habitat modification and fish stock over-harvest (plus the effect of hydro projects on the Columbia and Snake Rivers). The rate of recovery from these habitat modifications depends upon both anthropogenic and natural activities. In general I believe that the improvements will be slow and be affected by the status of the various natural climatic and oceanic cycles. Such factors as in-stream cover can be improved, rapidly by man (with varied success), or slowly by nature. Sedimentation recovery depends upon vegetation growth, bank stabilization, flushing flows, etc. Some of these take considerable time. Even if measurable improvements are seen in such parameters as temperature

or sediment, it may take considerable additional time before steelhead population improvement is apparent. I think it could take at least the 30-year period of the plan (based upon goals out through 2027) to see significant improvement in some cases. Logically, where most improvement might be possible, the worst conditions probably exist and the most water quality and habitat improvement is needed. As a result, where we might be best able to measure recovery, that recovery could also be expected to take the longest time.

Even such factors as habitat partitioning among the various salmonid species could affect the relative recovery rates of the salmon and steelhead in any given watershed; differences in oceanic migration patterns might also favor one salmonid species' recovery over that of another. In other words, measurement of success can be a complicated business and we should not expect too much, too soon. However, the objectives and activities of the supplement are the right medicine and they will eventually succeed in recovering the species if we do not introduce another major impediment (e.g. an introduced species or disease, a major alteration of the marine food web, or reckless over-harvest). This also assumes that if monitoring indicates that current land management or other practices are not sufficiently protective of habitat, that more stringent measures will be adopted by the responsible parties.

State Response 20:

Agreed.

Chapman Comment 21:

Except for two items, the water quality monitoring proposed should achieve the goals of the supplement. These two exceptions (noted previously) are a probably insufficient number of sampling sites (e.g. too few sites for the number of watersheds and river miles), and failure to adequately measure intergravel dissolved oxygen.

State Response 21:

See responses to earlier comments on these points.

Chapman Comment 22:

8. Highest Priority:

1. evaluating temperature and sedimentation in conjunction with land activities;
2. evaluating biological indices with respect to temperature and sedimentation as well as to other physical habitat features (stream flow, cover, etc.);
3. measuring intergravel dissolved oxygen as a function of sedimentation and stream flow;

Lowest Priority:

1. concern regarding toxic chemicals;
2. measuring water column DO;
3. pH.

Early emphasis should be on establishing a good data base for minimally impacted reference sites (in good steelhead habitat) and for recovery/restoration sites where one would expect to find conditions similar to reference sites if land management activities are successful in attaining environmental goals. I have already questioned the allocation of reference (and random) sampling sites without apparent consideration of where the better habitat and most fish stocks should exist. I salute the apparent decision not to conduct extensive water chemistry analyses for toxic chemicals which I believe would be a major waste of resources. I would look for chemical causes and conduct ambient sample bioassays if biological criteria indicated poor conditions, but where no other of the identified factors of decline appeared to be in evidence.

State Response 22:

Agreed.

Dr. Robert Hughes

Dynamac

Hughes Comment 1:

1. Not knowing what the other chapters are in the Steelhead Supplement I am wondering whether issues such as barriers (especially dams, culverts, dewatered streams), disease, fish stocking, estuarine and near coastal water quality and physical habitat, alien stocks and species, physical habitat, and instream flows are covered as relevant water quality factors.

More importantly, the driving social factors are ignored, like institutional resistance to change, human overpopulation and overconsumption, continued population and economic growth, lack of an ecological ethic, limited leadership and vision from agency heads and the legislature, and an emphasis on individualism vs. communitarianism (greed vs sharing, present vs future, humans vs. ecosystems, materialism vs. service). Technological fixes and rules do not substitute for the great social conversion that must occur if we are to make a place for salmon in a world evermore dominated by humans. I can provide citations of the scientific literature making these connections if you wish.

State Response 1:

In addition to this section on water quality there are other sections addressing physical habitat, water quantity, fish screening, and fish passage, dams and hydropower projects, and fisheries management. All of the issues identified in the first paragraph of the comment are addressed in the Supplement. The Supplement does not address the “great social conversion” envisioned by Mr. Hughes, except in the sense that it tries to educate the public about their role in salmon recovery and the major effort to involve watershed councils and other local stakeholders in the development and implementation of the Plan.

Hughes Comment 2:

I think land use must be more precisely and accurately evaluated.

State Response 2:

Agreed. This will occur as watershed assessments are undertaken in each of the watersheds in the steelhead ESUs over the next ten years.

Hughes Comment 3:

The biological objectives do not appropriately address the declining factors for the reasons mentioned in 1. Also, few of the biological objectives are biological. For example, even in the biocriteria bio-objectives 1 is a habitat objective, 2 is a set of monitoring milestones for general biological conditions, 3 is an expectation that watershed councils will assess biological conditions, 4 is a very general objective that could be met with weak steelhead populations, and 5 is a water quality objective. Nowhere is there an objective of producing sustainable populations of wild steelhead that can also support a high quality fishery. Although the stated objectives are necessary, they are not sufficient. Somewhere some grander over-arching objectives, goals, or assessment endpoints are needed for steelhead. Therefore many of the objectives could be met without halting or reversing steelhead declines.

State Response 3:

Agreed that many of the “biological objectives” are not really biological. Biological objective is terminology that NMFS is comfortable with and requested that the State use to describe the objectives in the Supplement. Each of the other sections in the Supplement also contains factors for decline and biological objectives. It is hoped that taken together these objectives, if achieved, would halt or reverse the decline of steelhead.

Hughes Comment 4:

I am uncertain whether the listed management measures are adequate or not. My guess is not. There is insufficient information on each to judge the probability of meeting even the limited objectives listed. It would have been useful (and might have saved paper) to have seen a matrix or table indicating the management measures vs. the objectives; as is, the redundancy made it only appear that much was being done. Very few time frames were presented so it is unclear whether they can be implemented within those time frames. Also, without some sense of funding and staffing levels implementation dates are guesses. The lack of such information does not inspire confidence in management or the likelihood of success in restoring steelhead.

State Response 4:

We agree the presentation of management measures leaves something to be desired. We are experimenting with alternative ways to present the information and changes will be made to the document in the final draft. Time frames for implementing the management measures are presented in detail in the work plans developed for each measure. Unfortunately, the work plans were not available at the time the Water Quality section was sent to the peer reviewers, but they will be incorporated into the final draft of the Supplement.

Hughes Comment 5:

I did not read any analyses or conclusions, nor were there clear linkages to the scientific literature. A supplement cannot protect and restore steelhead. I think the proposals have potential for improving conditions. The major areas requiring additional research are the effects of ocean condition--including management & harvest of other marine & estuarine resources--and the social issues presented in 1. Since people are the problem, we need to know much more about how to manage us as opposed to fish and their habitats. The connections between land use (resource exploitation), population growth, and salmon response need to be clarified and communicated to the public. I think many people still believe we can continue to devegetate the landscape and fill it with people yet have salmon as long as we leave a green strip near streams. This is folly.

State Response 5:

Agreed.

Hughes Comment 6:

Some of the measures should result in measurable improvements some will not, or only indirectly. Many of the measures will require decades or centuries to result in improved steelhead populations; this is all the more reason to start soon. As stated in 4, recovery rate is a function of \$ and staff--if the investments planned do not exceed or at least compare favorably with those invested in destroying natural resources there will be no improvement, let alone enough to recover steelhead.

State Response 6:

Agreed.

Hughes Comment 7:

There are some very good parts to the proposed monitoring, especially DEQ's idea of a systematic random sample for site selection. Here again the \$ and staff are not proposed; without them this is just pieces of paper. A major shortcoming is the apparent lack of any coordination among state monitoring agencies in terms of design, indicators, measurements, data management, or data analysis and reporting. There is also no clear statement of overall objectives, assessment questions, or assessment endpoints of interest to decision makers. Without knowing what we want to know, we cannot know it.

State Response 7:

Coordination with other agencies, while not obvious in this document, is a goal of the overall plan. To this end DEQ and other state and federal agencies formed a monitoring team early in the process to discuss and coordinate the issues you raise above; monitoring design, measurements, data management, analysis and reporting. The end result is still uncertain, but an honest attempt is being made to coordinate monitoring activities between different agencies.

The objectives/questions of the proposed monitoring elements are listed briefly below:

What is the current status of stream conditions within each ESU?

What is the trend in stream conditions within each ESU?

These two questions will be answered primarily by the sampling of randomly selected stream reaches within each ESU. A fixed number of randomly selected sites (normally 100+) will be sampled over a five year period. Physical habitat, chemical water quality and biological communities (benthic macroinvertebrate and fish communities) will be assessed at each sample site. Repeated sampling over time will provide an up-to-date status report on stream conditions and the trend in stream quality over time.

What level of stream quality is attainable by streams within each ESU?

How effective have restoration or management measures been in enhancing and protecting stream quality?

How do management measures need to be modified to meet stream quality objectives?

These questions will be addressed by a strategic sampling design. This means physical, chemical and biological parameters will be evaluated at specific sites where restoration projects, TMDLs, or AWQMPs have been implemented. Reference sites (sites with minimal or no disturbance) will also be identified and sampled within each ESU to provide an appropriate bench mark for streams in the area to be compared to.

What are the key streams or stream reaches within specific watersheds that need protection and enhancement?

What are the major stream quality problems within specific watersheds?

These questions will be answered through analysis of stream conditions at the watershed level. This analysis may rely heavily on data previously collected within each watershed, and on data collected by watershed councils, US Forest Service, BLM and other state or federal agencies. Much of the information utilized for TMDLs and AWQMPs will also help answer these questions.

Hughes Comment 8:

8. The most impressive part of the Supplement is the sense that several independent agencies are beginning to try to collaborate. This should be furthered to the maximum degree possible. The historical differences among agencies developed as persons interested in exploiting and protecting specific resources recognized the need for some state authority. Now we know, as salmon continuously remind us, that all these resources and actions are interconnected. We should try to make our agencies and legislation recognize that fact through close collaboration and reorganization at some levels, especially monitoring. If the agencies cannot cooperate, a separate monitoring and reporting agency should be established. We do this at the federal level to assess the human population; it is far more important to have high quality data about natural resources and anthropogenic stressors.

State Response 8:

Agreed. The Oregon Plan includes a chapter devoted to monitoring our progress, or lack of it, in achieving the objectives stated in the Plan and an independent panel of scientists (IMST) has been established to review the monitoring information and make recommendations to the Governor and Legislature to address shortcomings.

Hughes Comment 9:

Page 4. How are results from biased sampling designs helpful in planning and focusing resources? Mightn't they simply distort both?

State Response 9:

The data gathered for the 303d list is currently the most complete data set available. It is agreed that it does not represent a true picture of the level or type of disturbance, but at this time it is the best picture we have. The proposed monitoring plan includes a probabilistic random design in order to get an unbiased data set to evaluate status and trends of stream conditions.

Hughes Comment 10:

Page 5. Numbers of stream miles assessed via a biased sampling design should not be used to make projections about entire populations of streams. If you sampled only your colleagues would you expect high accuracy in predicting election results? Political pollsters have recognized the need for unbiased sampling at least since Truman v. Dewey; why do you suppose our profession has been so sluggish?

State Response 10:

Agreed that specific unbiased sampling needs to be done for each watershed as the Plan is implemented. Since that information is not available for many steelhead watersheds in Oregon we attempted to use the best available information to develop this Supplement. Ideally, we would have complete unbiased sampling results representative of all waterbodies in the steelhead ESUs. Lacking that we must press forward with the best information currently available and make adjustments as better information becomes available through specific watershed assessments.

Hughes Comment 11:

Page 16. There are a number of monitoring measures by DEQ and DF listed here, wouldn't it be nice to coordinate them in terms of design, indicators, measurements, and database management?

How are watershed analyses related to temperature standards?

State Response 11:

See response to comment 7. Watershed analysis reports often contain temperature data for specific streams in the watershed.

Hughes Comment 12:

Page 17. DEQ is proposing some good stuff here!

State Response 12:

Thanks.

Hughes Comment 13:

Page 18. There are a number of monitoring measures by DEQ and DF listed here, wouldn't it be nice to coordinate them in terms of design, indicators, measurements, and database management?

How are watershed analyses related to temperature standards?

Who will be developing and implementing monitoring strategies? Is temperature the only indicator of restoration? What is the frequency and history of restoration projects and ag plans?

State Response 13:

See response to comment 7 & 11.

Monitoring strategies will be developed by a team including DEQ, other involved agencies and watershed councils if they exist in the particular watershed. Implementation will be determined by the team and will likely include a combination of agency and watershed council personnel. Since DEQ does not have the resources to implement monitoring activities in all the watersheds that will be assessed, we will provide technical assistance on monitoring methods and design to watershed councils and coordinate with other agencies.

No, temperature will not be the only indicator of restoration. Habitat information, water chemistry such as dissolved oxygen, pH and nutrients, and biological data will be collected as well depending on the objectives of specific restoration projects and monitoring plans.

What is the frequency and history of restoration projects and ag plans? None. These are new programs.

Hughes Comment 14:

Page 19. This is another area where a statistical sampling design would be essential.

State Response 14:

Agreed. It is anticipated that the random sampling design outlined in the plan will provide much of the data to determine these milestones.

Hughes Comment 15:

Page 24. How will reference sites be defined and found? My sense is that only a few small high gradient reference sites exist. Are they representative of the habitats occupied by steelhead?

Wouldn't it be worthwhile to develop collaboration with DF and DFW in the sediment monitoring covered under objectives 1 & 2?

State Response 15:

Reference sites are generally referred to as streams which represent unimpaired or "least" impaired conditions (EPA, 1990). This recognizes that finding streams in natural conditions, with no anthropogenic disturbance ("unimpaired"), may not always be possible. In such cases streams that represent areas with the least human disturbance or minimal impairment may be used as reference sites.

As you suggest headwater reference sites cannot be used as reference sites for larger stream segments. Therefore, we plan to group streams into categories using channel gradient and bankfull width categories. Categories are currently being assessed by EPA using data previously collected from sites in the Oregon Coast Range. The number of reference sites listed in the plan are based on our best ideas of how many sites will be needed to provide a sufficient data set over several size and gradient categories. We are also exploring the idea of developing a reference community based on historical information for streams types that have no suitable reference sites available (ex. low elevation valley segments).

DEQ will be trying to coordinate monitoring activities with DF and DFW for sediment information.

EPA. 1990. Biological Criteria – National Program Guidance for Surface Waters. EPA, Washington DC. EPA-440/5-90-004.

Hughes Comment 16:

Page 25. There are a number of monitoring measures by DEQ and DF listed here, wouldn't it be nice to coordinate them in terms of design, indicators, measurements, and database management?

Who will be developing and implementing monitoring strategies? Is sediment the only indicator of restoration? What is the frequency and history of restoration projects and ag plans?

State Response 16:

See response to comments 7 & 13.

Hughes Comment 17:

Page 26. Are the estuary & hydropower programs listed really relevant to steelhead spawning gravels?

State Response 17:

The estuary programs are relevant because they address the tributaries feeding the estuaries, as well as the estuaries themselves. However, the review of hydropower projects on the Snake River under section 401 of the Clean Water Act probably won't beneficially affect steelhead spawning

because there aren't spawning gravels below the projects. Thus, DEQ30S has been removed from the biological objective on page 37.

Hughes Comment 18:

Page 28. Are SB1010 and CAFO relevant to areas exceeding DEQ water quality standards?

State Response 18:

Yes, ODA is responsible for ensuring high quality waters are protected as they implement SB1010 and the CAFO program.

Hughes Comment 19:

Page 30 & 31. Wouldn't it be worthwhile to develop collaboration with DF and DFW in the DO monitoring covered under objectives 1 - 3?

State Response 19:

See response to comment 7.

Hughes Comment 20:

Page 32. Who will be developing and implementing monitoring strategies? Is DO the only indicator of restoration? What is the frequency and history of restoration projects and ag plans?

State Response 20:

See response to comment 13.

Hughes Comment 21:

Page 34. Are SB1010 and CAFO relevant to areas exceeding DEQ water quality standards?

State Response 21:

Yes, see State Response to Hughes Comment 18 above.

Hughes Comment 22:

Page 35. Might not TDG also be an issue in streams, especially those in ag and range areas receiving excessive nutrients and lacking shade?

State Response 22:

Yes, see Dam and Hydro Chapter Technical Review Draft, A-IV page 5.

Hughes Comment 23:

Page 37. I think alien species and stocks should be added to the list of adverse alterations.

What sort of community is NOT balanced, integrated, or adaptive? They wouldn't persist for years if they were not. This phrase sounds nice but it has little basis in ecology. The remainder of the footnote is fine.

State Response 23:

Agreed, alien species and stocks have been added to the list of adverse alterations under the biological conditions factor for decline. Fish community data will be assessed for factors such as, % of introduced species and % hatchery vs. wild stocks present.

The definition of "Ecological Integrity" is taken from Oregon's narrative biological criteria (DEQ, OAR 340-41-027). The wording was debated and reviewed at length during its development.

Hughes Comment 24:

Page 38. Who will be developing and implementing monitoring strategies? Is biocondition the only indicator of restoration? What is the frequency and history of restoration projects and ag plans? How will biological condition be evaluated by watershed councils?

Do all the activities listed here and on p. 39 have a biological component? If so, what is it?

State Response 24:

See response to comment 13.

The activities listed on page 38 & 39 either have direct biological data components, like macroinvertebrate and fish community data, associated with them, or have habitat and water quality components that are important in understanding the status of biological communities.

Hughes Comment 25:

Page 39. What sort of community is NOT balanced, integrated, or adaptive? They wouldn't persist for years if they were not. This phrase sounds nice but it has little basis in ecology.

An ecoregion, subecoregion, or channel type would also be preferable to sub-basins as stratification units. Catchments are too variable to use for this purpose.

State Response 25:

See response to comment 23. Because of the listing process, ESUs are the primary scale of assessment. Within ESUs different scales may be evaluated including sub-ecoregions, basins and watersheds.

Hughes Comment 26:

Page 41. I am doubtful that riparian and instream improvements can counter intensive and extensive catchment disturbances. There are several publications indicating that stream responses are driven as much or more by catchment land uses as by riparian condition. I can provide them if you wish.

State Response 26:

References have been requested from Mr. Hughes. The state believes that riparian measures will improve the stream over existing conditions even where there is extensive catchment disturbance. However, nowhere is it assumed that we can improve a stream to "pristine" conditions simply by improving riparian function. For small streams watershed factors are less important than riparian factors. For large systems, watershed factors may outweigh riparian factors, but even there improving riparian functions should improve water quality in general.

Hughes Comment 27:

Page 44. Is there any evidence that physiological markers will separate stress from multiple toxins vs. capture and handling stress? Which specific toxins are detected physiologically?

State Response 27:

There are some biomarkers that respond only to exposure to certain types of chemicals such as: the induction of metallothionein with exposure to cadmium and certain other metals; and, cytochrome P450 1A with exposure to Ah-receptor binding chemicals such as dioxins, furans, and PCBs. However, some biomarkers are not contaminant specific but can indicate system

stress such as stress proteins. The monitoring can be designed to use biomarkers to indicate exposure to certain types of contaminants and while other biomarkers can be used to indicate stress. There are several biomarkers that can be used which are unaffected by the stress of capture and handling.

Hughes Comment 28:

Page 45. How are the listed measures related to physiological monitoring of toxins?

State Response 28:

The appropriate monitoring protocols will be developed under DEQ19S.

Hughes Comment 29:

Page 50. Who will be developing and implementing monitoring strategies? Is pH the only indicator of restoration? What is the frequency and history of restoration projects and ag plans?

State Response 29:

See the response to comment 13.

Hughes Comment 30:

Page 52. What is the relevance of SB1010 and CAFO to sites better than pH standards?

State Response 30:

See the State response under Hughes comment 18 above.

Hughes Comment 31:

Page 61. Is there sufficient \$ to complete catchment assessments and TMDLs?

Since watersheds are continuous entities varying in size and complexity with each additional stream reach, their general size must be defined to make statements about them. What sampling design will be employed for sampling and listing all watersheds not meeting standards?

Has DEQ received its Healthy Streams budget? If so, is it likely to be continued? Without more predictable budgets, this measure and others in the supplement are mere wishes.

State Response 31:

There are adequate resources in the Healthy Streams Partnership budget for the current biennium for DEQ to undertake TMDLs at a pace that would have them all complete within ten years. If those resources are continued in future biennia, the ten year target should be met.

Hughes Comment 32:

Page 62. The wetland research group at the EPA lab in Corvallis has an interesting set of publications documenting the sorry state of 401 permit reviews and enforcement. I can provide them if you wish.

Has DEQ received its Healthy Streams budget? If so, is it likely to be continued? Without more predictable budgets, this measure and others in the supplement are mere wishes.

State Response 32:

See State response under Hughes comment 31 above. Also, DEQ has requested the documents on the 401 programs Mr. Hughes has offered to provide. The Department's concern with the implementation and enforcement of 401 certification conditions was one of the main reasons it included measure DEQ4S in the Supplement.

Hughes Comment 33:

Page 63. Since watersheds are continuous entities varying in size and complexity with each additional stream reach, their general size must be defined to make statements about them. What sampling design will be employed for sampling and listing all watersheds not meeting standards?

State Response 33:

The randomized site selection design is the primary approach that will be used to assess the status and trends of stream conditions within each ESU.

Hughes Comment 34:

Page 66. I like the proposed randomized design. Some questions remain: When will sampling occur? How will it and the indicators be linked with those of other agencies? What stream sizes will be sampled? Does DEQ have integrity indices for fish and benthos? How do they relate to steelhead integrity? What sort of database management system and staff is available to handle and report on the data collected?

The "Strategic" Design reads more like a 'Site-Specific' Design. The randomized design mentioned above sounds much more strategic. I see only two designs: randomized and site specific. The former can be used to extrapolate to the population sampled; the latter offers information about the site sampled only. This distinction makes one cost-effective and the other costly.

State Response 34:

Dr. Hughes raises a number of questions here that will be addressed in a more detailed monitoring and QA plan. Specific answers to his questions are listed below. These refer to the randomized design only.

When will sampling occur? July 1 through October 1.

How will it and the indicators be linked with those of other agencies? It is not known at this time how many random site locations will overlap with monitoring activities of other agencies. Sites selected under the strategic and watershed design will have more direct links to the monitoring activities of other agencies.

What stream sizes will be sampled? 1st through 3rd order wadable streams.

Does DEQ have integrity indices for fish and benthos? We have a preliminary set of metrics derived from previous work in the Coast Range (REMAP and Sub-ecoregion study) for both fish and benthos. These metrics are currently being reviewed and will be available for assessing the data for this study.

How do they relate to steelhead integrity? The goal of the biotic metrics is to give an overall assessment of biological condition that reflects habitat and chemical disturbance. It is not designed to characterize conditions for a specific species. Implicit in this approach is that streams with healthy biotic communities provide adequate conditions for salmonid fish survival such as steelhead. Other factors, such as fish passage barriers, fishing pressure, hatchery competition, etc., will need to be evaluated as well when determining why steelhead are present or not.

What sort of database management system and staff is available to handle and report on the data collected? A Microsoft Access database system is being brought online at the DEQ laboratory

for storage and access to chemical, habitat and biological data. Parts of this system are currently being used. The full system is expected to be online in six months. Staff for managing and reporting data will involve up to nine new positions identified as necessary to implement the steelhead monitoring program outlined in this supplement.

Strategic Design: Strategic design refers to sites placed strategically to address effectiveness of specific restoration projects or the location of reference sites, rather than randomly placed sites. Because there will be numerous project specific activities associated with restoration and BMP implementation, it was felt necessary to identify sites to help assess their effectiveness. While random site results will help assess effectiveness of the overall program by providing unbiased data on the status and trends within a region (ESU, basin, etc.), it would not likely be effective in assessing the effectiveness of site specific types of projects.

Hughes Comment 35:

Page 67. What criteria will be used to select reference sites?

You might consider using fish tissue to monitor contaminant loadings; we've found them more sensitive than sediment or water samples at detecting organic toxins and heavy metals.

State Response 35:

See response to comment 15. Agree the fish tissue is effective at identifying the presence of toxins. Some fish tissue and enzyme work is planned as a tool for assessing the presence of toxins.

Hughes Comment 36:

Page 68. I believe TDG may be a problem in productive agricultural streams also.

I think DEQ should run a cost-effectiveness analysis of its ambient water quality monitoring. There are far more effective ways to monitor trends.

What sort of sampling design will be used to monitor watersheds? What data are available and how comparable are they? In Tetra Tech's evaluation for DEQ of the available data on the Willamette River, they concluded it did not meet data quality standards for multiple reasons. I suspect these other sources will have similar shortcomings.

Completing 384 TMDLs by 2007 means 38 per year--what is the number DEQ normally completes per year? Are they of comparable complexity, i.e., do they involve loads for temperature and sediment from diffuse sources?

State Response 36:

Agree that TDG may be high in some highly enriched agricultural streams. In such locations pH may be more problematic since gas bubble disease typically requires the deep pools that occur below dams.

Watershed monitoring studies will vary depending on the specific objectives and questions identified. DEQ will be providing oversight on the development of monitoring plans for watershed councils.

TMDLs will be developed on a watershed wide basis. Thus one watershed level TMDL may address 10 or 20, 303d listed segments. This is a new approach compared to methods used for earlier TMDLs.

Hughes Comment 37:

Page 69. I agree that citizen monitoring can produce low quality data--but I think it can be corrected with training and supervision. If water quality data are of low quality, I believe biological data will be also. How will site measurements be converted to watershed values?

State Response 37:

Monitoring plans will be developed to address the questions and TMDL needs identified for specific watersheds. Designs will vary depending on ownership (and access), available data, etc. Having watershed councils use a random site selection design will be one tool considered.

Hughes Comment 38:

Page 74. A similar permit system should be implemented to ag and grazing on private lands. Streams and salmon/steelhead don't know they are only to be protected on federal lands.

State Response 38:

ODA is working closely with the additional agencies who are responsible for developing permit conditions for grazing on federal lands with the intention of developing a uniform set of management goals and strategies across public/private ownership. ODA is presently working with a committee to develop permanent rules which will describe the conditions to be placed into a "401" certification for grazing permits on federal lands. The intent of a "401" certification is to ensure that a given activity proposed on federal lands will not harm water quality.

The ultimate goal is to develop a process where the rules which apply to 401 certifications for grazing permits on federal lands are equivalent to the conditions which apply to livestock grazing in an Agricultural Water Quality Management Area Plan.

Hughes Comment 39:

Page 76. What is surveyed in the ODFW surveys and with what sampling design? How realistic is it to survey all streams in an entire ESU or all ESUs?

State Response 39:

This comment has been referred to ODFW for response.

Hughes Comment 40:

Page 86. From the preceding 10 pages it appears that DFW has weak monitoring designs and enforcement activities; it doesn't seem to be a full partner.

State Response 40:

This comment has been referred to ODFW for response.

Hughes Comment 41:

Page 87-97. As with DFW, DF appears to lack any sort of monitoring design.

Given the amount of effort and \$ expended it is negligent of the DEQ, DFW, DA, & DF at a minimum to not have a collaborative monitoring design (preferably with a strong random component), a set of common indicators and measurements, and a common data base

management system. There is also a clear need for implementing more remote sensing. This monitoring should cover ambient instream conditions, implementation of recovery plans, and ambient land use practices. If the State truly wants to restore salmon, it cannot conduct business as usual. I can provide references outlining such a monitoring program if you like.

State Response 41:

Agreed. Many of Dr. Hughes comments here are being pursued (ex. collaborative monitoring effort and integrated database between agencies, etc.). We would appreciate any references for integrated monitoring programs Dr. Hughes can provide.

Dr. James Karr

Professor of Fisheries and Zoology
University of Washington

As with the Coastal Oregon Plan that I reviewed earlier this year, this document clearly reflects a thoughtful approach to protecting and restoring the salmonids of the region. The conceptual framework of the process of protecting water quality is stronger than has been used through most of this century. I am especially pleased by the effort to frame the issue in terms that emphasize the importance of biological endpoints.

Let me first react to the first two questions:

1. Are all relevant factors of decline included?
2. Are the factors of decline described appropriately?

Karr Comment 1:

Toxics (page 44): An important effect of the presence of toxic materials is increased susceptibility of fish or other organisms to other stressors, organisms in a toxic environment may be more susceptible to disease.

State Response 1:

Agreed. Change made in toxics factor for decline.

Karr Comment 2:

Stream Fertility (page 53): Several causes of decline are wisely mentioned here but one major one is not included. Livestock grazing in many watersheds significantly degrade rivers by the direct and indirect influences of livestock wastes in and near the stream channel.

State Response 2:

Agreed. Change made in stream fertility factor for decline.

Karr Comment 3:

Biological Conditions (page 37): During the past 25 years, we have identified five major ways that humans degrade the biological condition of rivers: 1. chemical pollution, 2. flow alteration, 3. physical habitat alteration, 4. alteration of energy and nutrient supplies, and 5. alteration of biotic interactions. The list as presented in your document covers segments of four of those five. The missing item is biotic interactions, an effect that is usually stimulated by introduction of exotics or the overharvest of sport and commercial fishers. The addition of that aspect to this list and the organization of the list into a coherent framework would be useful as an aid to understanding the complex of important human influences. Let me react to each of the items in your list, including the number it corresponds to in my organization of five classes.

Habitat degradation: this implies everything when I suspect you intend physical habitat (3).

Flow alteration: good (2).

Nutrient and sediment inputs: good. (Includes aspects of both 1. nutrients and 3. physical habitat).

Removal of riparian vegetation: Influences components of all five.
Pesticide applications: (1)
Discharges from point sources: (1)
Channel modification: Text implies it is from landscape. But also influenced by channelization and riparian corridor as well as upland activities.

This structure leaves out many other chemical effects from industrial and other effluents. Personally I prefer an organized list to which we can add or incorporate factors in groups rather than a long laundry list without that organization.

The other questions are less clear to me and harder to answer because they require a broader framework for evaluation. For example, the water quality objectives are outlined but without knowing how the monitoring to track resource condition will be implemented it is hard to know if the program will be a success. Rather than follow your questions, I will provide a few reactions to my reading of the document.

State Response 3:

No response.

Karr Comment 4:

Page 4 - You acknowledge mid-page that the results of the 303(d) list do not necessarily represent conditions or the magnitude of the problem. I agree that the 303(d) process is fundamentally flawed in several ways, Yet in the next sentence you suggest they suggest what water quality parameters are helpful in determining where the state should focus. In a fundamental way, this conflict illustrates a central flaw of the organization of this document. The list of parameters ranges over a variety of conventional water quality parameters (DO, toxics, sediment, temperature, etc.) but oddly mixes biological condition as one of the members of the list. Biological condition is the endpoint of interest to society and the physical and chemical parameters are factors that may be important in indicating (and causing) the degradation in biological condition. But there are factors in addition to that range of chemical water quality parameters that also play a major role in degrading biological condition. See the list of five factors above and explore the human activities that relate to them. They go well beyond the present short list of conventional "water pollution" measures.

Further the tabulations and figures that go along with this text seem to focus narrowly on these parameters rather than considering the broader framework of human induced degradation. It is more a bean-counting classification of problems than a reflection of the situation. Rather than trying to classify the frequency of problems from single sources, it might be better to see each place as being influenced by nearly all of them. It is the cumulative impacts of these many factors and others that are causing degradation at each site. The challenge is teasing out which set is responsible at each site and by how much.

By fragmenting the problem into a set of conventional water quality issues (pollutants), we sustain the view of the problem that has limited our ability to respond with effective protection and restoration strategies in the past. Simply put, a broader strategy for diagnosis of the causes of

degradation in each watershed is critical if the restoration efforts are to properly target the causes of degradation in each watershed.

The listing of parameters given here as a series of coequals should be reevaluated. Some are the direct results of human actions, and thus the causes of degradation in biological condition. But biological condition is not a cause of degradation in water quality. It is the primary measure of interest to society. It is why we focus on chemical water quality parameters as one set of indicators of biological degradation. Biological condition is not a factor for decline.

State Response 4:

Agreed that overall biological condition is not a factor of decline of salmonids, but an indicator of biological degradation. However, what is being addressed in this factor of decline and biological objectives is the use of DEQ's biological criteria water quality standard to measure degraded biological conditions (these may occur even if the individual water quality parameters seem to be OK), and to address the factors causing the degradation in a holistic manner. DEQ believes that its biological criteria standard, if used properly, can be one of its most effective tools in dealing with degraded biological conditions. By its nature it integrates the effects of all stressors on the biological community and allows identification of problems that can be overlooked by merely checking individual water quality parameters.

Karr Comment 5:

Targets are established in percentage reduction but little guidance is provided as to how those tasks will be accomplished. What is known about the translation of change in miles of water with changed water chemistry to direct improvement in biological condition, the desired endpoint. How will the diagnostics procedures operate to evaluate these issues? How were those targets established and why? Why are they not too slow? Too much of this is left aside or unspoken, making it impossible to evaluate the likelihood of success.

On page 39, for example, the standards are set pretty low. A 20% reduction in impaired stream miles in the next 2 decades seems a token accomplishment given what needs to be done and how easy it is to make improvement in biological condition in a large proportion of stream miles.

State Response 5:

Agreed that significant improvement in biological condition can be made with relatively simple changes in management practices, and that we should move as quickly as possible to effect these changes. The percentage reductions in impaired stream miles for biological conditions are set at fairly conservative levels in the Supplement because we don't have a good data set of the current biological condition of many watersheds in the steelhead ESUs. When you don't know where you are it is difficult to determine how far you need to go to reach the desired endpoint. DEQ has proposed significant additional biological condition monitoring (DEQ19S) in the Supplement to develop the database needed to assess biological conditions and move ahead with solutions.

Karr Comment 6:

On page 37, a sampling plan that has from 50 to 75 reference sites in each of the major watersheds seems an extremely high set of numbers, in part because it is too ambiguous how many kinds of systems will require reference sites. How many reference sites are sought for each stream classification group to be evaluated? How many groups are there? It is excessive too

when one consider that reference sites are supposed to represent the best sites, the sites minimally disturbed by the past actions of human society. In my experience in the Pacific Northwest, it will be nearly impossible to find that many truly reference sites for each of the rivers types in each of the watersheds. But I can't really tell because the language is not adequately defined and described for me to understand what will really be done.

State Response 6:

Reference sites are generally referred to as streams which represent unimpaired or "least" impaired conditions (EPA reference site info?). This recognizes that finding streams in natural conditions, with no anthropogenic disturbance ("unimpaired"), may not always be possible. In such cases streams that represent areas with the least human disturbance or minimal impairment may be used as reference sites.

We plan to group streams into categories using channel gradient and bankfull width categories. Categories are currently being assessed by EPA using data previously collected from sites in the Oregon Coast Range. Possible categories include: 3 gradient classes (0-2%; 2-4%; > 4%) and 3 bank-full width classes (0-5 meters; 5-10 meters; > 10 meters). The number of reference sites listed in the plan are based on our best ideas of how many sites will be needed to provide a sufficient data set over several size and gradient categories. The final number may be less if that number can't be located. We are also exploring the idea of developing a "reference community" based on historical information for streams types that have no suitable reference sites available (ex. low elevation valley segments).

EPA. 1990. Biological Criteria – National Program Guidance for Surface Waters. EPA, Washington DC. EPA-440/5-90-004.

Karr Comment 7:

One final comment to reiterate a point made earlier. It is critical that you see biological condition as the endpoint of interest to society in the implementation of both the Endangered Species Act and the Clean Water Act. By making biological condition a water quality parameter, rather than that endpoint, you keep the door open to the same class of mistakes that we have made in water resource management and endangered species protection (or lack thereof) in the past.

State Response 7:

We agree that biological condition is the endpoint of interest. However, the state biological criteria water quality standard is a very useful tool in addressing biological degradation. See the State response to Karr comment 4 above.

Dr. Bill Krueger

OSU Department of Rangeland Resources

This is my review of the Water Quality Chapter of the Steelhead Supplement to the Oregon Plan.

Krueger Comment 1:

1. Are all relevant water quality factors included? The coverage seems adequate.

State Response 1:

No response necessary.

Krueger Comment 2:

2. Are the factors of decline described appropriately? No. It is impossible to sort out scientific principle, site specific results and opinion since statements are not fully documented as to the basis.

State Response 2:

The factors of decline were developed collaboratively by a team of state and federal natural resource agencies working together in a water quality workgroup. Agencies represented included: DEQ, ODFW, ODA, ODF, DLCD, ODOT, NMFS, USFWS, and USEPA. The factors of decline included in the Supplement represent the consensus opinion of the agencies represented in the water quality workgroup about what and how water quality parameters affect salmonids/steelhead. Documentation is available for each of the statements made in the factors for decline, but is not included in the Supplement for the sake of brevity.

Krueger Comment 3:

3. Since scientific data concerning the results of achieving biological objectives are not presented, this question cannot be answered.

State Response 3:

It was hoped the peer reviewers would have used their expertise in water quality to give their opinion on the adequacy of the biological objectives.

Krueger Comment 4:

4. Are agency measures adequate? The programs will probably move some aspects of water quality towards improved water quality for fish. Since how science will be used is not clear, it is impossible to provide a firm answer to this without a firmer basis in sciences and less on general views of the authors.

State Response 4:

See response 3 above.

Krueger Comment 5:

5. Are conclusions consistent with scientific literature? In some ways this is true and in others it is difficult to tell. For example, page 15 water temperatures are too warm or too cold. The literature suggests that there are thresholds of ecological change that are pertinent with respect to the nature of biological response. Achievable thresholds for fish survival or potential to reduce anchor ice formation are not referenced. It sounds like the authors consider ecological change to be fully manageable and does not consider that when thresholds are crossed, management cannot reverse a response. When anchor ice is forming, there may be a temperature threshold through

which shade could prevent anchor ice formation but if it gets cold enough no shade can prevent the formation of anchor ice. The dynamic nature of ecological responses seems to be minimized in the document.

State Response 5:

The authors do not consider ecological change to be fully manageable. In fact, many of the ecological problems we are facing today are the result of people thinking they could fully manage through technological fixes the effects of the ecological changes they were causing in the name of human progress (e.g.; use of hatcheries to replace wild fish lost due to construction of dams). The purpose of this conservation plan is to address those factors that have resulted in decline of salmonids to the extent we are able while recognizing that much has already been lost that may never be recovered. The first priority is to protect those areas where the steelhead stocks are still healthy. The second priority is to restore those areas where steelhead are impaired to the extent feasible.

Krueger Comment 6:

6. Are water quality improvements measurable and over what time period? The monitoring is possible. Designs for monitoring need careful and site/location specific intensity and focus. This detail is beyond the plan but is critical to future interpretation of ecological parameters monitored. If DEQ protocols are followed there probably will not be sufficient funds to meet their current protocols. If an overall, well designed, statewide monitoring plan is designed that is not hierarchically linked to local sites and local management areas, it is feasible to monitor the parameters listed in a statistically reliable way over a 3-4 year time frame. This will accurately reflect what is being done in the state but it cannot be used to evaluate basins, reaches, etc.

State Response 6:

Changes and improvements in water quality are measurable. Tracking such changes has been one of the key objectives of water quality agencies across the country. The time period necessary to observe measurable improvements will vary both between different watersheds depending on the types of problems and restoration activities undertaken, and for different parameters. Improvements in water temperature for example, may be easier to measure and respond sooner than improvements in sediment deposition.

The monitoring plan described will only be possible if the necessary funding requested is provided. Currently nine FTE were requested to implement this monitoring plan across the four ESUs. The plan identifies both a random design monitoring approach to characterize status and trends, and a strategic design, or site specific approach, to address local issues within specific basins, watersheds, reaches, etc.

Krueger Comment 7:

Will water quality improve soon to recover species? I do not know but I do know water quality is not the only factor related to current steelhead population sizes.

State Response 7:

Agreed. The Supplement includes sections on water quality, physical habitat, water quantity, fish passage, fish screening, fisheries management, dams and hydropower projects. It is hoped that together these measures can halt or reverse the decline of steelhead.

Krueger Comment 8:

7. Is water quality monitoring adequate as described? No. See answer to 6 above.

State Response 8:

See response to comment 6.

Krueger Comment 9:

8. Priorities? I think there should be a clearer prioritization of the relative roles of all the factors of decline and this should all be made public. The solvable problems should be clearly identified and if they will restore salmon/steelhead they should be implemented. If they won't, we should not pursue them. Finally, monitoring is very expensive. Design a system to monitor that will answer the questions that are of highest priority (probably statewide success) and don't waste money on something that cannot be interpreted.

State Response 9:

The factors of decline are listed in the water quality section with the most important factors affecting steelhead recovery listed first. The water quality workgroup felt that temperature and sedimentation were the two most significant water quality parameters affecting steelhead recovery. Text has been added to the factors of decline section to clarify this point.

Section 1. Water Quality Document (17B1-63)

Krueger Comment 10:

Page 17-B4, paragraph 6. REMAP project. The 57 sites if sampled randomly can be used to estimate the status and its value will be described by the confidence limits you can put on the estimate made from the data sets.

State Response 10:

Agreed.

Krueger Comment 11:

Page 17-B8, paragraph 4. "with such large..." This statement from the Botkin report is purely speculative and has no basis beyond the guess of Botkin.

State Response 11:

Agreed.

Krueger Comment 12:

Page 17-B9, paragraph 3. Sedimentation is not suggested as important in the physical habitat document. Be sure your chapters agree. This is difficult when standards come from viewpoints not scientific data.

State Response 12:

Agreed that we have some departure in the chapters. Sedimentation is an issue if it is causing the loss of high quality spawning gravels and gravel habitat for invertebrates. There are such effects reported in the literature for other places such as the Idaho Batholith, most fisheries habitat experts think that lack of channel complexity and temperature are the key issues limiting fish throughout most of Oregon. However, on the eastside where there are increasing sediment concerns sediment can be a significant problem. The chapter authors will confer on this issue and harmonize the chapters. The physical habitat chapter has a coastal bias right now and it needs to be broadened to better address the whole of Oregon.

Krueger Comment 13:

Page 17-B28, paragraph 6. Research reports clearly show that irrigation withdrawals do not always cause an increase in water temperature. In some cases irrigation reduces ambient water temperatures.

State Response 13:

Agreed. There are exceptions to all generalizations.

Krueger Comment 14:

Page 17-B61. I do not believe ODFW has the ability to define conditions that cause streams to exceed temperature criteria.

State Response 14:

ODFW, DEQ and other state and federal natural resource agencies work collaboratively to define conditions that cause streams to exceed the temperature criteria.

Krueger Comment 15:

Oregon Department of Agriculture Description of Programs.

This document explains the ODA processes well. It doesn't discuss how agricultural practices will be managed by ODA. Monitoring protocols are not included.

State Response 15:

Agreed.

Jim Lenhart, PE

Vice President of Research & Engineering
Stormwater Management

General Comments:

Lenhart Comment 1:

1. It seems that the document can be reduced to about 10% of it's size by organizing the factors, ESU's and Agency Management Measures into a matrix or tabular format. This would also allow the authors to recognize duplications or missing agency management measures easily.

State Response 1:

This is a problem that has confounded the authors from the beginning of the planning process for recovery of coastal coho salmon. We have tried several alternative ways to organize the information so that it takes up less space and still conveys information to the reader without excessive cross-referencing. A new organization of the materials is being attempted in the revised section, but there is still some duplication. Hopefully, we will develop a superior way to present the information in the next update to the Oregon Plan.

Lenhart Comment 2:

2. The water quality summary is a written presentation of a lot of numbers. The reader quickly loses a sense of what is being said.

State Response 2:

Changes have been made to improve the readability of the water quality summary.

Lenhart Comment 3:

3. Some formatting is inconsistent.

State Response 3:

Corrections have been made.

Lenhart Comment 4:

4. Some acronyms are not defined.

State Response 4:

All acronyms are now defined the first time they are used in the water quality section.

Lenhart Comment 5:

5. It would be good to include a map of the ESUs to gain an understanding of where they are and a general idea of the presence of cities, dams, mountains, state parks etc.

State Response 5:

Appendix 1 has been added to the document showing the steelhead ESUs with reference to the USGS 4th field watersheds in Oregon. The additional detail of also including cities, dams, mountains, etc. is feasible but not within the publication parameters of this document.

Lenhart Comment 6:

6. The document continuously states that DEQ will rely on other agencies and watershed councils to provide technical assistance. My interpretation is that DEQ does not have the funds and is hoping that some one else will carry what promises to be a heavy economic burden. My question is "is it realistic to assume that others will collect these data, coordinate and deliver it to

the state for some future compilation.” I would also question the motives of a multiplicity of people collecting these data to serve their own interest, whether they view environmental protection as a need or an obstacle. In addition, these data will be collected with different instruments, data collection error and data collection techniques. It has been my experience that when you attempt to compile and analyze data from many different sources, it can be very difficult.

State Response 6:

DEQ personnel have been hired to provide technical assistance to watershed councils to help them develop appropriate monitoring strategies and provide training to council members so they will be able to collect acceptable data. DEQ is also participating in an interagency monitoring team that as one of its tasks is writing monitoring protocols for watershed councils to follow and thus provide a more standardized data set. The 20 million dollars allocated to GWEB will be the primary funding source for watershed councils to undertake and complete monitoring activities. The motives of different members of watershed councils will likely vary as you suggest, but it is felt that with proper assistance they will be able to collect data with acceptable levels of confidence. for certain parameters. Measurements of organic toxins for example are not expected to be carried out by watershed councils. We agree that it can be quite difficult to analyze data from many different sources. We are actively involved in developing protocols and training to minimize differences and improve data quality.

Lenhart Comment 7:

1. I do not understand the basis for the selected number of sites. It appears these numbers are arbitrary i.e. in quantities of 50 and 100. I would seek to select the number of sites based on the diversity and statistical variance in stream reach characteristics. This will allow an optimization of the number of monitoring sites.

State Response 7:

The monitoring design followed here is that recommended by the EPA, EMAP program (Environmental Monitoring & Assessment Program). One of the primary objectives of the EMAP program is to, “Estimate the current status, extent, changes and trends in indicators of the condition of the nation’s ecological resources on a regional basis with known confidence” (EPA Region 10, 1994). This objective is also true of the monitoring plan for the steelhead ESUs. To accomplish this objective a probabilistic sampling design based on a random selection of monitoring sites has been developed by numerous ecologists and statisticians working on EMAP. By selecting a sufficient number of random sites across a specified region (a region could be a watershed, a basin, an ecoregion, etc.), an estimate of the current status for the measured parameters can be determined. By repeating the sampling at the same sites on a specific frequency (every 5 years for example) trends in conditions can also be estimated. The minimum number of sites for an effective estimate is considered to be 50 (Allen Herlihy personal comm., 1997). More sites provide a more robust estimate and are able to discern smaller changes and trends. Given that 50 sites is considered a minimum, the 100 to 150 sites per ESU identified in this plan was considered sufficient to provide a good measure of status and trends over each of the areas (some sites will also be sampled repeatedly each year to help evaluate annual differences due to shifts in weather patterns). A similar approach has been selected for monitoring the status and trends of stream conditions in the Oregon Coast Range for the State of

Oregon's salmon recovery plan. This monitoring plan was developed with numerous agency biologists and statisticians, including EPA, over a nine month period, which included many discussions about the proposed design. Therefore, while it is agreed that the steelhead supplement doesn't provide much detail on the rationale for the proposed methods much discussion and thought has gone into its development.

EPA Region 10. 1994. 1994 Field Operations and Methods Manual for Streams in the Coast Range Ecoregion of Oregon and Washington. EPA, Seattle, WA.

Lenhart Comment 8:

2. I do not think that randomly selecting the monitoring sites is a good approach. It seems a better approach would be to take a random sampling to establish both the variance and different population characteristics. Once these statistical parameters are understood then carefully select the site locations to best represent the diversity of each stream reach. This allows carefully controlled data collection. For example: monitor temperatures on the upstream and downstream borders between land uses. Monitor for toxics above and below agricultural watersheds. Also try to select sites that are easily accessible to reduce data collection costs.

State Response 8:

See response to comment 7.

Lenhart Comment 9:

3. When objectives are outlined I assume that there is a timeline or chronological order to the objectives. In many cases one objective can not be started until the previous one is achieved.

If this is the case then the management of non-degraded systems should be paramount and listed as objective number one rather than number six.

State Response 9:

Agreed that management of non-degraded or high quality systems should be the first priority biological objective. The biological objectives were listed in the order they were developed. To reflect the high priority for protection of non-degraded systems that objective has been moved to the top of the list in each factor of decline.

Lenhart Comment 10:

4. Each factor is given a time line for percent completion. Again these numbers seem arbitrary. I do not understand the basis. In addition the paper states that the 95th percentile will be reached some time in the future. This is 1.65 standard deviations to the right for a normally distributed population. Think about what it takes to bring something more than 2 standard deviations from the mean. If we assume that, at best, the variance in a water quality parameter is normally distributed then getting the 84th percentile (1 standard deviation) may be more realistic.

My opinion is that if we are overly optimistic about the goals and they are not reached, then the whole effort is set back because the goals have lost their meaning.

State Response 10:

Agree that the goals may be overly optimistic. Not enough information is available to know what targets can actually be achieved and the associated timeframes. The numbers shown are best

guess estimates and should be changed over time as we learn more about what is possible and necessary to effect recovery of steelhead.

Stuart McKenzie
Hydrologist, retired
USGS, Water Resources Division

Thank you for asking me to review the water-quality chapter of the steelhead supplement to the Oregon Plan. I found it most interesting and the plan to be challenging.

This response will include general comments to the questions addressed in the cover letter from Ms. Paula Burgess and some specific questions and suggestions related to specific pages or programs listed in the document.

McKenzie Comment 1:

Question 1 -- We need to recognize that this plan only lists water-quality conditions for stream miles that have been assessed. One has to wonder about the areas that have yet to be assessed. A summary of the assessed stream miles are listed below:

Geographic area	Total stream miles	Stream miles assessed	Percent assessed
Klamath Mts. and Oregon Coast	18,138	6,089	34
SW Washington Lower Columbia	4,902	1,628	34
Upper Willamette	11,248	2,768	25
Snake River Basin	5,565	1,404	25

This table suggests that as much as 67 to 75 percent of the water-quality problems are yet to be found. Note later that the stream miles assessed may not be a good measurement of what we have looked at.

State Response 1:

Agree that most stream miles in the steelhead ESUs (and the State) are yet to be assessed for water quality conditions. That is one of the reasons DEQ included measure DEQ19S in the Supplement to help address this problem. The relatively large number of stream miles in Oregon (>100,000) and the relatively small DEQ monitoring staff have made it necessary for DEQ to prioritize its monitoring efforts to ensure the most significant water quality problems are addressed. Unfortunately, this leaves a large part of the State unassessed even when DEQ uses all available water quality data from state and federal agencies, universities, tribes, the public and other stakeholders.

McKenzie Comment 2:

Question 2 -- I would like to see more emphasis on habitat measurements and assessment. Such a program might include the following:

1. Determine what is appropriate habitat for the different ecoregions with emphasis on reference sites.
2. Establish specific protocols for measuring elements of habitat.

3. Establish methods to assess habitat, chemical, and biological data to determine the likely improvement to biota if specific habitat improvements were made.
4. Ensure that this monitoring and assessment program is compatible with Federal agencies and their management of Federal lands.

State Response 2:

Agreed. It is our intention to address the 4 points raised. Habitat assessments are a regular part of the biological monitoring procedures. In addition ODFW has an extensive habitat monitoring program, as does USFS. As Mr. McKenzie recommends in point #3, we have methods for assessing habitat, chemical and biological conditions and will be doing so to determine if improvements in biota are occurring as a result of habitat restoration efforts. DEQ's methods are also compatible with EPA and BLM methods and in many cases USFS.

McKenzie Comment 3:

Question 3. The plan does not address factors of decline, rather it addresses factors as they have been measured (including 25 to 34 percent of the stream miles) relative to standards that have been set for water uses including spawning, rearing, and passage of cold water fish. This plan is conceived on the premise that the populations of steelhead will not be limited by water-quality conditions if water-quality conditions of most of the stream miles meet water-quality standards. For this plan to be effective, the State needs to continue to update water-quality standards and this program relative to research findings for cold-water uses to ensure the most benefit for expended resources. I suggest a technical review of this program after 10 years.

State Response 3:

Agreed. Adaptive management is one of the major components of the Oregon Plan. Further, an independent science panel has been established to oversee its implementation. See State responses to Bach comments 3 and 7 above.

McKenzie Comment 4:

Question 4, 5, and 6 -- It would seem that this plan does use current understandings associated between water-quality conditions and cold-water fish. Because any improvement in water-quality conditions should be conducive to improving fish reproduction, rearing, and transport, it is generally accepted that this is a rational approach. However, the specific benefit of any specific activity or program listed in this plan is likely to be highly variable. The bottom line on this one is that I am not sure this effort will make a measurable change.

State Response 4:

We believe water quality will be measurably improved over time with the full implementation of this plan. However, the time horizon to realize improvements in water quality can be decades when dealing with nonpoint sources and recovery of natural systems (e.g.; restoration of canopy/shade in riparian areas, or redistribution of sediment loads in a watershed).

McKenzie Comment 5:

Question 7 -- Some of the big unknowns in the recovery of salmon and steelhead are as follows:

- o What effect is "El Nino" having on the fishery?
- o What effect is ocean fishing having on the fishery?
- o What are the water-quality problems in the 67 to 75 percent of the stream miles that have not been assessed?

The Monitoring program in this plan calls for visiting 1/5 of the monitoring (environmental and reference) sites each year and for the following 4 years and repeating the sampling every five years. How will future assessments be accomplished if there are large differences in rainfall and runoff between 5 year samplings? I suggest that some percent of the sites be sampled each year; this is particularly true of the reference sites, which are hopefully going to quantify effects due to climatic factors.

State Response 5:

Agreed. We plan to resample 10 to 15% of the sample sites every year to evaluate climatic factors. This was not stated clearly in the current plan.

McKenzie Comment 6:

Question 8 -- Hopefully, the 10 year review mentioned above will identify those elements that are effective, those that are ineffective or having such a minimal effect (over the time period measured) to cause no measurable difference, and new elements to be added.

State Response 6:

Agreed. If adaptive management works as planned, appropriate changes will be made over time that will make a measurable difference. The key will be whether the State and federal agencies remain focused on implementing the Plan over decades, not just one or two bienniums or Governor's terms.

McKenzie Comment 7:

Page 5 -- The first paragraph says that 6,089 stream miles have been assessed, but in the second paragraph, only 3,403 stream miles have been assessed for temperature. This makes the 6,089 stream miles assessed rather meaningless, since it is not representative of any one or group of parameters. I suggest deleting this value in tables 1,3,5,and 7 and in the text. The same problem occurs in following sections.

State Response 7:

The 6,089 stream miles assessed in the coastal ESUs represents the total stream miles DEQ determined were not meeting water quality standards, plus the miles categorized as being of potential concern, plus the miles that are meeting water quality standards for all parameters evaluated. These totals were done in a way that double counting of stream segments is avoided, so the totals represent the actual miles assessed. It provides a high level summary of water quality data that helps us understand how much of the total stream miles (18,138) in the coastal ESUs we have assessed. Also, if we were to delete this column in Tables 1,3,5 and 7 some people would try to calculate it anyway by adding across the columns generating incorrect results and conclusions.

McKenzie Comment 8:

Page 7 -- Because fecal coliform bacteria are not directly related to salmon and steelhead habitat, I suggest deleting it from this report. This report is already complicated enough without this information.

State Response 8:

While high levels of fecal coliform bacteria are not known to directly cause adverse effects to salmonids they can be an indicator of problems with sewage treatment or farm animal waste runoff. These problems can also include high levels of nutrients, which can cause conditions

adverse to salmonids. So, high levels of bacteria contamination should be investigated for potential indirect effects on salmonids.

McKenzie Comment 9:

Page 13 --

- Nutrients - includes [nutrients] NITROGEN and phosphorus
- Toxics - includes pesticides and OTHER toxics

State Response 9:

Agreed. Changes made.

McKenzie Comment 10:

Page 15 -- Under the Temperature discussion and Factors for decline:
Suggest adding GROUND-WATER PUMPAGE at the end of the paragraph.

State Response 10:

Agreed. Changes made.

McKenzie Comment 11:

Page 17 -- Temperature Biological objective 2:

I assume that the proposed number of reference sites will be in addition to those listed in Temperature Biological Objective 3? It is clear that random sites sampled under DEQ19S will be continuously monitored for temperature for 2 to 3 months. Is this also true for the reference sites? Your presentation of 1998 sampling 20 percent of the reference sites, then in 1999 sampling 40 percent of the reference sites is misleading. As I understand your monitoring plan, it calls for sampling at a different 20 percent of the reference sites for the first five years and then repeating this effort every 5 years. This means that you will not have resampled sites and the ability to assess climatic effects until 2003. I suggest first that the presentation of your sampling plan be changed to show better what you plan (See table below) and secondly to consider sampling a few sites each year for at least the first 5 years so you can determine the annual effects of climate. The table format shown below should be considered for all of the schedules of reference sites and for random sites.

Suggested table format:

Year	Sites sampled	Total sites sampled
1998	First 20%	20%
1999	Second 20%	40%
2000	Third 20%	60%
2001	Forth 20%	80%
2002	Last 20%	100%
2003	Repeat cycle by resampling the first 20%	

State Response 11:

Yes, reference sites are in addition to the random sites.

Temperature will also be measured continuously for two to three months at the reference sites.

Agree that some percent of the same reference sites should be sampled every year to account for the effects of annual differences in climate. Also agree with the format you propose for the tables showing the monitoring frequencies.

McKenzie Comment 12:

Page 19, 22, 33, 52, and 57 list DEQ25S "Three Basin Rule" and implementation of this program in Clackamas River Basin. Why only in Clackamas Basin? Why not in Santiam and McKenzie Basins as well?

State Response 12:

Change made to DEQ25S. This measure originally only included the Clackamas watershed because we weren't sure if we were going to address the Upper Willamette River ESU since NMFS has not proposed to list steelhead there. The Supplement now includes the Upper Willamette ESU.

McKenzie Comment 13:

Page 23, last paragraph, second line -- Suggest it read -- emerging fry have been filled or covered by excessive FINE sediment.

State Response 13:

Agreed. Change made.

McKenzie Comment 14:

Page 26 -- Sediment Biological objective 4: refers to DEQ's water-quality standards for inter-gravel dissolved oxygen. It would be helpful to list this standard somewhere in the document. If it is in the larger document, then this is great and it should be referenced here for the reader.

State Response 14:

Agreed. Appendix 2 to the Water Quality Section now includes a summary of all Oregon water quality standards.

McKenzie Comment 15:

Page 31 -- Dissolved Oxygen Biological objective 2: In most cases, there have been 75 reference sites listed for Klamath Mountains and Oregon Coast ESU. I suggest that this objective also include 75 sites rather than the 50 listed.

State Response 15:

Dissolved oxygen and pH are both planned to be sampled continuously with hydrolabs over a 3 to 5 day period. Due to projected equipment and staff resources we do not expect to be able to sample at all of the sites proposed for other parameters. Instantaneous samples of dissolved oxygen and pH, however, will be collected at all sites.

McKenzie Comment 16:

Page 32 -- Dissolved Oxygen Biological objective 5:

Relative to tables 1, 3, 5, and 7, about 80 percent of the stream miles assessed currently are meeting this objective. Assuming that this is representative of all stream miles, your milestone suggests that the State would not need to show any improvement until the year 2017. Is this what you mean to say? I suggest you provide an estimate of 80 percent for the year 1997 and list tables 1, 3, 5, and 7 in this document as the source of this estimate and then have the following milestones:

2007 -- 85%

2017 -- 90%
2027 -- 95%

State Response 16:

Overall we estimate that 67% of the stream miles assessed for dissolved oxygen currently meet the dissolved oxygen standard, however we do not know what percentage is meeting the objective for total stream miles. If we assume the percentage also applies to the waterbodies yet to be assessed then our schedule for meeting the D.O. standard can be accelerated. It may well be that more than 35% are currently meeting the objective. These numbers will be updated as more data are collected.

McKenzie Comment 17:

Page 35 -- TDG Biological objective 2: How does DEQ ensure that an average of 80% of the smolts pass the dams (fish passage efficiency)?

When you address the TDG standard, do you mean the 110 percent of saturation (State standard) or the larger amount that is now allowed when the COE is spilling water at the dams?

State Response 17:

DEQ can not assure 80% FPE but we can work toward structural modification of dams that would allow the dams to spill the water required to achieve an 80% FPE and still meet the TDG of 110%. Meeting the TDG standard would be the 110% level.

McKenzie Comment 18:

Page 45 and 55 -- Toxics Biological Objective 3 and Stream Fertility Biological objective 6: Presently, about 82 percent of the stream miles assessed have toxics problems (tables 1, 3, 5, and 7 in this document). With the milestones you listed, the State would not need to show any improvement until the year 2017, assuming the percent of sites with problems is the same as those asses to date. Is this what you mean? I suggest making the milestone as follows:

Present -- 82% (estimated after assessing 1,370 stream miles)
2007 -- 85%
2017 -- 90%
2027 -- 95%

A similar schedule might be considered for similar reasons on page 55, but with a different percentage for present condition.

State Response 18:

Approximately 18% of the stream miles assessed for toxics do not meet state water quality standards for toxics. Another 73% of stream miles assessed for toxics are of potential concern or need more data to determine their status. We don't agree that these data are necessarily representative of the ESUs as a whole. The sample size (1,372) of miles assessed is too small to draw conclusions about the total (39,853) miles in the steelhead ESUs.

McKenzie Comment 19:

Page 48 and 53-- pH Biological objective 1, Stream Fertility Biological objective 2: This schedule seems to be slow. I suggest the following schedule, and allow the determination to be done by correlation in addition to direct measurements.

2002 -- 75%
2007 -- 98%

State Response 19:

Given the projected staffing and equipment limits we do not feel confident that a more rapid time frame is possible.

McKenzie Comment 20:

Page 49 -- pH Biological Objective 2: I suggest using the same number of reference sites as listed for the other elements. In my mind, this is one of the most sensitive tests and one which is very likely to be affected by annual changes in climatic effects.

State Response 20:

See response to comment 15.

McKenzie Comment 21:

Page 62 -- DEQ8S -- A date for starting and ending the next cycle is needed.

DEQ9S -- Why are only the TMDLs related to biological criteria, pH and toxics being considered in this effort? It seems an inefficient way of completing this effort. Have biological criteria, pH and toxics been found to be most problematic for steelhead? If so, say so.

State Response 21:

The starting and ending dates for DEQ8S are included in the work plan for this measure. The Triennial Review is beginning now and will be complete in three years.

DEQ9S - this measure complements DEQ1s. Together these measures are intended to result in TMDLs for all water quality parameters by 2007. DEQ will develop TMDLs at a watershed scale and address all water quality parameters when the TMDL is developed.

McKenzie Comment 22:

Pages 65 - 69 -- DEQ19S -- On the three goals at the top of page 66, should not one of the goals be to monitor all reaches that are now listed by 303(d) as "Need data or potential concern"?

State Response 22:

This information should be included in the watershed level monitoring for TMDL and AWQM plans.

McKenzie Comment 23:

I very much like the monitoring of temperature continuously for two to three months.

State Response 23:

No response necessary.

McKenzie Comment 24:

Dissolved oxygen and pH -- the 3 to 5 continuous days of monitoring should include at least 3 consecutive days with <10 percent cloud cover during daylight hours.

State Response 24:

It is not likely that our sampling schedule will have the flexibility to pick certain weather conditions for sampling. Weather conditions prior to and at the time of sampling will be recorded.

McKenzie Comment 25:

Biological Communities -- need to add at the end AND CORRECTED FOR ANNUAL CLIMATIC EFFECTS BY USING REFERENCE SITES.

State Response 25:

Agreed.

McKenzie Comment 26:

Toxics -- this item says that the biological assessments will be used as indicators of potential toxic chemical contamination. I assume this relationship is well established? You might want to include a reference to this knowledge.

State Response 26:

Agreed.

McKenzie Comment 27:

Stream Fertility -- This item needs to address the following:

- o Frequency of sample collection, and
- o Hydrologic and climatic conditions to be targeted for sampling.

Should you also be looking at the biological communities and try to make a measure of bioproductivity?

State Response 27:

Nutrient data will be collected during the regular site visits that include data collection for habitat and biotic communities. This will occur once at each site (some sites will have duplicate samples taken for QA purposes) between July 1 and October 1, which is during summer low flow conditions. A very gross estimate of biological productivity will be included in the biotic assessment. To get a more precise measure of biotic productivity would require more sampling effort than is possible given the geographic scope and resources available.

McKenzie Comment 28:

Under Strategic Design -- Temperature, Sediment/Turbidity, and toxics: It says that DEQ will rely largely on data collected by watershed councils or other agencies for these data. I suggest the following for this effort:

- DEQ provide protocols for other agencies to use.
- The protocols should include some quality control activities that will allow DEQ to determine the quality (bias and variability) associated with these environmental data.
- If other agency programs are to provide data useable by DEQ to address concerns listed in this document, DEQ will need to identify some staff to ensure that these monitoring activities carry out the first two items listed above.

State Response 28:

Agreed. We are currently working on standardized protocols which will include QA/QC elements.

McKenzie Comment 29:

Dissolved Oxygen and pH -- Suggest deleting diurnal and replacing it with diel. Diurnal can mean daylight hours; if you mean over 24 hours, diel is the preferred term.

State Response 29:

Agreed.

McKenzie Comment 30:

Assessment of these data for trend information -- Do you wish to address decadal, annual, seasonal, or monthly trends? What method of analysis will be used to assess trends? How much

data is needed? Should I assume the data will be compared with reference sites to ensure that climatic effects are removed? Why are DEQ lab personnel only to audit and move equipment?

State Response 30:

Ambient data will be assessed for trends using water quality models designed for trend analysis. In general annual and seasonal trends are evaluated. A minimum of ten years of data is generally required before trends can be assessed. Ambient site data will not be comparable to reference site data as the site locations are normally quite different. As such climate conditions need to be taken into account when interpreting annual trends in ambient data. Due to the more complicated meter calibration and data downloading procedures of continuous monitoring equipment it was felt, that to ensure data quality, best to use DEQ lab personnel who are experienced in the methods.

McKenzie Comment 31:

Biological Communities -- There needs to be a reference to use of reference sites to remove climatic effects. Is there a reason that algae are not being considered as part of biological communities? It is my understanding that fish will show effect over years, macroinvertebrates over months, and algae over weeks. I can provide a reference to this timeline if you need it. I very much like the reference to duplicate samples being collected to evaluate sampling and natural variability.

State Response 31:

We are aware that algal communities are also good indicators of stream condition. They have not been included because of limited resources and less data seems to be available on algal communities in Northwest streams. Also seasonal variability appears to be a greater problem with algal samples. We'd be happy to receive any references you have.

McKenzie Comment 32:

Toxics -- I suggest deleting herbicides and replacing it with pesticides, a more generic term that includes herbicides. When you speak about sampling, are you using water, streambed or suspended sediment, fish tissue, semi-impermeable membrane devices, or a combination of these media? I suggest providing a guideline as to the percent of identified sites that will be sampled.

State Response 32:

Agreed. Herbicides will be replaced with pesticides. Sediment and fish tissue are the primary media that will be tested for toxics. At this point we are not sure how many sites we will have resources to assess.

McKenzie Comment 33:

Total Dissolved Gas -- What about downstream of Willamette Falls and Lost Creek Dam?

State Response 33:

Agreed.

McKenzie Comment 34:

Ambient Water Quality -- Would total suspended solids and temperature be included in the sample analysis?

State Response 34:

Yes, however, temperature will be an instantaneous measurement.

McKenzie Comment 35:

The TMDL table showing TMDLs at fifth and sixth field scale -- are these numbers addable? Are there 213 plus 384 or 597 TMDLs that DEQ will need to complete by 2007? WOW!! Do you have a job ahead for you. What happens if you are not able to accomplish this task?

State Response 35:

No they are not addable. We were trying to estimate the number of TMDLs that would have to be developed based upon the watershed scale chosen. The results show that the smaller the watershed the more TMDLs that would be necessary to cover all water quality limited waterbodies. DEQ intends to undertake TMDLs at a watershed scale, and will likely use 4th or 5th field watersheds for most TMDLs.

McKenzie Comment 36:

I like your listing of data quality for citizen groups. For DO, pH and sediment/turbidity, I suggest that the citizen data could be high in quality because of being able to make measurements or collected samples during critical hydrologic/climatic times.

State Response 36:

Agreed.

McKenzie Comment 37:

Page 73 -- DEQ28S -- next to the last line -- do you mean "removed" or some other word?

State Response 37:

It means the deflectors are no longer being studied at these dams, but are being installed at this time.

McKenzie Comment 38:

Page 76 -- ODFW 1B2S -- When would phase 1 be completed?

State Response 38:

This comment has been referred to ODFW for response.

McKenzie Comment 39:

Page 88 and 89 -- ODF 10S, 11S, 12S, 13S,14S, 15S, and 17S, -- There was too little information provided to evaluate what would be done, what geographic areas would be affected, and the timelines for completion.

State Response 39:

There is more information provided in the agency work plans section. We should provide extensive cross-referencing in the final version.

Dr. Bruce Rettig

OSU Department of Agriculture & Resource Economics

I have reviewed the water quality chapter of the steelhead supplement to the Oregon Plan, but I regret that I have no constructive comments to provide on this important element of the plan.

Rettig Comment 1:

With that caveat and with apologies for not being able to provide the detailed review requested, please let me share two observations. First, much of the water quality material in both the original Oregon plan and the steelhead supplement is an expression of hope, often optimistically phrased. For example, the actions to reduce non-point pollution from agricultural lands are based on the success of watershed-based best management practices, as directed by Senate Bill 1010. How well this will work is yet to be seen. I share the hopes of ODA, but not their stated optimism. However, we have few alternatives until this approach is attempted.

State Response 1:

Agreed.

Rettig Comment 2:

Second, the steelhead supplement, like the original Oregon plan, requires provision of careful monitoring and enforcement. In turn, refinements of future measures and enforcement hinges on much needed research and liaison between agencies and their clients. As the steelhead supplement expands the geographical coverage of the Oregon plan, the cost of these activities will rise. We must hope that the taxpaying public will provide a mandate to future legislatures to fund this work adequately.

State Response 2:

Agreed.

Eric Strecker, PE

National Stormwater Practice Leader
Woodward-Clyde Consultants

I appreciate very much the opportunity to provide a technical review of the Water Quality Chapter of the Oregon Plan Supplement (Steelhead Supplement) for salmon and stream restoration. The perspective I bring to this review is that of a water quality specialist. My work over the past 13 years has been focused on water quality and quantity management, primarily providing technical and project management services on urban runoff and watershed management to municipal, state, federal and private clients. I am a registered Civil and Environmental Engineer and a trained fisheries biologist. Early in my career, I performed stream surveys for the US Forest Service on the Coquille, Sixes and Elk River systems in southern Oregon.

Below, I have attempted to address each of the questions that were posed by you to focus the review. I would like to note that some of the questions are not completely answerable (at least by me).

- 1. Does the document list all relevant water quality factors of decline regarding steelhead? If there are additional significant factors regarding steelhead decline, please list them.*

Strecker Comment 1:

I suggest that flow modification not only address flow diversion (removal), but also land-use change effects on the volume of runoff and resulting changes in soil erosion and within-stream erosion and sedimentation. When forest land is developed or logged, the volume of runoff increases. This increase in runoff usually results in an increase in soil erosion, transport of soil and emission of biochemical oxygen demanding substances and other pollutants. The hydrology impacts on habitat are, I assume, addressed by other elements of the plan.

State Response 1:

The physical habitat and water quantity sections both address flow modification, but neither directly addresses changes in hydrology due to land use changes. Urbanization, with the resultant large increases in impervious surface area, is an example of a change in land use that results in a significant change in stream hydrology. There are several studies showing negative habitat effects due to increased peak flows and lower low flows. If the land is developed (agriculture or urbanization) and soil properties are changed such that overland flow occurs then hydrology can be significantly affected and we may not have effective measures to deal with this issue at this time. ODF disagrees with the statement that when forest land is developed or logged the volume of runoff increases. If the land is reforested and modern forest practices are used that do not overly compact the soil then hydrological impacts should be minor. The biggest effect in general will be increased base flows due to lower evapotranspiration.

Strecker Comment 2:

The document should specifically identify that some (and sometimes many) water quality standards exceedances are natural.

State Response 2:

Agreed, some water quality standards conditions are due to natural conditions. The state water quality standards recognize this issue by providing that exceedances due to natural conditions are not considered a violation. However, determining when natural conditions are the cause of an exceedance can be problematic. DEQ is in the process of developing guidance for determining when exceedances are due to natural conditions. Changes have been made in the text to indicate that some standards exceedances are natural.

Strecker Comment 3:

The land use descriptions are confusing. If the land use figures presented in the supplement are actual land use adjacent to streams, this should be clearly stated. I would suggest that land use based upon watershed percentage would often be a more relevant indicator of potential water quality concerns for many of the factors. Pie charts could be used to display land use percentages.

State Response 3:

The land use figures are for land use or land cover that is adjacent to streams in each ESU. Changes have been made to the text to clarify this point.

Strecker Comment 4:

The ESU unit discussions seem to be overlapping. For example, the lower Willamette River information is discussed in both the Lower Columbia and Upper Willamette discussions.

State Response 4:

The Lower Willamette River watershed is actually a part of the Lower Columbia River ESU. Therefore, it is discussed with that ESU. The Middle Willamette and Upper Willamette watersheds are part of the Upper Willamette ESU. So there is no overlap in the discussion.

2. *Are the factors of decline described appropriately? If not, what improvements can you suggest?*

Strecker Comment 5:

I would add to potential causes of temperature changes those changes that can occur from removing the watershed vegetative canopy and converting land to developed land uses. As watersheds are converted to other land uses (urban, for example), the entire watershed can be warmed. In addition, short-term temperature changes can occur from rainfall on hot pavements. These impacts are in addition to those caused by riparian canopy degradation.

State Response 5:

Agreed. Changes made to the text of the temperature factor for decline.

Strecker Comment 6:

The reliance on the 303D listings of water quality limited streams may not adequately present the total stream miles that are in fact impacted. I recognize that there is limited availability of actual water quality data to assess all streams in the ESUs. However, there are some potential approaches that could be used to evaluate other stream segments where data is not available. GIS could be used to evaluate watershed conditions in those watersheds where water quality data is available to determine if these conditions can be used to predict where problems would likely be present in other areas. For example a number of studies in the US have identified that, when an urban watershed reaches between 15 and 25 percent impervious area, the macro-invertebrate

community is severely degraded. It is likely that other watershed factors, such as logged areas per acre, miles of forest roads per acre, number of cattle grazed per square mile, etc., could be explored to assess whether these factors correspond to noted water quality impacts. These factors could be used to evaluate other watersheds.

State Response 6:

DEQ has made a policy decision to only list waterbodies on the 303 (d) Water Quality Limited list if there is supporting data which demonstrates the segment is not meeting established water quality criteria. The inference method suggested could help in identifying where potential water quality or habitat concerns may exist. However, the method assumes the state has sufficient information and data at a resolution detailed enough to identify areas of concern. Additionally, much research would need to be undertaken to determine relationships between certain land uses and water quality conditions. At the present time the state does not believe it has the necessary information, data or relationships needed to successfully apply this method.

Strecker Comment 7:

It should be pointed out more strongly that an exceedance of a water quality standard does not necessarily mean that negative impacts are occurring; it is only an indicator, especially given that many of the standards were not originally developed to assess salmonid species (and even their typical forage species).

State Response 7:

A single exceedance doesn't normally mean there is impairment of beneficial uses. The state uses the following EPA guidelines for determining impairment:

In general, waters with less than or equal to 10% of the samples exceeding a standard are considered as meeting the standard, waters with greater than 10% and less than or equal to 25% of the samples exceeding a standard are considered moderately impaired, and waters with greater than 25% of the samples exceeding a standard are considered severely impaired. This language is added to the text of the water quality section for the reader's information.

State water quality standards are developed to protect the most sensitive beneficial uses as required by the Clean Water Act, on the theory that if you protect the most sensitive use then you also are protecting the less sensitive uses. Very often the most sensitive uses in Oregon are cold water aquatic species, especially salmonids. Therefore, DEQ's water quality standards are developed to protect salmonid species in most cases.

Strecker Comment 8:

Each of the standards that DEQ used to assess streams should be briefly described (e.g., what temperature criteria values were utilized) and their applicability to steelhead explained. For example, it should be noted whether the criteria were expressly based upon evaluations of steelhead (or salmonids) or other actual associated biota (food source, etc.). The linkages between the factors and impacts to steelhead should be discussed. At a minimum, some of the studies should be presented in which water quality impacts have been shown to be detrimental to steelhead and at what life stages. This would strengthen the case for specific actions.

State Response 8:

Appendix 2 has been added to provide a summary of state water quality standards. Also, a reference to the 1992-1994 Water Quality Standards Review Final Issue Papers has been added

for those who wish to review the scientific literature relative to the effects of temperature, dissolved oxygen and pH on salmonids and steelhead. The information is too voluminous to include in the Supplement.

Strecker Comment 9:

ODA should have a role in defining potential problems, rather than just be involved in permitting of CAFOs and facilitating SB1010 watershed plans, which are only developed in response to a DEQ TMDL listing.

State Response 9:

ODA does have a role in defining potential problems as they relate to agricultural activities and their impact on water quality. For example, ODA's CAFO program completed a rapid screening aerial assessment of all the permitted CAFOs in the coastal zone, and is in the process of following-up with preliminary "courtesy" inspections in targeted areas and/or subsequent inspections to evaluate compliance with permit conditions. Aggressive civil penalty enforcement actions are being taken when necessary.

The Department of Agriculture is also in the 3rd year of a joint a EPA/ODA CAFO compliance initiative in the Tillamook Basin and surrounding North Coast region, and will continue to focus its efforts in that area in 1998. This aggressive compliance inspection program involves formally inspecting those CAFOs which have been determined through the rapid screening assessment as likely to be in violation of permit requirements. Those found to have water quality problems are directed to take corrective action or face enforcement procedures such as civil penalty action.

In addition to the Clean Water Act (303{d} listing and TMDL response) the SB 1010 planning process can also be triggered by other state or federal mandate such as the Coastal Nonpoint Pollution Control Program, National Estuary Program designation, and the Endangered Species Act.

3. *Do the biological objectives address the factors of decline appropriately? Will achieving the biological objectives result in halting or reversing the decline of steelhead in the ESUs identified in the Supplement?*

Strecker Comment 10:

I believe that they provide an adequate description of the factors of decline as overall categories. As noted above, I would add some additional sub-factors.

State Response 10:

Comment noted and changes made.

4. *Are the agency management measures listed in the Supplement adequate to achieve the associated biological objectives? Do they move us in the right direction to address the factors of decline in a timely manner? In your opinion are the agency management measures able to be implemented within the identified time frames?*

Strecker Comment 11:

I believe that the management measures are an appropriate first step in attempting to reverse the decline of steelhead. One of the concerns I have, however, is whether we can expect a program

that relies on so many voluntary programs to be successful. We should, I believe, make an attempt to solve the problem this way first, but be prepared with “next steps”. The document should include potential measures that would be implemented in the future if the proposed measures are found to be inadequate. This would provide responsible agencies with additional support for aggressive implementation of the measures.

In addition, many of the measures will only reduce and/or slow the increase in degradation that occurs with land use activities. This is especially true when land use changes and the land is to be more intensively used. This increase (even with management measures) must be more than balanced, by reducing existing problems to achieve overall reductions in degradation.

State Response 11:

Agree that the state needs to be prepared to take the “next steps” if the measures in the plan are not adequate for steelhead recovery. Many of the programs described in the measures already include provisions for the “next steps” to be taken if voluntary compliance is unsuccessful. For example, the SB1010 process of developing and implementing agricultural water quality management plans starts out with the assumption that operators will voluntarily implement the plans. However, the SB1010 statute provides ODA with enforcement authority to use if voluntary compliance is unsuccessful, or if there are recalcitrant operators. ODA has committed to using this authority as necessary after the voluntary approach has been given a fair chance to work.

Strecker Comment 12:

I see problems with the fact that the ODA measures simply primarily rely on the CAFO and SB1010 programs. Although the CAFO sites are obvious choices for control, focusing only SB1010 activities on water quality limited streams will result in many areas not being addressed (or at least not being addressed for a long time), solely due to a lack of monitoring data (rather than problems). I believe that ODA should develop a set of best management practices to be applied throughout the ESAs to address such key problems as protection of stream banks from grazing activities, direct agricultural runoff, etc. In addition, this approach does not address how ODA will ensure that high quality streams are not degraded in the future.

State Response 12:

It should be noted that the terms of the Healthy Streams Partnership specify that water quality management area plans for agricultural areas designated under SB1010 for stream segments on the 1996 303(d) list will be developed in 4 to 5 years. It should also be noted that implementation will be occurring concurrently in a number of watersheds.

ODA’s water quality management plans will address protection of stream banks and reduction of nutrients, bacteria and sediment in agricultural runoff, but at the present time, we will not be prescribing a set of BMPs to be applied across the entire agricultural landscape. We will be developing a set of recommended or recognized conservation practices for each of our planning efforts, and these practices will be recognized locally as being effective in addressing the problems identified in the area and in the agricultural water quality management area plan.

Generally speaking, forestry is a homogeneous cropping system, whereas agriculture deals with plants, animals, as well as short and long-term cropping systems. As a result, we feel the bottom-up approach the SB1010 planning process offers is much better suited for addressing agricultural activities because it is a flexible enough process to accommodate individual basin differences.

Our mandate is to develop plans to “prevent and control water pollution from agricultural activities and soil erosion”. This is the process ODA is committed to and we take this responsibility seriously.

Strecker Comment 13:

DEQ should provide some technical guidance to ODF on how the planned stream surveys can be used to gather water quality information relative to 303D listing and potential water quality problems. With this added information, DEQ could then evaluate those sections of streams which will be surveyed.

State Response 13:

DEQ has provided this guidance to ODF and others who plan to do temperature monitoring in the form of temperature monitoring protocols. DEQ encourages other agencies and entities to perform water quality monitoring and will utilize water quality data provided to it that has been collected and handled according to its approved protocols.

Strecker Comment 14:

I would recommend that DEQ review its overall auditing of permit compliance and consider how it might be improved to meet water quality goals for steelhead. This could mean increased frequency of facility inspections, increased reviews of annual compliance reports for NPDES permits, and more focus on review of BMP implementation in all programs, permit-driven and voluntary. An annual report on the progress of implementation of the measures would be a good tool to combine with monitoring data to assess the effectiveness of the program.

State Response 14:

DEQ has prepared a compliance rate monitoring plan to address this issue and it will appear in a separate chapter of the Supplement. It is also referenced in a new measure (DEQ34S) in the water quality section.

Strecker Comment 15:

DEQ15S should list which cities might be subject to the Phase II program within the ESUs. These cities should be notified regarding their possible inclusion in the program. This may help assist local governments in developing the support they need to participate in the various measures.

DEQ should review the significant land use data collected under the industrial and municipal stormwater programs to identify specific concerns for steelhead (DEQ19S).

State Response 15:

DEQ is working with the League of Oregon Cities and the Association of Clean Water Agencies to ensure cities potentially subject to Phase 2 are aware of that fact. The data from Phase 1 program will be reviewed by DEQ.

Strecker Comment 16:

The US Forest Service and BLM are not represented in the plan. Given that they are such large land owners in the watershed, I have concerns about the overall success of this program without their participation.

State Response 16:

Agree the USFS and BLM should be represented in the Plan. The state has been working with federal agencies throughout the preparation of the Supplement. Unfortunately, the federal agency measures were not available at the time the water quality section was sent out for peer review. Federal agency measures have now been incorporated into the water quality section for: USFS, BLM, EPA, NMFS, USFWS, BOR, NRCS, USACE, BPA, and BIA.

Strecker Comment 17:

ODF35S could be problematic in that increasing the capacity of culverts could, if not done correctly, increase problems. One potential problem is that flows could be more shallow and cause a decrease in fish passage. In addition, if flows are slowed, sedimentation could occur, also reducing passage. If culverts are to be enlarged, they should be “fish friendly” (e.g., ODF 34S).

State Response 17:

ODF 35S and ODF 34S are handled together so culverts on fish bearing streams will be designed specifically for fish passage.

Strecker Comment 18:

ODF59S should be expanded to include hydrology (volume of runoff) changes relating to forestry practices to assess potential affects on water quality (sediments, biochemical oxygen demanding materials, and temperature) and the need for measures to address these affects.

State Response 18:

The effects of hydrology on both physical habitat and water quality are minor and short term and do not warrant consideration compared to factors like riparian condition or sediment control. In fact the primary low flow effect (increased water yield except in rare cases where fog drip is a significant player) is beneficial to stream water quality. The effects of forestry on peak flows is widely debated and there is little consensus. According to recent synthesis articles like the Botkin report, studies showing negative channel or water quality effects due to peak flow changes in forestry are nonexistent.

Strecker Comment 19:

ODF should consider having a management measure to develop a plan for post-fire erosion control. Forest and rangeland fires, especially in areas where fire suppression has been practiced, cause extensive damage including significantly increasing erosion potential. A plan for post-fire mitigation measures would help ensure that impacts to salmonid streams are minimized following fires. If there are such plans in place, they should be reviewed in terms of minimizing impacts to steelhead.

State Response 19:

This is a good idea and will be considered in future iterations of this planning effort. Hot fires cause and have caused extensive damage whether past fire suppression activities have occurred or not. However, Mr. Strecker does have a point in that fire suppression activities without forest management to control fuel loads leads to hotter fires that cause more damage.

Strecker Comment 20:

The municipal and industrial NPDES storm water program should be listed under all of the appropriate biological objectives.

State Response 20:

Agreed. Changes made.

Strecker Comment 21:

The potential problem of water quality impacts from fish hatchery discharges (including viruses) should be addressed.

State Response 21:

This comment has been referred to ODFW for response.

Strecker Comment 22:

Temperature impacts of reservoirs and dams (including smaller facilities) should be considered for all facilities, not just those that are listed for re-licensing (DEQ30S).

State Response 22:

Agreed. This is addressed in the Dam and Hydropower section and by new DEQ measures DEQ32S and DEQ33S.

Strecker Comment 23:

Under DEQ 20 and 22S, new development controls (CZARA Management Measure Guidance, Chapter 4, II Urban Runoff, A. New Development Management Measure) should also be a key component of DEQ's efforts. New development would likely be a larger source of water quality problems than ODOT roadways alone.

State Response 23:

New development controls are addressed in the Coastal Nonpoint Pollution Control Program (CNPCP). DEQ has committed to develop a program to management storm water runoff from new development in the CNPCP.

Strecker Comment 24:

DOGAMI or another appropriate agency should be addressing in-stream gold dredging as a source of water quality problems. This activity occurs somewhat frequently on some of the south coast streams.

State Response 24:

DEQ and DSL currently regulate in-stream gold mining. DEQ has a general permit that applies to recreational gold mining

5. *Are the analyses and conclusions in the Supplement consistent with the specific literature, and does the analysis support the conclusions? Is more research needed in any area of water quality for the Supplement to be successful in protecting and restoring steelhead? If so, what areas require additional research.*

Strecker Comment 25:

In general, yes. However, as stated above, the supplement should specifically cite studies and literature reviews to strengthen its assertions (as noted above).

State Response 25:

Agreed. References added.

6. *Does it appear that the agency management measures listed in the Supplement will result in water quality improvements that are measurable, and over what period of time? Will the water quality improvements occur soon enough to recover the species?*

Strecker Comment 26:

If in fact the many volunteer programs are implemented, we will see in some watersheds improvements, and in others a decrease in the rate of decline of water quality. This will depend highly on whether or not a watershed is undergoing land use changes (e.g., land clearing, development, etc.). I believe that we are talking in terms of a fairly long time period, except in watersheds where there are obvious sources of problems that can be remediated quickly.

State Response 26:

Agreed.

7. *Does the Supplement, in combination with the Oregon Plan, contain adequate water quality monitoring to determine the success of individual measures, to allow for adaptive management, and to assess success of the plan? If not, what additional water quality monitoring is necessary?*

Strecker Comment 27:

I do not believe that the limited monitoring suggested in the plan will give us the ability in most cases to differentiate what individual measures are actually contributing to reducing water quality problems. It is unlikely that there will be very many situations where a measure is implemented separately from other measures in the watershed. Thus it would be very difficult to evaluate the results produced by individual measures, especially statistically valid ones. And attempting to monitor the effectiveness of each measure separately could be more expensive than simply implementing many of the measures. There should be an evaluation of the appropriate level of monitoring (cost/effort) in relation to the magnitude of the resulting costs of management measures implementation and considering potential savings from altering the measure.

Monitoring the “performance” of best management practices is problematic. Nationally, there has been little consistency in either the actual monitoring methods employed or the analytical analysis approaches. Even more problematic is the lack of consistent information on watershed characteristics and management practice design information. This has made it very difficult, if not impossible, to utilize study information on a broader scale in order to improve the selection and design of measures. To address this problem, EPA is currently in a cooperative agreement with the American Society of Civil Engineers to develop a set of monitoring protocols for urban stormwater management practices. I would suggest that DEQ develop a set of monitoring protocols (standards) for individual management practice studies, so that it is more likely that it will be able to assess the effectiveness of measures in varying locations.

State Response 27:

Identifying specific measures that are resulting in reducing water quality problems will no doubt be difficult. The intent of the monitoring effort is focused more on documenting if water quality problems are declining or not rather than specific causes of change. Some effort however, is targeted at evaluating the effectiveness of restoration projects and BMPs. These studies will

likely occur in the actual vicinity of restoration projects. For example, data would be collected before and after restoration in stream reaches above, within and below the restoration activity. In this way we hope to develop a set of data that provides some measure of effectiveness on a project by project basis. This project monitoring will likely be carried out by watershed councils who have implemented the restoration activities. The actual number of projects that may be monitored is not known at this time. Other broader scale sampling through the randomized monitoring design should provide region wide or basin wide indicators of improvement or decline.

DEQ is currently working with other agencies in developing standard monitoring protocols for stream assessments. While these protocols aren't specifically identified for BMP effectiveness monitoring, they could be used for that in many cases. We will continue to explore monitoring protocols for BMP effectiveness assessment with other agencies.

8. *What should be our priorities for implementing the factors of decline, biological objectives, and agency management measures? In other words, what are the most effective elements of the Supplement? Are there agency management measures that will be ineffective and/or a waste of money?*

Strecker Comment 28:

Given the level of information in the plan, this is a difficult question to address. I believe that the priorities for individual management measures for problem prevention should focus on those land uses and activities that are the largest potential sources of problems. I believe that those measures which reduce hydrologic impacts (volume of runoff) will also likely be very effective at reducing water quality problems. As the main uses of the developed areas of watersheds are forestry, agriculture, industrial and urban, the management measures should be focused on these activities.

State Response 28:

Agreed.

Strecker Comment 29:

One way to improve this supplement relates to the selection and prioritization of management measures. I believe that this planning process could benefit from a more formal and comprehensive decision analysis. It appears that the coordination among agencies was minimal and that each agency was asked for individual input, rather than participation in a formal group planning process. A process where all the potential measures were evaluated together, utilizing a set of well chosen criteria, would result in a much more comprehensive and defensible plan, as well as assist with prioritization. An example of this approach is the stormwater management plans developed for the municipal stormwater NPDES programs, where multiple agencies worked together to suggest, evaluate, select (and not select), and prioritize management measures. (See Portland, Eugene, Gresham, Unified Sewerage Agency plans, for example).

State Response 29:

Agreed. It may be possible to undertake this type of planning process when the next supplement to the Oregon Plan is prepared.

Strecker Comment 30:

Another improvement I would suggest, would be undertaking a more comprehensive watershed planning approach. The plan as it stands now includes measures which focus on source control (widespread and/or activity-specific) and reference to various different kinds of watershed planning and implementation efforts. One approach would be to develop a more comprehensive watershed planning approach that would combine some of the efforts with a more limited focus (TMDLs for example). In the end, I believe this would be more cost-effective. In addition, I believe that many of the watershed improvement efforts that have been conducted have been somewhat light on planning in favor of implementation (getting things done). While I agree that planning can go on forever, in many cases we may be jumping to solutions before we have developed enough of an understanding about what is needed. I suggest that one of the management measures be a prioritization and scheduling of comprehensive watershed planning efforts.

State Response 30:

Agreed. It may be possible to undertake this type of planning process when the next supplement to the Oregon Plan is prepared.

Dr. Tim Sullivan

E&S Environmental Chemistry

I have reviewed the draft Water Quality chapter of the Steelhead Supplement to the Oregon Plan (June 1997) and would like to offer the following comments. Overall, I thought that the draft contained useful material and provided reasonable descriptions of the relevant water quality factors associated with the decline of steelhead in Oregon waters. I did note a number of problems with the draft, however, and these are discussed below.

Sullivan Comment 1:

I thought that the overall organization of the chapter and text format were of poor quality. The chapter is not presented in a clear and easy to follow fashion, and it is difficult to navigate through it. The major and minor headings should have a hierarchical structure. It is too difficult to figure out what section you are in at various points in the chapter. For example, see page 15 of the draft; the bold headings have no logical nesting sequence and it is difficult to piece it together.

State Response 1:

Agreed. Changes made in the formatting and organization of the water quality section.

Sullivan Comment 2:

The summary graphics (i.e., significant water quality parameters, significant land use) were very useful, as were the accompanying tables (e.g., 303d data summaries).

State Response 2:

No response necessary.

Sullivan Comment 3:

The listings of Agency Management Measures (e.g., pg. 16, pg. 18, pg. 19-21, etc., etc.) were of no value whatsoever and seriously detracted from the chapter. I understand the purpose: to demonstrate that agencies are actually doing things. My response to these lists is, however, "means nothing; so what?" If you want to list programs, do it in a table with check offs for temperature, sediment, etc. If you want to discuss programs in the text, then *discuss* them; don't list them. I would suggest discussing the ones that really matter and having a big table in an appendix.

State Response 3:

Changes made and agency management measures are now listed separately from the factors for decline and biological objectives.

Sullivan Comment 4:

Figure 1 legend - include Klamath Mt. in title

State Response 4:

Change made.

Sullivan Comment 5:

Page 5, second paragraph, line 4 - give % after 298 stream miles: (9%)

State Response 5:

Change made.

Sullivan Comment 6:

Same comment elsewhere, e.g., pg. 6, bottom two paragraphs; page 8, bottom paragraph

State Response 6:

Changes made.

Sullivan Comment 7:

Page 16, top paragraph - the statement "according to the following milestones (% of watersheds identified:

2002 - 50%

2007 - 95%"

is ambiguous. Some readers will not understand what you mean. State more clearly. (Same comment elsewhere, e.g., pg. 17 top and bottom of page).

State Response 7:

Changes made.

Sullivan Comment 8:

The formatting here is awful! For example, page 17, what are the principal headers?: Temp Biol. Objective 2, Agency Mgmt Measures, DEQ 19S, Temp Biol. Obj. 3, Agency Mgmt Measures, or DEQ Measures Summary??

State Response 8:

Changes made to formatting.

Sullivan Comment 9:

The numbers (percentages) listed on Page 17 (and elsewhere) are unclear. For example " 1998 - 20%" will be interpreted by some readers as 20% unimpaired, whereas I think you mean 20% surveyed. Be more specific.

State Response 9:

Changes made to clarify.

Sullivan Comment 10:

Page 17, middle of page. The Temperature Biological Objective 3 (and all analogous objectives for all other parameters) has a major problem. You propose random site selection as per the REMAP approach. This is great for documenting current status, but CANNOT BE USED FOR TRENDS. This whole salmon/steelhead effort is (and appropriately so) a "go in and find where the problems are, and then fix them" kind of an effort. As soon as you pick a "random" site, you cannot go back and resurvey every five years because that site will NO LONGER BE REPRESENTATIVE of the population. This is because you will want to fix it. If you do, it is no longer representative. If you decide to leave it alone, it is also no longer representative because you are fixing things elsewhere! This is a major flaw. You need a monitoring approach for trends, but the one you have will not work.

State Response 10:

First, the monitoring design followed here is that recommended by the EPA, EMAP program (Environmental Monitoring & Assessment Program). One of the primary objectives of the EMAP program is to, "Estimate the current status, extent, changes and trends in indicators of the condition of the nation's ecological resources on a regional basis with known confidence" (EPA Region 10, 1994). This objective is also true of the monitoring plan for the steelhead ESUs. To

accomplish this objective a probabilistic sampling design based on a random selection of monitoring sites has been developed by numerous ecologists and statisticians working on EMAP. By selecting a sufficient number of random sites across a specified region (a region could be a watershed, a basin, an ecoregion, etc.), an estimate of the current status for the measured parameters can be determined. By repeating the sampling at the same sites on a specific frequency (every 5 years for example) trends in conditions can also be estimated. The minimum number of sites for an effective estimate is considered to be 50 (Allen Herlihy personal comm., 1997). More sites provide a more robust estimate and are able to discern smaller changes and trends. Given that 50 sites is considered a minimum, the 100 to 150 sites per ESU identified in this plan was considered sufficient to provide a good measure of status and trends over each of the areas (some sites will also be repeated each year to help evaluate annual differences due to shifts in weather patterns). A similar approach has been selected for monitoring the status and trends of stream conditions in the Oregon Coast Range for the State of Oregon's salmon recovery plan. This monitoring plan was developed with numerous agency biologists and statisticians, including EPA, over a nine-month period, which included many discussions about the proposed design. Therefore, while it is agreed that the steelhead supplement doesn't provide much detail on the rationale for the proposed methods much discussion and thought has gone into its development.

EPA Region 10. 1994. 1994 Field Operations and Methods Manual for Streams in the Coast Range Ecoregion of Oregon and Washington. EPA, Seattle, WA.

Sullivan Comment 11:

Page 18, top paragraph. Monitoring after remediation is *not sufficient* - Need to also monitor before and need to monitor "reference" sites that you don't try to fix. Relying on watershed councils to develop monitoring strategies to address the effectiveness of remediation efforts is totally unrealistic. You need a statistically-rigorous approach that can be modified by the councils to fit their situation, but they will not be able to devise it. I view this as a big problem. There is no adequate plan in place with which to determine regional trends. This problem extends to all parameters discussed in this chapter.

State Response 11:

DEQ is working with other agencies on standardized monitoring protocols for a range of stream assessment parameters. The final protocols will be given to watershed councils and training and technical assistance will be provided either through DEQ or other groups. This will hopefully reduce some of the sampling variability between different monitoring groups. Since restoration projects haven't been identified yet we don't know how many sites will have baseline data available, but some will. Also since restoration projects generally take years to produce the desired result, monitoring completed during the first year of a project will provide some measure of baseline information. Finally, having watershed councils participate in restoration and monitoring activities has been a key element of the Oregon Plan, and was not decided by DEQ. We also agree that without adequate funding and training it will not be possible to document success for failure of restoration efforts.

Sullivan Comment 12:

Page 19, top of page. "or have historically supported steelhead" - How determined and by whom?

"See Figure 9" - took long time to find the figure 40 pages later!

If 1997 is "unknown", how in the world do you aim for 35% by 2007? If you have an estimate for 1997, give it here. Need to set some realistic goals, by region. These broad percentages are meaningless.

State Response 12:

The determination of where steelhead have historically occurred in watersheds will be made by fisheries agencies (e.g.; ODFW, USFWS, and NMFS) based upon historical data available to those agencies. Changes made to address other comments.

Sullivan Comment 13:

Page 25, Objective 3. It is very difficult to monitor changes in sediment yield because of its dependence on climatic and hydrological conditions which vary within and between years. You need to monitor for changes in the *parameter values* of the observed relationships between sediment yield (i.e., TSS loading) and the principal external forcing functions: discharge, precipitation intensity, antecedent moisture conditions, etc. Watershed councils will not be able to do that.

State Response 13:

Sediment measurements will be based on percent surface fines collected from erosional and depositional areas within designated stream reaches. Turbidity will also be monitored at selected sites during winter storm events to help characterize possible sediment problems. Sediment is clearly one of the more variable and difficult parameters to measure. We have found, however, measures of percent surface fines correlate strongly with biological data (fish and invertebrate community results), and feel it is useful in interpreting biological results. We also agree that variability will occur naturally between years, and we plan to sample a subset (10-15%) of the same sites each year at both reference sites and project sites to characterize inter-year variability.

Sullivan Comment 14:

Page 30, D.O. Need to discuss connection between D.O. and temperature. Also, D.O. is not expected to be a significant problem in most areas. It will be a localized problem where 1) point sources contribute to very high BOD and/or 2) where temperatures are very high. For the most part, watershed councils should focus on temperature; it is a lot easier to measure and it's more generally important.

State Response 14:

Agreed. Change made to D.O. factor for decline text.

Sullivan Comment 15:

Page 37, Objective 1. This is really fuzzy. "watersheds used by steelhead" is of little value; could be excellent habitat quality or quite marginal and still be used by steelhead.

State Response 15:

Agreed. Reference sites chosen will be in areas of watersheds that are unimpaired or least impaired by human activities.

Sullivan Comment 16:

Page 39, Objective 4. Very unrealistic. There is no way to restore all steelhead waters to pristine conditions. Objective should focus on realistic, attainable goals that will really help the fish.

State Response 16:

Agree there is no practical way to restore steelhead waters to pristine conditions. The objective is directed at returning steelhead watersheds to conditions where the species are relatively healthy compared to unimpaired or least impaired reference sites.

Sullivan Comment 17:

Page 44, Objective 1. This program *does not need to know what background levels of toxins are*. This knowledge is 1) irrelevant to the health of steelhead populations throughout the state, 2) expensive and difficult to collect, and 3) not conducive to watershed council activities. Toxins are not a steelhead problem, with few exceptions. Deal with these exceptions through other programs. If you must include toxics, then 1) identify what levels constitute a hazard (it's usually for human consumption rather than fish health), and 2) monitor for exceedances. Don't bother with background levels. I hate to see the effort diluted. You need to focus squarely on the Big Regional Issues: temperature, sediment, stream channel complexity.

State Response 17:

Agree that toxins are not likely a significant factor for decline of steelhead except in some specific situations. However, the data set for toxics in steelhead watersheds is very limited in most cases. We need some method of assessing whether there are toxics of concern in watersheds. The purpose of the objective is not to determine background levels of toxins everywhere, but to have adequate background reference sites in unimpaired or least impaired areas to compare with toxin levels found elsewhere. This will help us determine whether the level of toxins found in impaired areas is of concern.

Sullivan Comment 18:

Page 53, Objective 1. I question whether there is any real scientific basis for this issue of nutrient availability being an important, regional problem for steelhead. Again, it's a matter of diluting the effort with relatively unimportant issues. I can picture every watershed council in the state running around the countryside with dead fish! Focus on the known big problems and you can perhaps make a real difference.

State Response 18:

Agree we should focus on the major causes of steelhead decline, and this may not be one. However, ODFW is concerned that the lack of nutrients may be a problem in some watersheds. The ODFW program should help determine whether addition of nutrients can make a difference.

Sullivan Comment 19:

Page 59. This is a good way to handle the program descriptions, not the earlier lists.

State Response 19:

Agreed.

Sullivan Comment 20:

Page 69, middle of the page. This is really important information. You need to spell out what monitoring watershed councils will be able to do in a rigorous fashion. According to DEQ (and I agree), it's temperature and turbidity. There is a big disconnect between this reality and what everyone (including this plan) is expecting of the councils.

State Response 20:
Agreed.

Dr. John Tanaka

OSU Department of Agriculture & Resource Economics

Attached is my review of the Water Quality chapter of the Oregon Plan Supplement for salmon and streams restoration. I have no particular expertise regarding specific water quality factors of decline to offer more than a lay opinion on whether all factors are listed, whether there are additional factors that should be considered, or whether the factors are ranked appropriately.

Tanaka Comment 1:

Let me begin my review with the observation that on the whole, I think the chapter supplement is fairly well done. I am not sure the presentation is the best since it appears that each factor is merely a repeat of the previous ones with only a few key words substituted in (e.g., sediment for temperature in each objective). The overall sampling design referred to in each of the factors does not fit together until you get to the details on pages 65-69. This seems to be the key to monitoring that is proposed. I do have some specific concerns over whether the data are adequate to really tell us what is proposed and the actual commitment to continue to collect the data. This is not an indictment of the plan, just a statement on political realities of biennial funding for long-term programs. I also believe that if you want to validate the impact of treatments on the factors of interest, that you need to contract that work to a research organization and let them design, implement, and interpret the data. Finally, I am concerned over the reliance on watershed councils and other volunteer groups to collect significant, coordinated data over a long time period without significant funding for that activity (for personnel, equipment, and analysis). I also think that unless there is some level of agreed upon standardization of protocols, the data will only be marginally useful to really understanding what is occurring. The agreement has to be among the councils and the agencies statewide, not just among the agencies and forced upon the local groups.

State Response 1:

Agreed.

Tanaka Comment 2:

As an economist, I think you also need to be realistic in this plan. What are the priorities for monitoring should full funding not be available? For example, does the whole plan fall apart if the watershed councils don't do the monitoring for you in the format you desire for statewide aggregation? If the monitoring outlined in the chapter is fully implemented with adequate quality controls, it will provide useful information.

State Response 2:

Agreed.

Tanaka Comment 3:

I am not convinced, however, that we know enough about each of the factors of decline (especially the very broadscale ones such as temperature) and their relationship to management practices in either the uplands or riparian areas to document the cause and effect. This is an area where much more research is needed if we really want to understand it. This is not to suggest that nothing happen while the research is conducted, but that researchers be involved (funded) to work with management agencies and watershed councils so that practices can be adequately

evaluated as they are on-going. A series of unrelated case studies, while interesting, will not be nearly as useful as an integrated, replicated study of the effects of a practice on the factor of interest.

State Response 3:

Agreed.

Tanaka Comment 4:

Assuming that the factors of decline are correct, the biological objectives are somewhat meaningless as currently stated. Meeting monitoring objectives will not result in halting or reversing decline of steelhead. The only true biological objective seems to be to manage so further degradation is avoided. The last one or two objectives for each factor seem to state that you will comply with EPA regulations and continue to review the factors and incorporate new information. Again, while this is good bureaucratic work, it does not seem likely to halt or reverse steelhead decline.

State Response 4:

There three key interrelated biological objectives associated with each factor for decline. The most important objective is the one aimed at protecting existing good quality habitat/water quality. A second related objective is restoring water quality where it has been impaired by human activities. The third key objective related to the first two is undertaking adequate water quality monitoring to know where conditions are good or are impaired, whether conditions are improving or not, and whether the changes in human activities are resulting in improvement in water quality. If we are successful in achieving these objectives significant progress will have been made in recovery of steelhead.

Tanaka Comment 5:

I was also asked to review the Physical Habitat chapter. I provided many comments on specific agency programs in that review and will not repeat them here. In general, some of the main points I made there included that agencies should not expend funds to develop their own education programs when the OSU Extension Service and other groups are already in place with appropriate expertise and infrastructure; that if agencies want voluntary compliance and cooperation, then the agencies need to operate to build trust and not use project cooperation as a way to enter private lands in order to turn someone in; to separate out scientific, peer reviewed results from documents that are opinions (however good) of scientists; to allow enough flexibility in standards so that short-term impacts are acceptable on a watershed basis if they lead to long-term improvement; and to remember that these systems are dynamic. Additionally, there needs to be a careful review of all programs and interpretations to ensure that personal values and biases do not enter into decisions under the guise of science. For example, many believe that there is a dogmatic bias against cattle grazing (the activity I am most familiar with) and that any research results or observations that go against the “common wisdom” must be discredited.

State Response 5:

Generally agree with the comments.

Tanaka Comment 6:

Page 6, Figure 2 – I think this figure needs to be clarified in its heading. This implies that a very small percentage of forested stream miles is 303(d) listed. Isn't this due to a lack of assessment rather than what may actually be occurring as suggested in the text (top of page 5)?

State Response 6:

Agree this is currently misleading. A note has been added to the text to clarify that the numbers represented by the bars in the figures only relate to what is currently known about water quality conditions.

Tanaka Comment 7:

Page 15, Factors for decline – I think you also ought to include upland conditions here. There is evidence that the capture, storage, and safe release of water within the watershed may have a significant impact on water temperatures. That is, getting the water into the ground and allowing it to percolate to the stream will result in lower temperatures reaching the stream. Riparian and stream physical and biological conditions will change the rate of heating, but cannot cool the water.

State Response 7:

Agreed. Upland conditions added to the factor for decline for temperature.

Tanaka Comment 8:

Page 17, obj. 2 – These reference areas need to be carefully selected and adequate sampling conducted to understand the hydrology and watershed conditions in order to extrapolate the results to other stream reaches.

State Response 8:

Agreed. We plan to group streams into categories using channel gradient and bankfull width categories. Categories are currently being assessed by EPA using data previously collected from sites in the Oregon Coast Range. Possible categories include: 3 gradient classes (0-2%; 2-4%; >4%) and 3 bank-full width classes (0-5 meters; 5-10 meters; >10 meters). The number of reference sites listed in the plan are based on our best ideas of how many sites will be needed to provide a sufficient data set over several size and gradient categories. The final number may be less if that number can't be located. We are also exploring the idea of developing a "reference community" based on historical information for streams types that have no suitable reference sites available (ex. low elevation valley segments).

Tanaka Comment 9:

Page 17, obj. 3 – Hopefully a statistician has been consulted on how to analyze these data? While the random selection makes the results statistically valid, using repeated measures will require you to control for interyear variations.

State Response 9:

Agreed. While not clearly stated in the plan, some sample sites will be sampled every year to provide a measure of inter-year variability.

Tanaka Comment 10:

Page 18, obj. 4 – It seems that if you are trying to evaluate the effects of specific practices, the monitoring protocol is going to be critical. There is also the question of collecting baseline data to understand the natural variability for that site. This is probably not going to happen in many sites due to the way funding requirements have been established to implement projects (i.e., one cannot get funding this year and then wait 2-3 years to collect the baseline data before implementing the project). At the same time, relying on watershed councils or others to collect the data is passing the buck and will likely result in a failure to achieve this objective. Adequate

funding must be provided to monitor the effectiveness of projects and to validate the assumptions involved in their design.

State Response 10:

DEQ is working with other agencies on standardized monitoring protocol for a range of stream assessment parameters including temperature. OSU, including the Range Dept., has reviewed the proposed temperature monitoring protocol. The final protocol will be given to watershed councils and training and technical assistance will be provided either through DEQ or other groups. This will hopefully reduce some of the sampling variability between different monitoring groups. Stream temperature data has been collected at many sites already. Since restoration projects haven't been identified yet we don't know how many sites will have baseline data available, but some will. Also since restoration projects generally take years to produce the desired result, monitoring completed during the first year of a project will provide some measure of baseline information. Finally, having watershed councils participate in restoration and monitoring activities has been a key element of the Oregon Plan, and was not decided by DEQ. We also agree that without adequate funding it will not be possible to document success for failure of restoration efforts.

Tanaka Comment 11:

Page 19, obj. 5 – Is there a basis for these timelines? That is, is there some research results, monitoring results, or a reach by reach evaluation of the potential rates of recovery given some assumed changes in management practices and land uses in order to set these timelines?

ODA Measures – I was not aware that CAFO addressed temperature issues or that confined animal feeding operations had a significant impact on water temperature factors.

OEDD Measures – The same thing related to the dairy industry and nonpoint source pollution.

State Response 11:

The timelines in this objective are based upon the best guess of DEQ staff as to how long it will take for water quality management plans to be developed and implemented and the length of time for recovery after implementation. It is largely educated guesswork and the method used is documented in the Oregon Plan, Chapter 17B, pages 61 to 64.

Agree that ODA's confined animal feeding operations (CAFO) permit program doesn't address causes of stream temperature problems. Changes made to text to remove those references.

Tanaka Comment 12:

Page 21, obj. 6 – This seems to be an obvious objective. I'm not sure more regulations/standards are necessary here. It seems that if a system is currently working and existing rules and standards are met, this should be adequate. I am also concerned that items such as DEQ6S would only focus on short-term changes that may have temporary negative impacts but may result in long-term benefits to water quality. For example, after viewing some of the large fires in eastern Oregon forests over the past few years, where landowners were able to manage the timber stand to reflect historical species composition and densities, the fire did not completely burn all riparian vegetation. In the short term, there would be some impacts from thinning but in the longer term, conditions would be maintained.

State Response 12:

The protection of areas where steelhead find good physical habitat, water quality and adequate flows is the top priority for this conservation plan. We must protect the places where steelhead are still plentiful while restoration efforts move ahead on impaired areas. The purpose of this objective is to ensure the existing programs are adequately protecting these areas.

DEQ6S includes provisions for allowing short-term degradation where there will be long-term benefits for water quality and aquatic species.

Tanaka Comment 13:

Page 23, obj. 7 – This seems to be a non-objective since it is required under current statute. All this says is that DEQ will follow the EPA requirements. While the intent in here is to use the “most current scientific information,” care must be taken to separate scientific information that is developed through the scientific process from numbers that are collected without such consideration. To qualify as “scientific information” the results are generally developed through rigorous statistical methods and evaluated and validated by peers. For example, just because someone sticks a temperature sensor in the water somewhere in a stream will generally not qualify as scientific information.

State Response 13:

Agreed, the objective is not really a biological objective, but it does represent a commitment that is important to NMFS. They are not convinced state water quality standards are adequately protective of salmonids and want the state to ensure they are reviewed and updated regularly to reflect the best scientific information available. Please refer to the 1992-1994 Water Quality Standards Review Final Issue Papers, DEQ June 1995 as an example of the scientific basis for the state water quality standards.

Tanaka Comment 14:

Page 23-24 – Regarding sediment loading, while it undoubtedly does all of the things listed in the introductory paragraph, the Physical Habitat chapter of the Oregon Plan Supplement indicates that there is little known regarding the effects of sedimentation on physical habitat and that many experts rate it as a low to moderate problem. This paragraph seems to imply the opposite is true. If you are going to base the plan on the best scientific information available, then this inconsistency must be reconciled or recognized and the appropriate research program funded and implemented.

State Response 14:

There certainly is disagreement among experts about the significance of sedimentation on salmonids, however, it was the considered opinion of the agency scientists who developed these factors for decline that sedimentation is a significant enough issue that it needs to be addressed. Certainly, this is an area where additional research is warranted. Also see the state response to Krueger comment 12 above.

Tanaka Comment 15:

Page 24, obj. 1 – Same comments as temperature objective 2.

Page 24, obj. 2 – Same comments as temperature objective 3.

Page 25, obj. 3 – Same comments as temperature objective 4.

Page 26, obj. 4 – Same comments as temperature objective 5.

Page 28, obj. 5 – Same comments as temperature objective 6.

Page 30, obj. 6 – Same comments as temperature objective 7.

State Response 15:

See response to referenced comments above.

Tanaka Comment 16:

Page 30, obj. 7 – This seems to be calling for the funding of research. If the current level of knowledge is not sufficient to determine impacts on beneficial uses, manipulating existing data will not lead to better decisions than currently exist.

State Response 16:

Agree that additional research may be appropriate. The USEPA may be willing to fund such research if they are convinced that development of sediment criteria is a high priority. DEQ intends to work with EPA, other state and federal agencies, university, industry, environmental, tribal and public water quality experts to review the existing information to determine if a sediment criteria can be developed or if additional research is needed or both.

Tanaka Comment 17:

Page 39, obj. 4 – The objective of “organization comparable to that of the natural habitat of the sub-basin” is good and probably relatively achievable if comparable in ecological structure and function of the components is the interpretation. If the interpretation is that success is only achieved by going back to pre-European settlement conditions (if we knew what those were), then the objective is likely to fail.

State Response 17:

Agreed.

Tanaka Comment 18:

Page 48, pH Factors for Decline – This seems like a create a problem issue. It appears from the wording that there is no good information on which to base decisions, only someone’s supposition that it may have an impact on steelhead. If elevated pH may be detrimental, why wouldn’t lowered pH? Can steelhead tolerate more acidic conditions? While some of the causes are plausible, I have a hard time how wide, shallow stream beds can be linked to pH changes. If the claim is that sedimentation automatically leads to wide, shallow stream beds in and of itself, then the sedimentation would need to be above some naturally occurring variable rate or coming from an area that naturally would not contribute sediment to the system. I have some of the same concern with the altered riparian vegetation factor. Is there documentation that sunlight in and of itself will cause significant pH changes? How does the change from filtered sunlight differ from direct sunlight?

State Response 18:

It is typically a combination of factors, such as increased nutrient loads, wide shallow streambeds, and increased solar inputs due to a loss of riparian vegetation, that will stimulate algal growth to levels that cause excessively high pH values. Low pH values are also a concern, however, low pH values are rarely observed based on data collected from around the state.

Tanaka Comment 19:

Page 53, Stream Fertility Factors for Decline – The discussion states salmon. Isn't this the steelhead supplement?

State Response 19:

The primary focus of this Supplement is recovery of steelhead salmon. However, the state is preparing to develop a broader based conservation plan to protect all aquatic species. In some places the broader term salmon has slipped in where steelhead could have been used. It is not felt to be harmful to use the broader term.

SECTION 2: PHYSICAL HABITAT COMMENTS

Invitation for Comments Letter

October 9, 1997

Inside Address

Dear

Thank you for your willingness to review the Physical Habitat chapter of the Oregon Plan Supplement for salmon and streams restoration. The document is organized by listing various factors for decline with associated biological objectives and state agency measures to address the factors of decline. In undertaking your review and comments, please assume that other non-physical habitat issues are addressed adequately in the Oregon Plan and Supplement. You are welcome to give your views on the adequacy of other parts of the Supplement and Plan, but to provide a common baseline for review of the Physical Habitat chapter please assume they are adequate.

In order to aid in focusing the review, the state is very interested in your response to the following questions regarding this document:

1. Does the document list all relevant physical habitat factors of decline regarding steelhead? If there are additional significant factors regarding steelhead decline, please list them.
2. Are the factors for decline described appropriately? If not, what improvements can you suggest?
3. Do the biological objectives address the factors of decline appropriately? Will achieving the biological objectives result in having or reversing the decline of steelhead in the ESUs identified in the Supplement?
4. Are the agency management measures listed in the Supplement adequate to achieve the associated biological objectives? Do they move us in the right direction to address the factors of decline in a timely manner? In your opinion are the agency management measures able to be implemented within the identified time frames?
5. Are the analysis and conclusions in the Supplement consistent with the scientific literature, and does the analysis support the conclusions? Is more research needed in any area of physical habitat for the Supplement to be successful in protecting and restoring steelhead? If so, what areas require additional research?

6. Does the Supplement, in combination with the Oregon Plan, contain adequate physical habitat monitoring to determine the success of individual measures, to allow for adaptive management, and to assess success of the plan? If not, what additional physical habitat monitoring is necessary?
7. What should be our priorities for implementing the factors of decline, biological objectives, and agency management measures? In other words, what are the most effective elements of the Supplement? Are there agency management measures that will be ineffective and/or a waste of money?

Once again, thank you for volunteering to review the document. If you have any questions or comments, please contact E. George Robison at the Oregon Department of Forestry at 503-945-7469, or me at 503-378-3548. Please return the review comments by November 3rd to:

E. George Robison
Oregon Department of Forestry
Forest Practices Section
2600 State Street
Salem, OR 97310

or by e-mail to george.robison@state.or.us, fax number 503-945-7490. Also, provide a copy of your comments to Jay Nicholas by either regular mail, e-mail, or fax. His addresses and fax number are:

Oregon Department of Fish & Wildlife
28655 Highway 34
Corvallis, Oregon 97333

nicholasj@fsl.orst.edu

fax: (541)737-2456

If you mail your comments to George, please include a diskette containing your comments.

I look forward to your comments. I believe they will help us strengthen the Supplement and improve our efforts to conserve steelhead and other salmonids.

Sincerely,

Paula Burgess
Governor's Assistant for Natural Resources

PB/sm
Enclosure

List of Invitees

Bill Krueger
Bill Liss
John Tanaka
Bob Beschta
Arne Skaugset
Marvin Pyles

Review Comments

November 3, 1997

E. George Robison
Oregon Department of Forestry
Forest Practices Section
2600 State Street
Salem, OR 97310

Dear Mr. Robison:

This is my review of the Water Quality Chapter of the Steelhead Supplement to the Oregon Plan and Section 2 Physical Habitat.

Water Quality Chapter of Supplement

1. Are all relevant water quality factors included? The coverage seems adequate.
2. Are the factors of decline described appropriately? No. It is impossible to sort out scientific principle, site specific results and opinion since statements are not fully documented as to the basis.
3. Since scientific data concerning the results of achieving biological objectives are not presented, this question cannot be answered.
4. Are agency measures adequate? The programs will probably move some aspects of water quality towards improved water quality for fish. Since how science will be used is not clear, it is impossible to provide a firm answer to this without a firmer basis in sciences and less on general views of the authors.
5. Are conclusions consistent with scientific literature? In some ways this is true and in others it is difficult to tell. For example, page 15 water temperatures are too warm or too cold. The literature suggests that there are thresholds of ecological change that are pertinent with respect to the nature of biological response. Achievable thresholds for fish survival or potential to reduce anchor ice formation are not referenced. It sounds like the authors consider ecological change to be fully manageable and does not consider that when thresholds are crossed, management cannot reverse a response. When anchor ice is forming, there may be a temperature threshold through which shade could prevent anchor

ice formation but if it gets cold enough no shade can prevent the formation of anchor ice. The dynamic nature of ecological responses seems to be minimized in the document.

6. Are water quality improvements measurable and over what time period? The monitoring is possible. Designs for monitoring need careful and site/location specific intensity and focus. This detail is beyond the plan but is critical to future interpretation of ecological parameters monitored. If DEQ protocols are followed there probably will not be sufficient funds to meet their current protocols. If an overall, well designed, statewide monitoring plan is designed that is not hierarchically linked to local sites and local management areas, it is feasible to monitor the parameters listed in a statistically reliable way over a 3-4 year time frame. This will accurately reflect what is being done in the state but it cannot be used to evaluate basins, reaches, etc.

Will water quality improve soon to recover species? I do not know but I do know water quality is not the only factor related to current steelhead population sizes.

7. Is water quality monitoring adequate as described? No. See answer to 6 above.
8. Priorities? I think there should be a clearer prioritization of the relative roles of all the factors of decline and this should all be made public. The solvable problems should be clearly identified and if they will restore salmon/steelhead they should be implemented. If they won't, we should not pursue them. Finally, monitoring is very expensive. Design a system to monitor that will answer the questions that are of highest priority (probably statewide success) and don't waste money on something that cannot be interpreted.

Section 1. Water Quality Document (17B1-63)

Page 17-B4, paragraph 6. REMAP project. The 57 sites if sampled randomly can be used to estimate the status and its value will be described by the confidence limits you can put on the estimate made from the data sets.

Page 17-B8, paragraph 4. "with such large..." This statement from the Botkin report is purely speculative and has no basis beyond the guess of Botkin.

Page 17-B9, paragraph 3. Sedimentation is not suggested as important in the physical habitat document. Be sure your chapters agree. This is difficult when standards come from viewpoints not scientific data.

Page 17-B28, paragraph 6. Research reports clearly show that irrigation withdrawals do not always cause an increase in water temperature. In some cases irrigation reduces ambient water temperatures.

Page 17-B61. I do not believe ODFW has the ability to define conditions that cause streams to exceed temperature criteria.

Oregon Department of Agriculture Description of Programs.

This document explains the ODA processes well. It doesn't discuss how agricultural practices will be managed by ODA. Monitoring protocols are not included.

Section 2 Physical Habitat

1. Does document list all physical habitat factors? Ocean temperature is surely a physical habitat factors.
2. Are factors for decline described appropriately? Native American fishing may be related to decline. Some factors listed are clearly assumptions with no data to validate such as taking of salmon by livestock trampling and vehicular traffic. These should not be included since they cannot be validated.
3. Biological objectives address decline appropriately? This is difficult to answer since the response of habitat diversity with complete protection and no fire based on current conditions is largely speculative.
4. Agency management adequate to achieve biological objectives? Agency management measures were not provided in complete form and the document does not clarify what level of watershed assessment and restoration will take place. The focus seems to be on instream habitat restoration with a lack of understanding of the physical function of streams. In my view this is a reversal of priority. They physical function needs to be addressed and working before the details of habitat restoration can be identified.
5. Consistent with science? Assumptions, facts and opinions are so thoroughly blended that this question cannot be answered.

Research? it is assumed protection is good but there is no attempt to determine if management may be as good or better than total protection. If total protection is to be the dominant aspect of the plan, it will fail.
6. Adequate monitoring plan? It was not presented.
7. Priorities to implement? First deal with roads. There is a good scientific basis to move ahead with this. Do watershed or proper functioning condition assessment using qualified staff before restoration efforts are begun. Educate fisheries professionals on watershed function, properly functioning condition, and the importance of having the physical factors in order before habitat restoration can be determined.

Editorial comments on Section 2 - Physical Habitat. The Issue Background is poorly written and obviously biased.

Page 1, paragraph 1. Mehan 1991 reference is an opinion but it is presented as a fact. It should be clearer.

Page 1, paragraph 1, last line "other disturbances" left out ungulate or large herbivore grazing.

See: Martin, Paul W. Who or what destroyed our mammoths? Megafauna and Man: Discovery of American Heartland, p. 109-117.

Burkhart, W. 1996. Herbivory in the Intermountain West. Univ. of Idaho Forest, Wildlife and Range Experiment Station.

Page 1, paragraph 3. Properly functioning condition should be defined. Meehan 1991 is a commentary, not a scientific report. It should not be used to determine the majority of streams are not in PFC.

Page 3, Table 1. In 6 of the 9 habitat categories the percent of streams in desirable category are greater than those in intermediate or undesirable. How can that be if the "majority of streams are not PFC"?

Page 3, last paragraph. "significant different views about the extent of habitat modifications and data are limited with regard to the degree to which changes have occurred..." Given this statement, the entire introduction is misleading and should be rewritten.

Page 9, paragraph 2. The findings reported should be backed with a scientific reference.

Page 11 d. Adequacy of actions/measures to meet objective.
Cannot determine adequacy of actions/measures to meet objectives without reviewing ODF 39S, 40S, 42S, 45S, 47S, 48S, 50S, 59S, 11S, and 14S

Page 14, paragraph 2. Indicate the reference for the stream classification methodology used.

Page 24, last paragraph. There is an overemphasis on fencing rather than management to modify cattle grazing effects. The widespread habitat destruction by elk and deer is not recognized.

Page 25, ODFS IVB2

This reflects an arrogance by ODFW that if well publicized will minimize cooperation of private landowners. The next paragraph is more conciliatory but once the private landowners write off ODFW there will be no cooperation. I suggest this part be re-written.

Page 29, paragraph 2. What is the basis for these "accurate" percentages, e.g. 66% not 60%±, etc? This appears to be a speculative assessment.

Page 36, last paragraph. Using local school children to collect monitoring data on temperature, water quality and riparian vegetation is ridiculous! Monitoring data must be collected with greater quality control than in local school children's projects.

Page 37, paragraph 4. Use of volunteers. Using volunteers for compliance monitoring will require effective training and education of the volunteers. I doubt it will be cost effective.

Page 39, paragraph 5. Eastern Oregon ESU's. Maybe there should be an incentive program for private landowners to participate in the program. The specifics any inference to the site specific differences on eastern Oregon streams.

Page 41, paragraph 2. Upland habitat restoration reference. Who will be the lead agency for upland habitat restoration? ODFW has expertise in instream habitat but it is evident in this document that ODFW does not understand proper functioning condition of watersheds or riparian areas. ODFW does not have the expertise to do watershed land assessments or restoration. Unless watersheds for ODFW are simply buffer strips along streams.

Page 51, paragraph 6 ii. This assures all streams that have a 1-4% stream gradient have the potential to have 35% gravel availability, etc. This is not a valid generalization for many streams that just do not have the potential.

Page 73, paragraph 2. Loading of LWD. Need to recognize that many streams have no potential to recruit large woody debris and haven't had the potential for hundreds of years.

Page 73, paragraph 8 iv. The only roughness element referenced is LWD, other elements should be defined and described.

Page 14, last paragraph. Vehicles or livestock in streams disrupt spawning fish or damage redds. Is there any evidence of this ever happening in Oregon? Is there any evidence of the relative importance of either factor in production of salmonids? This seems to be stretching the speculative powers of the authors.

A few general thoughts.

1. The document indicates the authors do not understand proper functioning condition as used in Oregon.
2. The document treats speculation of pre-European settlement conditions as if they were fact.
3. The document indicates protection will restore habitat and fish stocks to those of pre-settlement times. This is at best a bad wild guess.
4. There is no discussion of the role of fire in maintenance of habitat diversity.

5. It is not understood that with complete protection of Oregon's lands and fire suppression diversity of habitat may decrease.

Bill Krueger

November 11, 1997

E. George Robison
Oregon Department of Forestry
Forest Practices Section
2600 State Street
Salem, Oregon 97310

Re: Review of "Physical Habitat: Key Parameters for Restoring Steelhead Salmon Populations"

I realize that, first of all, this review is late and secondly, it is not a very good effort. However, I have reached the time I have allotted for this task. There simply is no more.

I would like to start with some initial comments. There has been a great deal of frustration on my part trying to get my arms around the task requested of me. First of all, I was not given a complete set of documents to review. The review questions in the cover letter asked about the physical habitat monitoring in the Oregon Plan and I didn't receive and don't have the Oregon plan. Also, material is referenced in the document that I did not receive, for example on page 2 the Monitoring Section, Section 16 is referenced and I didn't receive that. There are other references in the document to material I did not receive making the review frustrating at best and meaningless at worst. I undoubtedly have access to some of that material but I choose not to pursue it because it would simply have added time and effort to a task that was short on both. The bottom line is that I did not receive a complete package adequate to perform the review and felt frustrated because of that.

A word of advice, in future versions of the document please add a list of acronyms. I realize you were very good about writing the name out first before using the acronym, but when it is introduced on page 21 and then used on page 138, the acronym is sometimes hard to remember. This is true of agencies and especially true of individual agency projects. A complete listing of acronyms available in table form for reference would be very useful.

The following addresses the review questions.

Question 1: The document that I reviewed did not list all the physical habitat factors regarding steelhead decline. Both "8. Water quality degradation/sedimentation:" and "9. Changes in flow:" was not included in the document I reviewed. I can not imagine a serious discussion of management effects on channel morphology, substrate changes, and instream roughness without including a serious discussion of sedimentation and flow issues. I realize that you include these topics in the Supplement somewhere, but I did not see them. While both sedimentation and flow issues are not technically physical habitat subjects, the only reason to worry about them is because of their potential effect on physical habitat. The only reason to change upslope practices with regard to sedimentation is to mitigate effects on physical habitat. Therefore, in my opinion,

your stratification of topics is inappropriate. Either change the content of the Physical Habitat section or else cross-reference real well and give reviewers like me a complete document.

Other than the above issue of inclusion of sedimentation and flow in the physical habitat section, the material seems complete. In fact the material is, in my opinion, almost compulsively too complete. There is too much material to get a clean grasp of what is being presented. I am a firm believer in Praeto's 80-20 rule. In this case, 80% of the problem can be presented and addressed with 20% of the material. Then the 80% of the material that addresses the other 20% of the problem just confuses the issue and, no pun intended, muddies it up. I realize you probably can't do it, but I would strongly encourage the document be streamlined. Find the key material that addresses the most important and key issues and present that in a very frugal and streamlined manner. I found the current document more confusing than helpful. It was ponderous, not streamlined, and probably tried to do too much.

Question 2: In general, I think the factors for decline are described appropriately. I could probably take issue with a specific point here or there but haven't the time or inclination to do a review at that micro level at this point. They will do in their present form.

Question 3: In all the sets of objectives there are two are always two of them that are, to paraphrase, refine the conditions needed to support healthy stocks of steelhead and carry out watershed assessments and actions plans. Achieving these objectives by themselves will have no effect on steelhead. They are logical steps that must be taken but are only of value when used to affect change in the management of steelhead bearing streams. This may seem to be a trivial and pedantic point but gathering data and planning, by themselves, accomplish nothing.

The balance of the objectives, if achieved, will result in arresting the decline of steelhead only if they are a limiting factor. If freshwater habitat is not limiting then improving it won't help steelhead. The objectives should be as they are in the Supplement to arrest the further decline of freshwater habitat and move toward an improved condition. Whether or not the fish respond may depend on some other factor. I believe the objectives directed toward doing and not planning or collecting data will all result in improved freshwater habitat conditions if accomplished.

Question 4: I am unprepared to respond to the detail that is provided by the agency management measures listed in the Supplement. I am aware of changes in the Forest Practice Rules, ODF Northwest Forest Plan and Elliot Forest Plan, and the Record of Decision binding the USFS. I am less aware of non-forest changes for forest protection. My impression was that forestry related programs had specific numbers in prescriptions while non-forestry programs were vague and had a lot of feel good words in them. It is going to be hard to comment on how well the vague agency measures will work unless you know the track record of the agency and I don't. I feel good about the forestry measures and I don't have a firm feel for the non-forestry related measures.

Question 5: The analysis and conclusion are consistent with the scientific literature to the extent I am aware of it with one exception. An area of weakness is the growing body of knowledge regarding disturbance ecology and ecosystem management. This body of knowledge doesn't

support a habitat quality benchmark approach to physical habitat but supports a physical habitat succession approach with different habitats in different successional stages and different quality classes as a normal course of events. Disturbance ecology and habitat quality benchmarks are, to some degree, inconsistent with each other. Both approaches probably have merit and they need to be reconciled, at least at a philosophical level. I'm not sure how to do that, but it seems like a worthwhile endeavor to embark on.

Question 6: I don't have the Oregon Plan and I couldn't find anything definite and concrete to evaluate in the Supplement regarding monitoring. Therefore, it is hard to comment on the monitoring.

Question 7: Currently, forestry is light-years ahead of the other natural resource extraction industries at protecting and enhancing fish habitat. Yet the current coho salmon and steelhead debate is concentrated on and centered around forestry fixes because the regulatory infrastructure is in place to regulate forestry. The proposed fixes in forestry, in the Forest Practices Act for example, apply to every stream, are detailed and site-specific as are prescriptions in ODF state forest management plans. While conversely, fixes for agriculture and range stream systems, estuaries and urban development apply primarily to already degraded systems and are vague, and non-prescriptive. The Supplement, in my opinion, is trying to solve the steelhead problem on the back of forestry while not holding the other natural resource extraction industries accountable to the same degree. Your priorities for implementing a strategy should be to bring other agencies up to the level of ODF Forest Practice Rules for protecting fish habitat.

Thank you for the opportunity to review the Supplement. If you have any questions or comments, please feel free to contact me.

Arne Skaugset

Review of:

Section 2

Physical Habitat: Key Parameters for Restoring Steelhead Salmon Populations

Reviewer: Marvin R. Pyles,
Associate Professor of Forest Engineering
Oregon State University

Overview comments:

The physical habitat section of this report (plan?) shows that a wide array of activities that benefit steelhead are planned or on-going in Oregon. Some of these activities are a routine part of current administration of land management law and rules and some are dedicated to the steelhead restoration effort. On the whole, the plan is good. It shows that Oregon has many activities in place and more planned that should benefit steelhead. Most of the objectives seem to be working in a direction that is generally thought to be beneficial to steelhead. It is also clear that the plan is far more a political document than a scientific document from the perspective of success or failure. The administrative success of the plan will be a function of whether all parties to it do their part. If all parties do their part, then the end result should be a better stream for steelhead. However, there is a significant lack of information that shows that the measures to be taken will succeed in restoring steelhead. The measures are largely based on professional inferences from anecdotal reports in the literature. These are a far cry from scientific cause and effect, but they are the best that we have.

Subsection 1. Loss/degradation of riparian areas

Specific Comments on Objectives:

Objective i. "...refine by reach or stream type, all the riparian conditions needed to support healthy stocks of salmonids..." -- If we currently have only threatened or endangered stocks, then this cannot be done in the true sense. The outcome of this objective will therefore be simply the opinion of whoever does the "refining". Also, without providing the criteria for 'typing' streams, this objective could go in almost any direction. For example we might envision a 'typing system' that includes recently clear-cut riparian zones, reforested riparian zones, partial-cut riparian zones, second-growth riparian zones, etc. Alternatively, we could have a type system that includes, constrained reaches, unconstrained reaches, meadow reaches, etc., with disturbance and non-disturbance pairs. What is it that you really want here. Keep in mind that you have stated that disturbance is natural (I agree), hence do not fall into the Federal trap of saying that the only riparian condition that can support healthy stocks is an undisturbed one.

An additional point to consider is the inter-relationship between stream reaches or types. This means that you have to deal with not only reaches, but also the healthy combination of reaches -- this is getting complicated -- can this really be done in other than an opinion mode?. Can it be done by 2002? Who will "agree" that it has been done and who will write the big report that will establish what the outcome is.

In the discussion section, you present the Elliot HCP. Without wording to the contrary, this could be interpreted as an example of how to do it "right" [at least that is the way it appears since it includes integrated forest management ... wide range of values...timber...fish], but this includes a set-aside of nearly 20 % of the Elliot area. Is this the plan for private timber land, and if so, does such a set-aside constitute a "taking of land" that will significantly reduce the tax base of all forest land counties in Oregon -- better run this one by the legislature! If the steelhead supplement is to succeed, then little details like this need to be endorsed by all stake-holders particularly the people and corporations that own the stakes! If on the other hand the Elliot example is just to verify that FPA standards are being equaled or exceeded on State Land, then don't go into the detail of the Elliot plan. What is the intent of the Elliot detail, and how will it be read by all interested parties?

Objective ii. The wording, "In the interim..." implies that once *Objective i.* is complete, we will have a new set of standards. This brings even more importance to my comments about *Objective i.*, above. If new rules must go through the standard rule making process, then it is not a forgone conclusion that cooperation of all stakeholders will exist.

Where did the arbitrary percentages come from, and are they consistent/compatible with other arbitrary values and biological aspects of steelhead.

Objective iii. Are the BLM guidelines compatible with the realities of natural disturbances? Is this the source of the targeted 67% of stream reaches [-- which implies that 33 % of stream reaches are naturally not in proper functioning condition]?

Objective iv. Do you truly have the cooperation of private landowners and appropriate State agencies, notably Agriculture?

Objective v. Pardon my doubts, but is it really possible to accomplish this in 10 years? It is easy to write, but what analysis of the work that needs to be done [which you haven't even identified yet since it is part of *Objective i.*] have you completed that leads you to believe that you can accomplish this objective?

Subsection 2. Channel morphology:

Specific Comments on Objectives:

Objective i. Here we see the same objective as in subsection 1. Most of the same comments apply. Further, since channel morphology is primarily a physical characteristic, I have some concerns about "reach typing" and the prescriptive nature of this type of an exercise. The world is very complex, and one of the things that stands out from the time I spent with Clyde Wahrhaftig and Luna Leopold learning the business of fluvial and "regular" geomorphology is that many features out there are the result of the "luck of the draw" as they often put it. In a broad sense, there are identifiable patterns of simple cause and effect, but site specifically there are at least as many exceptions that are rooted in the complexity of processes. This casts doubt on the whole objective of "typing". I would like you to all think long and hard about how this "typing" will be done, and more importantly, what sort of prescriptive restorative activities will be required as a consequence [I can recall our fisheries colleagues blasting out natural obstructions of both the bedrock and large woody variety as a result of a prescriptive view of the world. I don't think we want to repeat this, and channel morphology lends itself to such activities -- e.g. "...this channel reach only has a pool index of 6 when it should be 8, so I guess we will have to go out a make [sic] a few more pools".

Objective ii. Usually as in the case of the Forest Practice Rules, such specific prescriptive objectives require a definition of terms. What is a pool, what is the definition of pool spacing, what is the definition of channel width? What if anything in detail consistent with this objective do we know about the relationship between the "support" that wood and a functional riparian area provides to "functional channel morphology". I hope you have this nailed down -- my recollection is that we have numerous anecdotes about pools and/or riffles, often in terms of "harvested" or "managed" versus "unmanaged", but this won't do it. Perhaps there is a yet to be released doctoral thesis that will shed light on the subject.

What is the definition of "interconnected with side channels"? I can see the cats making "side channels" as we speak. Be careful here!

Objective iii. Okay, suppose that the ODFW stream surveys are judged to be incapable of differentiating unimproved from improved stream reaches in morphological terms (ie. pools and riffles, and connection to side channels)-- isn't the jury still out on this. Then you are going to have to start over with stream surveys, and you will never finish it by 2002 -- you probably won't finish it by 2002 anyway. This objective may be okay if you interpret the wording loosely, but is that the way NMFS will interpret it?

Objective iv. Reword for clarity! My guess would be that you will be criticized for allowing the shopping list "prevent, minimize, or mitigate". The result will probably always be minimize when the NMFS desire would probably be to prevent first and mitigate second, but never just minimize.

Objective v. Do we know how to do this?

Subsection 3. Substrate changes in streams:

Specific Comments on Objectives:

The Standard Objectives. It would appear here that components of the program could work at cross purposes to each other. There are miles of coastal streams that have bedrock channels - either because that is the natural state, or in response to management activities. Question, will a bedrock channels be judged to be a natural but unnecessary condition for healthy stocks of steelhead, and as a result will mitigative measures be taken to "pave" bedrock channels in gravel. If this is done at the same time the we are all working hard to prevent or minimize the entry of sediment into the system, then we will be working at cross purposes. This may seem obvious, but I have listened to presentations of watershed restoration plans where exactly this occurred. A primary deficiency of gravel (which is sediment after all) was observed and noted as a management related change from the natural state, and then a vigorous program to eliminate sediment input was instituted for the watershed. You make the call.

Subsection 4. Loss of instream roughness:

Specific Comments on Objectives:

Objective vi. I believe we are talking about 60 to 70 % of total fish bearing stream miles as needing restoration from the perspective of instream roughness elements (see Table 1 on page 3). Doing this restoration on 2.5 % per year seems like a daunting task. Have you made even a preliminary estimate based on currently available stream surveys of how many stream miles would need to be restored per year, and does that number seem attainable either from the workload or cost perspective? Keep in mind that most of the stream miles that need restoration may not be reachable by the necessary equipment.

Subsection 5. Passage impediments:

Specific Comments on Objectives:

Habitat Objective i. This is an administrative objective to identify problem sites which by their very nature are physical and not biological. As such it is not a biological objective, and since it involves no actual modification of a stream or part of a stream, does not directly address any decline in steelhead salmon. This is however, an important part of a logical process of remediating human caused physical habitat alterations to the stream system. One point to note is that misdirection of upstream migrants is as important if not more important than misdirection of downstream migrants. Also, mitigation of a barrier to only 600 ft of stream should probably be a low priority on a stream that has the vast majority of habitat available, but is underseeded.

Habitat Objective ii. If the term "human activities" is take broadly to include "in-action" as well as "action" then failure to remove beaver dams that impede movement of fish can be considered a

violation of this objective (a similar statement could be made about debris jams). Placement of in-stream structures (fish enhancement structures) that do not meet fish passage criteria would also be a violation of this physical objective. Note again, that merely "not doing bad things" is not an action that improves the current situation. These are examples of the dangers of prescriptive language in either laws, rules, or plans.

Habitat Objective iii. We are now talking about some form of action, but it is again related to physical, not biological objectives. The amount of mitigation is arbitrary, has an unclear basis for the percentage, and does not seem to be linked to the life cycle of steelhead salmon. For example, if the percentage base is the current impediment population as of a given date, then in 100% would be remediated in about 13 years (6.66 bienniums). If on the other hand, the percentage base is impediment population each year, then complete remediate will never be achieved. I don't know that it matters a great deal which method of calculation is used, but the method should be more clearly spelled out to avoid misunderstandings between agencies and organizations. Linking remediation to the life cycle of steelhead would seem a reasonable approach that makes some biological sense. If a barrier exists on a stream that has an endangered (although not designated as such) population of steelhead, then it would seem that we should work to remove that threat either within one year to offer greater opportunity to the next group of spawners, or at least by the time the current juvenile production returns as adult spawners. A more relaxed objective might be acceptable on streams with only threatened rather than endangered populations. Additionally, less stringent objectives might be adopted on streams where the primary perceived reason for decline of steelhead was not associated with passage barriers (Note that this is nearly all streams).

Other Comments:

Two types of mitigative measures (both administrative and true in-stream actions) are apparent from the list of "Actions/Measures". One type is an action or measure that is incidental to existing activities, and the other is a dedicated activity or measure. An example of an incidental activity is the replacement of an existing culvert that is at the end of its physical service life with a new culvert. In this case, with or without any dedicated initiative aimed restoring salmonids, the new stream crossing will be designed and installed to provide passage for both juvenile and adult game-fish because that is the current law (or administrative rule). A dedicated activity would be the replacement of a barrier culvert before the end of its physical service life for the specific purpose of fish restoration. It is these dedicated activities that offer the opportunity for poorly spent or down-right wasted funds. For example, replacement of a stream crossing culvert that is a barrier to a modest length of stream channel on a stream that has a currently adequate population of steelhead is probably a poor expenditure of funds relative to another stream that has a barrier well down in the system and has a poorer population. Prioritizing in an appropriate manner (note that what is appropriate is not always clear) is important, and does not seem to be a main thread in this document. Are there some basic prioritization precepts that can be stated that apply to the physical habitat section. Physical habitat may well offer the greatest opportunity for change since many physical attributes can be controlled to a greater degree than biological attributes.

Subsection 6. Loss of wetlands:

Specific Comments on Objectives:

Objective iii. Why a completion date of 2007 for this objective when all the others are 2002?

Objective iv. Since determination of the amount of wetlands necessary to support healthy stocks of steelhead will be determined as a part of *Objective i.* by 2002, it is unclear how you can begin the wetland work advocated here until you know what is necessary. Have you investigated land use zoning and planning and tax obstacles (or incentives) to turning "productive" forest or agricultural land into non-productive wetland. Further, the definition of wetland for this objective could have a profound effect on whether any measurable benefit accrues to steelhead. If all you do is create or restore 100 acres to the condition of having hydric soils, you will have done very little if anything for fish. I realize you have qualified the objective as "...wetlands that contribute to health stocks...", that is good, but there may be significant work to define this.

Other Comment:

I find it more than interesting that this issue which has far more to do with agricultural land and practices than it does forest land and practices has only one small and rather irrelevant measure from the Oregon Department of Agriculture. What is the deal here? Are you trying to balance the steelhead books on the backs of forestry when it is clear that steelhead, being the anadromous species that they are, spend significant and important parts of their lives in agriculturally dominated sections of the stream and river system?

Subsection 7. Loss of estuarine rearing habitat

Specific Comments on Objectives:

Objective iv. You are proposing to restore or create wetland, but you are only going to restore "habitat features" in the estuaries. Why not restore habitat features in the wetlands? Why not create estuary area? -- particularly since so much of it has been lost. I realize that there are many obstacle to doing this (see my comments on subsection 6.), but as an objective, why is it different than the wetland objective?

Subsection 10. Elimination of habitat:

Specific Comments on Objectives:

Here is an area where the desire to improve the current status of a species will come face to face with people. Particularly in the Coastal region (and the east side of the coast range), elimination

of habitat by reservoirs has been done for the benefit of adequate clean domestic water supplies for various municipalities. Is this loss of habitat worth talking about in relation to the other habitat issues?

A Final Comment:

This brings to mind my final comment. You have indicated an effort to prioritize activities for each habitat subsection, but should you also be prioritizing between these subsections? I would submit that you should. The result of this will be that some issues will be by-passed completely in restoration activities, and that will probably be the correct move.

Department of Agricultural and Resource Economics
Oregon State University
213 Ballard Extension Hall
Corvallis, OR 97331

November 3, 1997

E. George Robison
Oregon Department of Forestry
Forest Practices Section
2600 State Street
Salem, OR 97310

Dear Mr. Robison:

Attached is my review of the Physical Habitat chapter of the Oregon Plan Supplement for salmon and streams restoration. I have no particular expertise regarding specific physical factors of decline to offer more than a lay opinion on whether all factors are listed, whether there are additional factors that should be considered, or whether the factors are ranked appropriately.

My comments will be both general and specific. I have listed them by page number and section. If you need any clarification please let me know. I can be reached at 541-737-1440 or by email at John.Tanaka@orst.edu.

I hope you find the comments useful.

Sincerely,

John A. Tanaka
Associate Professor

Review of Physical Habitat Chapter of the Oregon Plan Supplement
Submitted by John A. Tanaka, Oregon State University
November 3, 1997

Let me begin by saying that I am generally impressed with the overall document. I do have some specific concerns related to several factors of decline and some general concerns. I find it most useful to go through the specific comments on a page by page basis.

Most of my comments are focused on the first few factors since the plan gets pretty repetitive (citing the same agency programs) after that or are focused on factors with which I am not familiar. You might save several trees by putting all of the agency program descriptions in one place rather than repeating them over and over again.

Finally, let me say that the comments are not meant to be derogatory to any profession or agency. I have attempted to raise questions or seek clarification. I also do not know the full content of many of the agency programs summarized in the document so could only go on what was written. Overall, I think that if the agency personnel, affected landowners, and the interested public will implement the important components of this plan in good faith, it has a reasonable chance to succeed. If any agency seeks to control it, it is probably doomed to failure.

Page 2, Par. 5 – The discussion of the dynamics of the alder dominated areas is good. Recognition of the dynamic nature of the riparian ecosystems is generally good throughout the document.

Page 3, last par. – Identification based upon review of key scientific literature, professional judgment, and advice of NMFS staff causes some concern. There is a great emphasis these days on relying on scientific literature even when it does not exist. I guess it rests on how scientific literature is defined. Looking at your literature cited section, there are very few peer reviewed journal articles. Most are non-peer reviewed or opinion articles. The basic fact is that many of the questions that are raised throughout the plan have not been subjected to replicated research or peer review. Generally speaking, where research has been done it is in one location (which makes for a case study) that cannot be validly used to extrapolate to broad areas. While the NRC and Botkin et al. documents appear sound and may be based on other literature, they are not peer reviewed research (i.e., science) but rather well grounded opinions of a group of scientists.

The bottom line is that we only know the cumulative impact of past practices and current conditions. My concerns here are the introduction of personal bias (values) in the name of professional judgment and the imposition of NMFS staff that may not have good knowledge of the specific areas of concern..

Page 4, par. 3 – The factors are discussed in “relative order of perceived importance.” Putting impoundments and hydropower at the bottom of the list because “thoughts and programs

regarding this factor are not fully developed” is avoiding the issue and probably wrong, especially as the plan applies to eastern and central Oregon.

Page 4, par. 6 – This short paragraph needs to be expanded. These interrelations are going to be important. Ideally, each section should contain another subsection that discusses the known connections/relationships.

Page 5, par. 2 – The recognition of the dynamic nature of these ecosystems is important. There should be more emphasis that the quantitative criteria specified in the plan must be interpreted in context. The sentence starting “Comparison of habitat measures...” does not make sense. If you have a potential, natural disturbances or management history cannot influence that potential. The natural disturbance is part of the potential of the site that will cause the site to be in a different state (e.g., seral stage). If either natural disturbance or management history has caused the site to change so radically that its potential has changed, then the site itself has a new potential that must be recognized. This has recently been described using a state-and-transition model. The last sentence implies that public safety is the most important criteria in designing projects. Surely there are many others such as feasibility, cost-benefit, cost effectiveness, and other criteria that will assist in setting priorities.

Page 5, par. 3 – While this paragraph makes sense, “the objective” has not been defined. If the objective is to have a diversity of habitats across the landscape, then all conditions would be expected to exist at different locations through time. It then becomes the mix of conditions that is important recognizing the dynamic nature of the system and the time involved for conditions to change.

Page 6, ODF 32S – While this program is important for basic information, it is not clear how the agencies will use the information. If efficiency is defined as getting the greatest return of fish for the resources expended, then the fish presence survey would be useful if it gives information on where fish currently exist and where there is the greatest potential to improve conditions for fish. The document should avoid setting priorities where there is little potential to increase fish numbers (i.e., a worst first policy) when resources are limited.

Page 7, ODFW 1B3 – This is an extremely important activity if adaptive management is going to be applied. In the past there has been little effort to do validation monitoring in a systematic manner. To be truly meaningful, the validation effort must collect pre-treatment baseline data and then monitor key parameters over time following the treatment in a statistically valid manner. Personnel trained in scientific research must be involved in the design of such efforts. Obviously not every project can be subjected to such scrutiny, so careful design to get the best possible information that can be extrapolated to similar sites is critical.

Page 7, ODF 11S – This is an example where validation monitoring would provide useful information in the future. There is an assumption that we know how much LWD is required in a functioning system. This assumption could be tested.

Page 7, ODF 13S – While this is interesting in itself, expending significant funds is probably not very efficient unless we expect similar size flooding in the near future.

Page 8 – Just a general comment that there is not much continuity/transition between the sections. It goes from the general discussion to specific factors.

Page 8, item 1.a. – There is a good link in the discussion between the riparian area and the uplands of the watershed. This thread needs to be maintained throughout the document. It seems rather short-sighted to just focus on the in-stream habitat or the riparian corridor without considering what is happening to the rest of the watershed. The third asterisk – connectivity between upland food sources for what and food supply for what?

Page 8, last par. – The use of the term “historically” needs to be defined. Are you writing relative to European settlement, Native American settlement, ice age, earlier? In each instance, the baseline changes. If the “historical” period is prior to European settlement, are you assuming that those are the conditions for which management should strive?

Page 9 – The plan seems to be an inappropriate place to lobby for agricultural and urban rules for riparian protection. Using the term protection is also value laden – it implies that it must be protected from all human-caused impacts. Isn't the goal to improve the habitat where it is in less than desired condition and to maintain it where it is? Appropriate management should be emphasized rather than protection.

Page 10, obj. – Where there are specific target values given in the objectives, can you provide what the current levels are? In other words, how far do things have to change to meet the objective? What provisions are in these objectives for natural variability when only one number is given?

Page 10, obj. iii – As I understand it, this is an inappropriate use of the PFC concept. While there is a great tendency for agencies to want to report amounts of PFC stream miles, the method used by BLM is a cursory assessment based on professional judgment of an interdisciplinary team. For it to be effective, each team member must have a large amount of experience in a system to properly evaluate it against actual potential rather than some personal view of potential. The results should only be used to assess where additional monitoring should occur and to help assess where resources should be directed (prioritization).

Page 10-11 – Need to renumber. There are two iv's. This needs to be fixed in the following text in part d.

Page 14, par. 3 – While implementation monitoring is funded, the more important validation monitoring is not mentioned here. Are the agencies doing any other type of monitoring besides just implementation? There is also the implication that all desired activities are fully funded. Is this really true – the agencies can do everything they desire? There is an implicit assumption that

volunteers are readily available and properly trained and that all such individuals, groups, etc. are also fully funded.

Page 16, ODOT action/measures – Why the 1.5:1 ratio? Is there a basis or requirement for such a condition or is it just a number picked because it sounded good?

Page 16, DSL action/measures – Why restrict it only to native species for restoration. While in many cases it may be a management objective to establish native species, there should be provisions for resource protection with the most appropriate desirable species available. Restricting it only to native species may be counterproductive in some cases where the native species is not available or only available at prohibitive costs.

Page 17, DSL S-1 – Reassigning 1 FTE for a temporary assignment seems like a waste of time and money. You should use existing educational programs (Extension, etc.) rather than send one person out to cover eastern and central Oregon.

Page 17, ODA 1 – This seems to be the only program that takes a realistic approach to planning. While it does not exclude restoration of historical natural conditions and vegetation, neither does it blindly establish it as a management goal for all locations.

Page 17, ODA 5 – This seems to be an unfocused program and probably an ineffective program given the size of the funds available. Those funds could likely be better used elsewhere on high priority projects, education, or other activity.

Page 17, ODA 6 – This seems redundant with other programs. Funds ought to go to groups already set up to conduct workshops such as OSU.

Page 18, ODA 9 – Same comment. If we are trying to remove redundancy, educational activities should rest with the state funded program established to conduct that activity. In Oregon, that is the Extension Service that already has the infrastructure in place.

Page 19, ODF 5S and 6S – Is there an organized effort to conduct outreach efforts out of these restoration projects? The Extension model of using demonstration areas on progressive landowner property to change attitudes and activities of later adopters could be very useful here as well as with many projects if it can be shown to be in the best interest of the manager.

Page 20, ODF 17S – I'm not sure I follow the wording related to "25 % of the excess conifer basal area will be harvested." If it is "excess" why can it not be harvested? If it is necessary to retain the tree on site for whatever reason, how can it be termed excess?

Page 21, ODS 42S – It is not clear whether this work is redundant with surveys being conducted by ODFW. If it is not, are the same protocols being used so that the data are roughly comparable?

Page 22, ODFW 1B2S – The introductory chapter depicts critical activities. I hope that the habitat criteria and assessments are done with interdisciplinary teams so that all factors of habitat can be adequately evaluated. That is, fish biologists should not be making assessments on vegetation, hydrology, etc. anymore than a vegetation ecologist should be assessing fish.

Phase 2 – The protocol specified here seems very vague.

Page 22, ODFW 1B3 – The protocol seems vague. How will “representative restoration projects” be chosen? Was there a pretreatment baseline sampling? What are the controls for the project going to be (that is, how will you tell whether the result is due to the treatment and not background noise)? While I think it is good to involve schools and students, I question whether these data should be used without some sort of formal certification training or other quality control.

Phase 2 – While the focus is on in-stream monitoring, isn't it important to also monitor what is happening in the uplands?

Page 23, ODFW 1D1 – This seems like something that the Extension Service was established to do. Again, why are state agencies trying to duplicate existing programs rather than focus on what they were established to do?

Page 23, ODFW IVA1 – The last sentence in this section points out a problem of trust. How do you expect landowners to voluntarily enter into programs when, if they are acting in good faith and an ODFW employee (with their own biases) deems that they don't like what they see, they are reported bringing down the regulatory agency upon them? Do the ODFW employees know the nuances and considerations involved in land management and operating businesses? Wouldn't it be better if the ODFW tried to help mediate the situation prior to “turning them in”? I agree that if a landowner will not change their activities to comply with the legal requirements that they should be reported. However, I also think if we are concerned about long-term attitude changes and improving the resources, a cooperative approach is a better first step. Along this vein, endorsing the Coordinated Resources Management Planning process would be a good step using the principals advocated in that program.

Phase 1 – This reads like ODFW wants to be in control. For example, in upland areas where ‘forest health’ is an issue and the land management agencies have a pretty good idea of what needs to be done for long-term improvement, what I hear from the public land managers is that ODFW is most often an impediment in dictating what can be done in the short-term (reference the Governor's Eastside Forest Health Panel meeting with the Forest Service and Bureau of Land Management earlier this year).

Page 24, ODFW IVA6 – I question whether ODFW has expertise in habitat protection as stated here. If you only concerned with in-stream habitat, this may be true. This comment is related to many of the previous comments. While the fish biologists may know some about habitat requirements, to suggest they know ‘the answer’ is a stretch. For example, in the case of the

OSU study on Catherine Creek where late summer grazing has been conducted over a long time period in pastures intermixed with long-term grazing exclosures, the researchers have observed more salmon redds in the grazed pastures compared to the ungrazed. Rather than seeking to find out why this was occurring, fish biologists and others were quick to condemn the observation with statements that it was immoral to even suggest such a thing (among other condemnations). What this seems to me is that as long as monitoring results fit with the dogma, all will be well. If observations (which they were in this case) or research results differ from preconceived biases, there is a great attempt to discredit those results. Please note that I am not bringing this up here to suggest that grazing is always compatible with good salmon/steelhead habitat, but rather to question whether ODFW has the professional expertise they seem to be claiming in this section. I think they do have expertise in fish biology, but not necessarily in land management or habitat management in the broader landscape sense. In other words, they may be able to design a pool within the stream, but not necessarily all of the upland management changes that could help create those pools naturally. There are other agencies with that type of expertise.

Phase 1 – Another option might be to use the demonstration model used by the Extension Service to get farmers to adopt new practices. Why is fencing the only option recognized? Is this seen as the savior in all cases (more dogma)? Is there any role for changes in management (numbers, timing, season of use, off stream waters, etc.)? What about other large ungulate impacts – are they building elk proof fences – or are the unnaturally high populations considered to be a natural element of the ecosystem?

Phase 2 – Again, why does ODFW want to add positions in education rather than focusing on their area of expertise and cooperating with others with the educational expertise? This hints at propaganda rather than education (if they won't tell our story just like we see it, then we have to do it ourselves).

Page 25, ODFW IVB2 – How can a technical advisor guide prioritization? It seems that the agency or land owner/manager makes prioritization decisions based on potential response, budget constraints, and all other competing objectives. The technical advisor can give advice on what project might have the largest impact on a specific objective (i.e., increasing fish habitat). It is rather presumptuous of ODFW to suggest that they guide the prioritization.

Page 26, Phase 2 – I'm not sure what is meant by habitat biologists. Are you writing about fish biologists or true land managers that deal with vegetation (e.g., foresters, rangeland managers) and the condition of watersheds?

Page 27, ODFW IVB6 – While this program may have the potential to have a significant impact in implementation of beneficial projects, it appears that it is designed to work outside of watershed councils or in concert with other agency activities. This should be corrected (either in wording here or in the enabling legislation).

Page 27, ODFW VA1 – I question this initiative of ODFW. As I have mentioned previously, there seems to be a rush of several of the state agencies to duplicate programs already in place. While the agencies have typically put out public relations information, to move into educational programs seems to be a waste of money and effort when they could be focusing those funds on areas where they have strengths rather than seeking to duplicate existing programs.

Page 28, OEDD 5 – This should be 4 unless one is missing.

Page 31, par. 4 – While the last statement may be true, the question remains whether the measures to protect stream morphology are cost effective or economically efficient.

Page 50, last par. – This paragraph seems to be arguing against having this factor listed as the third most important. If it is truly the third most important and so little is known about its impacts, then the remaining factors must be even more nebulous. If sedimentation is not a major limiting factor, why is there such a high priority placed upon it. It seems that the state ought to either commission definitive studies on this factor (and all others listed below it) or reduce the efforts related to it. There is also the question related to short term increases in sedimentation through management practices designed to convert eastside forests to recent historical communities through stand thinning and prescribed burning compared to waiting for catastrophic fires that will result in more intense damage and likely more significant sediment loads. This seems like another case where fisheries biologists personal dogma outweighs the scientific evidence – they “know” that sediment is bad even though experts give it a low to moderate importance rating so that it still ends up at the top of the list with an implied high importance.

Page 72, par. 1 – This seems to be a good argument that a one-size fits all standard is inappropriate, rather there should be a goal to achieve and maintain a diversity of LWD conditions in all streams where appropriate.

Page 72, par. 4 – The references cited in this quote need to be identified. It seems odd to put in a 1987 in press citation in a 1997 document. Did it get published and where?

Physical Habitat Responses

Comment Reply to Invited Commentators

Marvin R. Pyles

Thank-you for your comments regarding the Physical Habitat Portion for Steelhead Supplement of the Oregon Plan. Below are listed some response to your comments by section.

Reply to comments regarding Subsection 1. Loss of riparian areas

As for objective i “refine by reach....” The topic has been kept purposefully vague while we determine how we want to refine the system by which we establish targets. Because of the great variation in response even for purely “pristine” systems any target or objective for riparian condition will take much consideration. The “arbitrary percentages” came from professional opinion. More work needs to be conducted to improve these targets or perhaps even change the way the plan will be evaluated apart from targets.

The comments regarding the Elliot State Forest have been scaled back in deference to your comment. I believe the newest draft will adequately reflect the Elliot HCP is not meant for private land.

Regarding Objective iv, we do indeed have cooperation from landowners but there is always room for improvement.

Reply to Comments on Subsection 2. Channel Morphology:

See comments above for objective 1. More detail on definitions and detail will be forthcoming as the plan is implemented.

Reply to Comments on Subsection 4. Loss of Instream Roughness.

The number of stream miles targeted for LWD additions will be reduced by a number of factors including narrowing it to streams that truly need wood additions and streams where wood placement is the key limiting factor. The numbers you reviewed are specific to the coast range and do not necessarily apply statewide.

Reply to Comments on Subsection 6. Loss of wetlands.

Regarding the lack of measures from agriculture and the concept that steelhead is being recovered on the “backs of forestry,” some specific ideas regarding measures for agriculture would be helpful.

Reply to final comment.

There is in implementation an emphasis to work on fish passage and road issues first. Measure ODF 1S and 2S are examples of this. I hope that this emphasis on going after the most significant and correctable problems remains an emphasis of the Plan.

Reply to Arne Skaugset's comments

Thank –you very much for your comments. In reply, most of your comments are well taken. In response to your comments, I have increased the amount of cross-referencing in the section. We apologize for not giving you a complete package (i.e., the four other major sections plus the monitoring plan along with workplans for measures). Our reasoning was that we felt that a complete package would have been overwhelming. Regarding your comments on natural disturbance and the difficulty in setting targets or indicators, the plan has only set interim guidelines and staff are working at refining these in light the variation that occurs due to natural disturbances.

Regarding the comment regarding the vagueness of the measures from agriculture and urban sources, more detail regarding these will be provided in the agency workplans in the final draft. In these workplans the amount of money and schedule for implementation is included. Once again we realize how difficult it can be to evaluate something with an incomplete package and appreciate your patience.

Reply to William C. Krueger's Comments

Thank-you for your comments regarding the Physical Habitat Portion for Steelhead Supplement of the Oregon Plan. Below are listed some response to your comments by question number and specific comment in your letter.

1. Ocean Conditions: A factor of decline for ocean conditions was added to the final draft in deference to this comment. However, no objectives or management measures were developed for this factor as it is out of management control. However, a statement was made that all other actions need to be judged in light of ocean conditions because they in large part control biological response.
2. Native American Fishing is handled in the fish management section.
4. In deference to this comment we have increased cross-referencing. We disagree with the statement that the focus is on instream habitat. With more cross-referencing we hope the balance in emphasis may be clearer.
6. The monitoring plan is a separate section and there is more cross-referencing in the final draft.

7. We agree with the commentator that watershed assessments are critical and they are part of biological objective for almost every factor of decline. However, we do not endorse the use of proper functioning condition assessments everywhere.

Reply to Specific Comments

Page 1, paragraph 1. We disagree that Meehan is an “opinion” nor did we call Meehan, 1991 a “fact.” Meehan, 1991 is a compilation of several forest service general technical reports that compiled scientific studies regarding fish habitat. In these reports are references to actual studies regarding fish habitat. The findings in Meehan in some cases represent opinions and other times represent facts.

Page 1, paragraph 3. We have taken out PFC, as the point of the sentence was to state change in conditions not report findings from a compilation of PFC studies. In reviewing Meehan, 1991 and other documents that document changes in rangeland and agricultural streams, the changes are well documented and we stand behind the assertions.

Page 3, Table 1. This table was mainly for forested streams in the coast range. The comment about streams in degraded conditions was an overall statement for all stream types. Note also that in 3/9 categories the percentages in “intermediate and undesirable” are in the majority pointing to problems.

Page 24, last paragraph. We have included emphasis on non fencing options in managing riparian areas. However, what reference do you have for the “widespread habitat destruction by elk and deer.”

Page 73, paragraph 2. We do not understand where you got the idea that we don’t recognize that some streams have no potential to recruit wood. We do understand that and that is why not 100% of the stream reaches are required to meet wood loading objectives. The actual percent or situations where streams will be expected to meet certain objectives is a watershed site specific issue that is best handled using watershed assessments which is what you advocated and what we advocate in the plan. The values for specific objectives are only interim guidelines and do not apply to 100% of the stream reaches.

Page 14, last paragraph. If vehicles are allowed in streams during times in which the spawning redds are in the gravel of course there is the potential for problems. This is not speculation but common sense. However, we do state that with existing regulations we feel this problem will be minimal.

Under “a few general thoughts.”

1. The reference to proper functioning condition referenced above has been changed. We disagree with the commentator that based on this statement that the Plans writers misunderstand PFC.
2. We disagree with the commentator that we treat “speculation as fact” regarding pre-settlement conditions. In fact, there is little or no content describing “pre-European settlement conditions” in the physical habitat section.
3. We disagree with this statement. Nowhere does this document state a goal to recreate pre-settlement fish stocks.
4. We agree that there is little discussion of fire in this document and future supplements of the Plan should discuss fire.
5. We are not calling for “complete protection of Oregon lands.” Rather this is a plan that leads to better management of lands. The area of land that is “protected” is relatively minor. Regarding federal land set asides, we are simply documenting what has already been done not advocating further set asides.

Reply to John Tanaka

Thank-you for your comments regarding the Physical Habitat Portion for Steelhead Supplement of the Oregon Plan. Below are listed some response to some of your comments by Page and Paragraph reference.

Overall Reply:

Many of your comments are well taken and there was a significant effort to better cross-reference into other parts of the plan. For instance regarding ODF 32S you were not sure how this information would be used. In referencing the workplan you could see that the surveys will be used in more accurately applying other management measures such as forestland riparian measures and fish passage corrections.

Replies to individual comments

Page 3, last par. We relied on such summary documents because we did not want to have to go back to original literature to make every single point. You are correct that Botkin, NRC, and other reports have significant places where opinion occurs but in such an exercise as this plan, adequate time to review all pertinent studies and synthesize them does not exist so we rely on such documents.

Page 4, par 3 – We put in hydropower at the place it occurs because it is cross-referenced by another complete sub-section signifying its importance. In the final document we make the cross-reference clear.

Page 9 – We were not trying to advocate for the imposition of riparian rules but rather report on what the major scientific synthesis studies came to for recommendations. Later in the document we report on agriculture’s current program and the various voluntary programs in a positive light.

Page 10, obj. We cannot tell you what the current levels are that’s why we have specific objectives to get more information.

Page 10, obj iii. We were not calling for a total population count of streams but rather based on the subsample determine the percentage of streams that are in PFC. Note that this is only an interim proposal and that more complete monitoring information would be used in the future.

Page 14, par 3. Some agencies are doing effectiveness or “validation” monitoring. Please see specific measures for forestry for instance. ODFW is also planning on monitoring effectiveness of instream work. However, some agencies are just now beginning to realize the need for effectiveness monitoring in which specific actions are monitored in controlled studies to evaluate effectiveness. More detail on this concern is given in the monitoring section.

Page 16, ODOT. The 1.5-1 is an attempt by ODOT to repair more than what was damaged. There is no criteria as to why it is not 2.0-1 or 1.25-1.

Page 16, DSL. This is a good point but I was not able to get to DSL in time for comment. We will look at this in future supplements.

Page 17, ODA1-9. These are valid concerns, however, some of your concerns may be due to lack of information. In the final version there are cross-references to both abstract list and agency workplans that may clarify. I will forward your comments to ODA for review.

Page 19, ODF 5S and 6S. There is no formal extension effort but both projects have large support and knowledge throughout the forest community.

Page 20, ODF 17S. The 25% excess is over a specific target in Forest Practice Rules. This is a very specific and complicated measure that has implementation guidance available for it. There is also more detail on this measure in the agency workplans.

Page 21, ODF 42S. This measure complements ODFW surveys and uses the same protocols. It is well coordinated with ODF and ODFW.

Page 22, ODFW 1B2S. Agreed, will forward to ODFW for review.

Page 22, ODFW 1B3. Upland monitoring is ongoing with ODF monitoring road conditions for instance. ODFW because of their fishery base are somewhat focused on the instream aspects while other agencies like ODA and ODF have riparian and upland focus as well.

Page 23, ODFW 1D1. ODFW has a long history in working with volunteers like the Step Program. This is only an expansion of what they are already doing.

Page 23-27, ODFW IVA1, ODFW IV A6, ODFW IVB2, and ODFW VA1 – Will forward comments to ODFW.

Page 50 , last par. Sediment like other stream habitat factors is variable depending on the specifics at the site. The reason there seems to be confusion about it is in some places the sediment factor is not that important while in others it is extremely important. The Plan argues for locally based assessments of conditions followed by action. The “experts” that considered sediment a less significant factor in the coast range were fishery biologists. Most of the factors to reduce sediment are related to roads. Correction of road related sediment problems will correct most the sediment problems and other road related action will also correct fish passage problems.

Page 72, par 1. Agreed, that is why we want to take time to come up with a better set of standards that takes into consideration stream type and disturbance ecology.

Page 72, par 4. I was just quoting as it appeared. It did get published. The citation is Lienkaemper and Swanson, 1986. Dynamics of large woody in streams in old-growth Douglas-fir forests. Canadian Journal of Forest Research.

SECTION 3: WATER QUANTITY, FISH PASSAGE, FISH SCREENING COMMENTS

Invitation for Comments Letter

October 15, 1997

Inside Address

Dear

Thank you for your willingness to review the Water Quality, Fish Passage, Fish Screening Chapter of the Oregon Plan for salmon and stream restoration. The intent of the Oregon Plan is to conserve and restore functional elements of ecosystems that support fish, wildlife, and people. A large part of this responsibility falls to state and federal natural resource agencies. The state and federal natural resource agencies have collaboratively developed management measures in four major issue areas: physical habitat, water quality, fish management, and water quantity. This chapter addresses *water quantity* issues (including fish passage and fish screening).

The chapter is organized by listing various factors of decline with associated biological objectives and state agency measures to address factors of decline. In order to aid you in the review, we would like you to focus on the following questions:

- 1) *Does the document list all relevant factors of decline related to water quantity, fish passage and fish screening? Are there additional significant factors of decline, if so, please list them.*
- 2) *Are factors of decline described appropriately? If not what improvements can you suggest?*
- 3) *Do the biological objectives address the factors of decline appropriately?*
- 4) *Are the management measures adequate to address the stated factors of decline? ... in a timely manner? In your opinion, which measures would be the most effective in addressing factors of decline?*
- 5) *Will implementation of the measures outlined in this chapter contribute toward measurable progress in restoring salmon runs?*
- 6) *Overall, what specific improvements can you suggest?*

Thank you very much for your assistance in reviewing this document. If you have questions or comments please call Bob Rice at (503) 378-8455 Extension 238 or Charlotte Haynes at (503) 378-8455 Extension 315. Please return your review comments by November 10 to:

Bob Rice

Water Resources Department
158 12th Street NE
Salem, Oregon 97310-0210

Sincerely,

Paula Burgess
Governor's Assistant for Natural Resources

PB/sm

List of Invitees

Bob Beschta
Chapin Clark
Jim Howland
John Youngquist
Brett Swift

Review Comments

November 17, 1997

To: Robert D. Rice
Oregon Water Resources Department

From: Chapin D. Clark
Professor Emeritus
University of Oregon School of Law
1221 University of Oregon
Eugene, OR 97405
Tel: (541) 342-2013

Subject: The Oregon Plan
Draft Document, October 20, 1997
Steelhead Supplement
Section 3: Water Quantity, Fish Passage, and Fish Screening

1. In reply to your request, I submit the following comments on Section 3 of the Steelhead Supplement to the Oregon Plan. I am a retired professor, University of Oregon Law School, with a general background in western water law through teaching and research. I currently serve on the board of the Oregon Water Trust.

2. Section 3 focuses on the need for: (1) instream flows, (2) barrier-free stream passage, and (3) screening devices on diversions in order to maintain and restore habitat for steelhead at sustainable levels. What can be accomplished under Oregon law in regard to these three factors is important in achieving the goal of sustainable steelhead, and yet, in the big picture, is necessarily limited because (1) legally protected instream flows (ignored in the Oregon law prior to 1955) are junior to so many existing water rights which divert water, (2) passage barriers and flow control associated with large federally controlled dams (not even mentioned in Section 3) are not directly subject to state jurisdiction, and (3) so many other factors (e.g. soil erosion, pollution) influence habitat for fisheries, especially in those basins which are urbanized or logged. Given these obvious constraints on Section 3 measures, in order to make progress in regard to these three habitat factors (flows, passage and screening) it seems especially important to set priorities in identifying those measures which will most likely make a difference in habitat and be carried out in timely fashion. (More on priorities later.)

3. Oregon law is reasonably well suited, at least compared to most western states, to carry out the 30 or so measures identified in this Section to meet the objectives for habitat improvement associated with inflows, passage and screening. The approach of the Oregon Plan is to rely on and implement existing law. No new laws are recommended in the Section. I suggest, nonetheless, in paragraph 15 several areas which I believe should at least be considered for new legislation.

4. Most of Section 3 concerns a description of what has been accomplished to date in water management affecting flows, passage and screening, and what can be accomplished in the future using the same laws and management tools to secure flows, free passage and construct screening. The result in Section 3 is an excellent summary of where we stand in many areas of water management, and a broad range of measures under these same laws and management practices to achieve those objectives which will reverse the "factors for decline" of steelhead. The structure of Section 3 is analytically sound and is well detailed in factual description. The "factors for decline" related to water quantity, fish passage and screening appear to be comprehensive and well stated. Although I am not a scientist, the biological objectives which are identified do intuitively appear to address these "factors of decline." Finally, the 30 plus management measures do address the "factors of decline" and if implemented as envisioned would not only contribute toward measurable progress in restoring steelhead, but would also constitute a substantially higher level (some would say a big step forward, others would say a bigger bureaucracy) in regard to water management in Oregon.

5. In the comments that follow I focus not on the biology or the details contained in Section 3, but rather on some "big picture" observations or issues which I believe are presented by Section 3. These may not be helpful to you in fine tuning Section 3 but I believe they are points which should be made, even if obvious.

6. Oregon water law on the books has been reasonably progressive and evolutionary, starting with the 1909 Water Code. On the other hand, the legislative funding level for the administration of water resources law has never been generous, considering statutory responsibilities, and is not generous today. In short, for reasons associated with tight budgets and politics, the ability of relevant state agencies to implement water law has always lagged considerably behind the expectations associated with the laws on the books.

7. If we are to take the Oregon Plan seriously (and we must), this basic reality of stingy funding has large implications for carrying out the approach of Section 3 and its wide range of over 30 measures - measures which involve the accelerated and firm implementation of many water management tools under existing law. This approach of Section 3 raises two important implications in my mind. First, whether the ambitious nature of over 30 broadly based measures will far outstrip the availability of necessary public funds (even in a fish "crisis") to carry out these measures. Second, whether Section 3 attempts to do more than it needs to do. Put another way, could Section 3 be improved by eliminating some measures marginal to steelhead habitat, or by imposing some priorities upon the implementation of the measures.

8. In regard to the first implication, Section 3 has a number of references to "depending on resources" or "funding alternatives" or "staffing needs later identified." Section 3 contains no cost-benefit analysis of any measure to restore habitat (perhaps an impossible task) and, more importantly, no cost analysis associated with any measure. This gap may be a deliberate and necessary choice at this stage of planning. But the point about costs (and funding) is pressed forward by the approach of Section 3 itself which lists such a wide range of measures, even those

which appear marginal or remote to the achievement of habitat objectives in any substantial way. One can only conclude after reading Section 3 that the costs are unknown but large indeed. In the interest of being comprehensive in planning have we gone considerably beyond any reasonable chance of the additional funding required? Will implementation monitoring to track accountability identify serious shortfalls in some measures which may not really be that important to plan objective? Will priorities emerge anyway at a later date by internal agency decisions to watch resources with selected measures?

The Oregon Legislature is a crucial partner in the success of the Plan's Steelhead Supplement, the objective of which is to maintain and restore steelhead habitat, not to achieve broad based water management effectiveness in Oregon, as desirable as this latter goal may be. I am apprehensive, at least as to Section 3, that these goals, although overlapping, may become confused in the political arena. The justification in this arena for additional funding for Section 3 must be strictly tailored to its needs and objectives.

9. This brings us to the second implication which is whether the objectives of Sections 3 would be better served by trimming some marginal measures or at least by setting some priorities in the Plan itself as to implementation of the measures. Section 3 is well done, but it flows by the reader as a smorgasbord of measures which are on the same table without sufficient guidance as to their importance or cost in maintaining and restoring health in fisheries habitat. Many priorities will be set in the process of implementing the Plan. My point is whether some priorities can be set in Section 3 itself.

10. My thought on priorities are offered, not because of any confidence in their validity, but to illustrate my point. As to the first level of priority, I suggest instream water rights, fish passage, and screening. These measures have a direct impact on flows for habitat, migration and mortality.

Despite their inherent weakness of coming late to the priority date scheme of water rights, instream water rights remain a basic tool in legally securing flows for fisheries habitat. WRD S-3, ODFW IV A3, WRD S-4, ODFW IV A8, WRD S-9.

Despite legal requirements to provide fish passage, many barriers (e.g., push-up dams) still exist. Some priority sites are already identified. A pilot project in the Illinois Basin has been completed. Priority can be given to these measures to assure fish passage: WRD S - 22, ODFW IV C 1, ODFW 1 B4.

Unscreened water diversions have the potential to kill many juvenile salmonids and some adults. The impressive detail on pages 43 - 47 shows that, despite some progress, there are thousands of unscreened diversions (some quite large) in the basins identified. Screening on these diversions extends to 10 years or longer in current plans to phase in screening. Priority can be given to these measures to facilitate screening: ODFW IV C2, ODFW IV C4.

11. In setting priorities a distinction can be made between correcting past practices as to existing water use (e.g., push-up dams and unscreened diversions) which remedies can be time consuming and expensive, and on the other hand looking to the future in conducting the on-going statutory responsibilities of relevant state agencies. As to future routine decisions it must be assumed, if Section 3 is to succeed, that proper recognition (i.e. an assumed priority) is given to the laws, rules, and administrative processes that are intended to preserve fisheries habitat and avoid mortality. In this regard, for example, substantial progress has been made in recent years in the issuance of permits for out-of-stream uses through the application of water availability and public interest criteria. WRD S-1, WRD S-21, and WRD S-2 (transfers). As to permits, transfer applications and other future decisions, Oregon law seems generally adequate to meet the objectives of Section 3 if agency commitment (and sufficient public support) is present. Other legal tools not mentioned in Section 3, such as withdrawals from appropriation, may be available to preserve habitat.

12. As to a medium tier of priority I suggest such measures as the inventory of water diversions, WRD S-10, dissemination of stream flow data, WRD S-11, and public outreach WRD S-17.

13. As to a low tier of priority (or candidates for dropping) I suggest the following measures which are undoubtedly worthy endeavors but appear too speculative or marginal in results for steelhead to justify a higher priority: voluntary water conservation programs (do they have any teeth?) WRD S-13 and S-14; initiative to cancel water rights forfeited by non-use (serious PR problems without helping fish) WRD S-16; ground water studies (important but marginal as to fisheries) WRD S-18; off-stream storage WRD S-19; reservations (not a statutory provision intended to help fisheries) WRD S-26; and Serious Water Management areas (unless measuring and reporting water use in a priority stream can be shown to aid steelhead) WRD S-20.

14. I have separated out those measures relating to enforcement in the field (WRD S-7, S-8, and S-9) because they are so critical to the success of so many other measures. Enforcement should have a top priority in my opinion. Reference (pages 23-25) is made vaguely to "increased field presence," additional water masters, and "increased staffing to implement the Plan" to be identified later. Perhaps this is the most that can be stated now. I can only reiterate what is widely known and that is watermasters are already spread thin over wide regions and must function primarily on a "complaint" basis as to enforcement issues. Section 3 relies for its success upon an adequate field presence for guidance, monitoring and enforcement in the relevant basins. This calls for a field presence at a considerably higher level than at present. Under the "adequacy of measures to meet objective" on page 25, it reads "WRD is ensuring compliance with existing water rights law in a number of ways. . ." This conclusion seems to me to overstate the case. Perhaps the scattered references to the need for additional field personnel could be buttressed by a forthright paragraph which pulls together these references and summarizes why their work is so important to the carrying out of other measures in Section 3.

15. Although a policy decision may have already been made not to recommend any new legislation in the Steelhead Supplement, I believe at least three areas could benefit from review

and consideration for possible new legislation: (1) incentives and other approaches to improve the efficiency of water use, (2) fish screening, and (3) wells exempt from the permit system.

(1) Efficiency is especially important in agriculture because of the large proportion of diverted water which is used in irrigation. Conveyance losses and inefficient applications (e.g., flood irrigation) offer an opportunity for improved efficiency which could potentially "save" substantial amounts of water for instream flows to enhance habitat or for other uses. How to achieve this greater efficiency and still maintain beneficial use on the land may be the next big challenge in water law. The "Conserved Water" Statute in Oregon has not been widely used, and to my knowledge cannot be considered successful. This "big challenge" of how to improve efficiency should be tackled sooner rather than later.

(2) Fish screening. Because of the large number of unscreened diversions and their relationship to fish mortality through entrainment, current Oregon law and the Cost Share Program might well benefit from legislative review. The material on Salmonid Mortality, pages 43-47, raises implicitly serious questions about the adequacy of Oregon's Cost Share Program for diversions under 30 cfs to achieve timely screening, whether the 30 cfs cut off point is too high, and related questions. In short, progress in screening appears too slow under current provisions of law and cost sharing.

(3) Exempt wells. Underground water studies on page 34 of Section 3, reference is made to the need to "prevent the inadvertent allocation of ground water that is hydrologically connected to surface water and would thereby cause injury to instream flows. . ." I believe it is true that, since the 1955 Ground Water Code in Oregon, wells for certain purposes (e.g., domestic) and up to a substantial daily pumping limit have been exempt from the permit process. Does the proliferation of such wells in proximity to surface water pose this threat of "inadvertent allocation" to the potential detriment of instream flows and where a new permit for-out-of-stream diversion would be denied? Is there a need for legislative review of this large exemption to ground water permitting? I do not have the facts to answer these questions confidently but there does appear to be a "gap" in the permitting of wells which cannot be justified any longer and which might pose a problem to conjunctive management and thus to the detriment of flows for habitat.

November 8, 1997

Mr. Bob Rice
Water Resources Department
158 12th Street NE
Salem, OR 97310-0210

Dear Mr. Rice:

My comments to the Steelhead Supplement on water quantity, fish passage, and fish screening are included below.

Does the document list all relevant factors of decline related to water quantity, fish passage, and fish screening? Are there additional significant factors regarding steelhead decline, if so, please list them.

It addresses some of the factors, but doesn't consider others. For example, with regard to maintaining instream flows for biological purposes the obtaining of a "minimum flow" is unlikely to be sufficient to halt the decline of anadromous fish runs. Aquatic/riparian ecosystems and their habitat characteristics need the full range of flows to maintain important chemical, physical, and biological processes and functions. For example, the biodiversity of riparian plant communities is a crucial component of developing sustainable aquatic habitats for fish and these communities need more than "minimum flows" for them to be sustained. Thus, the acquisition of "minimum flows" (which could represent a major improvement over existing conditions) for highly appropriated streams cannot be considered as a final solution to the water quantity needs of stream systems that are intended to support and sustain viable anadromous fish populations.

The supplement (page 4) indicates that from 1958 to 1987, flows in 547 stream segments were given protection by setting of "minimum flows". While 547 stream segments seems like an important improvement, it's not clear what percentage of the State's total stream miles now have this minimum level of protection. It's also not clear what was the basis for setting minimum flows --- was an IFIM approach used or was it simply an arbitrary flow that was set without the benefit of biological information? If the "minimum flow" was expressed as a percentage of the original or unaltered flow for a basin, what would that percentage be? Similar concerns might apply to the instream water rights (ISWRs) that the State has obtained since 1987.

Because agriculture is typically the greatest consumer of stream and river waters in the State, they will need to be a significant partner in any solutions involving instream flows. It is not clear whether any improvements in water efficiency gained from water conservation plans will actually provide more instream flows. Will water conservation efforts allow landowners to irrigate larger areas and thus maintaining their current level

of consumption? Will water conservation efforts simply make additional withdrawals available to those with more junior water rights and thus provide little instream benefits?

With regard to fish passage, page 12 & 13, it is indicated that existing state laws require that fish passage be provided and maintained on all stream crossings and instream structures. It's not mentioned here, but the Oregon Department of Forestry has implemented forest practices rules mandating that all culverts and stream crossing structures be able to pass both adult and juvenile fish. While the discussion in the Supplement discusses fish passage, it does not specify that all instream structures for Oregon streams be able to pass both adult and juvenile fish. Why not?

Years ago, it was common practice for hatcheries along small streams and rivers to build fish barriers so that adults could not migrate upstream to spawn. Are those barriers still in place? How many are there and where? Will they be removed to help meet fish passage needs of depleted anadromous stocks? In a similar vein, I found nothing in the Supplement indicating that tidal gates were a concern with regard to anadromous fish passage. Why not? While tidal gates may have a more important affect on coho passage, at least some of the coastal streams where tidal gates have been used may also block steelhead passage. I am supportive of the effort by ODF&W in the Oregon Coast and Klamath Mountain provinces (page 41) to inventory all artificial structures that may be barriers to fish passage. Such inventories should be conducted in all provinces.

With regard to fish screens, the limited data for Oregon (Nichols 1990) suggest this could be an important problem for smolts migrating downstream. However, it's possible that some unscreened diversions may actually be benefiting salmon production. For example, the use of irrigation ditches by young-of-the year might represent important rearing habitat in some areas; screening all diversions might exclude those ditches from providing rearing habitat. Thus, before embarking on an expensive state-wide program to screen every possible diversion it would be important for some basic research to be conducted confirming the potential magnitude of the problem and the likelihood that screening (or some other practice) will have the intended benefits. A modest research effort could provide important insights into the utility and desirability of embarking on a screening program for all diversions.

Are the factors of decline described appropriately? If not, what improvements can you suggest?

See comments following question #1.

Do the biological objectives address the factors of decline appropriately?

The three primary biological objectives identified in the plan were quantity of flows, fish passage, and salmonid mortality (primarily from unscreened diversions). These represent three important areas of concern.

Are the agency management measures adequate to address the stated factors of decline? in a timely manner? In your opinion, which measures outlined in this chapter contribute toward measurable progress in restoring salmon runs?

One of the proposed measures (page 6) is that of data collection and inventory. In recent years there has been a discontinuance of many gaging stations in the state. It is important that many of these be reopened to continue a long-term data base. Particularly important are gaging stations in eastern Oregon that are located above significant instream diversions and which are largely unaffected by flow diversions. Without high quality flow data of unimpacted stream systems, as well as managed stream systems, our ability to understand the instream effects of water management practices across Oregon's diverse landscapes will continue to be hampered.

Will implementation of the measures outlined in this chapter contribute toward measurable progress in restoring salmon runs?

I don't know. The Supplement identifies a large number of programs and efforts that state agencies are undertaking (or continuing) with regard to water quantity, diversions, etc. However, from the descriptions in the text, it is difficult to ascertain what these will actually mean with regard to Steelhead. There is essentially no quantification of how current and past programs by the various agencies have succeeded (or not succeeded) in improving steelhead stocks. There is no estimation by the agencies as to which programs are likely to provide the greatest benefits. I'm not sure how state agencies will determine the relative success or lack of success regarding various proposed measures. In the past, I've seen agencies develop simple bookkeeping methods of keeping track of objectives, targets, and completed projects as a measure of success while at the same time ecological impacts to streams and riparian systems continued to occur. Have any independent, scientific, in-the-field reviews of current measures been scheduled to assess if those measures have been effective? Do you anticipate scheduling future independent, scientific, in-the-field reviews of ongoing or proposed measures? Independent evaluations of proposed measures and their effectiveness by knowledgeable persons from outside of State agencies should be an important component of any assessment program. While obtaining review comments of the Supplement is a reasonable first step, those comments should represent only the beginning of a continuing and independent review process.

Overall, what specific improvements can you suggest?

The description of the "comprehensive monitoring strategy" (page 16) is totally inadequate for understanding what the state will monitor to ensure its programs are having their intended effects. Apparently more information is provided in the Oregon Plan (which I was unable to review). Never-the-less, this paragraph is promising an "evolving comprehensive monitoring strategy" that will tell Oregonians how successful all the proposed efforts will be. I'm really concerned that in 10 years a lot of data will have been collected but Oregonians may have little confirmation as to the success of various efforts. Comprehensive monitoring is perhaps one of the most important of the proposed agency efforts and it has to accurately assess the effects of changing management practices. This is a major challenge. It also needs to include some bona fide research efforts that most state agencies are ill-equipped to undertake.

One of the assumptions indicated in the Supplement is that the State agencies will work within the existing legal and regulatory framework regarding flow management. While this is obviously necessary for current conditions, such a regulatory framework may represent a significant constraint as to the amount of instream flow improvement that may be expected to occur. Thus, Oregonians via their elected representatives or other means may need to modify the State's water laws to allow for improved protection of aquatic ecosystems (and the anadromous fish that are dependent upon these systems).

In 5 to 10 years if not sooner, I suspect Oregonians are going to ask for significant evidence that any of the proposed measures have made a difference. While the factors affecting steelhead are many and diverse, the State needs to incorporate a significant research effort to evaluate important concerns, to help understand the gravity of specific practices, to provide insights as to the likelihood of success of a particular program or practice, etc. Thus, I would strongly recommend that research efforts be identified and undertaken. Such research will hopefully confirm the usefulness of the measures outlined in the Supplement. Without a significant research effort to address important knowledge gaps, there is the potential that State agency measures may be ineffective.

It seems that the proposed measures are based on a noble assumption that the major water users of the state (i.e., the agriculture industry) will voluntarily move forward on all measures in an efficient and timely manner. It is important that the State agencies provide institutional "memory" of any changes that occur (e.g., an annual summary of improved instream water quantities) so that the citizens of the state can begin to track the rate of progress in coming years. While I am personally hopeful that significant progress can and will occur, history indicates that water user groups with a major political base are unlikely to rapidly implement measures for improving the quality and quantity of instream flows.

I trust these comments will be useful as you consider alternative means of improving the status of steelhead stocks in Oregon.

Sincerely,

Robert L. Beschta
Professor of Forest Hydrology
Oregon State University

17 November 1997

Bob Rice
Oregon Water Resources Department
158 12th Street NE
Salem, OR 97310-0210

Dear Bob:

Thank you for the opportunity to comment on the Oregon Plan for steelhead (October 20, 1997 draft). The Northwest Water Law and Policy Project is a grant-funded, water law and policy research and education center located at Northwestern School of Law of Lewis & Clark College. The goal of the Water Project is to stimulate regional efforts to develop sustainable water policy and promote changes in the way the Northwest manages and uses its water resources. The Project's review of the Draft Steelhead Supplement is limited to Section 3: Water Quantity, Fish Passage, and Fish Screening.

The Water Project supports your efforts to identify factors responsible for declines in steelhead populations and develop a plan aimed at restoring the species. However, although the plan recognizes that protecting and maintaining flows and restoring flows through conservation are necessary to save steelhead, the proposed measures do not contain specific enough targets or measurable criteria to accomplish the identified objectives. Below are comments that respond to your questions.

(1) & (2) In general, the plan identifies the relevant factors of decline related to water quantity, fish passage, and fish screening, and adequately lists the right issues that must be addressed in order to restore streamflows. These include enforcing existing rights, reducing wasteful use and improving water use efficiency, and promoting leases and transfers.

(3) The listed biological objectives address the factors for decline, but the plan fails to include several critical objectives: (a) the role of the conserved water statute, and (b) the need to minimize exemptions to fish passage requirements.

(4) Although the plan lists and describes relevant factors of decline, the proposed management measures are inadequate to address these factors. Many of the measures are indefinite, contain no measurable criteria, or lack sufficient funding. Moreover, the plan overall lacks sufficient implementation measures.

The following are the Project's general comments about the plan:

(a) Several measures require increased funding to ensure implementation. Therefore, the plan should clearly state that these measures will not result in maintaining or restoring

streamflows unless this funding is achieved. For example: ODFW IVA3, WRD S-8, WRD S-9.

(b) Several measures rely on voluntary actions for implementation. While we support volunteerism, whether such measures will result in increased streamflows necessary to restore steelhead is quite uncertain. Voluntary efforts are valuable but are not proven to be effective and lack a means to evaluate progress. For example: WRD S-13, WRD S-15, WRD S-22. Therefore, we recommend that the plan incorporate monitoring mechanisms to allow WRD to evaluate the progress made by these voluntary efforts.

(c) The proposed measures fail to include specific performance criteria; consequently, the plan includes little that is quantifiable. We recommend that the measures be amended to incorporate performance criteria, target dates, and other measurable criteria. In addition, WRD and ODFW need to specify whether they have met recently passed or will meet upcoming deadlines in several measures to determine how effectively they are implementing the plan. For example: WRD S-12, WRD S-22, ODFW IVC1.

(d) Many of the measures rely on the identification of priority areas by ODFW under ODFW IVA8 (requiring the identification and prioritization of areas where steelhead habitat is most dependent on restoration of streamflows). However, target dates in the majority of these measures conflict with the target date by which ODFW will identify the priority areas (January 1, 1999). For example: WRD S-8, WRD S-9, WRD S-10, WRD S-14. We recommend that the measures be amended to recognize and account for the January 1, 1999 deadline.

The following are the Project's comments on specific measures in the plan:

WRD S-2 The review process for transfers should include a finding that the public interest is protected in addition to existing instream water rights.

WRD S-3 While coordinating data collection and compliance monitoring among agencies is beneficial, this measure contains no specific measures to ensure that instream water rights are being fulfilled in accord with issuance priority dates. We recommend that the agencies actively enforce water rights now, not wait for coordinated field meetings to be scheduled sometime in the future.

ODFW IVA3 We support the establishment of instream water rights as a method to restore streamflows. However, many of the state's streams are overappropriated, and creating instream rights with junior priority dates will not significantly increase flows. Therefore, we recommend that WRD focus on converting senior water rights to instream flows. In addition, the measure contains no guarantee of adequate funding and staff necessary to collect flow information and prepare applications; without this, this measure will not be effectively implemented.

- WRD S-6 This measure contains a schedule for providing information to determine water availability, but fails to provide a date by which WRD will conduct an evaluation of the information gathered, or to what end this information will be used. We recommend that WRD use this information to prioritize areas to establish instream flows, increase enforcement efforts, and promote the use of conservation.
- ODFW IVA8 This measure calls for gathering information to identify and prioritize the areas where steelhead habitat is most dependent on restoration of streamflows, but fails to set forth a schedule with specific flow restoration targets for WRD and ODFW.
- WRD S-8 While increased enforcement is a commendable concept, this measure lacks any specific goals. This measure calls for WRD to develop a plan by June 30, 1998 to increase enforcement in priority areas identified by ODFW (ODFW IVA8). Since ODFW will not identify priority areas until January 1, 1999 under measure ODFW IVA8, it will be difficult for WRD to adequately evaluate what will be required to implement its plan and to what extent the plan can be implemented with existing resources. In addition, this measure illustrates a weaker commitment of resources outside the coastal basins. For example, WRD has failed to replace staff responsible for the Willamette Basin who have refocused their efforts to coastal basins.
- WRD S-9 The Water Project supports the installation of monitoring/gaging stations necessary to monitor the priority areas identified by ODFW (ODFW IVA8). However, this measure is flawed in several respects. First, there is no indication how often monitoring will occur, or how the information will be used to restore streamflows. Second, the schedule set forth for the development of funding proposals for the installation, operation, and maintenance of the identifies priority sites in the Oregon Coast and Klamath Mountains Province Evolutionary Significant Units (ESUs) (April 1, 1998) does not coincide with the deadline for ODFW to identify these same priority areas (January 1, 1999). We recommend that WRD establish a monitoring schedule and a plan for how it will use the gathered information.

WRD S-10 We recommend that inventorying water diversions be used to identify illegal diversions as well as diversions which appear detrimental to salmonids. In addition, when determining whether a diversion is detrimental, WRD should evaluate the cumulative effects of diversions in the area, not simply the effects of individual diversions. In addition, the measure calls for WRD to develop a program by June 1, 1998 to inventory priority areas identified under ODFW IVA8. As noted several times above, ODFW will not identify these priority areas until January 1, 1999, making it difficult for WRD to develop any kind of plan.

WRD S-11 According to the draft, WRD should have completed the plan called for under this measure by November 1. Has this target date been met?

WRD S-12 The Water Project believes that improving efficiency and prohibiting waste is an effective tool to restoring streamflows, and that WRD should implement this concept immediately. However, this measure fails to include target dates for the creation of the working groups, the development of goals and model practices to increase efficiency, and the development of standards to identify waste. Therefore, it is difficult to determine when this measure may result in increased flows. The Water Project has volunteered to assist WRD in its efforts to develop regional efficiency guidelines under the CSRI.

WRD S-13 & S-14 It is unclear how the development of voluntary water conservation plans will result in increased streamflows. The measures contain no criteria to measure the success of the plans or to ensure implementation. In addition, the measures call only on irrigation districts and municipalities to develop these voluntary plans: they fail to require non-irrigation district water users or industry to develop conservation plans. This is an appropriate place for the plan to emphasize potential use of the conserved water statute. Measure 14 also conflicts with the deadline (January 1, 1999) set out for the identification of priority areas under ODFW IVA8. We recommend that WRD developing monitoring mechanisms to evaluate the success of the voluntary efforts and call on non-irrigation district water users and industry to develop conservation plans.

WRD S-15 & ODFW IVB5 The Water Project supports the use of instream transfers and leases to restore streamflows. However without a significant funding source, this measure will result in limited flow increases.

WRD S-16 This measure conflicts with the deadline set forth in ODFW IVA8 (January 1, 1999). Otherwise, the Water Project supports the identification of rights potentially subject to forfeiture and the development of solutions to put the water back instream.

- WRD S-18 We recommend that WRD complete the groundwater studies before it acts on any new applications for groundwater.
- WRD S-20 The Water Project supports the use of measurement and reporting as an effective tool to increase streamflows. However, this measure contains no target dates for Serious Water Management Problem Areas (SWMPA) designations, but merely states that WRD will evaluate the possibility. Therefore, we recommend that WRD develop goals for establishing SWMPAs in high priority areas.
- WRD S-22 This measure merely calls for the prioritization of basins where fish passage problems associated with push-up dams need to be resolved. The measure fails to set targets for the necessary modification or removal of these dams.
- ODFW IVC1 While pursuing removal of artificial fish barriers and promoting the installation of passage capability are good goals, this measure contains no measurable criteria. As it is phrased, there is no way to determine the effectiveness of this measure to eliminate artificial obstructions to fish passage.
- ODFW IB4 This measure fails to identify how the inventory of artificial barriers will be used by ODFW to eliminate those barriers.
- ODFW IVC2 Many of the screening target dates have expired. What percentage of screens have been installed according to the established target dates?
- ODFW IVC4 This measure includes no criteria to determine its effectiveness. ODFW fails to establish any target dates for screening diversions of greater than 30 CFS. Also, under Phase 2, it is unclear what ODFW means when it states that Aprogress@ by irrigation districts is expected by 2007.

(5) For the reasons discussed above, the Water Project believes that implementation of the measures outlined in Section 3 will not contribute to measurable progress in restoring steelhead runs. The measures are not strong enough, not specific enough, and often rely on uncertain funding.

(6) The plan identifies the relevant factors, and recommends addressing the right issues. But, the plan must go further to provide adequate streamflows to restore steelhead. We recommend that the plan be amended to include:

- (a) Increase enforcement and monitoring, particularly in areas identified as critical to the recovery of steelhead. In addition to regulating illegal uses, the WRD should promise to enforce permit conditions and establish SWMPAs.

(b) Prohibit the issuance of new water right permits in basins identified as critical to steelhead recovery and/or explore the possible use of augmentation plans.

(c) In efforts to secure instream water rights, WRD should promise to focus on converting senior water rights. Much of the state is fully or overappropriated and instream water rights with a current priority date will not contribute to increasing streamflows.

(d) Secure funding adequate to implement measures called for in the plan.

Thank you for the opportunity to comment on the draft steelhead plan.

Sincerely,

Brett Swift
Assistant Director
Northwest Water Law & Policy Project

**REVIEW OF "DRAFT WORKING DOCUMENT,
The Oregon Plan,
Steelhead Supplement,
Section 3: Water Quality, Fish Passage and Fish Screening"**
Reviewed by Jim Howland, former Water Resources Commission member
November 7, 1997

These remarks are based on the assumption that having additional water at specific times will increase the number of fish in the waterways. I am not qualified to evaluate the biological objectives. However, it does appear that in addition to deficiencies in water quantity and quality, fish passage and screening, forces such as oceanic conditions that are not adequately understood are causing the fish runs to diminish. Thus, will concentrate on a combination of questions 4), and 6), in the letter from the office of Governor John A. Kitzhaber, dated October 15, 1997 and signed by Paula Burgess.

A. Water quantity and quality at appropriate times. On most streams we no longer have the ability to return them to their natural state within any reasonable limits of cost in dollars and cost in economic hardship for segments of our population. Man has altered the environment. Now it is up to man to manage the waters to benefit both the fish and man. Each stream and each region of the state is different requiring very different management measures on different streams.

1. Measures proposed in the plan It appears to me that each of the measures listed will benefit a stream or class of streams. Their application must be managed by competent people close to the situation in each case.

2. Additional needs In most instances the plan proposals will increase flows and thus quality of water. However, it seems to me that **in a number of situations much more positive dramatic action that will require major state funding is required** such as:

a. Field staff - This has been addressed in part by adding coastal offices and using Willamette Basin people on the coast. When I was on the Commission, numbers and support of people in the field was inadequate. There has historically been a great need for more adequately trained people in the field enforcing the laws and regulations. There is no benefit in laws, regulations and plans unless there are people on the ground, not in office, making them work.

b. Real time flow data - More staff gages are proposed. In many cases the flows in the streams can only be adequately managed if there is storage on the stream and the water master has continuous flow data. More gauging and storage is needed in many cases.

(1.) Some funds should be allocated for research leading to more economical stream gauging equipment or procedures.

c. Storage program - Major state funding need for a storage program even though dams have lost political favor. Off stream storage is mentioned in the document. Another alternative is aquifer storage which has been blocked by the Department of Environmental Quality. There are opportunities to provide irrigation water from aquifer storage and thus allow natural flow in streams during low flow periods.

d. Acquisition of water rights for instream use - Gifting and leasing are in the plan. Purchase could be another more positive option although opposed by some organizations. Care must be taken to prevent destruction of an area economy by taking water now being put to out-of-stream beneficial use.

e. Additional Agency Representation - As indicated on page 6, under "Public Interest Test," economic development is a factor in evaluating proposed water use. In this document there does not appear to be any agency representing, or addressing, economic development issues. This is also true in regard to municipal water supply. WRD, ODFW, DSL, OSP, and ODA are the only agencies mentioned.

f. Indian Water Claims - This is very important for long term solutions. The Indian claims are extensive and need to be settled. One might expect that the Indians would be sensitive to fish needs. However, there is considerable evidence that the Indians have, on occasion, not used various rights they have gained in a responsible way.

g. Major Power Rights - The water rights at the Oregon City Willamette Falls are, to my knowledge, the most extensive. Leaving water in the streams may be advantageous to power production. Saving water for fish enhancement with later release may not be.

B Fish Screening - Each of the proposals appear to be beneficial for fish enhancement.

a. Maximum Flow for Unscreened Intakes - In many cases it is very important to screen intakes having less than 30 cfs flow. It appears that many of these are being addressed on a cooperative basis. The laws should so provide.

b. Screening Schedules - Dead lines shown for accomplishing much of the screening seem to be rather far into the future if benefits are to be realized in a reasonable length of time. I realize that funding is the problem.

M. JOHN YOUNGQUIST
WATER RESOURCES CONSULTANT

827 SE MOSHER
ROSEBURG, OREGON 97470
PHONE/FAX: (541) 672-5692

PROJECT MANAGEMENT

PERMIT/LICENSING

RESEARCH

PLANNING

November 10, 1997

Bob Rice
Oregon Water Resources Department
158 12th Street, NE
Salem, Oregon 97310-0210

Re: Comments on Section 3: Water Quantity, Fish Passage and Fish Screening
The Oregon Plan - Draft Working Document

Dear Mr. Rice:

The following are my thoughts and comments on the above referenced document as transmitted to me by Paula Burgess:

1. *Does the document list all relevant factors of decline related to water quantity, fish passage and fish screening? Are there additional significant factors of decline, if so please list them.*

In my opinion, the author(s) did a good job of identifying the factors as they relate to water quantity, fish passage and fish screening.

2. *Are factors of decline described appropriately? If not what improvements can you suggest?*

Generally, yes the factors are described appropriately. In some instances, field biologists have made decisions on “potential” fish habitat that may be available. I believe decisions on water use applications should be made on confirmed fish presence, or habitat, not on “potential” fish presence or habitat. Factors of decline need to be verified information based on actual surveys or appropriate data from qualified consultants before imposing restrictions on proposed actions by appropriators.

3. *Do the biological objectives address the factors of decline appropriately?*

This is not my field of expertise and do not feel qualified to respond to this question.

4. *Are the management measures adequate to address the stated factors of decline?...in a timely manner? In our opinion, which measures would be the most effective in addressing factors of decline?*

I believe the measures initiated and proposed to be initiated are probably the best options at this time. It will be important to continue funding the measures described in the document. Currently, the measures described have resulted in no new appropriation for natural flow virtually statewide. In addition, reservoir applications have been examined to prevent inundation of anadromous fish habitat and the blocking of fish passage without specific passage facilities. These actions are in place and should prevent the continued decline of water quantity that will injure the fish populations and allow fish passage where needed.

The protection now in place and the protection plan proposed is being done in a very timely manner from an administrative perspective. In my opinion, the proposals contained in the document will produce benefits for the fish populations in as timely a manner as possible. I believe the predominately voluntary approach will produce quicker, longer results for both the resource and state agencies. This approach should cost less than a pure regulatory approach and the funds saved in enforcement may be used to “cost share” in critical areas.

I believe the following measures could produce the desired benefits in the shortest possible time when implemented:

1. Continue and expand the fish screening program for diversions less than 30 cfs. The highest priority should be for gravity (ditch) diversions followed by pump diversions. In areas identified as critical for the fish survival, consideration should be given for additional grants (over the 50%) as an incentive for more immediate action.
2. Encourage transfers from diversions on channel to hydro logically connected ground water where feasible. This would eliminate the inchannel diversion and minimize the direct impact on surface flows by the appropriators. Using hydro logically connected ground water will not be a direct one to one exchange with surface water in most areas and this will provide additional surface flows.

3. Measurement and enforcement of the Oregon Water Code should have immediate, measurable impacts on surface flows in many areas around the state (See No. 6 for more detailed comments).
4. Work with appropriators in developing appropriate conservation plans and agricultural best management practices (BMP's). This should apply to all water users with the highest priority given to the larger appropriators.

Developing BMP's for agricultural and urban (small tract) users will not only identify how to most efficiently use the water but will include protection for the riparian area. Well understood and supported BMP's will improve the water quantity, quality and riparian areas on adjoining streams and rivers.

5. The state should encourage multipurpose storage projects that have minimal impacts on the fishery resource or have impacts that may be mitigated. Given the existing rights of record and the potential growth in Oregon over time, it is obvious that additional water will be needed in the future.

A multipurpose project can provide the future water supply for a variety of users and either provide instream flows or exchange water. It may be more beneficial to divert water from storage to existing rights of record and allow their normal diversion to remain in the stream/river. A well designed project can be beneficial to the environment we are trying to protect/enhance and provide for the future appropriative need.

Off channel storage and reservoir sites high in the watershed should be given utmost priority. The state should consider participating in these sites to provide exchange flows for existing rights or increased instream flows that satisfy fishery needs. While developing multipurpose storage it may be possible to improve and enhance a watershed while allowing population, agricultural and commercial growth.

5. *Will* implementation of the measures outlined in this chapter contribute toward measurable progress in restoring salmon runs?

With minor adjustments, yes.

6. Overall, what specific improvements can you suggest?

1. At this time I don't believe the OWRD's Water Development Loan Fund is a viable option for many water users. Unless several applicants file jointly, the cost of securing a loan does not make the fund attractive. The loan program needs to be modified to allow economical loans in the \$100,000 - \$500,000 range.
2. More gaging stations need to be installed to properly manage the water. I am not a supporter of distribution based on conversion factors or relationships based on minimal gaging station records. These calculations are suitable for planning purposes, however, distribution enforcement and policy decisions should be based on actual measurements at gaging stations.
3. Knowing the amount of water actually used is an important feature of the plan. Measurement and reporting can be a useful tool in achieving the objectives of the plan. The OWRD is currently requiring measuring devices on applications that exceed 0.10 cfs. Reporting at various levels may or may not be required of the applicant.

This is useful information if it is being examined and a data base is developed by the OWRD. If the information is not being used, reporting does not serve any useful purpose.

Measuring devices fall into a similar category. They can be useful on water sources that require distribution or ground water sources in limited or sensitive areas. If the devices are not used by the Watermaster or the information gathered is not developed into a data base, in my opinion they serve little purpose.

I suggest that the OWRD develop the following procedure concerning measuring and reporting:

- a. Confirm with users that the POD-Id correctly represents the water right's diversion and use.
- b. Initiate a program by which the appropriators receive notice that the reporting information has been received and is in proper form.
- c. Begin a data base which may be used to show average, maximum and minimum use by type in a given area. For example: The reporting information on the Lookingglass -

Olalla Water Control District demonstrates that their annual use ranges from 1.67 - 1.98 acre feet/acre/year. Their maximum/minimum use in 1996 was 0.67 acre foot/acre and 3+ acre foot/acre.

This type of data is important in future planning and will assist the Watermaster in discovering if the duty is being exceeded in a given area. This should assist in future distribution. Reports not regularly reviewed serve little purpose.

How measurement and reporting is handled is very important as the OWRD endeavors to identify efficient use and “waste”. These subjects need to be handled very carefully and the reporting information can be invaluable as efforts proceed to develop rules and policies on waste.

4. The OWRD and ODFW should consider possible mitigation measures for a new applicant. In many areas it may be possible to do sufficient mitigation in connection with a new application that would not only allow the appropriation but may improve conditions for the fishery resource.
5. If a current water right of record holder desires to transfer water to an instream use, this should be accomplished with minimal effort by the applicant. The OWRD should complete the forms and maps to accomplish this with no fees for the applicant. This would encourage more appropriators to take advantage of the program.
6. I would point out that water rights not used for five years are subject to forfeiture. They are not automatically forfeited unless they go through one of several legal processes.
7. I am disappointed that the long standing relationship between the OWRD and Counties is not mentioned in the document. This can be of significant advantage to the OWRD in carrying out their efforts in Salmon - Steelhead recovery. More emphasis should be given to working with local governments, specifically Counties. Currently, most Assistant Watermasters are employees of Counties. To fully develop a plan for water use and fishery recovery, the

OWRD and other state agencies need the full support of watershed councils, other agencies and Counties.

Thank you for the opportunity to comment on this portion of the Oregon Plan. Please contact me if you have any questions or desire additional information.

Yours truly,

M. John Youngquist

Water Quantity, Fish Passage, Fish Screening Comments Responses

November 8, 1997

Mr. Bob Rice
Water Resources Department
158 12th Street NE
Salem, OR 97310-0210

Dear Mr. Rice:

My comments to the Steelhead Supplement on water quantity, fish passage, and fish screening are included below.

- 1. Does the document list all relevant factors of decline related to water quantity, fish passage, and fish screening? Are there additional significant factors regarding steelhead decline, if so, please list them.**

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It addresses some of the factors, but doesn't consider others. For example, with regard to maintaining instream flows for biological purposes the obtaining of a "minimum flow" is unlikely to be sufficient to halt the decline of anadromous fish runs. Aquatic/riparian ecosystems and their habitat characteristics need the full range of flows to maintain important chemical, physical, and biological processes and functions. For example, the biodiversity of riparian plant communities is a crucial component of developing sustainable aquatic habitats for fish and these communities need more than "minimum flows" for them to be sustained. Thus, the acquisition of "minimum flows" (which could represent a major improvement over existing conditions) for highly appropriated streams cannot be considered as a final solution to the water quantity needs of stream systems that are intended to support and sustain viable anadromous fish populations.

The supplement (page 4) indicates that from 1958 to 1987, flows in 547 stream segments were given protection by setting of "minimum flows". While 547 stream segments seems like an important improvement, it's not clear what percentage of the State's total stream miles now have this minimum level of protection. It's also not clear what was the basis for setting minimum flows --- was an IFIM approach used or was it simply an arbitrary flow that was set without the benefit of biological information? If the "minimum flow" was expressed as a percentage of the original or unaltered flow for a basin,

WRD: ODFW is focusing on obtaining the flows necessary for fish. Fish are one of the most sensitive species to alterations in streamflows. "Minimum streamflows" were adopted by the Water Resources Commission in basin programs and were predecessors to instream water rights. Most "minimum streamflows" have been converted to instream water rights. "Minimum streamflows" can be viewed as having been a starting place for instream flow protection until other flows levels were identified by ODFW and approved by WRD as ISWRs.

ODFW: Existing Instream Water Rights, both converted minimum perennial streamflows and recent applications were established based on biological information gathered during extensive studies throughout the state. These studies were conducted expressly for the purpose of making

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what would that percentage be? Similar concerns might apply to the instream water rights (ISWRs) that the State has obtained since 1987.

the flow recommendations and were based on the IFIM style methodology. "Percentages" of basin flows are not allowed as the basis of flow recommendations and have not been used.

Because agriculture is typically the greatest consumer of stream and river waters in the State, they will need to be a significant partner in any solutions involving instream flows. It is not clear whether any improvements in water efficiency gained from water conservation plans will actually provide more instream flows. Will water conservation efforts allow landowners to irrigate larger areas and thus maintaining their current level of consumption? Will water conservation efforts simply make additional withdrawals available to those with more junior water rights and thus provide little instream benefits?

WRD: Agricultural and urban water conservation plans encourage demand side management of water, more accurate water measurement and reporting, and the development of water budgets and alternatives for preserving water. The exact amount of water returned to streams cannot be explicitly qualified. However, depending on the circumstances, improvements made under the Conserved Water Statutes (OAR Chapter 690, Division 18) can result in 25 to 100 percent of the conserved water being left instream and protected as an instream water right. The remaining portion of the conserved water is available for additional out-of-stream uses.

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With regard to fish passage, page 12 & 13, it is indicated that existing state laws require that fish passage be provided and maintained on all stream crossings and instream structures. It's not mentioned here, but the Oregon Department of Forestry has implemented forest practices rules mandating that all culverts and stream crossing structures be able to pass both adult and juvenile fish. While the discussion in the Supplement discusses fish passage, it does not specify that all instream structures for Oregon streams be able to pass both adult and juvenile fish. Why not?

Years ago, it was common practice for hatcheries along small streams and rivers to build fish barriers so that adults could not migrate upstream to spawn. Are those barriers still in place? How many are there and where? Will they be removed to help meet fish passage needs of depleted anadromous stocks? In a similar vein, I found nothing in the Supplement indicating that tidal gates were a concern with regard to anadromous fish passage. Why not? While tidal gates may have a more important affect on coho passage, at least some of the coastal streams where tidal gates have been used may also block steelhead passage. I am supportive of the effort by ODF&W in the Oregon Coast and Klamath Mountain provinces (page 41) to inventory all artificial structures that may be barriers to fish passage. Such inventories should be conducted in all provinces.

ODFW: Fish passage statutes do not distinguish between adults and juveniles and neither does ODFW's related measures; juveniles of all species are included by definition. The Department of Forestry uses the distinction to emphasize that juvenile passage, often overlooked in the past, is of special concern.

ODFW: With regard to state-owned hatcheries, ODFW is reviewing the justification for maintaining intentional barriers at ODFW hatcheries. In cases where the barriers are no longer justified, they will be made passable. With regard to privately owned hatchery facilities, they will be treated the same in ODFW's barrier removal efforts as any other obstruction to fish passage.

Good point. ODFW treats tide gates that block fish migration like any barrier. They are being inventoried and prioritized for removal.

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With regard to fish screens, the limited data for Oregon (Nichols 1990) suggest this could be an important problem for smolts migrating downstream. However, it's possible that some unscreened diversions may actually be benefiting salmon production. For example, the use of irrigation ditches by young-of-the-year might represent important rearing habitat in some areas; screening all diversions might exclude those ditches from providing rearing habitat. Thus, before embarking on an expensive state-wide program to screen every possible diversion it would be important for some basic research to be conducted confirming the potential magnitude of the problem and the likelihood that screening (or some other practice) will have the intended benefits. A modest research effort could provide important insights into the utility and desirability of embarking on a screening program for all diversions.

ODFW: ODFW is aware that certain diversions benefit salmon, e.g. Mill Creek in Stayton and Salem, so they are not screened.

2. Are the factors of decline described appropriately? If not, what improvements can you suggest?

See comments following question #1.

3. Do the biological objectives address the factors of decline appropriately?

The three primary biological objectives identified in the plan were quantity of flows, fish passage, and salmonid mortality (primarily from unscreened

WRD: Agreed.

diversions). These represent three important areas of concern.

4. Are the agency management measures adequate to address the stated factors of decline? in a timely manner? In your opinion, which measures outlined in this chapter contribute toward measurable progress in restoring salmon runs?

One of the proposed measures (page 6) is that of data collection and inventory. In recent years there has been a discontinuance of many gaging stations in the state. It is important that many of these be reopened to continue a long-term data base. Particularly important are gaging stations in eastern Oregon that are located above significant instream diversions and which are largely unaffected by flow diversions. Without high quality flow data of unimpacted stream systems, as well as managed stream systems, our ability to understand the instream effects of water management practices across Oregon's diverse landscapes will continue to be hampered.

WRD: Agreed. Measure WRD S-9, Installation of Monitoring Stations, addresses the need for additional gaging stations. The Department is currently seeking funding to assist in the implementation of this measure.

5. Will implementation of the measures outlined in this chapter contribute toward measurable progress in restoring salmon runs?

I don't know. The Supplement identifies a large number of programs and efforts that state agencies are undertaking (or continuing) with regard to water quantity, diversions, etc. However, from the descriptions in the text, it is difficult to ascertain what these will actually mean with regard to Steelhead. There is essentially no quantification of how current and past programs by the various agencies have succeeded (or not succeeded) in

WRD: Good point. Although all Phase 1 measures will be implemented this biennium, an adaptive management strategy will be used to help prioritize the measures being implemented.

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improving steelhead stocks. There is no estimation by the agencies as to which programs are likely to provide the greatest benefits. I'm not sure how state agencies will determine the relative success or lack of success regarding various proposed measures. In the past, I've seen agencies develop simple bookkeeping methods of keeping track of objectives, targets, and completed projects as a measure of success while at the same time ecological impacts to streams and riparian systems continued to occur. Have any independent, scientific, in-the-field reviews of current measures been scheduled to assess if those measures have been effective? Do you anticipate scheduling future independent, scientific, in-the-field reviews of ongoing or proposed measures? Independent evaluations of proposed measures and their effectiveness by knowledgeable persons from outside of State agencies should be an important component of any assessment program. While obtaining review comments of the Supplement is a reasonable first step, those comments should represent only the beginning of a continuing and independent review process.

An Independent Multidisciplinary Scientific Team (IMST) has been established to serve as an independent scientific peer review panel to work with the Monitoring Team and oversee the development of monitoring protocols and the implementation of the Oregon Plan (see Chapter 15B and 15C).

A new measure, WRD S-25, Compliance Rate Monitoring, has been added to determine the effectiveness of the state's regulatory presence. Performance monitoring to determine whether commitments were carried through, as well as resource monitoring will be reported annually in the Governor's springtime State of the Salmon address.

6. Overall, what specific improvements can you suggest?

The description of the "comprehensive monitoring strategy" (page 16) is totally inadequate for understanding what the state will monitor to ensure its programs are having their intended effects. Apparently more information is

WRD: This section has been revised. See response to question #5 and Chapter 15B and 15C for more

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provided in the Oregon Plan (which I was unable to review). Never-the-less, this paragraph is promising an "evolving comprehensive monitoring strategy" that will tell Oregonians how successful all the proposed efforts will be. I'm really concerned that in 10 years a lot of data will have been collected but Oregonians may have little confirmation as to the success of various efforts. Comprehensive monitoring is perhaps one of the most important of the proposed agency efforts and it has to accurately assess the effects of changing management practices. This is a major challenge. It also needs to include some bona fide research efforts that most state agencies are ill-equipped to undertake.

One of the assumptions indicated in the Supplement is that the State agencies will work within the existing legal and regulatory framework regarding flow management. While this is obviously necessary for current conditions, such a regulatory framework may represent a significant constraint as to the amount of instream flow improvement that may be expected to occur. Thus, Oregonians via their elected representatives or other means may need to modify the State's water laws to allow for improved protection of aquatic ecosystems (and the anadromous fish that are dependent upon these systems).

In 5 to 10 years if not sooner, I suspect Oregonians are going to ask for significant evidence that any of the proposed measures have made a difference. While the factors affecting steelhead are many and diverse, the State needs to incorporate a significant research effort to evaluate important concerns, to help understand the gravity of specific practices, to provide

information.

WRD: Both the Oregon Plan and the Steelhead Supplement are based on the existing system and aim to make the implementation of current laws more effective. Changes to those laws may be recommended in the future if monitoring of implementation of the Plan indicates the need for specific authority not provided for by current laws.

WRD: The IMST and Monitoring Team will take the lead on suggesting new research. New research needs may also be identified as part of the

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insights as to the likelihood of success of a particular program or practice, etc. Thus, I would strongly recommend that research efforts be identified and undertaken. Such research will hopefully confirm the usefulness of the measures outlined in the Supplement. Without a significant research effort to address important knowledge gaps, there is the potential that State agency measures may be ineffective.

It seems that the proposed measures are based on a noble assumption that the major water users of the state (i.e., the agriculture industry) will voluntarily move forward on all measures in an efficient and timely manner. It is important that the State agencies provide institutional "memory" of any changes that occur (e.g., an annual summary of improved instream water quantities) so that the citizens of the state can begin to track the rate of progress in coming years. While I am personally hopeful that significant progress can and will occur, history indicates that water user groups with a major political base are unlikely to rapidly implement measures for improving the quality and quantity of instream flows.

I trust these comments will be useful as you consider alternative means of improving the status of steelhead stocks in Oregon.

Sincerely,

Robert L. Beschta

*The Oregon Plan
Supplement I – Steelhead
December 15, 1997*

adaptive management strategy.

WRD: Since January, 1996, state agencies have been writing the Governor biweekly reports (monthly since October, 1997) on the progress state agencies have made in implementing the Oregon Plan. In April 1998, the first annual State of the Salmon address will be made to evaluate the successes and failures of the Oregon Plan.

Water Quality, Fish Passage, Fish Screening Comments

Peer Review Letter

State Response

Professor of Forest Hydrology

Oregon State University

November 17, 1997

To: Robert D. Rice
Oregon Water Resources Department

From: Chapin D. Clark
Professor Emeritus
University of Oregon School of Law
1221 University of Oregon
Eugene, OR 97405
Tel: (541) 342-2013

Subject: The Oregon Plan
Draft Document, October 20, 1997
Steelhead Supplement
Section 3: Water Quantity, Fish Passage, and Fish Screening

1. In reply to your request, I submit the following comments on Section 3 of the Steelhead Supplement to the Oregon Plan. I am a retired professor, University of Oregon Law School, with a general background in western water law through teaching and research. I currently serve on the board of the Oregon Water Trust.

2. Section 3 focuses on the need for: (1) instream flows, (2) barrier-free stream passage, and (3) screening devices on diversions in order to maintain and restore habitat for steelhead at sustainable levels. What can be accomplished under Oregon law in regard to these three factors is important in achieving the goal of sustainable steelhead, and yet, in the big picture, is necessarily limited because (1) legally protected instream flows (ignored in the Oregon law prior to 1955) are junior to so many existing water rights which divert water, (2) passage barriers and flow control associated with large federally controlled dams (not even mentioned in Section 3) are not directly subject to state jurisdiction, and (3) so many other factors (e.g. soil erosion, pollution) influence habitat for fisheries, especially in those basins which are urbanized or logged. Given these obvious constraints on Section 3 measures, in order to make progress in regard to these three habitat factors (flows, passage and screening) it seems especially important to set priorities in identifying those measures which will most likely make a difference in habitat and be carried out in timely fashion. (More on priorities later.)

3. Oregon law is reasonably well suited, at least compared to most western states, to carry out the 30 or so measures identified in this Section to meet the objectives for habitat improvement associated with inflows, passage and screening. The approach of the Oregon Plan is to rely on and implement existing law. No new laws are recommended in the Section. I suggest, nonetheless, in paragraph 15 several areas which I believe should at least be considered for new legislation.

4. Most of Section 3 concerns a description of what has been accomplished to date in water management affecting flows, passage and screening, and what can be accomplished in the future using the same laws and management tools to secure flows, WRD: Agreed.

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free passage and construct screening. The result in Section 3 is an excellent summary of where we stand in many areas of water management, and a broad range of measures under these same laws and management practices to achieve those objectives which will reverse the "factors for decline" of steelhead. The structure of Section 3 is analytically sound and is well detailed in factual description. The "factors for decline" related to water quantity, fish passage and screening appear to be comprehensive and well stated. Although I am not a scientist, the biological objectives which are identified do intuitively appear to address these "factors of decline." Finally, the 30 plus management measures do address the "factors of decline" and if implemented as envisioned would not only contribute toward measurable progress in restoring steelhead, but would also constitute a substantially higher level (some would say a big step forward, others would say a bigger bureaucracy) in regard to water management in Oregon.

5. In the comments that follow I focus not on the biology or the details contained in Section 3, but rather on some "big picture" observations or issues which I believe are presented by Section 3. These may not be helpful to you in fine tuning Section 3 but I believe they are points which should be made, even if obvious.

6. Oregon water law on the books has been reasonably progressive and evolutionary, starting with the 1909 Water Code. On the other hand, the legislative funding level for the administration of water resources law has never been generous, considering statutory responsibilities, and is not generous today. In short, for reasons associated with tight budgets and politics, the ability of relevant state agencies to implement water law has always lagged considerably behind the expectations associated with the laws on the books.

WRD: Agreed. WRD is seeking both state and federal funding for measures.

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7. If we are to take the Oregon Plan seriously (and we must), this basic reality of stingy funding has large implications for carrying out the approach of Section 3 and its wide range of over 30 measures - measures which involve the accelerated and firm implementation of many water management tools under existing law. This approach of Section 3 raises two important implications in my mind. First, whether the ambitious nature of over 30 broadly based measures will far outstrip the availability of necessary public funds (even in a fish "crisis") to carry out these measures. Second, whether Section 3 attempts to do more than it needs to do. Put another way, could Section 3 be improved by eliminating some measures marginal to steelhead habitat, or by imposing some priorities upon the implementation of the measures.

8. In regard to the first implication, Section 3 has a number of references to "depending on resources" or "funding alternatives" or "staffing needs later identified." Section 3 contains no cost-benefit analysis of any measure to restore habitat (perhaps an impossible task) and, more importantly, no cost analysis associated with any measure. This gap may be a deliberate and necessary choice at this stage of planning. But the point about costs (and funding) is pressed forward by the approach of Section 3 itself which lists such a wide range of measures, even those which appear marginal or remote to the achievement of habitat objectives in any substantial way. One can only conclude after reading Section 3 that the costs are unknown but large indeed. In the interest of being comprehensive in planning have we gone considerably beyond any reasonable chance of the additional funding required? Will implementation monitoring to track accountability identify serious shortfalls in some measures which may not really be that important to plan objective? Will priorities emerge anyway at a later date by internal agency decisions to watch resources with selected measures?

WRD: Good point. The state has not conducted a cost-benefit analysis of measures, instead the state has listed a set of tools which can be used to restore streamflows.

The Oregon Plan is a living document in the sense that as the state learns more about which tools are most effective and cost efficient in reversing the factors for decline, these tools will be emphasized. This is part of the adaptive management strategy approach.

The state is committed to meeting the

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The Oregon Legislature is a crucial partner in the success of the Plan's Steelhead Supplement, the objective of which is to maintain and restore steelhead habitat, not to achieve broad based water management effectiveness in Oregon, as desirable as this latter goal may be. I am apprehensive, at least as to Section 3, that these goals, although overlapping, may become confused in the political arena. The justification in this arena for additional funding for Section 3 must be strictly tailored to its needs and objectives.

9. This brings us to the second implication which is whether the objectives of Section 3 would be better served by trimming some marginal measures or at least by setting some priorities in the Plan itself as to implementation of the measures. Section 3 is well done, but it flows by the reader as a smorgasbord of measures which are on the same table without sufficient guidance as to their importance or cost in maintaining and restoring health in fisheries habitat. Many priorities will be set in the process of implementing the Plan. My point is whether some priorities can be set in Section 3 itself.

deadlines and accomplishing all of the Phase 1 (this biennium) measures with existing resources. The Phase 2 measures are ones which will not be accomplished within this biennium or without additional fiscal resources. Thus, priorities have already been set.

WRD: Agreed. Additional funding requests to the Oregon Legislature have been directly tied to measures and evolutionary significant units.

WRD: See response to #8.

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10. My thought on priorities are offered, not because of any confidence in their validity, but to illustrate my point. As to the first level of priority, I suggest instream water rights, fish passage, and screening. These measures have a direct impact on flows for habitat, migration and mortality.

WRD: Comments 10 - 14 all address setting priorities. The Oregon Plan is a living document in the sense that as the state learns more about which tools are most effective and cost efficient in reversing the factors for decline, these tools will be emphasized. This is part of the adaptive management strategy approach.

The state is committed to meeting the deadlines and accomplishing all of the Phase 1 (this biennium) measures with existing resources. The Phase 2 measures are ones which will not be accomplished within this biennium or without additional fiscal resources. Thus, priorities have already been set.

Despite their inherent weakness of coming late to the priority date scheme of water rights, instream water rights remain a basic tool in legally securing flows for fisheries habitat. WRD S-3, ODFW IV A3, WRD S-4, ODFW IV A8, WRD S-9.

Despite legal requirements to provide fish passage, many barriers (e.g., push-up dams) still exist. Some priority sites are already identified. A pilot project in the Illinois Basin has been completed. Priority can be given to these measures to assure fish

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passage: WRD S - 22, ODFW IV C 1, ODFW 1 B4.

Unscreened water diversions have the potential to kill many juvenile salmonids and some adults. The impressive detail on pages 43 - 47 shows that, despite some progress, there are thousands of unscreened diversions (some quite large) in the basins identified. Screening on these diversions extends to 10 years or longer in current plans to phase in screening. Priority can be given to these measures to facilitate screening: ODFW IV C2, ODFW IV C4.

11. In setting priorities a distinction can be made between correcting past practices as to existing water use (e.g., push-up dams and unscreened diversions) which remedies can be time consuming and expensive, and on the other hand looking to the future in conducting the on-going statutory responsibilities of relevant state agencies. As to future routine decisions it must be assumed, if Section 3 is to succeed, that proper recognition (i.e. an assumed priority) is given to the laws, rules, and administrative processes that are intended to preserve fisheries habitat and avoid mortality. In this regard, for example, substantial progress has been made in recent years in the issuance of permits for out-of-stream uses through the application of water availability and public interest criteria. WRD S-1, WRD S-21, and WRD S-2 (transfers). As to permits, transfer applications and other future decisions, Oregon law seems generally adequate to meet the objectives of Section 3 if agency commitment (and sufficient public support) is present. Other legal tools not mentioned in Section 3, such as withdrawals from appropriation, may be available to preserve habitat.

12. As to a medium tier of priority I suggest such measures as the inventory of water diversions, WRD S-10, dissemination of stream flow data, WRD S-11, and public outreach WRD S-17.

ODFW: Unscreened or improperly screened diversions do kill thousands of salmonids. Plans are for all diversions to be screened within 10 years.

WRD: WRD believes that by relying on water availability and public interest reviews (OAR Chapter 690, Division 310 and Division 33) on a permit by permit basis that the same level of resource protection is afforded to salmonids while maintaining flexibility which would be lost under a basin withdrawal.

However, where a basin withdrawal is an appropriate tool, the Department is open to considering it.

WRD: Knowing where water is being diverted, through the inventory of water diversions, is critical to water

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13. As to a low tier of priority (or candidates for dropping) I suggest the following measures which are undoubtedly worthy endeavors but appear too speculative or marginal in results for steelhead to justify a higher priority: voluntary water conservation programs (do they have any teeth?) WRD S-13 and S-14; initiative to cancel water rights forfeited by non-use (serious PR problems without helping fish) WRD S-16; ground water studies (important but marginal as to fisheries) WRD S-18; off-stream storage WRD S-19; reservations (not a statutory provision intended to help fisheries) WRD S-26; and Serious Water Management areas (unless measuring and reporting water use in a priority stream can be shown to aid steelhead) WRD S-20.

14. I have separated out those measures relating to enforcement in the field (WRD S-7, S-8, and S-9) because they are so critical to the success of so many other measures. Enforcement should have a top priority in my opinion. Reference (pages 23-25) is made vaguely to "increased field presence," additional water masters, and "increased staffing to implement the Plan" to be identified later. Perhaps this is the most that can be stated now. I can only reiterate what is widely known and that is watermasters are

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management and enforcement of water rights.

WRD: Agricultural and urban water conservation plans encourage demand side management of water, more accurate water measurement and reporting, and the development of water budgets and alternatives for preserving water. Agricultural and urban water users are the two main water users groups in the state, and if significant improvements in streamflows are to be made they will have to part of the solution.

Ground water studies are important when making decisions on new surface and ground water applications. The studies will provide information on the surface/ground water connection.

WRD: Agreed. A Watermaster position has been added in Medford. WRD is seeking funding for an additional position in the North Central and Eastern Regions. The additional staff to be hired in early 1988 will also aid in enforcement

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already spread thin over wide regions and must function primarily on a "complaint" basis as to enforcement issues. Section 3 relies for its success upon an adequate field pressure for guidance, monitoring and enforcement in the relevant basins. This calls for a field presence at a considerably higher level than at present. Under the "adequacy of measures to meet objective" on page 25, it reads "WRD is ensuring compliance with existing water rights law in a number of ways. . . ." This conclusion seems to me to overstate the case. Perhaps the scattered references to the need for additional field personnel could be buttressed by a forthright paragraph which pulls together these references and summarizes why their work is so important to the carrying out of other measures in Section 3.

activities.

15. Although a policy decision may have already been made not to recommend any new legislation in the Steelhead Supplement, I believe at least three areas could benefit from review and consideration for possible new legislation: (1) incentives and other approaches to improve the efficiency of water use, (2) fish screening, and (3) wells exempt from the permit system.

WRD: The Oregon Plan and Steelhead Supplement are based on the existing system and aim to make the implementation of current laws more effective. However, if new laws are needed there will be the need for broad-based support.

(1) Efficiency is especially important in agriculture because of the large proportion of diverted water which is used in irrigation. Conveyance losses and inefficient applications (e.g., flood irrigation) offer an opportunity for improved efficiency which could potentially "save" substantial amounts of water for instream flows to enhance habitat or for other uses. How to achieve this greater efficiency and still maintain beneficial use on the land may be the next big challenge in water law. The "Conserved Water" Statute in Oregon has not been widely used, and to my knowledge cannot be considered successful. This "big challenge" of how to improve efficiency should be

WRD: The Conserved Water Statutes and how to increase their use was one of the key issues focused on at the October, 1997 Oregon Water Resources Commission Flow Enhancement Workshop. The Commission will be addressing a proposal developed from that workshop at its meeting on January 22,

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tackled sooner rather than later.

(2) Fish screening. Because of the large number of unscreened diversions and their relationship to fish mortality through entrainment, current Oregon law and the Cost Share Program might well benefit from legislative review. The material on Salmonid Mortality, pages 43-47, raises implicitly serious questions about the adequacy of Oregon's Cost Share Program for diversions under 30 cfs to achieve timely screening, whether the 30 cfs cut off point is too high, and related questions. In short, progress in screening appears too slow under current provisions of law and cost sharing.

(3) Exempt wells. Underground water studies on page 34 of Section 3, reference is made to the need to "prevent the inadvertent allocation of ground water that is hydrologically connected to surface water and would thereby cause injury to instream flows. . ." I believe it is true that, since the 1955 Ground Water Code in Oregon, wells for certain purposes (e.g., domestic) and up to a substantial daily pumping limit have been exempt from the permit process. Does the proliferation of such wells in proximity to surface water pose this threat of "inadvertent allocation" to the potential detriment of instream flows and where a new permit for-out-of-stream diversion would be denied? Is there a need for legislative review of this large exemption to ground water permitting? I do not have the facts to answer these questions confidently but there does appear to be a "gap" in the permitting of wells which cannot be justified any

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1998. How to improve the Conserved Water Program is among the proposals being developed for Commission consideration. Measure WRD S-12, Improving Efficiency and Prohibiting Waste, seeks to tackle this important issue.

ODFW: ODFW is trying to obtain additional funds to achieve timely screening. The Oregon Legislature will probably review the program during the next session.

WRD: There is the potential for exempt wells to be hydraulically connected to surface water which could result in reduced flows. Most exempt wells use only a small amount of water for domestic purposes. As noted, a law change would be required to eliminate exempt uses.

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longer and which might pose a problem to conjunctive management and thus to the detriment of flows for habitat.

REVIEW OF "DRAFT WORKING DOCUMENT,

The Oregon Plan,
Steelhead Supplement,

Section 3: Water Quality, Fish Passage and Fish Screening"

Reviewed by Jim Howland, former Water Resources Commission member

November 7, 1997

These remarks are based on the assumption that having additional water at specific times will increase the number of fish in the waterways. I am not qualified to evaluate the biological objectives. However, it does appear that in addition to deficiencies in water quantity and quality, fish passage and screening, forces such as oceanic conditions that are not adequately understood are causing the fish runs to diminish. Thus, will concentrate on a combination of questions 4), and 6), in the letter from the office of Governor John A. Kitzhaber, dated October 15, 1997 and signed by Paula Burgess.

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A. Water quantity and quality at appropriate times. On most streams we no longer have the ability to return them to their natural state within any reasonable limits of cost in dollars and cost in economic hardship for segments of our population. Man has altered the environment. Now it is up to man to manage the waters to benefit both the fish and man. Each stream and each region of the state is different requiring very different management measures on different streams.

WRD: Agreed.

1. Measures proposed in the plan It appears to me that each of the measures listed will benefit a stream or class of streams. Their application must be managed by competent people close to the situation in each case.

WRD: Agreed

2. Additional needs In most instances the plan proposals will increase flows and thus quality of water. However, it seems to me that **in a number of situations much more positive dramatic action that will require major state funding is required** such as:

WRD: The state has already committed \$30 million to the Oregon Plan, and is seeking additional funding for the Steelhead Supplement. WRD will continue to seek additional state and federal funds. However, the implementation of the plan will occur under fiscally limited budgets.

a. Field staff - This has been addressed in part by adding coastal offices and using Willamette Basin people on the coast. When I was on the Commission, numbers and support of people in the field was inadequate. There has historically been a great need for more adequately trained people in the field enforcing the laws and regulations. There is no benefit in laws, regulations and plans unless there are people on the

WRD: WRD is strengthening its field presence in two ways. First, eight additional field personnel have been added (one watermasters and seven other staff to address water resources problems. Second, the Resource Management Division has been

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ground, not in office, making them work.

b. Real time flow data - More staff gages are proposed. In many cases the flows in the streams can only be adequately managed if there is storage on the stream and the water master has continuous flow data. More gauging and storage is needed in many cases.

(1.) Some funds should be allocated for research leading to more economical stream gauging equipment or procedures.

c. Storage program - Major state funding need for a storage program even though dams have lost political favor. Off stream storage is mentioned in the document. Another alternative is aquifer storage which has been blocked by the Department of Environmental Quality. There are opportunities to provide irrigation water from aquifer storage and thus allow natural flow in streams during low flow

reorganized with an increased field emphasis. A Senior Water Resources Coordinator has been assigned to work with and in each region.

WRD: WRD agrees that more gauging stations are needed. Measure WRD S-9, Installation of Monitoring Stations, addresses this need. Additionally, WRD is making the flow data more accessible by posting it on the Internet, Measure WRD S-11, Dissemination of Streamflow Data.

WRD: A number of technical advances have been made in streamflow monitoring including data loggers, pressure transducers, and ultra sound. WRD is evaluating the effectiveness and accuracy of these devices and will install the devices in new and existing stations as appropriate.

WRD: WRD agrees that ground water recharge offers the potential for restoring streamflows and will assist watershed councils and water users in assessing the feasibility of recharge, as well as other alternatives. There are water quality concerns associated with

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- periods.
- d. Acquisition of water rights for instream use - Gifting and leasing are in the plan. Purchase could be another more positive option although opposed by some organizations. Care must be take to prevent destruction of an area economy by taking water now being put to out-of-stream beneficial use.
- e. Additional Agency Representation - As indicated on page 6, under "Public Interest Test," economic development is a factor in evaluating proposed water use. In this document there does not appear to be any agency representing, or addressing, economic development issues. This is also true in regard to municipal water supply. WRD, ODFW, DSL, OSP, and ODA are the only agencies mentioned.
- f. Indian Water Claims - This is very important for long term solutions. The Indian claims are extensive and need to be settled. One might expect that the Indians would be sensitive
- storing surface water underground. For aquifer storage and recovery the stored water must be of potable quality, for groundwater recharge DEQ has a nondegradation policy.
- WRD: Measure WRD S-15 and ODFW IVB5, Instream Transfers and Leases, indicates that both WRD and ODFW are "engaged in efforts to protect streamflows by working with individual water right holders to voluntarily transfer, purchase, lease, or donate out-of-stream rights to instream uses."
- WRD: Economic Development is one of the factors considered under the general public interest review (OAR Chapter 690, Division 310). The Water Quantity Section of the Steelhead Supplement does not mention the Economic Development Department, because that agency is unlikely to have information pertinent to fish protection and restoration.
- WRD: There are a variety of activities with which WRD is working with Indian Tribes, some of which are listed

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to fish needs. However, there is considerable evidence that the Indians have, on occasion, not used various rights they have gained in a responsible way.

- g. Major Power Rights - The water rights at the Oregon City Willamette Falls are, to my knowledge, the most extensive. Leaving water in the streams may be advantageous to power production. Saving water for fish enhancement with later release may not be.

B Fish Screening - Each of the proposals appear to be beneficial for fish enhancement.

- a. Maximum Flow for Unscreened Intakes - In many cases it is very important to screen intakes having less than 30 cfs flow. It appears that many of these are being addressed on a cooperative basis. The laws should so provide.
- b. Screening Schedules - Dead lines shown for accomplishing much of the screening seem to be rather far into the future if benefits are to be realized in a reasonable length of time. I realize that funding is the

below: In November 1997, the federal government and State of Oregon signed a water rights treaty with the Confederated Tribes of the Warm Springs Indian Reservation. The state is actively working to resolve water right claims with the Klamath Tribe and is working with the Confederated Tribes of the Umatilla Indian Reservation on the Umatilla Basin project.

WRD: Power generation is not a consumptive use of water -- the water stays in the river. At Willamette Falls, the river is not impounded for later release.

ODFW: Agreed.

ODFW: Agreed. State law currently provides for this.

ODFW: Plans are for all diversions to be screened within 10 years. ODFW is pursuing additional funding.

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problem.

17 November 1997

Bob Rice

Oregon Water Resources Department

158 12th Street NE

Salem, OR 97310-0210

Dear Bob:

Thank you for the opportunity to comment on the Oregon Plan for steelhead (October 20, 1997 draft). The Northwest Water Law and Policy Project is a grant-funded, water law and policy research and education center located at Northwestern School of Law of Lewis & Clark College. The goal of the Water Project is to stimulate regional efforts to develop sustainable water policy and promote changes in the way the Northwest manages and uses its water resources. The Project's review of the Draft Steelhead Supplement is limited to Section 3: Water Quantity, Fish Passage, and Fish Screening.

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The Water Project supports your efforts to identify factors responsible for declines in steelhead populations and develop a plan aimed at restoring the species. However, although the plan recognizes that protecting and maintaining flows and restoring flows through conservation are necessary to save steelhead, the proposed measures do not contain specific enough targets or measurable criteria to accomplish the identified objectives. Below are comments that respond to your questions.

(1) & (2) In general, the plan identifies the relevant factors of decline related to water quantity, fish passage, and fish screening, and adequately lists the right issues that must be addressed in order to restore streamflows. These include enforcing existing rights, reducing wasteful use and improving water use efficiency, and promoting leases and transfers.

WRD: Agreed.

(3) The listed biological objectives address the factors for decline, but the plan fails to include several critical objectives: (a) the role of the conserved water statute, and (b) the need to minimize exemptions to fish passage requirements.

WRD: The Conserved Water Statute is viewed as a means to achieve an objective, such as restoring streamflows. The Conserved Water Statute (ORS 537.455 to 537.500) allows for a portion of the water saved through improved efficiency to be dedicated for instream flows and be protected by the priority date of the original water use. The

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Conserved Water Statute is described under Measure WRD S-12, Improving Efficiency and Prohibiting Waste.

ODFW: Under current fish passage statutes, there are no exemptions to the requirement to provide for fish passage at artificial in-channel obstructions. HB 2607 (1997) addressed the issue of exemptions to the requirement to provide for fish passage by putting in place two parallel processes: (1) gives the Oregon Fish and Wildlife

Commission the temporary power to consider waiving the requirement or accepting in-lieu-of mitigation; and (2) establishes a task force to explore the question of whether exemptions should be allowed in the future, and, if so, what requirements must be met.

WRD: WRD disagrees. The vast majority of measures give specific deadlines for completing specific tasks. Funding constraints are

(4) Although the plan lists and describes relevant factors of decline, the proposed management measures are inadequate to address these factors. Many of the measures are indefinite, contain no measurable criteria, or lack sufficient

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funding. Moreover, the plan overall lacks sufficient implementation measures.

clearly identified as Phase 1 (this biennium) or Phase 2 measures (future bienniums where additional funding may be needed). The state responds to the reviewers suggestion for addition measures in #6.

The following are the Project's general comments about the plan:

(a) Several measures require increased funding to ensure implementation. Therefore, the plan should clearly state that these measures will not result in maintaining or restoring streamflows unless this funding is achieved. For example: ODFW IVA3, WRD S-8, WRD S-9.

WRD: All Phase 1 measures will be implemented with existing funding. The Phase 2 measures will not occur in the current biennium and may need additional funding. The Steelhead Supplement has been revised to clarify funding issues.

(b) Several measures rely on voluntary actions for implementation. While we support volunteerism, whether such measures will result in increased streamflows necessary to restore steelhead is quite uncertain. Voluntary efforts are valuable but are not proven to be effective and lack a means to evaluate progress. For example: WRD S-13, WRD S-15, WRD S-22. Therefore, we recommend that the

WRD: The underlying framework of the Oregon Plan is to work within existing laws and rules before developing new ones. Some measures, such as WRD S-15, Instream Transfers and Leases,

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plan incorporate monitoring mechanisms to allow WRD to evaluate the progress made by these voluntary efforts.

are necessarily done on a voluntary (or willing seller) basis.

(c) The proposed measures fail to include specific performance criteria; consequently, the plan includes little that is quantifiable. We recommend that the measures be amended to incorporate performance criteria, target dates, and other measurable criteria. In addition, WRD and ODFW need to specify whether they have met recently passed or will meet upcoming deadlines in several measures to determine how effectively they are implementing the plan. For example: WRD S-12, WRD S-22, ODFW IVC1.

Monitoring of all measures is a necessary component of the plan. Three types of monitoring described in the Oregon Plan and Steelhead Supplement: performance monitoring (did the agencies do what they committed to doing?), compliance monitoring (are citizens complying with state law?), and resource monitoring (the status of the ecosystem).

WRD: The vast majority of measures, including WRD S-22, have tasks which are to be performed by specific dates. WRD S-12, inadvertently had the timelines removed from the October 20, 1997 draft. The timelines have been restored.

The next revision of this chapter will reflect whether past deadlines have been met. The Implementation Report

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(d) Many of the measures rely on the identification of priority areas by ODFW under ODFW IVA8 (requiring the identification and prioritization of areas where steelhead habitat is most dependent on restoration of streamflows). However, target dates in the majority of these measures conflict with the target date by which ODFW will identify the priority areas (January 1, 1999). For example: WRD S-8, WRD S-9, WRD S-10, WRD S-14. We recommend that the measures be amended to recognize and account for the January 1, 1999 deadline.

component of the Steelhead Supplement will also indicate whether and to what extent the state is meeting the implementation deadlines.

WRD: ODFW IVA8 has been revised to reflect two dates: January 1, 1998, for the Oregon Coast and Klamath Mountains Province and January 1, 1999 for the other ESUs. Where there continue to be date conflicts, the state has either amended the measures to use the best available information present, or has extended the measure deadline so that there is no conflict.

The following are the Project's comments on specific measures in the plan:

WRD S-2

The review process for transfers should include a finding that the public interest is protected in addition to existing instream water rights.

WRD: State statutes do not currently allow a public interest review for transfers.

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WRD S-3

While coordinating data collection and compliance monitoring among agencies is beneficial, this measure contains no specific measures to ensure that instream water rights are being fulfilled in accord with issuance priority dates. We recommend that the agencies actively enforce water rights now, not wait for coordinated field meetings to be scheduled sometime in the future.

WRD: Agreed, WRD is actively enforcing water rights now, while concurrently holding field meetings to coordinate enforcement activities.

ODFW
IVA3

We support the establishment of instream water rights as a method to restore streamflows. However, many of the state's streams are over appropriated, and creating instream rights with junior priority dates will not significantly increase flows. Therefore, we recommend that WRD focus on converting senior water rights to instream flows. In addition, the measure contains no guarantee of adequate funding and staff necessary to collect flow information and prepare applications; without this, this measure will not be effectively implemented.

WRD: ODFW IVA3, involves applying for additional instream water rights. Converting out-of-stream rights to instream rights is covered under WRD 15 and ODFW IVB5. In both instances WRD is committed to expeditious processing of the instream water rights.

Measure ODFW IVA3 includes collecting collect flow information and preparing instream water right applications. The measures also indicates that ODFW will be submitting a budget request for collecting

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WRD S-6

This measure contains a schedule for providing information to determine water availability, but fails to provide a date by which WRD will conduct an evaluation of the information gathered, or to what end this information will be used. We recommend that WRD use this information to prioritize areas to establish instream flows, increase enforcement efforts, and promote the use of conservation.

additional flow data.

WRD: The proposed analyses and prioritization will occur under ODFW IVA8. WRD is a cooperating agency under the measure and is working closely with ODFW in performing the task. The dates by when WRD will complete its evaluation are indicated by ESU.

ODFW
IVA8

This measure calls for gathering information to identify and prioritize the areas where steelhead habitat is most dependent on restoration of streamflows, but fails to set forth a schedule with specific flow restoration targets for WRD and ODFW.

WRD: The purpose of the measure is to develop a schedule with specific flow restoration targets.

WRD S-8

While increased enforcement is a commendable concept, this measure lacks any specific goals. This measure calls for WRD to develop a plan by June 30, 1998 to increase enforcement in priority areas identified by ODFW (ODFW IVA8). Since ODFW will not identify priority areas until

WRD: See response under general comment (d) regarding the date issue.

As indicated in Measure WRD S-8, additional resources will be

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January 1, 1999 under measure ODFW IVA8, it will be difficult for WRD to adequately evaluate what will be required to implement its plan and to what extent the plan can be implemented with existing resources. In addition, this measure illustrates a weaker commitment of resources outside the coastal basins. For example, WRD has failed to replace staff responsible for the Willamette Basin who have refocused their efforts to coastal basins.

needed to replace the staff dedicated to the Oregon Coast ESU from the Upper Willamette ESU. However, new water right specialists in all five WRD regions will augment existing staff and will allow some level of increased compliance monitoring statewide.

WRD S-9

The Water Project supports the installation of monitoring/gaging stations necessary to monitor the priority areas identified by ODFW (ODFW IVA8). However, this measure is flawed in several respects. First, there is no indication how often monitoring will occur, or how the information will be used to restore streamflows. Second, the schedule set forth for the development of funding proposals for the installation, operation, and maintenance of the identifies priority sites in the Oregon Coast and Klamath Mountains Province Evolutionary Significant Units (ESUs) (April 1, 1998) does not coincide with the deadline for ODFW to identify these same priority areas (January 1, 1999). We recommend that WRD establish a monitoring schedule and a plan for how it will use the

WRD: The frequency of water measurements depends on the type of monitoring station and the data needs. For example, a gaging station continuously records data while a staff gage only provides an instantaneous measurement. The Watermasters work with ODFW and others to determine the data needs of a monitoring station. The flow information is used to distribute water according to the rights of record.

See response under general comment (d) regarding the date issue.

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gathered information.

WRD S-10

We recommend that inventorying water diversions be used to identify illegal diversions as well as diversions which appear detrimental to salmonids. In addition, when determining whether a diversion is detrimental, WRD should evaluate the cumulative effects of diversions in the area, not simply the effects of individual diversions. In addition, the measure calls for WRD to develop a program by June 1, 1998 to inventory priority areas identified under ODFW IVA8. As noted several times above, ODFW will not identify these priority areas until January 1, 1999, making it difficult for WRD to develop any kind of plan.

WRD: WRD inventories authorized and unauthorized diversions, including those not consistent with their water rights. When diversions are found with fish screening or fish passage problems, ODFW is notified. WRD does not have the fish biologists on staff to determine the cumulative effects of diversions.

See response under general comment (d) regarding the date issue.

WRD S-11

According to the draft, WRD should have completed the plan called for under this measure by November 1. Has this target date been met?

WRD: Yes.

WRD S-12

The Water Project believes that improving efficiency and prohibiting waste is an effective tool to restoring streamflows, and that WRD

WRD: WRD S-12, Improving Efficiency and Prohibiting Waste, inadvertently had the timelines

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should implement this concept immediately. However, this measure fails to include target dates for the creation of the working groups, the development of goals and model practices to increase efficiency, and the development of standards to identify waste. Therefore, it is difficult to determine when this measure may result in increased flows. The Water Project has volunteered to assist WRD in its efforts to develop regional efficiency guidelines under the CSRI.

removed from the October 20, 1997 draft. The timelines have been restored.

WRD S-13
& S-14

It is unclear how the development of voluntary water conservation plans will result in increased streamflows. The measures contain no criteria to measure the success of the plans or to ensure implementation. In addition, the measures call only on irrigation districts and municipalities to develop these voluntary plans: they fail to require non-irrigation district water users or industry to develop conservation plans. This is an appropriate place for the plan to emphasize potential use of the conserved water statute. Measure 14 also conflicts with the deadline (January 1, 1999) set out for the identification of priority areas under ODFW IVA8. We recommend that WRD developing monitoring mechanisms to evaluate the success of the

WRD: Measure WRD S-13 refers to "irrigation water users" -- not just irrigation districts, although since irrigation districts are generally large users of water they are a high priority.

Whenever municipalities seek new water rights they are required to develop a water conservation plan.

The use of the Conserved Water Statutes which were discussed in WRD S-12, are considered in the preparation of water conservation

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voluntary efforts and call on non-irrigation district water users and industry to develop conservation plans.

management plans and are an important tool, particularly when seeking to improve agricultural water conservation.

See response under general comment (d) regarding the date issue.

WRD S-15
& ODFW
IVB5

The Water Project supports the use of instream transfers and leases to restore streamflows. However without a significant funding source, this measure will result in limited flow increases.

WRD: Agreed. Instream transfers and leases are a useful tool, particularly on tributaries where a relatively small volume of water can make a significant biological difference for fish.

WRD S-16

This measure conflicts with the deadline set forth in ODFW IVA8 (January 1, 1999). Otherwise, the Water Project supports the identification of rights potentially subject to forfeiture and the development of solutions to put the water back instream.

WRD: See response under general comment (d) regarding the date issue.

WRD S-18

We recommend that WRD complete the groundwater studies before it acts on any new

WRD: Oregon statutes require the timely processing of water right

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applications for groundwater.

applications and do not currently allow for the completion of groundwater studies.

WRD S-20

The Water Project supports the use of measurement and reporting as an effective tool to increase streamflows. However, this measure contains no target dates for Serious Water Management Problem Areas (SWMPA) designations, but merely states that WRD will evaluate the possibility. Therefore, we recommend that WRD develop goals for establishing SWMPAs in high priority areas.

WRD: WRD is currently evaluating whether the use of SWMPA, which would require measurement and reporting of water use, will likely increase instream flows. This is a necessary first step before developing goals for establishing SWMPAs.

WRD S-22

This measure merely calls for the prioritization of basins where fish passage problems associated with push-up dams need to be resolved. The measure fails to set targets for the necessary modification or removal of these dams.

WRD: In the last two years a multi-agency effort has successfully addressed the fish passage problems associated with push-up dams in the pilot Illinois Watershed, as well as the Applegate system, and continues to be expanded in the Rogue and South Coast Basins. The measure is being expanded to all of the steelhead ESUs and will develop an implementation schedule for addressing problem

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ODFW
IVC1

While pursuing removal of artificial fish barriers and promoting the installation of passage capability are good goals, this measure contains no measurable criteria. As it is phrased, there is no way to determine the effectiveness of this measure to eliminate artificial obstructions to fish passage.

push-up dams.

ODFW: There are a number of factors that make quantification of goals for improvement of fish passage at barriers to steelhead impractical: (1) There is currently no comprehensive listing of barriers (being addressed under measure ODFW IB4) on which to base a structured problem resolution effort; (2) Because there are no funds designated for the remediation of barriers, it is not possible to state absolute or measurable goals at this time.; (3) While ODFW will continue to investigate reported fish passage problems and direct appropriate remediation, it is not possible to anticipate how many complaints will be resolved.

ODFW
IB4

This measure fails to identify how the inventory of artificial barriers will be used by ODFW to eliminate those barriers.

ODFW: Good point. The measure will be modified to state that "ODFW will use information on barriers in the database to

Peer Review Letter

State Response

		prioritize future barrier removal activities, be they cooperative projects or enforcement actions." At this time, it is not realistic to establish a measurable goal here.
ODFW IVC2	Many of the screening target dates have expired. What percentage of screens have been installed according to the established target dates?	ODFW: The Steelhead Supplement has been revised to reflect current screening target dates. The target dates prior to November 30, 1997 have been met.
ODFW IVC4	This measure includes no criteria to determine its effectiveness. ODFW fails to establish any target dates for screening diversions of greater than 30 CFS. Also, under Phase 2, it is unclear what ODFW means when it states that "progress" by irrigation districts is expected by 2007.	ODFW: The Steelhead Supplement has been revised to evaluate effectiveness; target dates have been established.
	(5) For the reasons discussed above, the Water Project believes that implementation of the measures outlined in Section 3 will not contribute to measurable progress in restoring steelhead runs. The measures are not strong enough, not specific enough, and often rely on uncertain funding.	WRD: WRD disagrees and believes that the revised measures are sufficient to contribute to the measurable progress of restoring steelhead runs.

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(6) The plan identifies the relevant factors, and recommends addressing the right issues. But, the plan must go further to provide adequate streamflows to restore steelhead. We recommend that the plan be amended to include:

(a) Increase enforcement and monitoring, particularly in areas identified as critical to the recovery of steelhead. In addition to regulating illegal uses, the WRD should promise to enforce permit conditions and establish SWMPAs.

(b) Prohibit the issuance of new water right permits in basins identified as critical to steelhead recovery and/or explore the possible use of augmentation plans.

WRD: WRD has and will continue to enforce water use. The WRD Enforcement Report is included as an attachment to this section. See response under WRD-S20 regarding the establishment of SWMPAs.

WRD: WRD believes that by relying on water availability and public interest reviews (OAR Chapter 690, Division 310 and Division 33) on a permit by permit basis that the same level of resource protection is afforded to salmonids while maintaining flexibility which would be lost under a basin withdrawal.

However, where a basin withdrawal is an appropriate tool,

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(c) In efforts to secure instream water rights, WRD should promise to focus on converting senior water rights. Much of the state is fully or over appropriated and instream water rights with a current priority date will not contribute to increasing streamflows.

the Department is open to considering it.

WRD: See response to ODFW IVA3.

(d) Secure funding adequate to implement measures called for in the plan.

WRD: Agreed. The state is pursuing additional funding.

Thank you for the opportunity to comment on the draft steelhead plan.

Sincerely,

Brett Swift

Assistant Director

Northwest Water Law & Policy Project

November 10, 1997

Bob Rice

Oregon Water Resources Department

158 12th Street, NE

Salem, Oregon 97310-0210

Re: Comments on Section 3: Water Quantity, Fish Passage and Fish Screening

The Oregon Plan - Draft Working Document

Dear Mr. Rice:

The following are my thoughts and comments on the above referenced document as transmitted to me by Paula Burgess:

1. *Does the document list all relevant factors of decline related to water quantity, fish passage and fish screening? Are there additional significant factors of decline, if so please list them.*

In my opinion, the author(s) did a good job of identifying the factors as they relate to water quantity, fish passage and fish screening.

2. *Are factors of decline described appropriately? If not what improvements can you suggest?*

Generally, yes the factors are described appropriately. In some instances, field biologists have made decisions on "potential" fish habitat that may be available. I believe decisions on water use applications should be made on confirmed fish presence, or habitat, not on "potential" fish presence or habitat. Factors of decline need to be verified information based on actual surveys or appropriate data from qualified consultants before imposing restrictions on proposed actions by appropriators.

WRD: The state has attempted to use the best available information, including professional opinion, regarding whether a water right or water right application would affect fish habitat. Additional information on fish presence is included in other sections of the Oregon Plan and Steelhead Supplement.

3. *Do the biological objectives address the factors of decline appropriately?*

This is not my field of expertise and do not feel qualified to respond to this question.

4. *Are the management measures adequate to address the stated factors of decline?...in a timely manner? In our opinion, which measures would be the most effective in addressing factors of decline?*

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State Response

I believe the measures initiated and proposed to be initiated are probably the best options at this time. It will be important to continue funding the measures described in the document. Currently, the measures described have resulted in no new appropriation for natural flow virtually statewide. In addition, reservoir applications have been examined to prevent inundation of anadromous fish habitat and the blocking of fish passage without specific passage facilities. These actions are in place and should prevent the continued decline of water quantity that will injure the fish populations and allow fish passage where needed.

WRD: Agreed.

The protection now in place and the protection plan proposed is being done in a very timely manner from an administrative perspective. In my opinion, the proposals contained in the document will produce benefits for the fish populations in as timely a manner as possible. I believe the predominately voluntary approach will produce quicker, longer results for both the resource and state agencies. This approach should cost less than a pure regulatory approach and the funds saved in enforcement may be used to "cost share" in critical areas.

WRD: Agreed.

I believe the following measures could produce the desired benefits in the shortest possible time when implemented:

1. Continue and expand the fish screening program for diversions less

ODFW: Gravity diversions are a higher

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| <p>than 30 cfs. The highest priority should be for gravity (ditch) diversions followed by pump diversions. In areas identified as critical for the fish survival, consideration should be given for additional grants (over the 50%) as an incentive for more immediate action.</p> | <p>priority than pumps. The cost share program pays 60 %; there is also an additional 50 % state tax credit. ODFW is pursuing additional funding.</p> |
| <p>2. Encourage transfers from diversions on channel to hydrologically connected ground water where feasible. This would eliminate the inchannel diversion and minimize the direct impact on surface flows by the appropriators. Using hydrologically connected ground water will not be a direct one to one exchange with surface water in most areas and this will provide additional surface flows.</p> | <p>WRD: Agreed. The state has done this when encouraging the replacement of push-up dams with off-stream infiltration galleries. The Steelhead Supplement will be revised to more clearly articulate this idea.</p> |
| <p>3. Measurement and enforcement of the Oregon Water Code should have immediate, measurable impacts on surface flows in many areas around the state (See No. 6 for more detailed comments).</p> | <p>WRD: Agreed. Several measures are intended to address this issue, including WRD S-7 (Coordinated Enforcement Plan) S-8 (Increased Distribution and Enforcement), S-9 (Installation of Monitoring Stations), and S-10 (Inventory of Water Diversions).</p> |
| <p>4. Work with appropriators in developing appropriate conservation plans and agricultural best management practices (BMP's). This should apply to all water users with the highest priority given to the larger appropriators.</p> | <p>WRD: Agreed. WRD S-12, Improving Efficiency and Prohibiting Waste, and WRD S-13, Agricultural Water Conservation Program, both involve</p> |

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working with the agricultural community.

Developing BMP's for agricultural and urban (small tract) users will not only identify how to most efficiently use the water but will include protection for the riparian area. Well understood and supported BMP's will improve the water quantity, quality and riparian areas on adjoining streams and rivers.

WRD: Agreed.

5. The state should encourage multipurpose storage projects that have minimal impacts on the fishery resource or have impacts that may be mitigated. Given the existing rights of record and the potential growth in Oregon over time, it is obvious that additional water will be needed in the future.

WRD: In general, WRD agrees. WRD will continue to use the administrative rulemaking process to consider reserving water for multi-purpose storage where reservation applications have been received. Rulemaking will follow the process established in 1996 and 1997 which required additional conditions on reservoir permits to protect fishery and instream values beyond those established in OAR Chapter 690, Divisions 310 and 33. The rules adopted for the Hood, Grande Ronde, Malheur, and Owyhee Basins and Burnt River subbasin require an assessment of the effect of the proposed reservoir on fish and wildlife in consultation with ODFW; an assessment of the effect of the proposed reservoir on water quality in consultation with DEQ; an analysis of water supply alternatives;

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A multipurpose project can provide the future water supply for a variety of users and either provide instream flows or exchange water. It may be more beneficial to divert water from storage to existing rights of record and allow their normal diversion to remain in the stream/river. A well designed project can be beneficial to the environment we are trying to protect/enhance and provide for the future appropriative need.

Off channel storage and reservoir sites high in the watershed should be given utmost priority. The state should consider participating in these sites to provide exchange flows for existing rights or increased instream flows that satisfy fishery needs. While developing multipurpose storage it may be possible to improve and enhance a watershed while allowing population, agricultural and commercial growth.

and an analysis summarizing and describing how the proposed project will enhance instream values, including but not limited to instream flows.

WRD: Field staff will provide assistance and advice to watershed councils and water users in evaluating the feasibility of all alternatives for restoring streamflows.

ODFW: ODFW agrees that off channel storage and reservoir sites high in the watershed provide an opportunity to enhance stream flows. However, each site would have to be evaluated on its own merits regarding fish and wildlife impacts. State fiscal participation in these projects is best addressed through the Legislature because of the policy issues involved.

5. *Will implementation of the measures outlined in this chapter contribute*

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toward measurable progress in restoring salmon runs?

With minor adjustments, yes.

6. *Overall, what specific improvements can you suggest?*

1. At this time I don't believe the OWRD's Water Development Loan Fund is a viable option for many water users. Unless several applicants file jointly, the cost of securing a loan does not make the fund attractive. The loan program needs to be modified to allow economical loans in the \$100,000 - \$500,000 range.

WRD: Agreed. A new measure, WRD S-27, Water Development Loan Fund, has been developed to respond to this need.

2. More gaging stations need to be installed to properly manage the water. I am not a supporter of distribution based on conversion factors or relationships based on minimal gaging station records. These calculations are suitable for planning purposes, however, distribution enforcement and policy decisions should be based on actual measurements at gaging stations.

WRD: WRD agrees that there needs to be more gaging stations. Measure WRD S-9 addresses this need. Currently, WRD is actively seeking federal support for additional gaging stations.

WRD does not distribute water based on conversion factors or relationships based on gaging station records. Distribution occurs based on actual water measurements.

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3. Knowing the amount of water actually used is an important feature of the plan. Measurement and reporting can be a useful tool in achieving the objectives of the plan. The OWRD is currently requiring measuring devices on applications that exceed 0.10 cfs. Reporting at various levels may or may not be required of the applicant.

WRD: Agreed. Additionally, reporting is required on all applications greater than 1.5 cfs and measurement and reporting may be required on any application if the situation warrants it.

This is useful information if it is being examined and a data base is developed by the OWRD. If the information is not being used, reporting does not serve any useful purpose.

WRD: WRD agrees and has requested funding for the water availability program.

Measuring devices fall into a similar category. They can be useful on water sources that require distribution or ground water sources in limited or sensitive areas. If the devices are not used by the Watermaster or the information gathered is not developed into a data base, in my opinion they serve little purpose.

WRD: Agreed.

I suggest that the OWRD develop the following procedure concerning measuring and reporting:

- a. Confirm with users that the POD-Id correctly represents the water right's diversion and use.

WRD: Agreed. The letter which WRD sends to water right users reminding users of the reporting requirement asks that the user contact WRD if they believe

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State Response

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- that there are errors or omissions in the summary or their rights which WRD provides to users.
- b. Initiate a program by which the appropriators receive notice that the reporting information has been received and is in proper form.
- WRD: WRD will consider increased feedback to water users filing reports as improvements are made in the data base.
- c. Begin a data base which may be used to show average, maximum and minimum use by type in a given area. For example: The reporting information on the Lookingglass - Olalla Water Control District demonstrates that their annual use ranges from 1.67 - 1.98 acre feet/acre/year. Their maximum/minimum use in 1996 was 0.67 acre foot/acre and 3+ acre foot/acre.
- WRD: Agreed. WRD is working to improve the water use data base to allow better access to the water use information. This work would be expedited with the funding with WRD has requested.
- This type of data is important in future planning and will assist the Watermaster in discovering if the duty is being exceeded in a given area. This should assist in future distribution. Reports not regularly reviewed serve little purpose.
- WRD: Agreed.
- How measurement and reporting is handled is very important as the OWRD endeavors to identify efficient use and "waste". These
- WRD: Agreed.

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subjects need to be handled very carefully and the reporting information can be invaluable as efforts proceed to develop rules and policies on waste.

- 4 The OWRD and ODFW should consider possible mitigation measures for a new applicant. In many areas it may be possible to do sufficient mitigation in connection with a new application that would not only allow the appropriation but may improve conditions for the fishery resource.

WRD: Agreed. WRD encourages that water right applicants discuss their proposed use of water with the local ODFW district biologist and WRD watermaster prior to submitting the application so that possible mitigation measures can be included in the application.

- 5 If a current water right of record holder desires to transfer water to an instream use, this should be accomplished with minimal effort by the applicant. The OWRD should complete the forms and maps to accomplish this with no fees for the applicant. This would encourage more appropriators to take advantage of the program.

WRD: Measure WRD S-15 indicates that WRD Regional Managers and Watermasters will provide information and encourage and assist with the leasing of existing water rights to instream. This can include the completion of forms and maps for applicants.

A statutory change would be required for waiving the applicant fees.

- 6 I would point out that water rights not used for five years are

WRD: Agreed.

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State Response

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- . *subject to* forfeiture. They are not automatically forfeited unless they go through one of several legal processes.

 - 7 I am disappointed that the long standing relationship between the OWRD and Counties is not mentioned in the document. This can be of significant advantage to the OWRD in carrying out their efforts in Salmon - Steelhead recovery. More emphasis should be given to working with local governments, specifically Counties. Currently, most Assistant Watermasters are employees of Counties. To fully develop a plan for water use and fishery recovery, the OWRD and other state agencies need the full support of watershed councils, other agencies and Counties.

WRD: Agreed.

Thank you for the opportunity to comment on this portion of the Oregon Plan. Please contact me if you have any questions or desire additional information.

Yours truly,

M. John Youngquist

SECTION 4: FISH MANAGEMENT COMMENTS

Invitation for Comments Letter

October 15, 1997

Inside Address

Dear

I am writing to request your technical review of the Fish Management section of the Oregon Plan Supplement (Steelhead Supplement) for salmon and stream restoration. The Supplement expands the scope of *The Oregon Plan* from coastal coho salmon to address other salmonid species throughout the state, but with the major focus being wild steelhead. The Fish Management section contains state agency measures (almost exclusively Oregon Department of Fish and Wildlife measures) addressing harvest and hatchery effects on wild populations of steelhead in Oregon, and also contains measures addressing effects of predators and exotic fish on wild steelhead. The document is organized by listing various factors of decline with associated biological objectives and state agency measures to address the factors of decline.

In undertaking your review and comments, please assume that other issues, primarily habitat issues, are addressed adequately in the Oregon Plan and Supplement. You are welcome to give your views on the adequacy of other parts of the Supplement and Plan, but to provide a common baseline for review of the Fish Management section please assume they are adequate. In order to aid in focusing the review, the state is very interested in your response to the following questions regarding this document:

1. Does the document list all relevant factors of decline regarding harvest, hatchery, predation, and exotic fish impacts on steelhead? If there are additional, but related, significant factors regarding steelhead decline please list them (habitat-related factors for decline are covered in other sections of the Supplement already).
2. Are the factors of decline described appropriately? If not, what improvements can you suggest?
3. Do the biological objectives address the factors of decline appropriately, or do they need revision?
4. Are the management measures competent, and do they move us in the right direction to address the factors of decline? What revisions or additional measures are needed?
5. Are the analyses and conclusions in the Supplement consistent with the scientific literature, and does the analysis support the conclusions? Is more research needed in any area of harvest, hatchery, predation, or exotic fish impacts for the Supplement to be

successful in protecting and restoring steelhead? If so, what areas require additional research?

6. Does it appear that the monitoring will be adequate to detect differences resulting from the management measures listed? What changes in monitoring are needed?
7. What should be our priorities for addressing the factors of decline, biological objectives, and implementing agency management measures related to harvest, hatchery, predation, and exotic fish impacts? In other words, what are the most effective elements of the Supplement? Are there agency management measures that will be ineffective and/or a waste of money?

Once again thank you for volunteering to review this document. The Fish Management section will be sent to you under separate cover from ODFW. Enclosed for your information is a list of all the reviewers of the Fish Management section. If you would like to review other portions of the Oregon Plan it is available on our web site at: <http://www.das.state.or.us/salmon/> If you have any questions please contact Barry McPherson at 503-872-5252, ext. 5418, or me at 503-378-6206. Please return your review comments by November 10th to:

Barry McPherson
ODFW
P.O. Box 59
Portland, OR 97207
barry.mcpherson@state.or.us

Jay Nicholas
ODFW
28655 Highway 34
Corvallis, OR 97333
nicolaj@ccmail.orsu.edu

Your comments may be submitted electronically via email or in hardcopy with a copy on disk. Please submit the electronic version of your comments in Microsoft Word for Windows 6.0 or WordPerfect 5.1 format.

I look forward to your comments. I think they will help us strengthen the Supplement and improve our efforts to conserve steelhead and other salmonids. We plan to post all reviewers comments on our web site, as we did for the coastal coho plan, to make them available for public review.

Sincerely,

Paul Burgess
Governor's Assistant for Natural Resources

PB/sm
Enclosure

List of Invitees

Dr. Pete Bisson
Dr. Ted Bjornn
Ed Bowles
Jeff Cedarholm
Dr. Jim Hall
Dr. David G. Hankin
Robert S. Hooton
Steve Leider
Dennis McEwan
Dr. Peter Moyle
Steve Nelson
Dr. Bruce Rettig
Dr. Terry Roelofs
Dr. Phil Roger
Bruce Sanford
Jim Steele
Dr. Art Tautz
Chris Zimmerman

Review Comments

November 10, 1997

Mr. Barry McPherson
ODFW
P.O. Box 59
Portland, OR 97207

Dear Mr. McPherson:

Enclosed are staff's comments to Section 4 of the Steelhead Supplement to the Oregon Coastal Salmon Restoration Initiative. We have tried to respond to your specific questions, but have taken the liberty to provide general comments, as well. There are many elements of the fish management section that Idaho and Oregon can and will cooperatively work on. I hope our comments are useful and lead to a plan of measurable steps for recovering our wild steelhead resources.

Sincerely,

Ed Bowles
Anadromous Fisheries Manager

Enclosure

Specific Comments to Questions (1-7) Posed by State of Oregon:

1,2. The document provides a comprehensive and relevant list of factors of decline for several ESUs of steelhead. There is considerable diversity of ESUs addressed in Section 4. The focus and direction would be improved if an element of priority were added for each factor of decline, and its related actions, as it pertained to each ESU. Factors of decline and strategies likely differ in relevance from group to group. This could be accomplished within the text, or perhaps expressed as a matrix for each ESU. We anticipate that you will synthesize response from question #7 of the cover letter to incorporate into the section, which would facilitate prioritization.

3. Biological objectives generally address the factors of decline appropriately relative to the current level of knowledge.

4. Management measures are competent but our previous comment regarding prioritization apply in terms of assessing whether management actions will move us in the right direction to address factors of decline. For some ESUs, effects of fish management actions may be masked because the factors of decline that they address are less significant than others. This may be the case in the Snake River Basin where modification of the mainstem migration ecosystem is a larger factor of decline and will strongly influence any fish management measures. Thus, monitoring needs to ensure that a “false positive” is not determined, i.e. benefit is not accrued to a fish management action when it was really a migration survival (or other environmental) phenomena.

5. There will always be an argument for more research – not only regarding the factors of decline, but also the factors as applied to the individual ESUs. Again, prioritization of the relevance of the factors of decline and the management strategies to address them is critical to focus on measures that will truly provide significant benefit to the ESU.

6. See comment for #4.

7. The most effective fish management elements of the supplement are likely related to harvest and hatchery impacts. In many cases, predation and exotic fish impacts are linked to a preponderance of an ecosystem that is out of balance, thus facilitating and enhancing adverse effects. Management measures taken independently of fixing the broken ecosystem are less likely to be effective. An example is hydropower reservoirs on the mainstem Columbia River. Approximation of more normative river conditions will have far more effect on adverse effects from predation and exotic fish on steelhead than any manipulative fish management action could.

General Comments:

It is difficult to ascertain relevance of specific fish management actions without a framework of their relevance within the whole suite of factors of decline for the specific ESU. We have

reviewed habitat sections of supplement but found very little linkage between fish management actions and migration corridor survival constraints, specifically for the Snake Basin ESU.

Oregon's regulatory and enforcement role in tribal fisheries should at least be identified in the harvest sections.

Page 4 – Information gathered by the University of Idaho from several years of radio-tagging steelhead would be relevant to Oregon's effort to maintain sampling on databases on sport and commercial fisheries, and the run crossing Bonneville Dam. Idaho supports and will continue to cooperate with Oregon's efforts to estimate aspects of the steelhead run, particularly A and B stock composition, in a more accurate manner.

Page 11 – The emphasis on maintaining as many populations as possible in setting escapement goals is critical to the structure of the ESUs and is consistent with efforts for listed Snake River salmon. This is an important concept that has implications in fish management actions beyond just setting escapement goals.

Page 13 – We look forward to working with Oregon on developing long-term restoration goals for wild steelhead in the Snake Basin. The Idaho Anadromous Fish Management Plan, 1992-96 estimated that about 54,800 wild steelhead were needed to seed steelhead habitat in Idaho. Cooperatively with the States of Oregon, Washington, and Snake Basin Indian Tribes, we will work to technically develop new escapement goals through both the U.S. v. Oregon and recovery processes.

Page 17 – It seems appropriate to include the Snake Basin ESU in Phase 1. of ODFWIIIC2S. This activity is already taking place relative to development of Recreational Fish Management and Monitoring Plans with the National Marine Fisheries Service, Section 7 consultations, and Section 10 incidental take permits.

Page 25 – Oregon should note that their efforts to work with co-managers to minimize bycatch of wild steelhead includes tribal fisheries in Zone 6.

Page 26 – The last paragraph helps to focus and prioritize activities within the entire fish management section. However, we believe the goal should be not only to stabilize and improve freshwater production, but it must include improving freshwater **productivity** (i.e. survival). At least for the Snake River ESU, this is the critical link between improving migration and survival other fish management actions.

Pages 29-30 – As Oregon implies, modifications to hatchery programs should be handled on a case by case basis. In some cases, even the naturally produced fish are of non-native lineage and it may not be a priority to provide the same level of protection as for native populations that represent a significant gene pool for recovery and persistence in local habitat. As in Oregon, there are Idaho streams where there is no historical stocking and little to no straying, yet populations have declined just as radically or more so than populations influenced by hatchery

programs. Modifying hatchery programs will likely not lead to improvement, unless adverse interaction from the hatchery program is a significant factor of decline.

skiefer\steelhd\govplan\oregon

(916) 653-2459

November 14, 1997

Mr. Barry McPherson
Oregon Department of Fish and Wildlife
Post Office Box 59
Portland, Oregon 97207

Dear Mr. McPherson:

Thank you for the opportunity to review your strategy to protect and restore steelhead trout in your State. I found it to be an ambitious plan and very well thought out by your planners. I have some comments about the plan, but they in no way are meant to distract from the fine product produced so far. I hope we can share information learned from your watershed group seminar effort and fish carcass placement program.

I note that review from Mr. Dennis McEwan of this Department was not possible because of work commitments. Mr. McEwan represents the biological aspects of steelhead requirements for our Department. My comments will only center on some of the "watershed level" issues as they arise in this State and I apply our observations to your plan. Since I know little of the conditions in Oregon, these comments may not be applicable.

1. We've noted that steelhead and coho, while coexisting in the same watersheds have overlapping habitats and may display some interspecific competition where they both occur. Some observers suggest that the lower gradient areas in coastal depositional reaches are the only areas suitable for coho due to lesser swimming capabilities compared to steelhead. Coho are not found in the higher gradient (>4%) reaches where steelhead are common. These low gradient areas can be made more suitable for steelhead or for coho through habitat modification. Coho appear to exist in numbers (assuming spawner returns) when canopy coverage is highest (85-100%) and abundant wood debris causes flow shadows and low flow deep pools. Where these conditions are the poorest, steelhead may still be found in abundance. This could argue for surveying for potential coho habitat and managing that area for conditions more suitable for coho, particularly if low gradient areas are in short supply. In California coastal streams, the low gradient depositional reaches have gone through severe modification placing coho on a higher concern for survival in this area than steelhead. A strategy to address this difference by surveying areas for "best fit" may be necessary.

2. Our experience in watershed restoration indicates that the best test for watershed level stability is when a greater-than-bank-full flood causes a channel response. Habitat degradation takes place when more sediment is introduced than in-channel. Mr. Barry McPherson objects, such as large woody debris, can scour pools and protect banks. A healthy system has instream objects and low sediment introduction, and pools, side channels and gravel bars are restored during these response periods.

Also, fish populations may be flushed out of the system at an immature life stage if fast flows cannot be avoided in side channels and behind logs. Dams may release flows at times which flush fish from the system and yet remove the peak from flood waters which cause a healthy stream response through habitat development. A strategy to analyze for these conditions may be warranted. This is also an excellent observational opportunity for monitoring purposes.

3. I note your intensive retrofit program for installing fish screens and believe this to be one of the most necessary fish protection devices. However, all screens are not equal and one design may work better in some conditions than others. I'm sure this consideration is in your program and some mention of you plans to assure proper placement and monitoring of results would improve the text.
4. Finally, I mention a point that we are having trouble solving and note that it was avoided in your writeup. A formula for cost/benefit analysis of the many action tasks mentioned would place their relative worth to fish recovery in perspective. If you've addressed this issue perhaps we could exchange notes. Right now, it appears that much of the efforts are focused on just a NMFS acceptance rather than a cost/benefit ratio argument which will also bring legislator and public support.

I hope these meager comments are of some value and look forward to working cooperatively with Oregon's salmonid and steelhead restoration program. If you have questions, please don't hesitate to call me at (916) 653-2459.

Sincerely,

Jim Steele
Assistant Division Chief
Inland Fisheries Division

Oregon Coastal Salmon Restoration Initiative - Steelhead Supplement

Some Thoughts From Afar

1. Harvest Impacts to Spawner Escapement

The question which plagues steelhead managers in Oregon and everywhere else in the animal's range is how many fish are there? Rarely are we able to answer that question and even less frequently are we able to answer it prospectively. Almost without exception harvest fisheries occur in advance of confirmation of run status and spawner populations are therefore commonly subjected to potential overexploitation.

From a biological perspective the approach to be taken under these circumstances is conservatism with respect to harvest until the status of the run can be determined. From a social and political perspective this is obviously contrary to the norm and difficult to sell. Nonetheless, if the objective of the Oregon plan is to prevent serious depletion of wild steelhead stocks and rebuild sustainable populations some revision of the traditional approach to harvest management would seem appropriate. It is suggested that more reliance should be placed on the development of in-season indices of abundance which would then trigger different harvest management options. Enumerating spawners at distant upriver weirs or counting redds is of little value if managers' ability to influence those numbers has been pre-empted by downstream harvest.

ESU and even water specific regulations appear to be rooted in "historical" localized decisions. Whereas they may be the best fit politically there are some apparent conflicts which need to be resolved if consistency is considered important. For example, "steelhead angling closures" seem to be in effect in some areas but outright angling closures apply in what appear to be similar situations elsewhere. Wild fish catch and release seems to have been accepted for some streams for a number of years while others whose run status seems to be described similarly remain open to harvest fisheries. The most striking example of inconsistency is the upper Columbia wild "B-run" fish which, by law, are managed to a target harvest rate of 32% (irrespective of abundance?!) whereas such harvest rates are unthinkable on other wild summer steelhead stocks.

Trout fisheries based on hatchery releases in wild steelhead production areas are being revisited under this initiative. There is clearly a move away from stocking areas where negative impacts on wild juvenile steelhead are known to occur. Presumably the rate and extent of movement in this direction is constrained by local circumstances but, again, consistency of approach seems desirable and the current initiative looks to provide an opportunity to effect the appropriate biological choices.

2. Escapement Goals

Definition of escapement targets based on analysis of habitat capability and historic distribution is a desirable objective. The relationship between those targets and weir counts, redd counts,

snorkel survey observations, etc is a different exercise which will likely take at least several years to establish. However, a standard approach to assessing theoretical spawner requirements is clearly worthwhile.

Reliance on smolt abundance as a measure of the strength or adequacy of spawning populations or as a predictor of adult returns is problematic. The relationship between spawners and emigrant smolts is highly variable and, even if smolts were sampled consistently to document age and therefore which brood year they originated from, the uncertainty around the influence of habitat variables and physical parameters can easily obscure any pattern which might otherwise be occurring. Several fold differences in the smolt population originating from a given complement of spawners are commonplace as are the adult returns from a given smolt population. A better index of the strength of spawning populations might be fry abundance in strategic areas. Fry are much more easily sampled and more closely reflect the spatial distribution of spawners. It is obviously worthwhile to understand the relationship between fry abundance and smolt production but it is more important to assess whether the number (density) and distribution of fry is anywhere near what a habitat analysis would predict as saturated. Maximum smolt production is not likely to result from low fry populations.

3. Hatchery Production

As our experience and understanding of hatchery production of anadromous salmonids grows there are emerging concerns on a number of fronts. Foremost among these are the potential negative impacts of hatchery/wild spawner pairings and the genetic fitness of progeny, residualism of hatchery juveniles which displace or otherwise outcompete smaller/younger wild juveniles, detrimental effects of fishing pressure in mixed stock fisheries (mortality among wild fish subjected to intensive fisheries for harvestable hatchery fish), and cost effectiveness.

Despite the enormous expenditures on hatchery production and the growing body of scientific literature and opinion which point strongly in the direction of revisitation of the efficacy of numerous anadromous fish culture programs there has not been any comprehensive analysis undertaken since Lloyd Royal's on behalf of the State of Washington twenty-five years ago. That review inspired biologically and economically defensible revisions to steelhead culture coast wide. We know far more now than we did in 1972 and we should be guided by that collective experience. One would question the wisdom of any further investments and augmentations in the absence of a critical look at where we have been. Biodiversity, arguably the most important variable in the longer term sustainability of wild steelhead populations and the fish culture programs dependent on them, will not be recovered if lost.

The notion of using fish culture programs to "restore" particularly weak natural runs should not be viewed as anything other than theoretical. Evidence to support that this will achieve the intended results is less than abundant. A reasonable alternative, no more risky, is to do nothing other than eliminate all fishing and monitor whether or not impoverished spawning populations show a trend to recovery.

4. Nutrient Addition

Collection, disease screening, and re-distribution of surplus hatchery carcasses to remote locations on a scale large enough to measure impacts is indeed a challenging undertaking. Would it not be worthwhile considering the addition of inorganic nutrients which have been shown to achieve similar results at very significantly lower cost?

5. Predator Control

The legal and policy framework to support any initiatives to reduce predator abundance must precede investment in scarce agency dollars to substantiate cause and effect relationships. It is understood the biological evidence for predator control might not be sufficiently described at present but it is also understood the weight of public opinion is likely to be strongly against such programs, regardless of what evidence might be brought forward. Pinnipeds and cormorants are likely to garner more public and political support than steelhead despite the best information and intentions of fisheries managers.

R. S. Hooton
Nov 16, 1997


Memorandum

To: Jay Nicholas
From: R. Bruce Rettig
Date: 11/15/97
Re: Review: Fish Management Section of the Oregon Plan Supplement (Steelhead Supplement)

My Background and Purpose in Reviewing Material

I am a professor of Agricultural and Resource Economics at Oregon State University with almost three decades of experience. My purpose in reviewing the supplement was to check for any use or misuse of economics and for any potentially important omissions from the economic literature. I did not attempt to pass judgement on biological analysis or data.

Discussion

Although the fish management section of the Oregon Plan Supplement makes no explicit use of economic data or analysis, it follows a valuable tradition of much of the work of the Oregon Department of Fish and Wildlife in past years. Due largely to its process of public involvement, the department balances its prime directive of conservation against the value to Oregonians to use natural resources in a manner that reflects the values of Oregon's citizens.

Clearly, the central focus is to avoid placing wild steelhead stocks in jeopardy and to provide reasonable opportunities for weak stocks to recover. However, the document continues to provide for many opportunities to fish in many parts of the state. This reflects a judgement that the value of a modest level of angling is highly valuable to local people. It also shows a desire to avoid major disruption of industry that depends on angling.

Studies of the value of salmon and steelhead are not mentioned in the analysis. However, the Department is well aware of the many studies of the significant value attached to sport angling to Oregon residents. Most of these studies emphasize the value to recreationists. Other studies identify the value of industry related to angling as an economic base. More recently, Professor Edward Whitelaw at the University of Oregon has argued that these activities and other attributes of high environmental quality attract new industry, such as high technology, to the state. Since these studies cannot be directly tied to the assessment of alternative actions in the report, I see no problem with the lack of explicit economic analysis at this time. I do hope that, as Oregon proceeds with recovery actions and as expensive alternative approaches are weighed, new analysis will become available to assist in this important, but ultimately costly, task.

This leads to my only specific criticisms, and these may be "nit picking" in nature. Action/measure ODFW IIIA2S reads "manage steelhead fisheries to minimize impact on wild salmon." If one really wished to choose the minimum impacts, no fishing would be allowed on any stream in which steelhead stocks are depressed. Clearly, there is a balancing here and

management is to be selected to keep impacts on wild salmon at a low level while providing a modest rate of fishing by recreational anglers and Indians with treaty fishing rights.

In a similar vein, action/measure ODFW IIC6S reads "manage non-steelhead fisheries in the Columbia River to minimize bycatch of wild steelhead." Again, this is not literally true since the management measures are selected to keep bycatch at a low level while providing valuable recreational and commercial fishing in other fisheries.

In summary, although additional economic analysis in the future will be valuable, I find sound economic intuition in this document. I am not proposing additional economic analysis at this time. However, it may be helpful to recognize explicitly the implicit reasoning.

I thank you for the opportunity to review this important and thoughtful document.

**STATE OF WASHINGTON
DEPARTMENT OF FISH AND WILDLIFE
FISH MANAGEMENT PROGRAM
FRESHWATER RESOURCES**

November 19, 1997

TO: Barry McPherson
FROM: Bruce Sanford
SUBJECT: Steelhead Supplement to the Oregon Plan

Thanks for the opportunity to review the draft steelhead supplement. I apologize for not getting back to you earlier. Things kind of piled up here.

I didn't review this in the utmost detail, but tried to catch the main points, especially those that might be asked from the viewpoint of NMFS. Some of these are merely comments and not necessarily things that should be incorporated. Setting aside the habitat components, I thought that the plan did an excellent job in describing limiting factors, objectives and action plans. In fact, this will help me prepared some of the rebuilding plans for the Upper Columbia and Snake River waters.

The following are just a few items, not necessarily in any order:

- 1) The third "biological objective" under Harvest Impacts is a bit confusing. I'm not sure if it is really meant to say "conduct fisheries that do not interfere with wild steelhead restoration" or "conduct fisheries **so that they do not** interfere with wild steelhead restoration". There is a difference in the meaning in the first implies new fisheries or those that have no impact while the second refers to modification of existing fisheries to minimize impacts.
- 2) WDFW is in the process of looking at additional assessment of mortality rates and fishery compliance. As we move to more conservative approach with both hatchery and wild steelhead, catch-and-release options will probably become more frequent. With it comes the responsibility of knowing what is going on. Over the next few months we will be developing some long-term approaches to specific studies that should have applicability to Oregon fisheries as well.
- 3) Squawfish is a predator that was not mentioned, or at least I didn't see any mention of it. Perhaps it fits better under the habitat component since we have created exceptional habitat for squawfish in the mainstem Columbia. At the very least, there is a need to review the current squawfish program in terms of its contribution towards salmonid mortality factors.

4) Factor III: Steelhead Bycatch: the term “bycatch” generally refers to “incidental” or “nontargeted” stocks and species that are taken during commercial fisheries, which is what I assume that you are strictly speaking to in this section. If so, you might just say that in the heading so that there is no confusion on the part of the reader, i.e. “Steelhead Bycatch in Commercial Fisheries”. If that is not the case, then there may be no distinction between this section and the Biological Objective under Factor I, which is “Conduct fisheries that do not interfere with wild steelhead restoration.”

5) With all the additional assessment, research and monitoring activities that are proposed in this report, my question is “How are you going to do it all?” I assume that items are going to be prioritized, and that will be referred to in the completed version.

That all I have. As you can see, I’m scratching for things to give you, but I hope these comments help.

November 6, 1997

Jay Nicholas
ODFW
28655 Highway 34
Corvallis, OR 97333

Dear Jay:

I have looked over the Fish Management section of the Oregon Plan Steelhead Supplement (working draft 10/17/97). I have not had much time to give to this review and have not had a lot of experience with steelhead, so my comments should be viewed in that light.

It appears to me that most of the relevant factors of decline have been well covered in your analysis. I am particularly pleased to see explicit consideration of the role of carcasses in nutrient regeneration, and applaud the experimental application planned here.

There is one additional factor of decline that comes to mind, though it may not be significant now that steelhead stocking levels have been significantly reduced. However, in the days when the stocking level for steelhead on the Alsea River was high, I believe that there is evidence that the additional angling effort that was stimulated by that stocking imposed a significantly increased angling mortality rate on the wild stock of steelhead. This additional mortality lead to a substantial reduction in the wild stock, which was obscured by the overwhelming abundance of the hatchery returns. I believe that this management consequence should at least be considered in evaluating the hatchery stocking strategies discussed in the plan.

I have a few other general concerns:

- 1) I have not seen the whole plan, but I miss some general perspective on the status of steelhead stocks, such as Table 15 (p. 122) in the Busby et al. 1996 Status Review.
- 2) Again, this may occur elsewhere in the document, but I suggest that more prominence be given to discussion of risk, and particularly, uncertainty, in the section on fish management (cf. Hilborn et al. 1993 CJFAS 50:874-880).
- 3) The emphasis on monitoring is commendable. However, I am concerned that some of these actions will not be feasible, given recent cutbacks in staff and budget. There are too many instances of “if funds can be obtained” in the Actions/Measures sections.

On a less useful note, I have a few niggling comments on the draft, many of which have no doubt already been cleaned up :

P.1, para 3, line 5 - extra word

P.2, para 2, line 13 - “look more like trout” seems inaccurate. They are trout.

There are a few places where Phase 2 is indicated for an action, but there is nothing indicated under Phase 1.(e.g. SW Washington, p. 15; also p. 53)

P. 23, last line - sentence should be in the past tense if 1996 is the correct year.

Sorry not to have done a more thorough job on this. Thanks for your continuing efforts on the Restoration Initiative.

Sincerely,

James D. Hall
Professor Emeritus of Fisheries

5 November 1997

Barry McPherson

Oregon Department of Fish and Wildlife

P.O. Box 59
Portland, OR 97207

Dear Barry:

Thank you for inviting me to review the management portion of the steelhead supplement to the Oregon Plan. In conducting this review, I was asked to assume that other portions of the plan are adequate. This is a critical assumption concerning the adequacy of habitat measures. Given the length of the juvenile freshwater phase found in steelhead, adequate habitat is a critical element in the recovery and maintenance of these populations. As a result, my comments on the management section of the Supplement are clearly made under the assumption that habitat measures are adequate. I have not seen the habitat section of the Supplement.

In the request for review that I received with the steelhead supplement there were seven questions regarding the document. I will frame my review around these questions.

1. Does the document list all relevant factors of decline regarding harvest, hatchery, predation, and exotic fish impacts on steelhead? If there are additional, but related, significant factors regarding steelhead decline please list them (habitat-related factors for decline are covered in other sections of the Supplement already).

The Supplement does adequately list relevant factors of decline on steelhead. The factors listed are primarily those caused by humans and, therefore, those that we have some control over. In that regard, it is inappropriate to list "ocean productivity" as one of these factors. Rather, this section should be entitled, "Manage steelhead harvest in response to ocean survival conditions."

2. Are the factors of decline described appropriately? If not, what improvements can you suggest?

Under *Predator Management (Exotic Fishes)* on page 53, the relation of degraded habitat and exotic fish proliferation is not addressed adequately. Under the assumption that habitat measures in the Oregon Plan will move systems towards better conditions, it can be expected that exotic species, such as smallmouth bass, will be minimized.

3. Do the biological objectives address the factors of decline appropriately, or do they need revision?

The Supplement does not adequately describe how escapement goals will be established. This is the most critical element of the Supplement as it will be these goals that will determine success of the measures implemented. Establishment of escapement goals for coastal streams will be based on habitat-based production potential models using existing data on habitat parameters. Given the assumption that most habitat is in a degraded condition, it appears that the goals will merely be to maximize production in relation to a degraded habitat condition. How can this be used to determine the success of habitat and management measures under the Oregon Plan? Escapement goals should be determined based on principles of population biology and some amount of conjecture. To merely manage for maximum production from degraded habitat is not acceptable recovery of the species.

4. Are the management measures competent, and do they move us in the right direction to address the factors of decline? What revisions or additional measures are needed?

ODFW IIB1S Recycling of hatchery adults is inconsistent with the biological objective listed on page 30 concerning reduction of genetic risk to wild steelhead by controlling the percentage of hatchery fish spawning with wild fish. Recycling programs should not be utilized if an intended goal of the wild fish management plan and the Supplement is to limit gene flow between wild and hatchery fish. Once a fish is intercepted at a fish trap or hatchery, it should be removed from the population. My recommendations are based on the experiences with recycling steelhead adults on the Deschutes River. This program recycled fish collected in the Pelton Fish Trap by trucking them to Mack's Canyon. The program was suspended because the recycled fish were found in east side tributaries and the Warm Springs River. With the construction of the weir at the Warm Springs National Fish Hatchery, the problem became more evident and the program eliminated. Recycling programs cannot be adequately evaluated without such a facility to monitor potential straying by recycled fish,.

I realize that recycling programs are considered sensitive issues between ODFW and the angling public. Given the determination expressed in the Supplement that interbreeding of hatchery fish and wild fish is undesirable, increasing the risk that hatchery fish will spawn in the wild following recycling is contrary to the goals of the Supplement.

5. Are the analyses and conclusions in the Supplement consistent with the scientific literature, and does the analysis support the conclusions? Is more research needed in any area of harvest, hatchery, predation, or exotic fish impacts for the Supplement to be successful in protecting and restoring steelhead? If so, what areas require additional research?

In relation to the need for additional research, Phase 2 under Specifics/Priorities for the two eastern Oregon ESUs ODFW IB1S states that the number of in-basin and out-of-basin hatchery steelhead spawning in natural production area of the Deschutes Basin will be conducted "if funds

are obtained." This should be a priority in the Deschutes and John Day Basins. This is a critical issue related to minimizing interbreeding between wild and hatchery fish.

6. Does it appear that the monitoring will be adequate to detect differences resulting from the management measures listed? What changes in monitoring are needed?

ODFW IIIA2S and ODFW IIIC6S require that a Genetic Stock Identification (GSI), based on allozymes, or DNA analysis be developed to manage fishery impacts on various steelhead ESU's (primarily those in the Columbia River). Currently, ODFW has personnel capable of dealing with genetic issues but lacks facilities to conduct such efforts. GSI, in particular, requires day to day monitoring to determine targeted populations. Such operations are sometimes conducted overnight so that fishery managers may make harvest related decisions on a daily basis. Scale analysis has also been done in the same day to day manner on the Fraser River in British Columbia. Without a quick turn-around in analysis, the effort is meaningless. Shipping samples to other labs would be one possibility, but a poor one in my view. Development of a genetics laboratory at ODFW capable of conducting protein electrophoresis and DNA analyses should be a priority given the goals of the Supplement.

ODFW IIA3S outlines the development of management objectives for steelhead hatchery programs which includes genetic guidelines. Without an appropriate genetic sampling program, the effectiveness of such guidelines will be impossible to determine. As described above, ODFW should establish a genetics laboratory that can conduct GSI and monitoring of hatchery programs. This lab would also be instrumental in monitoring the impacts of interbreeding between wild and hatchery steelhead. Without adequate monitoring, genetic guidelines concerning hatchery management are useful but lack credible evidence.

Pinniped predation has been perceived as a significant issue concerning salmonid populations. ODFW should consider this an important area of research so the impact of this perceived risk can be evaluated. ODFW currently has staff dealing with this issue, but funding for these studies has always been questionable. Given the focus that pinniped predation has received by the public, this issue should be a research priority for ODFW.

7. What should be our priorities for addressing the factors of decline, biological objectives, and implementing agency management measures related to harvest, hatchery, predation, and exotic fish impacts? In other words, what are the most effective elements of the Supplement? Are there agency management measures that will be effective and/or a waste of money?

On the surface, the Supplement is primarily a statement of current management relative to steelhead. There are several elements that should prove to be effective given the assumption that habitat measures will be effective. Good approaches outlined in the Supplement include minimizing the impacts of trout stocking programs, marking all hatchery steelhead, developing management objectives for hatchery programs, and implementation of carcass nutrient cycle studies.

On the other hand, there is a significant measure that can be considered a waste of money. Seabird hazing on the Nestucca, Nehalem, and Tillamook Bays is a waste of funds given the rationale and monitoring that this program is based upon. This program is not based on scientifically derived conclusions, but rather, on the mere possibility that predation could occur. The program is not monitored in an adequate manner. The Supplement suggests that the efficacy of this program will be determined based on a comparison of smolt survival of hatchery coho. Smolt to adult survival is based on many factors and increased survival of a cohort from a hazing year versus a non-hazing year is not adequate. I recommend that sea-bird hazing in these bays is discontinued and funds applied toward a statistically based monitoring program of sea-bird food habit studies.

I have focussed my comments on the shortfalls that are most evident given my understanding of steelhead populations in Oregon. Steelhead are an important resource and deserve our best efforts of protection and restoration. The Supplement lays out many programs of monitoring and research that will require additional funding. If the Supplement is intended as an alternative to listing under the Endangered Species Act, it will only be an acceptable substitute to listing if the measures included are funded adequately.

Sincerely,

Christian Zimmerman

Fish Management Responses

December 12, 1997

Mr. Chris Zimmerman
Pacific NW Research Station
US Forest Service
3200 SW Jefferson Way
Corvallis, OR 97331

Dear Mr. Zimmerman:

Thank you for taking the time to comment on the October 17 draft of the Fish Management section of the steelhead supplement to *The Oregon Plan*. I have attempted to address your concerns and comments in the newest draft, which will be released December 18. If you feel that your concerns and comments have not been adequately addressed, please let me know because the supplement will be revised once more before it is made final in mid-January. The December 18 draft and a list of libraries and offices where hard copies can be viewed will be posted on a web site (www.oregon-plan.org).

You provided many useful ideas and suggestions. I want to respond specifically to some of your comments.

I have kept “ocean productivity” as a factor for decline rather than change it to “manage steelhead harvest in response to ocean survival conditions”. I still feel that ocean productivity is the factor, and I list biological objectives and measures to carry out the monitoring of ocean survival and management of harvest in response.

You make a valid point that proliferation of exotic fish and predation on salmonids has a relationship to habitat degradation and, therefore, improvement of habitat and water conditions under *The Oregon Plan* could reduce predation. I have added language to reflect this point.

My modification of the escapement goal measure (ODFW IA1S) should address concerns you expressed. It is now a measure to establish population health goals, and addresses other indicators of population health such as juvenile seeding, geographic distribution, and life history diversity. I agree with you that “To merely manage for maximum production from degraded habitat is not acceptable recovery of the species”. Any habitat-based production goals must be conditioned with a desire and expectation that habitat will be improved through *The Oregon Plan*.

I agree that recycling of hatchery adults back down river to increase angling opportunity and harvest rate on them does not work well in all situations. But there are situations where it works, particularly if fish are recycled just below concentrations of anglers (e.g., the South Santiam River program for summer steelhead). Our intent is to apply and monitor recycling programs cautiously to increase benefits to anglers without increasing genetic risks to wild steelhead populations beyond that allowed in the Wild Fish Management Policy. As stated in the plan, when fish are approaching their time to spawn, we will cease recycling to reduce the chance of them spawning in the wild.

I agree that determining the number of hatchery strays in the Deschutes and John Day Basins should be a priority. ODFW does not have the funds to do the work now, and I have indicated the high priority nature of this work in the new draft.

I have not included your suggestion that ODFW develop its own genetics laboratory because we have had good results contracting the work to outside specialists. Set-up costs would be high and I don't think we would overcome the problem of shipping samples; samples would still have to be shipped from sites around the state to our lab, if not another lab.

I agree that research on pinniped predation on salmonids needs to be a priority. ODFW has ongoing research and is seeking additional funding for internal and contract research. I also agree that the effectiveness of hazing seabirds to reduce predation on smolts in bays is in question and there is a need to further research the extent of sea-bird predation on wild and hatchery smolts. Because these are priorities, we have listed the needs in this supplement to the plan, but they have to be listed as Phase 2 activities until funds are acquired.

Thank you again for your comments and your strong interest in sustaining Oregon's steelhead.

Sincerely,

Barry McPherson
Fishery Restoration Leader

c Berry
Temple

December 12, 1997

Dr. Jim Hall
Dept. of Fisheries & Wildlife
Oregon State University
Nash Hall 108A
Corvallis, OR 97331

Dear Dr. Hall:

Thank you for taking the time to comment on the October 17 draft of the Fish Management section of the steelhead supplement to *The Oregon Plan*. I have attempted to address your concerns and comments in the newest draft, which will be released December 18. If you feel that your concerns and comments have not been adequately addressed, please let me know because the supplement will be revised once more before it is made final in mid-January. The December 18 draft and a list of libraries and offices where hard copies can be viewed will be posted on a web site (www.oregon-plan.org).

You make a valid point that additional angling effort stimulated by stocking of hatchery steelhead can lead to excessive harvest impacts on wild populations in some cases. This is a concern that I tried to express, but I have added additional language about managing selective harvest on hatchery adults to avoid unacceptable risk to wild adults.

Your suggestion that the supplement present some general perspective on the status of steelhead is being addressed. A status report by ODFW will be an attachment and will be summarized in the introduction to the supplement. There will also be discussions of risk agents and the adequacy of the supplement to accomplish restoration (you expressed the need for such discussions).

I agree with your concern that many of the monitoring actions are contingent upon funding. A package of state agency funding needs is being generated for pursuing funds from the Oregon legislature, the federal government, and other sources, and monitoring of steelhead and their habitats is a high priority.

I have made corrections and changes in response to your final four typographical, grammatical, and organizational comments. Thank you again for your comments and your strong interest in sustaining Oregon's steelhead.

Sincerely,

Barry McPherson
Fishery Restoration Leader

c Berry
 Temple

December 12, 1997

Mr. Robert S. Hooton
Fisheries Section, Ministry of Environment
Skeena Region
3726 Alfred Avenue, Bag 5000
Smithers, BC, Canada VOJ 2N0

Dear Mr. Hooton:

Thank you for taking the time to comment on the October 17 draft of the Fish Management section of the steelhead supplement to *The Oregon Plan*. I have attempted to address your concerns and comments in the newest draft, which will be released December 18. If you feel that your concerns and comments have not been adequately addressed, please let me know because the supplement will be revised once more before it is made final in mid-January. The December 18 draft and a list of libraries and offices where hard copies can be viewed will be posted on a web site (www.oregon-plan.org).

I agree with your concern for the need to develop pre-season or in-season estimates of abundance to regulate harvest, at least for the Columbia River fisheries which can have substantial harvest rates. I have added language about the existing process of predicting Columbia River steelhead runs and managing these fisheries according to pre-season and in-season estimates. Such estimates are not nearly as important for management of the many wild populations subjected only to sport fisheries where we estimate harvest rates are 5%-15% with our newest regulations. The allowable harvest rates on Columbia River steelhead, such as the 32% rate on the B-run you were concerned about, will be renegotiated by all co-managers in 1998 through the US v Oregon process as the current provisions of the Columbia River Fishery Management Plan expire.

As you point out, there are inconsistencies in Oregon angling regulations for what appear to be similar situations. Angling regulations are set in a very open public process with final decisions made by members of the Oregon Fish and Wildlife Commission who are appointed by the Governor with the Senate's approval. Many factors, including societal issues at the local level, enter into the final decisions.

You make a valid point that fry (or juvenile) abundance may be a better index of the strength of spawning populations. My modification of the escapement goal measure (ODFW IA1S) should be more satisfactory to you. It is now a measure to establish population health goals, and addresses other indicators of population health such as juvenile seeding, geographic distribution, and life history diversity. It appears that you are in close agreement with ODFW in our general approach to modifying hatchery programs to address wild fish concerns. You make some very valid points, particularly the point that using fish culture programs to restore depressed steelhead populations should still be treated as experimental since the evidence of this approach being successful is "less than abundant".

Your point is valid that addition of inorganic nutrients to streams may improve juvenile salmonid growth and survival at a lower cost than distributing hatchery salmon carcasses to streams. However, there are other special problems and public perception issues associated with this approach. There is evidence that carcasses provide more direct input to juvenile fish (they even feed on the carcasses) and there are potential benefits from the mix of nutrients and trace elements brought back from the ocean in adult salmon, so we want to take the more natural approach at this time.

Your comments on the nature of predator research and control are very pertinent. Public and political interest plays a significant role, and is not always predictable. There is a need for conclusive data on predation, its relation to habitat conditions, and the benefits of predator control.

Thank you again for your comments and your strong interest in sustaining steelhead resources of the region.

Sincerely,

Barry McPherson
Fishery Restoration Leader

c Berry
 Temple

December 12, 1997

Dr. Bruce Rettig
Dept. of Agricultural & Resource Economics
Oregon State University
Ballard Hall 231
Corvallis, OR 97331-3601

Dear Dr. Rettig:

Thank you for taking the time to comment on the October 17 draft of the Fish Management section of the steelhead supplement to *The Oregon Plan*. I have attempted to address your concerns and comments in the newest draft, which will be released December 18. If you feel that your concerns and comments have not been adequately addressed, please let me know because the supplement will be revised once more before it is made final in mid-January. The December 18 draft and a list of libraries and offices where hard copies can be viewed will be posted on a web site (www.oregon-plan.org).

I appreciate your supportive comments on the October draft, particularly your recognition of ODFW's attempt to use public involvement in balancing conservation against resource use. As you note, the agency's approach and measures reflect a judgment that a modest level of angling is highly valuable to local people.

You are correct in stating that the titles of ODFW IIIA2S and IIIC6S (renumbered to IIIA4S) may mislead some to the conclusion that we might eliminate all fishing if we are truly going to "minimize" impacts of fisheries on wild fish. The content and discussion of the measures clarifies that we intend to keep impacts on wild steelhead at a low level while providing a modest rate of fishing for steelhead and other species.

I agree with your concern that, as Oregon proceeds with restoration measures, new analyses will be needed to judge the benefits and weigh the often expensive alternative approaches to restoration. A chapter of the December 18 draft of the supplement, separate from the fish management section, will address these issues.

Thank you again for your comments and your strong interest in sustaining Oregon's steelhead.

Sincerely,

Barry McPherson
Fishery Restoration Leader

c Berry
 Temple

December 12, 1997

Mr. Bruce Sanford
Washington Department of Fish & Wildlife
600 Capitol Way N
Olympia WA 98501-1091

Dear Mr. Sanford:

Thank you for taking the time to comment on the October 17 draft of the Fish Management section of the steelhead supplement to *The Oregon Plan*. I have attempted to address your concerns and comments in the newest draft, which will be released December 18. If you feel that your concerns and comments have not been adequately addressed, please let me know because the supplement will be revised once more before it is made final in mid-January. The December 18 draft and a list of libraries and offices where hard copies can be viewed will be posted on a web site (www.oregon-plan.org).

In response to your comment, I have added sentences to clarify the intent of *Biological Objective C: Conduct steelhead fisheries that do not interfere with the restoration of wild steelhead*. The emphasis will be on maintaining or adding selective fisheries on finclipped hatchery steelhead in situations where there is low risk of depleting wild populations or interfering with their restoration.

I am pleased to hear of your plans to make additional assessments of mortality rates and fishery regulation compliance. ODFW looks forward to any opportunities to coordinate efforts with WDFW or apply your results to Oregon where applicable, as stated in the supplement.

Control of squawfish predation is mentioned under Biological Objective A in the fish predation part of Section 4, but you are correct in stating that it is not given much attention. It is almost entirely a mainstem Columbia River issue. As the introductory materials of this supplement to *The Oregon Plan* will explain, the supplement focuses on Columbia River tributaries and coastal streams while deferring to existing processes and forums to deal with the bulk of mainstem Columbia River issues.

As you suggested, I have changed Factor III to read “Steelhead Bycatch in Commercial Fisheries”. I have added some clarification about the term “bycatch” in the discussion of the factor.

You expressed a valid concern about the need to set priorities for restoration activities. Although I tried to indicate many of the priorities in Section 4, I realize they are not be as clear and comprehensive as needed. In a separate chapter of the draft supplement that will be released December 18, there will be a discussion of methods to set priorities and a presentation of priorities.

Thank you again for your comments and your strong interest in sustaining steelhead resources of the region.

Sincerely,

Barry McPherson
Fishery Restoration Leader

c Berry
Temple

December 12, 1997

Mr. Jim Steele
Inland Fisheries Division
California Department of Fish & Game
1416 9th Street
Sacramento, CA 95814

Dear Mr. Steele:

Thank you for taking the time to comment on the October 17 draft of the Fish Management section of the steelhead supplement to *The Oregon Plan*. I have attempted to address your concerns and comments in the newest draft, which will be released December 18. If you feel that your concerns and comments have not been adequately addressed, please let me know because the supplement will be revised once more before it is made final in mid-January. The December 18 draft and a list of libraries and offices where hard copies can be viewed will be posted on a web site (www.oregon-plan.org).

I agree with your point that steelhead tend to use higher gradient stream reaches than coho, and your recommendation that streams reaches be examined for suitability to each species before deciding on the emphasis of the habitat work to be done. You make a number of useful observations about habitat restoration and fish screening. Those two issues are not covered in Section 4, but in Section 2 and Section 3. I will pass your comments on to the authors of those sections.

You make a valid point that legislators and the public will be concerned about the cost/benefit of many measures in the supplement, yet analysis of the costs and benefits is a difficult problem. As Oregon proceeds with restoration measures, new analyses will be needed to judge the benefits and weigh the often expensive alternative approaches to restoration. A chapter of the December 18 draft of the supplement, separate from the fish management section, will address these issues.

Thank you again for your comments and your strong interest in sustaining steelhead resources of the region.

Sincerely,

Barry McPherson
Fishery Restoration Leader

c Berry
 Temple

December 12, 1997

Mr. Ed Bowles
Anadromous Fishery Manager
Idaho Department of Fish & Game
Box 25
Boise, ID 83707

Dear Mr. Bowles:

Thank you for taking the time to comment on the October 17 draft of the Fish Management section of the steelhead supplement to *The Oregon Plan*. I have attempted to address your concerns and comments in the newest draft, which will be released December 18. If you feel that your concerns and comments have not been adequately addressed, please let me know because the supplement will be revised once more before it is made final in mid-January. The December 18 draft and a list of libraries and offices where hard copies can be viewed will be posted on a web site (www.oregon-plan.org).

You expressed a valid concern about the need to set priorities for restoration activities. Although I tried to indicate many of the priorities in Section 4, I realize they are not be as clear and comprehensive as needed. In a separate chapter of the draft supplement that will be released December 18, there will be a discussion of methods to set priorities and a presentation of priorities.

I agree with your concern that factors for decline existing in the migratory corridor for steelhead of the Snake and Columbia basins may overshadow and mask progress made in addressing factors for decline in tributaries. As the introductory materials of this supplement to *The Oregon Plan* will explain, the supplement focuses on Columbia River tributaries and coastal streams while deferring to existing processes and forums to deal with the bulk of mainstem Columbia River issues.

You make a valid point that predation and exotic fish impacts on salmonids are linked to habitat degradation, or “ecosystems out of balance”. I agree with your point that fixing the habitat conditions will be far more effective in reducing adverse effects from predation and exotic fish than any manipulative fish management action could. I have added language to reflect this point.

I have added more language in the fishery regulation, enforcement, and bycatch measures that should address your point of showing state and tribal role sharing on these issues, including Zone 6 fisheries. As you suggested, I have added language under ODFW IIIC2S about ongoing coordination with NMFS on fishery management and monitoring in the Snake Basin ESU.

You expressed support for the plan’s statement of the need to maintain as many populations of steelhead as possible, not just overall abundance, so I think you will agree with my modification of the escapement goal measure (ODFW IA1S). I have modified it to strengthen the concept of focusing on overall health, not just abundance. It is now a measure to establish population health

goals, and addresses other indicators of population health such as juvenile seeding, geographic distribution, and life history diversity.

As you pointed out, improving the survival of steelhead in freshwater, not just the production, is critical to dealing with periods of low ocean productivity. I have added language to clarify.

I appreciate your supporting comments on how we have approached the issue of modifying hatchery programs in the supplement. Thank you again for your comments and your strong interest in sustaining steelhead resources of the region.

Sincerely,

Barry McPherson
Fishery Restoration Leader

c Berry
Temple

SECTION 5: DAM & HYDRO POWER COMMENTS

Invitation for Comments Letter

October 30, 1997

Inside Address

Dear

Enclosed is a revised set of Dam/Hydroelectric Steelhead Measures to replace those which you received from Oregon Department of Fish and Wildlife. These measures are different from the set that was previously sent out for review for a few important reasons.

The original version of these measures contained several proposed commitments for which there was questionable statutory authority enabling the Water Resources Department to perform the measure as written. Subsequent revision of the measures brought them more in line with both the statutes and the policies of the involved state natural resource agencies.

Unfortunately, the original version was sent to you before it was revised to reflect the comments of revising state agencies. That review process has now occurred and the enclosed set better represents the commitments which I believe can be delivered by the State. I appreciate the inconvenience of receiving these finalized measures at the last minute and I thank you for your understanding and cooperation.

Sincerely,

Paula Burgess
Governor's Assistant for Natural Resources

PB/sm

List of Invitees

Bill Liss
Bruce Rettig
Don Negri
Bob Pearce
Eugene M. (Max) Smith
Dudley Reiser
Jim Buell
Tim Hardin
Don Clark
Frank Ligon
Rich Grost
Jan Lee
Lorri Bodi
Jeff Curtis
Joni Low
MaryLou Soscia
Bill Bakke
David Bayles

Review Comments

TROUT UNLIMITED

November 25, 1997

Kammy Kern-Korot
ODFW/Habitat Conservation Division
2501 SW First Avenue
P.O. Box 59
Portland, OR 97207

Jay Nicholas
Oregon Department of Fish and Wildlife
28655 Highway 34
Corvallis, OR 97333

Dear Ms. Kern-Korot and Mr. Nicholas,

Trout Unlimited appreciates the opportunity to comment briefly on the hydropower/large Dam section of the Oregon Salmon Plan Steelhead Supplement. As a national organization with approximately 100,000 members dedicated to conserving, enhancing, and restoring wild coldwater fish and their habitat, we have been involved in dam relicensing and other Federal Power Act and hydroelectric issues throughout the United States.

Trout Unlimited is encouraged that Oregon is taking steps to halt the decline of native steelhead populations. However, we do not believe the steelhead supplement, including the Hydropower/Large Dam section, goes far enough to recover and restore steelhead populations. We have reviewed and agree with the comments recently submitted to the state by American Rivers regarding hydropower and large dam objectives and measures. While collaborating with dam owners and operators to formulate resource objectives and implementation measures should be encouraged, the state must realize that it has the authority to move forward in many instances to impose actions necessary for species restoration and recovery. As an example, the state should be prepared to invoke reopener provisions in existing licenses in order to make necessary changes in minimum flows or ramping rates to protect fish or other ecological processes. In short, the hydropower/large dam section is an attempt by the state to formulate a consensus document without acknowledging that a strong public interest other than that of the operator exists. As American Rivers notes, “[t]here will be no steelhead recovery without mandatory, timely remedial action.”

Trout Unlimited does have one specific comment regarding state measures pertaining to the Grants Pass Irrigation District and fish passage problems at Savage Rapids Dam. The Water Resource Department's commitment to "not issue a final water right certificate until the fish passage problem is solved" is not sufficient. On October 2, 1997, the Oregon Water Resources Commission directed the district to take specific steps towards dam removal prior to February, 1998, or face a reduction in allowed water use. Specifically, the district must submit a plan to the Commission detailing its plan and timeline for dam removal including explicit funding provisions. Therefore, the state should be exceedingly clear in the final version of the hydropower/large dam section of the steelhead supplement that if the district does not comply with the Commission's requirements, the state should revoke the district's permit to divert and use the additional flows.

Again, we appreciate the opportunity to comment on the hydropower/large dam section of the Oregon Salmon Plan Steelhead Supplement. Please don't hesitate to call us with additional questions or comments.

Thank You,

Jeff Curtis
West Coast Conservation Director

AMERICAN RIVERS

November 24, 1997

Via Facsimile and First Class Mail

Kammy Kern-Korot
ODFW/Habitat Conservation Division
2501 SW First Avenue
P.O. Box 59
Portland, OR 97207

Jay Nicholas
Oregon Department of Fish and Wildlife
28655 Highway 34
Corvallis, OR 97333

Re: Comments of American Rivers on the Hydropower/Large Dam Chapter of the Oregon Plan Steelhead Supplement

Dear Ms. Kern Korot and Mr. Nicholas:

American Rivers appreciates the opportunity to comment on the above-referenced document. As you may know, American Rivers' Northwest Regional Office is presently working in Oregon and throughout the Pacific Northwest to reform dam operations to protect and restore native anadromous and resident fish, including steelhead.

American Rivers applauds Oregon's initiative to develop an effective steelhead recovery plan. This call for action is long overdue. However, we believe strongly that the Steelhead Supplement should not substitute for an ESA listing unless it requires timely actions by dam owners/operators that will result in operational and/or structural changes necessary to meet the needs of steelhead and other native anadromous species.

Northwest Regional Office
400 East Pine Street
Suite 225
Seattle, WA 98122-2360
206-323-8186
206-323-8188 (Fax)
arnw@igc.apc.org (Internet)

Although we support a collaborative approach between the State and dam owners/operators to develop remedial actions and an implementation schedule, if agreement cannot be reached, the State must move forward with those measures it deems necessary for recovery. In short, the needs of the steelhead, not the desires of dam operators, must be paramount. Governor Kitzhaber acknowledged this recently when he stated: “For too long, we have labored under the assumption that we can recover salmon without incurring political or economic costs. We can’t. The bottom line is effective salmon recovery based on sound science is going to cost everybody something.”

Our comments are directed primarily at the factors of decline, objectives for addressing those factors, and the proposed remedial measures. Our comments on the proposed remedial measures at specific dams focus on the types of measures proposed and the implementation schedule, as opposed to the efficacy of each proposed measure. Our ability to comment on the efficacy of project-specific measures is severely hampered by the lack of basin and project-specific information regarding population status and factors of decline in each of the basins where the measures would apply. For example, if the lack of fish passage facilities is the primary factor of decline for a population in a specific basin, merely improving water temperature and ramping rates will not lead to run recovery. This gap must be filled before the Supplement’s likely efficacy can be determined.

COMMENTS

Statement of the Problem

In paragraph 2, handling mortality should be identified as a risk associated with barging and trucking of fish.

In paragraph 5, it is the location of the intake, not the type of outlet structure, that affects water temperature below the project.

Paragraph 6 should be revised to make it clear that flow regulation changes both the quantity and timing of flows, and that those changes occur both on a daily and seasonal basis.

In paragraph 7, reduced production in the littoral zone should be identified as another adverse consequence of reservoir fluctuation.

Paragraph 11, which discusses turbine mortality, should identify tailrace attraction as another aspect of this problem.

If not addressed elsewhere in the Supplement, a paragraph should be added regarding the changes in the composition of the fish community in reservoirs, particularly the introduction of exotic species.

Solutions to the Problem

The last sentence of the first paragraph should be revised to more accurately state the need for dam removal. We suggest the following: “In some cases, dam removal and site restoration may be warranted to restore or provide access to critical habitat, or to eliminate unacceptable mortality.”

Proposed Measures

A. Water Quality

1. Factors of Decline and Biological Objectives

A-I. *Temperature*

Objective AI-1 should be revised as follows: “Ensure that water temperatures in stream reaches above and below dams meet state water quality standards.”

A-III. *Dissolved Oxygen*

We propose the following for the overarching biological objective: “Assure that dissolved oxygen levels are adequate for steelhead and other native cold-water species.” Competition is not the only factor of decline related to DO, as noted in the preceding explanatory statement.

A-IV. *pH*

Objective AV-1 is a restatement of the overarching objective. We propose revising it as follows: “Ensure that all dam-affected stream reaches comply with the State’s pH water quality standard.”

A-VI. *Compromised Biological Conditions*

This factor is too broad and vague for meaningful remedial measures to be designed, and therefore is not useful. It should be omitted.

A-VII. *Toxics*

Revise the overarching objective as follows: “Assure that toxic chemicals do not accumulate to levels that affect reproduction, growth, or mortality of steelhead.”

A-VIII. Altered Stream Fertility

Similar to factor A-VI, this factor is not useful for identifying remedial measures, and therefore should be omitted.

1. Statewide Measures

Verifying that existing state water quality standards for each of the parameters discussed in this section are adequate to protect steelhead and other native salmonids, should be added as another statewide measure.

We are very concerned about the delay and lack of commitment to specific remedial actions inherent in proposed measures DEQ 2 and 3. Improving hydro operations through relicensing and the TMDL process adds nothing new: DEQ has that responsibility now. Although those measures should be pursued, they are not enough.

In our view, the State should seek to change operations as soon as possible at the dams where operations and/or facilities need to be improved. The State should then identify the specific remedial measures needed and implement those measures in a timely fashion. Of course, the State should work cooperatively with dam owners to identify and implement remedial measures, but if agreement cannot be reached, the State should use its legal authority to implement remedial measures. In the case of hydroelectric dams, that means invoking reopener provisions in existing licenses.

Regarding Measure DEQ 2, we support the use of water quality reopener provisions in State 401 certifications. This is essential to improve project operations should the initial certification terms come up short of the objective.

1. Project-specific Measures

Measure PacifiCorp 1, to increase bypass reach flows to reduce summer water temperatures at the Powerdale Project, should not be conditioned upon PacifiCorp receiving an additional water right for 120 cfs. The higher flows should be implemented immediately. The principle is that needed remedial measures should not be subordinated to the economic interest of dam owners. Protecting steelhead and other public resources is a cost of doing business.

Measure PacifiCorp 2, to replace fish screens at the Powerdale project, should also not be contingent upon PacifiCorp obtaining an “acceptable new license.” While we recognize PacifiCorp’s interest in limiting cost and obtaining favorable license conditions, remedial measures should not be held hostage. Of course, PacifiCorp should receive full credit for screen replacement when mitigation requirements at the time of relicensing are determined.

Measure PGE 1, to form the Sandy River Fisheries Working Group, is a laudable initiative, but not a recovery action. The group may, however, provide a useful forum for designing and implementing recovery measures. Identifying those specific measures and an implementation schedule should be the focus of the Supplement.

Similarly, measure PGE 2, monitoring temperatures in the project bypass reach of Marmot Dam, while certainly not objectionable, does not constitute a remedial action. We know now that flows are inadequate in the bypass reach and should be increased to improve salmonid habitat as well as reduce temperatures. Accordingly, instream flow requirements should be identified and implemented as soon as possible, and PGE should obtain credit for those measures during relicensing.

We are surprised to see that there are no proposed measures regarding the City of Portland's dams on the Bull Run River, a tributary of the Sandy. Two of these dams lack fish passage facilities. In addition, and perhaps more pressing, is the lack of adequate flows below these dams. Reduced flows adversely affect anadromous fish habitat in both the Bull Run and the Sandy, and contribute to water quality problems. Accordingly, the development and implementation of a minimum flow plan below Headworks dam should be a specific measure in the Supplement. In addition, an investigation of the feasibility of reintroducing steelhead and other salmonids above Bull Run Dams No. 1 and 2 should be included as an action measure.

Measure PGE 3, continue funding the Clackamas River Fisheries Working Group, is similar to measure PGE 2. See comments above. Specific remedial measures for PGE's Clackamas Basin projects, such as effective juvenile passage facilities, should be provided in the Supplement.

There are several other hydro dams in the Clackamas Basin, such as River Mill Dam and the Oak Grove Project. We understand that the fish passage facilities at the former are inadequate, and that flows below the latter are in need of improvement. Measures should be included to address both problems.

A. Physical Habitat

1. Factors of Decline and Biological Objectives

Aside from the obvious need for biological objectives for most of the listed factors, there seems to be some overlap. Factors B-III and B-IV seem to be encompassed by B-II, geomorphic changes. The connection between loss of estuarine rearing habitat dam operations needs to be clarified. Finally, the meaning of "direct take" as a factor of decline is unclear.

2. Statewide Measures

Measure WRD 1, requiring geomorphic evaluations, has been substantially weakened in its revised form. Measures should go beyond merely identifying where changes are needed; they should also identify mechanisms for achieving those changes in a timely fashion.

1. Project-specific Measures

See previous comments on measure PacifiCorp 1.

See previous comments on measure PGE 1.

Measure PGE 4, a firm commitment to fund fish and wildlife enhancement projects in several river basins affected by PGE dams, is the type of action-oriented measure necessary for steelhead recovery.

See previous comments on PGE 3.

A. Water Quantity/Fish Passage/Fish Screening

1. Factors for Decline and Biological Objectives

C-I: *Flow alteration*

“Operate projects to simulate natural flow conditions on both a daily and seasonal basis,” should be added as a discrete biological objective.

C-II: *Obstructions to fish passage*

We propose combining Objective CII-1 and –2 as follows: “Ensure that all dams within the anadromous zone have adult and juvenile fish passage facilities that meet NMFS design criteria and effectively pass fish.” These objectives, as currently drafted, do not mention juvenile passage facilities. In addition, there is no need to qualify this language with terms such as “if feasible” and “if consistent with recovery plans.” Of course, if the recovery plans do not call for fish passage or fish passage facilities will not be effective, fish passage facilities should not be required, but that should not change the objective.

We propose adding the following objective: “Remove dams that block access to critical salmonid habitat if effective fish passage facilities cannot be built.”

Objective CII-3 is too vague and broad. We propose the following language: “Operate reservoirs to prevent mortality and interruption of migration of adult and juvenile salmonids.”

C-III: *Inadequate screening*

We propose adding the following objective to address tailrace barriers: “Ensure that effective tailrace barriers are installed to protect migrating adult salmonids.”

C-IV: Loss of riparian habitat

The term “riparian” in the description of the factor appears to be a mistake and should be replaced with “riverine.”

The loss of salmonid habitat is a given when a dam is constructed within the anadromous zone. Accordingly, the overarching objective should be: “To minimize the loss of salmonid habitat caused by dam impoundments, and to restore key riverine habitat essential to salmon and steelhead recovery.”

Because new dams will inundate salmon habitat, objective CIV-1 makes no sense. We propose revising the objective as follows: “Prevent new dam construction that would eliminate steelhead habitat.”

Objective CIV-2 appears to contain both an action (evaluation) and an objective. We propose revising this objective as follows: “Obtain full mitigation for all salmonid habitat losses related to reservoir inundation.”

We propose adding the following two objectives: (1) “Modify operations at existing dams to reduce reservoir area and restore steelhead habitat”; and (2) “Remove dams where necessary to restore critical salmonid habitat essential to stock recovery.”

1. Statewide Measures

Measure WRD 2, amend current licenses to improve fish passage, has also been substantially weakened in its revised form, indicating that the Supplement is heading in the wrong direction. The original measure called for identification of priority dams where fish passage and minimum flows are most desperately needed, and then a specific action to remedy the problem – amend state and/or federal licenses to require improved fish passage and minimum flows. In contrast, the revised measure calls for only “a voluntary program wherein project owners may amend the terms and conditions in their state licenses” to improve passage and flow conditions at the projects. This change renders this measure virtually meaningless and takes us back to the status quo. There will be no steelhead recovery without mandatory, timely remedial action.

This measure should be revised to establish a collaborative process between the State and the project operators for identifying specific passage and flow measures at these high-priority projects, and deadlines for completing the collaboration and requesting amendments to state and federal licenses so implementation can begin. The measure should also clearly state that if agreement cannot be reached through the collaborative process, the State shall exercise whatever authority it has to implement the necessary recovery measures, such as reopening project

licenses. Operators would then be credited at the time of relicensing or reauthorization for the remedial measures taken.

1. Project-specific measures

See previous comments on PacifiCorp 1 and 2 under water quality section. In addition these measures are stated differently in this section of the Supplement.

Expedited handling of and support for changes in water rights at PacifiCorp's Powerdale project (Measure WRD 3, Measure ODFW 1, and Measure DEQ 4), are not remedial measures as we believe that term should be defined. Those commitments should be part of PacifiCorp 2 – to increase flows below the project. Similarly, Measure ODFW 2, WRD 4, and DEQ 5, petition FERC to expedite licensing of Powerdale, is apparently a vehicle for obtaining timely construction of new fish screens, and as such should be part of PacifiCorp 2.

Measure PacifiCorp 3, participate in Hood River watershed council, is similar to PGE's proposal to establish fishery working groups in several basins. Though certainly a positive action, it does not require any specific actions that would protect steelhead.

Similarly, PacifiCorp 4, study reservoir passage criteria, may provide useful information in the long-run, but is not an action-oriented recovery measure. Existing problems with passing downstream migrating juveniles through reservoirs need to be addressed through operational and structural improvements.

Measure PacifiCorp 5 appears appropriate because it proposes action to remedy a known problem.

Measure FID 1 appears to be an irrigation, not hydropower, issue.

Measures FID 2 and MFID 1, because they appear to be firm commitments to take the proposed action, seem appropriate.

There is insufficient information regarding the significance of the degradation on the East Fork Hood River tributaries to determine whether measure MFID 2 is sufficient. The 10-year lag time before conditions are improved is of particular concern.

Measure PGE 5 appears to be appropriate because it is an unconditional commitment to improve juvenile passage in a timely manner.

Measure PGE 6, to begin a comprehensive evaluation of needed fish and wildlife mitigation measures in preparation for relicensing of the Marmot/Bull Run project, is not enough. Clearly, some of the issues, such as fish passage may require extensive analysis warranting a delay in immediate implementation of a remedial measure. However, other

changes, such as minimum flow adjustments and ramping rates, should be evaluated on an expedited basis and remedial measures implemented as soon as possible. PGE should receive credit during relicensing for such mitigation measures.

Measures PGE 7-9 are a start to addressing passage issues at these PGE projects, but there needs to be a timeline for completing studies and implementing remedial measures.

Our comments on measure PGE 6 also apply to measures PGE 10, 11, and 13.

For measure PGE 12, a firm timeline should be set for completion of the juvenile bypass system evaluation and the implementation of remedial measures to bring the Sultan Plant bypass into compliance with state and federal standards.

Measure WRD 5, coordinating state input for the operation of the Army Corps' Willamette River Basin reservoirs, is not a remedial measure. A firm commitment to obtain additional fish flows is needed. Of course, the amount of water obtained for fish flows must be based on the needs of fish, not the amount of available, uncontracted water. If the uncontracted water is not enough to provide adequate fish flows, additional water should be obtained from other sources.

Measure Corps 1, to continue to work with state and federal agencies to develop a conservation release plan, is similarly not a remedial measure. As noted in the explanation, deviation from the plan is frequent during the summer months. What is needed is a firm allocation of water from these projects to meet fish flows that is not subject to change based on the needs of other water users. This should occur through the Willamette Basin Review, addressed in measure Corps 2.

We lack sufficient information to comment on Corps measures 3-7.

Measure WRD 7, withhold water right certificate until fish passage issues are resolved at Savage Rapids Dam, is inadequate. In early October, the Water Resources Commission directed the Grant's Pass Irrigation District to develop, by February 1, 1998, a timeline and action plan for dam removal. This mandate followed the determination by NMFS that dam removal is the best option for protecting "threatened" Rogue River coho, a conclusion which holds true for steelhead as well. Accordingly, the Supplement should require timely completion of GPID's dam removal plan, and a firm obligation to implement the plan. The Supplement should also explicitly state that failure to complete or implement the plan will result in revocation of GPID's permit for additional water.

We are not commenting on the Fish Management Factors of Decline or the proposed measures to address those factors, as we understand that they are more fully addressed in other sections of the Supplement. Generally, we agree that hatchery supplementation should be used only to the extent consistent with the recovery of wild stocks.

In closing, American Rivers wishes to emphasize the need for a recovery plan based on specific, scientifically sound remedial actions and a timely implementation schedule. As explained above, we believe that the proposed remedial measures in the current draft are inadequate, and that substantial improvement is required before the Steelhead Supplement presents a credible, effective plan for steelhead recovery.

Sincerely,

Robert J. Masonis
Hydropower Coordinator,
Northwest Regional Office

Cc: M. Bowman, American Rivers
R. Benson, Waterwatch
J. Curtis, Trout Unlimited
J. Myron, Oregon Trout

From: "Richard T. Grost" rgrost@compuserve.com
To: "ODFW, Jay Nicholas" <nicolaj@ccmail.orst.edu>, "O...
Date: 11/3/97 1:07PM
Subject: hydro / dam steelhead comments

Hello Jay and Kammy, here are my comments regarding the dam and hydropower chapter of the steelhead supplement to the Oregon Plan. First a commendation for attempting such an "overarching" document -- dam / hydropower projects are notoriously complicated and addressing all in one document is a noble exercise. Now a disclaimer: as an independent volunteer on this project I had limited time and no \$ available -- consequently this is a brief, general review, not a comprehensive one. I could help out in a more comprehensive way if the resources became available to support this. I hope these help to improve and complete the plan.

Richard Grost
RTG Fishery Research and Photography
541-496-4580

Following are my main comments. First I'll give my best current answers to your 8 review questions, then comment on specifics and generalities in the draft.

Question (Q) 1: relevant factors of decline -- No, the draft does not explicitly list all. I suggest that 2 of the larger factors of decline could be: 1) flow fluctuations (ramping) downstream of dams and powerhouses, and 2) interception of bedload (gravel and cobble) necessary for spawning and rearing habitat and food production downstream of dams. Neither of these are explicitly described in the draft. They should be added to the "overview" list of negative ecological impacts as well as to specific "factors of decline" in the habitat section. See detailed comments below.

Q 2: factors of decline described appropriately -- No, the "overview" descriptions are confusing and sometimes misleading. For instance, there is no differentiation between impacts caused by "dams" vs. operations of the dams (e.g. hydropower, water withdrawal, impoundment of water) and the fact that there are many different configurations of dams and facilities, each with specific features. Even for a general discussion, this needs to be made much more clear. Perhaps add a paragraph describing large storage projects (huge reservoirs, small or no diversion reaches) vs. Diversion hydro projects (small reservoirs, long diverted reaches) vs. Irrigation diversions (most / some water doesn't return to river). Similarly, statements like "dams cause..." are used pervasively, yet many dams DON'T cause the subsequently described problem. I suggest subheadings in this section to help clarify the impacts and reduce redundancy in the descriptions. In the "factors of decline" section, the "physical habitat" section is incomplete and one of the most important elements.

Q 3: do biological objectives address factors of decline appropriately? =Sometimes, but not all factors of decline are clearly elucidated. They appear to be steps in the right direction. Will achieving the objectives reverse the decline of steelhead (assuming all other management is adequate)? I hope so, but am not holding my breath.

Q 4. are measures adequate to achieve the biological objectives? No, in most cases -- for instance working groups do nothing measurable relative to the objectives. do they move in the right direction? Yes. can they be completed within suggested time frames? Only with strong incentives -- many measures (e.g. working groups) have no time frames associated with on-the-stream implementation. other management measures? Yes -- any efforts to: a) streamline relicensing, and b) facilitate implementation of interim measures (before new licenses are issued) would be beneficial to getting on-the-stream improvements and thus reduce time frames for implementation of measures. ODFW's recent new staff positions dedicated to hydropower relicensing is a step in the right direction here, and perhaps worthy of mention as a "statewide measure".

Q 5: are analyses and conclusions consistent with the literature? What analyses and conclusions?-- the general statements appeared mostly accurate to me. is more research needed? Not in general, but site-specific conditions are always important to understand for each project / river (hence working groups and relicensing studies ARE useful).

Q 6: will measures result in a measurable reduction of ecological impacts? Yes, in some cases -- increased instream flows (e.g. at Powerdale) and fish passage (e.g. Sullivan Plant) are measurable. will improvements occur soon enough to recover the species? Only with strong incentives.

Q 7: is monitoring adequate? No -- very few of the measures explicitly indicate any monitoring for success, and several imply there will be none (e.g. build fish passage to meet NMFS criteria, presumably with the assumption that such facilities will adequately work and not need monitoring or adaptive efforts). what additional monitoring is necessary? Every measure should have a criteria for success and should be monitored at the appropriate time-scale (perhaps annually in most cases) to describe the success or failure and proposed reaction.

Q 8: what are the most effective elements (priority items) of the supplement? An apparent desire by the state and project owners to facilitate relicensing decisions and implementation of improvements at hydropower projects. Specific comments: [brackets =3D strike out] CAPS =3D NEW TEXT Introduction: define "healthy", at least generally (e.g. naturally reproducing populations of wild fish large enough to allow harvest without diminishing future generations? some percentage of estimated populations during pre-European times?)

Statement of Problem: first sentence rewrite to be: "Dams and hydropower projects have significantly altered many natural river systems in the Northwest to provide beneficial uses (e.g. flood control, electricity, irrigation) to our society."

Para 2: indicate major dams are >10 ft high (also cite source for figures) 2E..diminished the ability of [the state's waters] SOME RIVERS to [regulate temperature,] transport sediments and nutrients, dilute contaminants, and [trigger...] SUPPORT HEALTHY POPULATIONS OF NATIVE FISH AND OTHER AQUATIC ORGANISMS.

Para 3: 2E..impacts dams AND THEIR ASSOCIATED FACILITIES can cause. Numbered items: In general -- this section may be streamlined and clarified by organizing into impacts UPstream of dams (e.g. inundation by reservoirs), AT dams (e.g. fish passage up and down), and DOWNstream of dams (e.g. lack of bedload transport beyond dam).

1) Dam[s] OPERATIONS can reduce river [levels] FLOW by... comment: I don't believe that "Most original state and federal licenses...did not require flow to the bypass reach" -- please check the facts on this; does this statement allow that many hydro projects DON'T HAVE bypass reaches?

2) rewrite first and second sentence to read: Dams can inhibit or prevent the upstream migration of fish. (i.e. remove confounding words about nutrients, etc. -- they are in other paragraphs)

10) ...hold back ROCKS, GRAVEL, SAND, silt, debris, and nutrients TRANSPORTED DOWNSTREAM BY RIVERS.

11) rewrite paragraph to read: Dams can injure or kill downstream-migrating fish as they are entrained into diversion waterways, through turbines, or through spillways. Fish screens can reduce the injury and mortality at some waterways and turbines, but can also impart injury if improperly designed and maintained. Spillway designs can be altered to reduce injury. Operational changes can also help reduce entrainment at some sites.

ADD NEW ITEM NUMBER:

13) Hydropower operations can cause rapid fluctuations in river flows (ramping) downstream of dams and powerhouses, sometimes on an hourly or daily basis for power generation. Rapid flow increases and decreases can potentially affect the behavior of salmonid juveniles (e.g. feeding) and adults (e.g. migration). Rapid drops in flow can strand fish along dewatered stream margins where they may die or be killed before flows increase again. Projects that ramp frequently on a daily cycle (e.g. for load following or peaking) could produce cumulative impacts which become substantial to the population of juvenile fish.

Solutions to the Problem

Comment: Dam removal should not be considered "extreme". Engineers and (most of) society did not consider it extreme to build these dams, and it is not extreme to demolish other engineered structures (e.g. buildings, bridges). Perhaps "experimental" is a better adjective, since each dam has specific constraints and too few dam removals have occurred to predict outcomes empirically.

WHY does this chapter NOT deal with Bonneville Dam?

Proposed Objectives / Measures -- I did not review these comprehensively for specific comments.

General comments:

There is much redundancy of measures in different sections (e.g. increased instream flows at Powerdale project, funding of working groups at Sandy and Clackamas Rivers appear many times). Anything to reduce this would be beneficial. EWEB (Leaburg/Waltermville projects) is conspicuously absent from any "measures" in this draft.

Physical Habitat sections -- is now incomplete, needs explicit description of bedload interception at most dams and impacts to downstream river habitats, esp. salmonid spawning and rearing habitat.

Voluntary programs -- measure WRD-2 would establish a voluntary program by which project owners could amend license terms to benefit steelhead via fish passage and instream flow changes. Measure ODFW-4 describes the unwillingness of a project owner to voluntarily install fish screens. This contrast and the uncertain future of hydropower rates (i.e. deregulation fears) suggests that not much \$\$\$ will be spent for voluntary programs.

END of comments by Richard Grost, RTG

November 4, 1997

Kammy Kern-Korot
ODFW/Habitat Conservation Division
2501 SW First Avenue
P.O. Box 59
Portland, OR 97207

Dear Ms. Kern-Korot:

Thank you for the opportunity to review the Hydropower/Large Dam Project chapter of the Oregon Plan Supplement for salmon and stream restoration.

As an economist, I cannot comment on the biological efficacy of the proscribed measures to increase fish populations since that is not within the realm of my expertise. However, I find it highly unusual that the plan does not cite any scientific studies that support the proposed measures.

From my perspective as an economist, I cannot help but note the conspicuous absence of any economic analysis in the plan. In a world where resources to address salmon restoration are limited, the lack of any economic considerations is, in my view, wholly inadequate. By now it must be obvious that restoration of healthy salmon populations in Oregon rivers and streams is going to be costly. If the State of Oregon is serious about salmon recovery then, at the very least, it should be committed to efficient use of scarce resources, maximizing the number of fish restored per dollar spent. Thus, efficient use of limited funds must be paramount in any recovery plan.

The stated goal of the recovery plan is “to restore populations of steelhead/salmonids and other fish species of concern to levels that are healthy.” There will be several alternative means of achieving this goal, some more expensive than others. In principle, the allocation of scarce recovery funds maximizes fish restoration when the last dollar spent on each restoration project restores the same number of fish. If that economic condition does not hold, then there is an alternative allocation of funds that will restore more salmon. Of course, since the relationship between the projects and the number of fish restored to the system may be subject to scientific uncertainty, the allocation of funds that maximizes fish populations may not be easily determined. But the question of efficacy of alternative allocations of funds is never addressed.

In my view, an effective recovery plan must examine the issue of cost effectiveness in meeting the stated goal.

I hope these comments will contribute to strengthening the plans to restore salmon to Oregon rivers and streams.

Sincerely,

Don Negri
Associate Professor of Economics
Willamette University

COMMENTS ON DAM AND HYDROPOWER CHAPTER

Supplement to the Oregon Plan

Comments of Dudley W. Reiser

I have reviewed the subject document and offer the following general and specific comments. Recognizing that the document is being developed for submittal to and consideration by the National Marine Fisheries Service (NMFS), perhaps my biggest concern with the document as prepared, is its lack of scientific support and technical detail to support both the impacts being ascribed to hydropower operations, and the measures that are being offered to mitigate/eliminate such. The document provides a very general review (at best) of impacts and effects of hydropower and dam operations on salmonid fishes, without providing any technical references from which the reader (NMFS) will be able to judge the conclusions and statements of fact (as they are portrayed). The sections describing the general impacts should be replete with references from technical journals and books, and the sections concerning specific projects should contain site specific information and reports. The measures being promoted as benefiting the resource should at least allude to other projects where similar actions have proven effective.

Specific comments are presented below and are referenced by page, section, and paragraph. I have also faxed sections of the document containing additional comments made directly on the manuscript.

- 1) Page 1, section I, para 1, - the stated goal alludes to restoration of salmonids to levels that are “healthy”. This seems unnecessarily vague and should include a bit more detail. Shouldn’t the goal be to restore, promote and attain stocks that are self-sustaining, harvestable, and that maintain the original genetic integrity and diversity of the different populations? Some additional thought is warranted here.
- 2) Page 1, section I, para 4, - re: the organization of the Chapter, seems like Water Quantity should be a separate section and NOT included as part of Fish Passage, and Fish Screening chapter. Water Quality is stand alone, and relative to hydropower projects, water quantity is one of the major impacts associated with such.
- 3) Page 1 - 3, section 1, para 5, - the summary paragraphs of the major impacts of hydropower projects need to include citations and references to studies that support the statements of impact noted. This doesn’t have to be a comprehensive literature review, but at least some citations/examples that serve to demonstrate these are real impacts. This will add credibility to that section. Should also consider changing the degree of certainty you are ascribing to each impact, e.g. “In the worst cases , bypass reaches below “are completely dewatered” ; change to “can become completely dewatered”. This holds true for other summary paragraphs as well.

4) Page 1, section 1, para 6 - omit “flow of plants” ; this seems like a stretch of the impacts and I am not aware of any project to which the issue of lack of “plant” flow has been raised. Not normally associated with hydropower impacts.

5) Page 2, section 1, para 1 cont.(# 2) - need to differentiate impacts between adult and juvenile fish (i.e. upstream passage for adults, downstream passage for juveniles and smolts). I’m not sure of impacts associated with “diminution of homing abilities”. I recall some studies in the Snake that demonstrated smolts require only a relatively small amount of time in natal waters (during critical imprinting period) in order to home with high accuracy to natal systems. Provide example/citation on that one.

6) Page 2, section 1, para 2 (#3) - discussion on flows as transport vehicle is somewhat confusing; e.g. “salmon ..depend on steady flows to flush them downstream as smolts”; however, smolt out-migration typically occurs in response to high flows (run-off) or pulse flows (freshet/spate) which trigger out-migration. Steady flows imply constant magnitude of flow which is not what smolts are sensitized to.

7) Page 2, section 1, para 3 (# 4)- mention should be made that creation of lacustrine environments can also shift biological advantage to exotic or introduced species that can become predatory or compete with native stocks. This warrants mention in a number of other sections as well.

8) Page 2, section 1, para 4 (# 5) - need to include spawning and egg incubation among the list of life stages impacted by temperature change (can delay or accelerate both depending on temperatures). Temperature changes (e.g. lower temperatures) can also affect growth of juvenile fish and therefore timing of smoltification, and outmigrations (potential delay).

9) Page 2, section 1, para 5 and 6 (# 6 and 7) - Riparian habitat affected by peaking flows? peaking a cause of downstream soil erosion and vegetation erosion? Need to give example; this seems unlikely. However, peaking regimes can create long and sometimes expansive varial zones within which aquatic biota, notably aquatic invertebrates and periphyton assemblages cannot be established and hence, productivity within those areas is much reduced.

10) Page 2, section 1, para 7 (#8) - focus of para is on reservoir; need to mention water quality changes in river segments below dams; fluctuations in flow can cause dramatic changes in water temperature, d.o., etc..depending on depth of release water.

11) Page 2, section 1, para 8 (#9) - omit reference to impacts on “vegetation” as result of release of oxygen poor water - this should actually benefit plants since CO₂ is their mainstay.

12) Page 3, section I, para 1 (#10) - many impacts noted in this paragraph; degree of certainty of some seems weak - e.g. accumulation of heavy metals and pollutants (do you have an example of this?) . One of the more common impacts of dams relative to salmonids is the potential elimination of gravel recruitment to downstream sections of the river below the dam. The dam

effectively traps the upstream gravel supply and therefore spawning gravels downstream often, overtime, become depleted due to continued transport. Thus, spawning gravels often become depleted or greatly reduced below dams. This is not always the case, provided there are tributaries below the dam that continue to provide gravel to the mainstem river.

13) Page 3, section I, para 2 (#11) - add “cavitation” to list of effects of turbine operations that can injure fish.

14) Page 3, section I, para 3 (# 12) - mention should also be given to “introduced/exotic” species as being favored by reservoir construction - increased predation, competition, etc..

15) Page 3, section I, para 4 - other operational changes that should be mentioned in context of benefiting the resource include; flushing flow releases to mobilize and transport sediments below dams; pulse flow releases for smolt out-migration, ramping rate limits to minimize/eliminate stage changes and stranding potential, etc.. Seems like a bit more detail could be added to this section.

16) Page 4, section A-1, para 3 - need to add technical references. Need to mention inter-dependencies of temperature and other parameters, e.g. D.O., etc..

General Comment: use of term - Overarching Biological Objective seems awkward - suggest different terminology. Objective AI-1 and AI-2 seem like essentially the same thing. By meeting DEQ’s standard, won’t you more closely mimic natural temperature regimes. Also - how do you define what “natural temperature regime” is? Also - I recommend for each mention of a DEQ standard, that you include the specific standard for that parameter - what is temperature standard? pH standard

17) Page 4, section A-II, para 6 - this discussion seems technically weak and disorganized. I generally do not consider high sediment loads as a logical consequence of hydropower operations. Indeed, streamflows below dams are generally much cleaner than upstream due to settling out of sediments upstream. This can cause some local scour and erosion downstream as the “hungry” water seeks equilibrium with its energy potential. However, projects which have been in operation for a number of years have already resulted in downstream channel adjustments. Some of the effects cited seem a bit of a stretch - e.g. reference to high sediment loads impairing homing instincts - I know of no situation where this has occurred. Check terminology and sentence structure - e.g. suffocating habitat for macro-invertebrates on which they feed - how do you suffocate habitat? This section needs work and further embellishment.

18) Page 5, section AII , para 3 - does DEQ have a standard for sediment levels in gravels; if not, should consider developing one. This would need to consider baseline/background levels of streams, and could be based on maintaining concentrations of fine sediments below some level. Objective AII-2 seems overly vague and general - what is meant by improve? shouldn’t these be quantitative?

19) Page 5, section A-III - lack of D.O. is a common cause, or “can be” a common cause? Low D.O.’s also detrimental to egg incubation and fry development - can result in smaller fry at emergence. I question association of low D.O. and decreased competitiveness with warm water species! Biological Objective seems awkward - D.O. levels suitable for salmonids are fundamental to the propagation and sustainment of aquatic ecosystems that harbor trout and salmon. Focusing on “competitiveness seems mis-directed and reduces significance of the parameter. Rework the objective. Objective AIII - 1 - what is the DEQ D.O. standard?

20) Page 5, section A-IV, para 4 - Overarching ...objective: assume you mean “ and” other species of concern rather than “of” other species of concern - check other sections for this same error.

21) Page 5, section A-V - elevated hydrogen ion activity? Why not just elevated pH levels? on page 6 - what are the direct and indirect effects? death, reduced growth, stress, disease? Does DEQ have pH standard?

22) Page 6, section A-VI - I don’t follow logic of why “Compromised Biological Conditions” is even mentioned under the section of Water Quality. Seems out of place. What is meant by “Managing projects” as an Objective under this section? Omit.

23) Page 6, section A-VII - why focus on mercury? I’d suggest keeping this generic, i.e. objective is to keep all contaminants at levels below state standards. Question - what is meant by “naturally occurring toxic chemicals”? aren’t we talking about contaminants that have been introduced?

24) Page 6, section A-VIII - stream fertility/salmon carcass reductions? water quality related - how do hydropower projects relate to this? I know of no project which actively removes carcasses post-spawn. The lack of carcasses is a function of the lack of returning adults, which could be related to the hydropower operations via other impacts - not water quality.

25) Page 7 - it is unclear how the “Statewide Measures” factor into addressing the water quality impacts noted earlier. Seems like these should be discussed with each of the specific impacts; e.g. sediment standard discussed when describing impacts of sedimentation. Are the DEQ standard modifications already planned and scheduled for implementation, or are these conceptual recommendations contingent on further agency review and evaluation. The point is timing. Are the proposed revisions by DEQ going to occur soon enough to affect a positive change relative to steelhead survival, in the short term, or are these long term measures which will have little effect on curtailing the need for near term listing.

D. Reiser comments on Hydropower Chapter (Continued)

26) Page 8 - at this point, the chapter begins discussion of measures specific to individual projects. Organizationally, it may be best to hold off with this until after all factors for decline are mentioned. This would eliminate reference to objectives (e.g. CI-1) that have not been discussed.

27) Page 8 - What is difference between a Phase I and Phase II measure? Phase II measure alludes to Objective AII-1, but that objective pertains to intergravel dissolved oxygen.

28) Page 9 - Sandy River - \$20K/year will not provide for much in the way of hands-on actions to benefit SH. Are funding sources available from which the working group can withdraw?

29) Page 9 - Phase 2 Measure - how will PGE address water temperature problems? This is generally handled with increases in flow, but that is not always an option? Selective gate withdrawal?

30) Page 9 - Same question as #28 for Clackamas River fisheries group.

31) Page 10 - Channel “simplification”? Carefully review stated “Overarching Biological Objective” make sure it says what you think it says!!!

32) Page 10 - Objective BII-1: how can you manage a hydro project to restore woody debris? Same question applies generally to gravel recruitment, i.e. usually must add gravel to streams that have curtailed gravel recruitment due to dams. More detail needed to describe how operations would be modified to address objectives stated.

33) Page 10 - no discussion of B-III through B-VIII?

34) Page 11 - Measure WRD 1 - suggest changing “Geomorphic” evaluation to Watershed Assessment. What are criteria for determining which projects will require such evaluations. Shouldn’t this be required for all projects, unless applicant is able to demonstrate not needed via formal waiver process.

35) Page 11 - Hood River Phase I measure is a repeat of that found on page 8 - I would avoid redundancy. Same comment for Sandy River measure re: work group.

36) Page 12 - PGE 4 measure appears will provide substantial funds for enhancement. However, difficult to evaluate value of such without definition of specific programs. Degree to which measures will benefit steelhead is unknown.

37) Page 13 - repeat of Measure PGE 4.

38) Page 14 - Objective CI-1 and CHI -2 - why the qualifier “adequate” fish passage on the

former and not the latter? Objective CHI - 3 - I am still unclear what habitat damage occurs relative to peaking and ramping regimes? It is mostly a stranding and varial zone issue.

39) Page 14 - reword Overarching BO for C-II - it is awkward.

40) Page 15 - C-IV - concur with notation that is better placed in habitat section.

42) Page 15 - is intent of CIV-1 to prevent inundation of all salmonid habitat, or just steelhead and salmon habitat?

43) Page 15 - is the statewide measure noted (WRD 2) the only one to address Water quantity and passage issues? Does Oregon have a screening requirement, passage requirement, etc..

44) Page 16-17: table 1: what is basis for proposing to reduce flows during the months of January - April and in December? Will these reductions have positive biological benefits? If not - how can these be promoted as benefiting steelhead?

45) Page 17-18: is WRD setting a dangerous precedent by noting it will provide assistance to PacifiCorp in preparing and submitting water rights applications? How much time will this actually save and will this in turn actually be beneficial to steelhead?

46) Page 19 - Pacificorp 4 - reservoir passage criteria study - this is laudable effort, but one in which I question the timing of its implementation and completion as providing meaningful results that can be used in the short-term to benefit steelhead production and curtail listing.

47) Page 20 - 21 - minor comments: MFID2 - these project specific measures appear reasonable and useful, but they must be evaluated in the context of the current status of steelhead stocks within those systems. What is status of stocks and will measures that have a timeline of 2007 be beneficial?

48) Pages 22-32: no comments/ measures should prove beneficial to steelhead stocks.

49) Page 33 - suggest adopting a more proactive User Awareness and Education program regarding impacts of poaching on stocks and which advocates “turning in a poacher”. This could prove beneficial in addition to increased enforcement.

(This letter received in hard copy only. Entered into electronic copy by ODFW. Although formatting not exact copy, all words are the same.)

Middle Fork Irrigation District

P.O. Box 291
8335 Clear Creek Rd
Parkdale, OR 97041
Phone (541) 352-6468
Fax (541) 352-7794

November 5, 1997

Kammy Kern-Korot
Oregon Department of Fish and Wildlife
Habitat Conservation Division
2501 SW First Avenue, P.O. Box 59
Portland, OR 97207

Dear Kammy,

We received your FAX transmittal yesterday regarding the Dam and Hydro Chapter Public Review Draft. The document was reviewed and our only comments refer to Measure: MFID 2. In addition to Evans Creek and Wishart Creek, Trout Creek, Emil Creek and Griswel Creek (Knight Creek) will not be used to convey Eliot and Coe Branch water.

Thanks for the opportunity to comment. If you have questions please call.

Sincerely,

(signed)
William Stanley
Manager

90701 Georgetown Rd.
Junction City, OR 97448
3 November 1997

Kammy Korot
Jay Nicholas
Oregon Dept. Fish & Wildlife

Subject: Requested comments on Hydropower/Large Dam Supplement to the Steelhead segment of the Oregon Plan for salmonid restoration.

The following are my comments as requested by Ms. Paula Burgess of Governor Kitzhaber's office in a letter dated 10 October. In response to those specific questions:

1: Adequacy of itemization of dam/hydropower factors re steelhead decline:

I believe the "Dam and Hydropower" chapter adequately identifies, in general terms, the major ecological impacts that are commonly associated with dam and hydropower projects.

To comport with the management measures listed in the document, some information might be included to clarify the relationships drawn between water storage and diversion projects and poaching by humans (D-III), maladaptive gene conservation practices in steelhead hatcheries (D-II), and problems associated with legal harvest (D-I) in sport and commercial fisheries.

2: Are the factors of decline appropriately described?

The factors for decline associated with dams appear appropriate.

Obviously, multiple natural and man-made population suppressing factors other than dam and hydropower projects act to diminish the probability of sustaining natural populations of steelhead.

3: Are the factors of decline adequately reflected in the stated biological objectives? Will achieving these biological objectives reverse declines in the identified ESU's?

In the information provided me, I see no concrete biological objectives expressed in accountable terms such as goals for numbers of returning adults or minimum numbers of effective breeding pairs by ESU. The "overarching biological objectives" really appear to address an array of biological, physical, chemical, operational and social problems. Perhaps "overarching ecological concerns" would be more appropriate terminology, as supported by a subhierarchy of underlying biological justifications (Factor for Decline).

Achievement of properly quantified numerical biological objectives should provide a genetic baseline population of naturally produced fish capable of sustaining the ESU through periodic environmental extremes.

4: Will the management measures listed in the supplement achieve the biological objectives? Do they move us in the right direction? Can these management measures be implemented to address population declines within the proscribed timeframes? Are there other useful management measures?

Where specific dam effects actually comprise material factors that suppress populations of naturally spawning steelhead, positive population response should occur, which moves in the right direction. Wise protection decisions target real problems.

The affected fish populations may not respond positively to the management interventions and to the degree needed within the prescribed time frames. It is uncertain that the effects of dam and hydropower projects represent the most critical limiting factors influencing these fish populations. Freshwater and ocean habitat conditions, short and long-term climatic anomalies, overharvest, predation, diseases or other limiting factors unassociated with dams may, combined or in isolation, actually be driving the observed population decline(s).

Ideally, an objective limiting factors analysis should be performed on each fish population of interest before identifying priority and resources to corrective interventions.

5: Are the analyses and conclusions in the Supplement consistent with scientific literature? Is more research needed? If so, what?

Scientific literature can undoubtedly be supplied to support all of the included analyses and conclusions. However, scientific literature frequently draws generalized conclusions and inferences gathered at one specific location that does not directly project to another site. Contradictory scientific literature along with site-specific information and economic concerns could most likely be supplied to argue against many of the management interventions proposed.

Need for additional information via research automatically generates from a rigorous limiting factors analysis. When assumptions replace credible information, a need for more concrete information is identified, which stimulates a research project.

General suggestions for collecting helpful information and facilitating the process of protecting steelhead while retaining the social and economic benefits of man-made stream obstructions:

First, stabilize the loss of genetic material in critically depleted ESUs, by artificial means if necessary.

Determine appropriate guidelines for integrating carefully managed gene-conservation fish culture operations into plans to promote species recovery. Where populations within specific ESUs are critically low, consider germplasm repository in egg-bank programs.

Review the results of ODFW's Carson-Willamette Stock Comparative Study as an example of, although inadvertent, successful egg-banking of Upper Columbia River spring chinook salmon genetic material in a lower river tributary. Determine how this concept might be applied to steelhead germplasm conservation efforts in specific ESUs.

Determine how to most effectively use the (largely retained) fish production potential in stream areas above reservoirs to generate sustainable populations of anadromous salmonids, including steelhead.

Refine the technology for collecting smolts from reservoirs and/or from tributaries to large reservoirs.

Review the conditions existing at projects that successfully pass (or have passed) steelhead upstream and downstream, and determine how these concepts might be applied to the specific project/ESU in question.

Determine which impoundments meet criteria for the successful rearing and emigration of juvenile anadromous salmonids and for retrofitting of effective downstream migrant collection systems.

Review the evaluation results from projects with fish facilities that "failed". Do different standards of success apply in light of ESA listings? Could these projects have continued to support a viable, self-sustaining fish population at some lower level than was originally deemed desirable? Could they do so if combined with a genetically appropriate fish culture program? Are new fish collection/passage technologies applicable? Did we "allow" specific programs to fail because of lack of resources or as tradeoff with other priorities?

Since stalemating, time wasting differences of opinion may arise, develop a mutually acceptable process for arbitration of dispute resolution between resource agencies and operators of dams.

6: Does it appear that the management measures listed in the Supplement will result in measurable reduction of ecological impacts of hydropower/large dam projects, and over what period of time? Will the improvements occur soon enough to recover the species?

See the comment related to Question 4 (above).

The question associates species recovery with environmental improvements at dams, which may not be direct relationships that can be measured in positive population response.

Short-term indications of changes in indirect ecological effects of dams can be measured quickly, comparing pre-to-post-intervention parameters (smolt survival past the project, physical and chemical indicators, etc.) Critically, decisions for ESA listings are most often driven by numbers of effective breeding pairs in an ESU and population trends, not indirect environmental measurements.

Corrections of ecological impacts at dams typically are expensive, take time to implement, and often contain no absolute assurance of positive response. Example: Willamette System Temperature Control Study (COE Measure 7).

Steelhead populations within a geographic area are often quite variable over time. Measurement of population response to interventions will require assessment of short-term effects over about 8-10 years. Assessment of direction of effects on long-term population trend may require observations extending several years longer.

Since steelhead require about four years (frequently two years in freshwater and two years in salt) to complete one generation return, it would take a minimum of eight years to examine one replicated test of adult return over four consecutive brood years in relation to intervention effects, which represents only a short-term monitoring program.

If the most critical limiting factor(s) suppressing the recovery of any given ESU are not related to dam or hydropower projects, monitoring will continue to detect only further population declines. And, if multiple interventions are practiced simultaneously, cause for positive population response will be masked, and attribution of results to any specific intervention will likely be impossible.

7: Does the Supplement contain adequate monitoring to determine the success of individual measures, to allow for adaptive management, and to assess success of the plan? What additional monitoring of measures is needed?

See the response to Question 5 (above).

Since numbers in the breeding fish populations and population trends are the most critically needed data, documentation of adult return/breeding population response over time is mandatory. Any ESU currently lacking such an inventory process should be supplied one.

Short-term changes in indirect measures of environmental indicators (D.O., gravel porosity, river stage fluctuation rates, etc.) resulting from management interventions can be measured relatively short-term, but they need to be compared to a baseline, and the more years of available baseline

data the better. Monitoring of these baseline environmental parameters should be currently underway in all important streams in those basins supporting ESUs.

Any monitoring program of less than eight years post-intervention to detect adult return response, in the case of steelhead, will probably be insufficient to determine even short-term effects. The monitoring programs listed in the document most often identify monitoring inception dates, not duration. Presumably such details lie beyond the scope of this document. Detailed monitoring plans need to be developed for each ESU.

Adaptive management requires that population response to interventions be assessed and, if apparently ineffective, adjustments to the interventions be made. Results of such adjustments also need to be monitored, further extending an already-protracted period of evaluation, time that some ESUs may not be able to sustain without assistance.

The relative likelihood of success or failure could be markedly diminished or enhanced by slightly changing sometimes arbitrary and arguable definitions, such as what constitutes a viable geographic ESU, what the effective breeding population must be to effect recovery, and permissible degree of inclusion of hatchery fish component in a given population.

Many of the included monitoring projects appear to be "voluntary" efforts on the part of dam operators resulting from real or implied incentives to regulatorily expedite needed project improvements. Quite prudently, regulatory agencies appear willing to expedite normally protracted and contentious regulatory processes in exchange for mutually beneficial early implementation of environmental enhancements at dams and hydroprojects in those locations where steelhead may come under federal listing.

Monitoring programs need to be developed for those important tributaries within the geographic ESUs that are not the subjects of imminent relicensing actions. Documenting adult returns and/or spawning surveys over time should comprise the minimum monitoring project.

8: What should be the priority for implementation? Are there management measures that will be ineffective and/or a waste of money.

Ideally, priorities for implementation would be dictated by an objective limiting factors analysis, with those factors determined to have real probability for direct positive influence on breeding populations being implemented first. Potentially, money and time may be wasted implementing remedies to perceived rather than actual problems, or in activities targeting symptoms.

In assigning general priority to remedial actions, those areas of greatest benefit to ESUs identified as being most critically depleted should be addressed first. Lower river fish passage projects should have priority over work in upper river tributaries, because improvements in passage or production at an upstream location may be nullified by problems downstream. Causative effects should take precedence over symptomatic relief (effective watershed restoration is long-term immunization, rolling rocks and logs into a degraded stream as "habitat improvement" is a cough drop).

The cooperative process suggested in the document has great potential. The steelhead resource will likely benefit from early implementation of many of the environmental enhancements prescribed for dams and hydro projects. Operators of dams and diversions benefit by knowing that regulatory agencies will expedite regulatory processes in the light of early implementation, make their own assessments of the costs involved, and thus have a basis for decision to willingly cooperate. This win-win agreement appears to be in the best spirit of the State initiative to collaborate to avoid ESA listings of stressed steelhead populations. How it will work in practicality depends on timely, good faith accountability and performance by both dam operators and the regulatory agencies.

Currently accepted definitions of "wild" populations permit some inclusion of hatchery fish of appropriate genetic heritage (Objective DII-1), apparently up to half of the breeding population. This definition confers a degree of flexibility. Man cultures steelhead effectively, and much has been learned about gene conservation practices in hatcheries. Relegating a part of a rapidly vanishing wild gene pool to direct manipulation via conservation hatcheries and egg bank programs appears to be a straightforward interim intervention with a high probability of assuring continuity of availability of diminishing germplasm and unique life history characteristics while other, more "ecological" interventions are being implemented and evaluated.

Resources will be "wasted" when correcting presumed important limiting factors which in reality have poor likelihood of measurably affecting population response. If dam operators honestly judge the cost too great and the effort too poorly justified, the capability of referring the question to an objective independent arbiter will eliminate unnecessary contention and delay.

Resources will most likely be wasted when prescriptions for project operations substantially exceed the identical parameters measured in the unobstructed streams tributary to the project. A prime example: ramping rates.

Funds dedicated to oversight or steering committees assure only more process, not product. A formal structure of accountability for positive progress must be included.

Other comments:

Attaching an abbreviated step-down format by ESU/subbasin would more clearly tie the biological goals to the associated tasks and activities proposed for remediation, as well as identify disassociation.

The concept of including "other fish species of concern" in this steelhead recovery document needs better development. While true that other species may benefit from the environmental improvements envisioned for specific dams and hydro projects, an encompassing plan that effectively addressed an array of species would likely elicit cooperation from operators of other projects that do not impact natural steelhead runs.

COE's recent initiatives to seek congressional authorities to give higher priority to project operations that benefit fish recovery has great potential and should be actively supported.

Steelhead and the many benefits provided by dams are two unique and extremely valuable resources enjoyed by the citizens of the Northwest. Both require careful stewardship. The goal of the steelhead recovery plan in relation to hydropower should be to conserve and protect the best benefits of both resources while conferring the least unnecessary detriment. If the Governor's initiative is to be effective and ESA listings averted, the best solutions lie in mutual cooperation based on enlightened self-interest.

Thank you for the opportunity to comment on this draft document.

Sincerely,

Max Smith

Dam and Hydro Power Responses

Peer Review Letter #1	State Response
<p>From: "Richard T. Grost" <rgrost@compuserve.com> To: "ODFW, Jay Nicholas" <nicolaj@ccmail.orst.edu>, "O... Date: 11/3/97 1:07PM Subject: hydro / dam steelhead comments</p> <p>Hello Jay and Kammy, here are my comments regarding the dam and hydropower chapter of the steelhead supplement to the Oregon Plan. First a commendation for attempting such an "overarching" document -- dam / hydropower projects are notoriously complicated and addressing all in one document is a noble exercise. Now a disclaimer: as an independent volunteer on this project I had limited time and no \$ available -- consequently this is a brief, general review, not a comprehensive one. I could help out in a more comprehensive way if the resources became available to support this. I hope these help to improve and complete the plan.</p> <p>Richard Grost RTG Fishery Research and Photography 541-496-4580</p>	
<p>Following are my main comments. First I'll give my best current answers to your 8 review questions, then comment on specifics and generalities in the draft.</p>	
<p>Question (Q) 1: relevant factors of decline -- No, the draft does not explicitly list all. I suggest that 2 of the larger factors of decline could be: 1) flow fluctuations (ramping) downstream of dams and powerhouses, and 2) interception of bedload (gravel and cobble) necessary for spawning and rearing habitat and food production downstream of dams. Neither of these are explicitly described in the draft. They should be added to the "overview" list of negative ecological impacts as well as to specific "factors of decline" in the habitat section. See detailed comments below.</p>	<p>ODFW: In this section of Chapter 15A, Measures, we tried to incorporate factors for decline that are described in, or parallel to, factors described in the other sections (e.g., Water Quality, Physical Habitat, etc). The factors are more general than you suggest. Nonetheless, we believe the potentially adverse impacts you list are now briefly described in the Factors for Decline subsections. Flow fluctuation (ramping) is identified as a concern on page 17, as Objective CI-1, "Implement ramping rates..." Interception of bedload by dams is described briefly on page 13 under Factor for Decline</p>

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	B-1, in the Physical Habitat subsection, which addresses geomorphology.
<p>Q 2: factors of decline described appropriately -- No, the "overview" descriptions are confusing and sometimes misleading. For instance, there is no differentiation between impacts caused by "dams" vs. operations of the dams (e.g. hydropower, water withdrawal, impoundment of water) and the fact that there are many different configurations of dams and facilities, each with specific features. Even for a general discussion, this needs to be made much more clear. Perhaps add a paragraph describing large storage projects (huge reservoirs, small or no diversion reaches) vs. Diversion hydro projects (small reservoirs, long diverted reaches) vs. Irrigation diversions (most / some water doesn't return to river). Similarly, statements like "dams cause..." are used pervasively, yet many dams DON'T cause the subsequently described problem. I suggest subheadings in this section to help clarify the impacts and reduce redundancy in the descriptions. In the "factors of decline" section, the "physical habitat" section is incomplete and one of the most important elements.</p>	<p>ODFW: Agreed. We made major changes to this subsection in response to your comments and those of several other peer reviewers. We agree that it is difficult to generalize about dams and hydropower projects given the variability of type of project, location, operation, and species and habitats affected. We revised the Introduction to refer the reader to other documents where impacts are specifically documented.</p> <p>We agree that the Physical Habitat subsection is an important element of the factors for decline associated with large dams and hydropower projects. We expanded the discussion of Factor for Decline B-I on page 13.</p>
<p>Q 3: do biological objectives address factors of decline appropriately? Sometimes, but not all factors of decline are clearly elucidated. They appear to be steps in the right direction. Will achieving the objectives reverse the decline of steelhead (assuming all other management is adequate)? I hope so, but am not holding my breath.</p>	
<p>Q 4. are measures adequate to achieve the biological objectives? No, in most cases -- for instance working groups do nothing measurable relative to the objectives. do they move in the right direction? Yes. can they be completed within suggested time frames? Only with strong incentives -- many measures (e.g. working groups) have no time frames associated with on-the-stream implementation. other management measures? Yes -- any efforts to: a) streamline relicensing, and b) facilitate implementation of interim measures (before new licenses are issued) would be beneficial to getting on-the-stream improvements and thus reduce time frames for implementation of measures. ODFW's recent new staff positions dedicated to hydropower relicensing is a step in the right direction here, and perhaps worthy of mention as a "statewide measure".</p>	<p>ODFW: Measures in the dam/hydro section were offered by operators and agencies with specific authorities to implement specific measures. Although ODFW agrees that additional actions might render faster results in terms of achieving biological objectives, the <i>Plan</i> is a consensus document that recognizes other regulatory processes and economic considerations.</p> <p>ODFW appreciates your recognition of our recently reorganized hydropower program. However, because this program is already established and considered a base function at ODFW, we chose not to list it as a measure.</p>
<p>Q 5: are analyses and conclusions consistent with the literature? What analyses and</p>	

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<p>conclusions?-- the general statements appeared mostly accurate to me. is more research needed? Not in general, but site-specific conditions are always important to understand for each project / river (hence working groups and relicensing studies ARE useful).</p>	
<p>Q 6: will measures result in a measurable reduction of ecological impacts? Yes, in some cases -- increased instream flows (e.g. at Powerdale) and fish passage (e.g. Sullivan Plant) are measurable. will improvements occur soon enough to recover the species? Only with strong incentives.</p>	
<p>Q 7: is monitoring adequate? No -- very few of the measures explicitly indicate any monitoring for success, and several imply there will be none (e.g. build fish passage to meet NMFS criteria, presumably with the assumption that such facilities will adequately work and not need monitoring or adaptive efforts). what additional monitoring is necessary? Every measure should have a criteria for success and should be monitored at the appropriate time-scale (perhaps annually in most cases) to describe the success or failure and proposed reaction.</p>	<p>ODFW: Agreed, post-construction or implementation monitoring is not described well, if at all, in the measures. It is common practice for ODFW, as well as the federal fish and wildlife agencies, to recommend post-construction evaluation and ongoing monitoring of all mitigation facilities and programs as part of new and relicensed hydropower projects. Even when a facility is designed to NMFS or ODFW criteria, ODFW seeks post-construction evaluation to ensure that facilities operate as anticipated. Given the short time between receiving peer review comments and preparing the final draft, we were unable to work out detailed monitoring agreements for inclusion in the <i>Plan</i>, with each of the operators who proposed project-specific measures. Often, such monitoring agreements are required by conditions on a license and developed jointly with the fisheries agencies after a new license is issued.</p>
<p>Q 8: what are the most effective elements (priority items) of the supplement? An apparent desire by the state and project owners to facilitate relicensing decisions and implementation of improvements at hydropower projects.</p>	
<p>Specific comments: [brackets = strike out] CAPS = NEW TEXT</p> <p>Introduction: define "healthy", at least generally (e.g. naturally reproducing populations of wild fish large enough to allow harvest without diminishing future generations? some percentage of estimated populations during pre-European times?)</p>	<p>ODFW: This short goal statement was included in the peer review draft because we were concerned that many of our peer reviewers were receiving the dam/hydro section without having the benefit of the rest of the Plan. The statement has been removed in the final draft.</p>

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<p>Statement of Problem: first sentence rewrite to be: "Dams and hydropower projects have significantly altered many natural river systems in the Northwest to provide beneficial uses (e.g. flood control, electricity, irrigation) to our society."</p>	<p>ODFW: This subsection has been significantly rewritten and renamed "Issue Background." Although we did not include your suggested language, we think the revisions are consistent with it.</p>
<p>Para 2: indicate major dams are >10 ft high (also cite source for figures)</p> <p>..diminished the ability of [the state's waters] SOME RIVERS to [regulate temperature,] transport sediments and nutrients, dilute contaminants, and [trigger...] SUPPORT HEALTHY POPULATIONS OF NATIVE FISH AND OTHER AQUATIC ORGANISMS.</p>	<p>ODFW: We clarified in Attachment E, References, that Oregon Water Resources Department, provided this information and defines "major" dams as those greater than 10 feet high.</p> <p>The last sentence of this paragraph was deleted in the final draft.</p>
<p>Para 3:...impacts dams AND THEIR ASSOCIATED FACILITIES can cause.</p> <p>Numbered items: In general -- this section may be streamlined and clarified by organizing into impacts UPstream of dams (e.g. inundation by reservoirs), AT dams (e.g. fish passage up and down), and DOWNstream of dams (e.g. lack of bedload transport beyond dam).</p> <p>1) Dam[s] OPERATIONS can reduce river [levels] FLOW by... comment: I don't believe that "Most original state and federal licenses...did not require flow to the bypass reach" -- please check the facts on this; does this statement allow that many hydro projects DON'T HAVE bypass reaches?</p> <p>2) rewrite first and second sentence to read: Dams can inhibit or prevent the upstream migration of fish. (i.e. remove confounding words about nutrients, etc. -- they are in other paragraphs)</p> <p>10) ...hold back ROCKS, GRAVEL, SAND, silt, debris, and nutrients TRANSPORTED DOWNSTREAM BY RIVERS.</p> <p>11) rewrite paragraph to read: Dams can injure or kill downstream-migrating fish as they are entrained into diversion waterways, through turbines, or through spillways. Fish screens can reduce the injury and mortality at some waterways and turbines, but can also impart injury if improperly designed and maintained. Spillway designs can be altered to reduce injury. Operational changes can also help reduce entrainment at some sites.</p>	<p>ODFW: This subsection has been significantly rewritten and renamed "Issue Background." We think the revisions will address your suggestions.</p>

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<p>ADD NEW ITEM NUMBER: 13) Hydropower operations can cause rapid fluctuations in river flows (ramping) downstream of dams and powerhouses, sometimes on an hourly or daily basis for power generation. Rapid flow increases and decreases can potentially affect the behavior of salmonid juveniles (e.g. feeding) and adults (e.g. migration). Rapid drops in flow can strand fish along dewatered stream margins where they may die or be killed before flows increase again. Projects that ramp frequently on a daily cycle (e.g. for load following or peaking) could produce cumulative impacts which become substantial to the population of juvenile fish.</p>	
<p>Solutions to the Problem</p> <p>Comment: Dam removal should not be considered "extreme". Engineers and (most of) society did not consider it extreme to build these dams, and it is not extreme to demolish other engineered structures (e.g. buildings, bridges). Perhaps "experimental" is a better adjective, since each dam has specific constraints and too few dam removals have occurred to predict outcomes empirically.</p>	<p>ODFW: This subsection has been renamed, "Management Solutions."</p> <p>The word, "extreme," was deleted from this sentence in response to your comment.</p>
<p>WHY does this chapter NOT deal with Bonneville Dam?</p>	<p>ODFW: A paragraph has been added to the "Introduction, Section Organization" subsection, on page 5 that describes why Bonneville Dam and other mainstem Columbia and Snake river dams are not included in this section.</p>
<p>Proposed Objectives / Measures -- I did not review these comprehensively for specific comments.</p>	
<p>General comments:</p> <p>There is much redundancy of measures in different sections (e.g. increased instream flows at Powerdale project, funding of working groups at Sandy and Clackamas Rivers appear many times). Anything to reduce this would be beneficial.</p>	<p>ODFW: Agreed, redundancy is problematic in this document. On page 4, last paragraph, of the "Introduction, Section Organization" subsection, we explain why some measures are repeated in several subsections. The majority, however, are listed only once.</p>
<p>EWEB (Leaburg/Walterville projects) is conspicuously absent from any "measures" in this draft.</p>	<p>ODFW: EWEB participated in the task force that was formed to develop measures for this section. Our initial focus was to develop measures that would specifically benefit native winter steelhead. The EWEB projects do not affect winter steelhead and were not considered high priority for inclusion in this supplement to the <i>Oregon Plan</i>.</p>

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<p>Physical Habitat sections -- is now incomplete, needs explicit description of bedload interception at most dams and impacts to downstream river habitats, esp. salmonid spawning and rearing habitat.</p>	<p>ODFW: Agreed. The description for Factor for Decline B-I has been expanded in response to your recommendation.</p>
<p>Voluntary programs -- measure WRD-2 would establish a voluntary program by which project owners could amend license terms to benefit steelhead via fish passage and instream flow changes. Measure ODFW-4 describes the unwillingness of a project owner to voluntarily install fish screens. This contrast and the uncertain future of hydropower rates (i.e. deregulation fears) suggests that not much \$\$\$ will be spent for voluntary programs.</p>	<p>WRD: The measure was revised to more accurately reflect what is allowed under current law. WRD has been advised by legal counsel that it does not have the authority to reopen licenses or water rights and require project owners to improve fish passage, unless language in the license allows it. Water rights and hydroelectric licenses are considered contracts between the state and the project owner and cannot be changed without agreement from both parties. However, as projects are reauthorized and new water rights issued, language can be included that allows the state to examine mitigation actions over time and require new actions if the proposed mitigation measures are not effective. WRD and the other agencies have not backed away from the commitment to identify projects that need changes in fish passage and to work with project owners to bring about those changes. WRD disagrees that improvements cannot be made unless they are mandated by the state. Some project owners already are working with the state to improve fish passage.</p>
<p>END of comments by Richard Grost, RTG</p>	

Peer Review Letter #2	State Response
<p style="text-align: center;">League of Oregon Cities Local Government Center 1201 Court St. NE, Suite 200 Salem, OR 97301</p> <p>November 5, 1997</p> <p>Paula Burgess Governor’s Assistant for Natural Resources State Capitol Salem, OR 97310-0370</p> <p>Dear Paula:</p>	
<p>Thank you for the opportunity to comment on the Dam/Hydroelectric Steelhead Measures. The following are comments I received from the Eugene Water and Electric Board (EWEB).</p>	
<p>Overview: EWEB focuses primarily on the format or style of the “chapter”. Consistency in presentation is important, since this is not a stand alone document, but is part of the larger Draft Steelhead Supplement.</p> <p>There appears to be a lack of consistency in approach, format, and terminology in this chapter compared to other sections of the Draft Steelhead Supplement, and to a lesser extent, between the sections themselves. Wherever possible and practical, format and terminology should be consistent throughout the document. I wonder if it would not be best to integrate the contents of the chapter into the main sections of Water Quality, Physical Habitat, Fish Management, and Water Quantity, Fish Passage, and Fish Screening, that the action/measures address. Neither the Oregon Plan, or the draft sections of the Steelhead Supplement that I have seen, have separate chapters on agriculture, timber harvest, or other resource-based industries that have impact on our fish populations. Their impacts, and potential corrective action/measures, are addressed under the appropriate factor of decline in each of the main sections. In this way all factors that impact Water Quality, for example, are together, as are the corrective action/measures that will hopefully improve Water Quality.</p>	<p>ODFW: Agreed. For the final draft, all of the section leaders of Chapter 15A, the Measures chapter, agreed on a consistent format and terminology to make the sections more comparable. We think you will notice an improvement.</p> <p>We carefully considered your suggestion that the dam/hydro section be incorporated into the other sections of Chapter 15A. After lengthy discussions with the Governor’s office and other section leaders, it was decided that a stand-alone section was useful and appropriate. We wanted to ensure that these important measures did not get lost in the other sections. Because this section includes project-specific measures proposed by private entities, both its format and content is significantly different than the other sections.</p>

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<p>A short list of specific comments are below:</p> <p>Page 1- Introduction Unless there is more to be added here, the existing statement seems redundant, ambiguous (e.g. define “healthy”) and is not necessary. Other sections do not have individual Introduction subheading.</p>	<p>ODFW: This short goal statement was included in the peer review draft because some of the peer reviewers of the dam/hydro section had not been involved in the development of the larger <i>Plan</i>. The statement has been removed in the final draft.</p>
<p>Page 1- Statement of Problem - This title appears to be inconsistent with main sections. Most sections seem to use Issue Background. If integrated within the other sections there would not be a need for this subheading. Most of the ideas in the Statement of the Problem, especially the list of 12 negative ecological impacts, are captured as Factors for Decline. They don’t need to be stated twice. Since they are already organized by topic (i.e. Water Quality; Physical Habitat; etc.), integration into topic sections would appear fairly straight forward.</p>	<p>ODFW: Agreed. The subsection heading has been changed to “Issue Background.” Major changes were made to this subsection, including your suggestion to incorporate the discussion of the 12 negative ecological impacts in the appropriate Factors for Decline subsections.</p>
<p>If the separate chapter format is continued, I suggest a shortened Issue Background subsection and a Factors for Decline subsection. In other sections of the Draft Steelhead Supplement, it appears that the action/measures are put directly behind their specific factor of decline and objective. This would eliminate the need for referencing, which is confusing and probably won’t be used.</p>	<p>ODFW: Agreed. As the previous comment indicates, a shortened Issue Background was included. Because some of the hydro measures address several factors for decline, references to specific biological objectives were used to avoid excessive redundancy (i.e., the listing of the same measure under many factors for decline).</p>
<p>Page 3- Solution to the Problem - For consistency, should be incorporated under the action/measures.</p>	<p>ODFW: This subsection title was changed to “Management Solutions.” Other peer reviewers commented that it was a good paragraph that expressed a positive approach to addressing adverse impacts. It is intended to be a general summary of the sorts of measures that are possible, recognizing that more specific measures follow later in this section.</p>
<p>Page 4- Overarching Biological Objective - This term is repeated throughout the document. I do not see “Overarching” used in the other sections. I don’t think its use adds any descriptive clarity. It is a ‘90’s buzz word. Suggest using Biological Objective or Ecological Objective.</p>	<p>ODFW: Agreed. This term has been changed to “biological objective.”</p>

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<p>Sincerely,</p> <p>Joni T. Low Sr. Staff Associate</p> <p>cc: Laurie Power, EWEB</p>	<p>Thank you for your comments.</p>

Peer Review Letter #3	State Response
<p><u>Middle Fork Irrigation District</u></p> <p style="text-align: right;">P.O. Box 291 8335 Clear Creek Rd Parkdale, OR 97041 Phone (541) 352-6468 Fax (541) 352-7794</p> <p style="text-align: right;">November 5, 1997</p> <p>Kammy Kern-Korot Oregon Department of Fish and Wildlife Habitat Conservation Division 2501 SW First Avenue, P.O. Box 59 Portland, OR 97207</p> <p>Dear Kammy,</p>	
<p>We received your FAX transmittal yesterday regarding the Dam and Hydro Chapter Public Review Draft. The document was reviewed and our only comments refer to Measure: MFID 2. In addition to Evans Creek and Wishart Creek, Trout Creek, Emil Creek and Griswel Creek (Knight Creek) will not be used to convey Eliot and Coe Branch water.</p>	<p>ODFW: Thank you for this clarification. Measure MFID 2 in the final document was revised to incorporate this information.</p>
<p>Thanks for the opportunity to comment. If you have questions please call.</p> <p>Sincerely,</p> <p>(signed) William Stanley Manager</p>	<p>Thank you for your comments and willingness to cooperate in this important planning effort.</p>

Peer Review Letter #4	State Response
<p style="text-align: right;">November 4, 1997</p> <p>Kammy Kern-Korot ODFW/Habitat Conservation Division 2501 SW First Avenue P.O. Box 59 Portland, OR 97207</p> <p>Dear Ms. Kern-Korot:</p> <p>Thank you for the opportunity to review the Hydropower/Large Dam Project chapter of the Oregon Plan Supplement for salmon and stream restoration.</p>	
<p>As an economist, I cannot comment on the biological efficacy of the proscribed measures to increase fish populations since that is not within the realm of my expertise. However, I find it highly unusual that the plan does not cite any scientific studies that support the proposed measures.</p>	<p>ODFW: In response to your comments and those of other peer reviewers, the Introduction subsection has been significantly rewritten. It now references two substantive reports which provide detailed scientific citations regarding the effects of dams on fish. The project-specific measures outlined in this section are based on project-specific studies and professional experience. In most cases, such study information was not provided in the description of each measure for the sake of brevity.</p>
<p>From my perspective as an economist, I cannot help but note the conspicuous absence of any economic analysis in the plan. In a world where resources to address salmon restoration are limited, the lack of any economic considerations is, in my view, wholly inadequate. By now it must be obvious that restoration of healthy salmon populations in Oregon rivers and streams is going to be costly. If the State of Oregon is serious about salmon recovery then, at the very least, it should be committed to efficient use of scarce resources, maximizing the number of fish restored per dollar spent. Thus, efficient use of limited funds must be paramount in any recovery plan.</p>	<p>ODFW: Agreed. Economic considerations for most of the project-specific measures were inherently addressed by the operators who proposed these measures. The operators will conduct an economic feasibility analysis of measures requiring new construction of fish facilities or changes in project operation as part of the application for a new license to the Federal Energy Regulatory Commission.</p>
<p>The stated goal of the recovery plan is “to restore populations of steelhead/salmonids and other</p>	<p>ODFW: Agreed. Unfortunately, available science (as to the</p>

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<p>fish species of concern to levels that are healthy.” There will be several alternative means of achieving this goal, some more expensive than others. In principle, the allocation of scarce recovery funds maximizes fish restoration when the last dollar spent on each restoration project restores the same number of fish. If that economic condition does not hold, then there is an alternative allocation of funds that will restore more salmon. Of course, since the relationship between the projects and the number of fish restored to the system may be subject to scientific uncertainty, the allocation of funds that maximizes fish populations may not be easily determined. But the question of efficacy of alternative allocations of funds is never addressed. In my view, an effective recovery plan must examine the issue of cost effectiveness in meeting the stated goal.</p>	<p>unit and type of effort needed to restore one fish or even “x” number of fish) is not this precise. As you note, there is much scientific uncertainty regarding the relationship between project improvements and the number of fish restored. The best we can do it to improve those conditions that are generally known to be the most detrimental to fish. Relicensing will allow for negotiation to resolve what measures are most needed and beneficial for fish.</p>
<p>I hope these comments will contribute to strengthening the plans to restore salmon to Oregon rivers and streams.</p> <p>Sincerely,</p> <p>Don Negri Associate Professor of Economics Willamette University</p>	<p>Thank you for your comments.</p>

Peer Review Letter #5	State Response
<p style="text-align: center;">Memorandum</p> <p>To: Kammy Kern-Korot</p> <p>From: R. Bruce Rettig</p> <p>Date: 11/22/97</p> <p>Re: Review: Hydropower/Large Dam Project Section of the Oregon Plan Supplement (Steelhead Supplement)</p>	
<p><u>My Background and Purpose in Reviewing Material</u></p> <p>I am a professor of Agricultural and Resource Economics at Oregon State University with almost three decades of experience. My purpose in reviewing the supplement was to check for any use or misuse of economics and for any potentially important omissions from the economic literature. I did not attempt to pass judgement on biological analysis or data.</p>	
<p><u>Discussion</u></p> <p>Although the hydropower/large dam section of the Oregon Plan Supplement is extremely professional and includes many actions that should be helpful in protecting weak wild steelhead stocks, it may share some of the problems encountered in attempts to recover wild Snake River salmon stocks. In specific, much of the funding is pointed toward additional studies rather than specific actions. Of the major actions identified, a large fraction appears to be driven by the requirements to gain approval for relicensing by FERC. Other actions appear to be motivated by laws with specific liability requirements.</p> <p>What this suggests is that large dams contribute to mortality of steelhead because complete mitigation of harmful actions is very expensive. In the case of actions on the Snake River, much criticism has arisen because the contribution to improved species survival is uncertain and perhaps problematic. Although I have no particular expertise relating to the actions listed in the steelhead supplement, the emphasis on studies suggests that many additional actions will be needed in the future. I applaud the</p>	<p>ODFW: Your point is well-taken. Measures in the dam/hydro section were offered by operators and agencies with specific authorities to implement specific measures. Although ODFW agrees that more action-oriented measures might render faster results in terms of achieving biological objectives, the <i>Plan</i> is a consensus document that recognizes other regulatory processes and economic considerations.</p> <p>The operators who proposed studies might take issue with your suggestion that action measures are avoided due to their high expense. Although we were unable to seek specific responses from operators who participated in our task force, ODFW understands that part of their rationale for proposing studies at this time is that the actual effects of project-specific facilities</p>

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focus on designing sound scientific studies of the effectiveness of dam modifications so that their biological effectiveness can be documented.	on steelhead and other salmonids has not been evaluated.
Recently, the Northwest Power Planning Council has increased its interest in selecting the most cost-effective methods to protect and recover salmon stocks. As the Oregon Plan progresses, I would hope that the studies to identify the biological effectiveness of dam modifications will lead to future studies of cost-effectiveness of alternative actions. I urge you to consult with the NPPC's economic analysis panel chaired by Dr. Emery Castle to help prepare our state agencies and avoid problems encountered in the Power Council's program to date.	ODFW: Thank you for your suggestion. We will consult with the NPPC's economic analysis panel as we enter into relicensing studies on many of these projects.
Finally, I note that the fish management measures at hydro/dam projects appear to be both sound and consistent with the fish management measures in the fish management section of the steelhead supplement.	
I thank you for the opportunity to review this important and thoughtful document.	Thank you for your comments.

Peer Review Letter #6	State Response
<p>COMMENTS ON DAM AND HYDROPOWER CHAPTER Supplement to the Oregon Plan Comments of Dudley W. Reiser</p>	
<p>I have reviewed the subject document and offer the following general and specific comments. Recognizing that the document is being developed for submittal to and consideration by the National Marine Fisheries Service (NMFS), perhaps my biggest concern with the document as prepared, is its lack of scientific support and technical detail to support both the impacts being ascribed to hydropower operations, and the measures that are being offered to mitigate/eliminate such. The document provides a very general review (at best) of impacts and effects of hydropower and dam operations on salmonid fishes, without providing any technical references from which the reader (NMFS) will be able to judge the conclusions and statements of fact (as they are portrayed). The sections describing the general impacts should be replete with references from technical journals and books, and the sections concerning specific projects should contain site specific information and reports. The measures being promoted as benefiting the resource should at least allude to other projects where similar actions have proven effective.</p> <p>Specific comments are presented below and are referenced by page, section, and paragraph. I have also faxed sections of the document containing additional comments made directly on the manuscript.</p>	<p>ODFW: In response to your comments and those of other peer reviewers, the Introduction subsection has been significantly rewritten. It now references two substantive reports which provide detailed scientific citations regarding the effects of dams on fish. The project-specific measures outlined in this section are based on project-specific studies and professional experience. In most cases, such study information was not provided in the description of each measure for the sake of brevity.</p>
<p>1) Page 1, section I, para 1, - the stated goal alludes to restoration of salmonids to levels that are “healthy”. This seems unnecessarily vague and should include a bit more detail. Shouldn’t the goal be to restore, promote and attain stocks that are self-sustaining, harvestable, and that maintain the original genetic integrity and diversity of the different populations? Some additional thought is warranted here.</p>	<p>ODFW: This short goal statement was included in the peer review draft because some of the peer reviewers of the dam/hydro section had not been involved in the development of the larger <i>Plan</i>. The statement has been removed in the final draft.</p>
<p>2) Page 1, section I, para 4, - re: the organization of the Chapter, seems like Water Quantity should be a separate section and NOT included as part of Fish Passage, and Fish Screening chapter. Water Quality is stand alone, and relative to hydropower projects, water quantity is one of the major impacts associated with such.</p>	<p>ODFW: We agree with your logic, however, the subsections were intended to parallel the other sections of Chapter 15A, <i>Measures</i>. The four other sections are “Water Quality,” “Physical Habitat,” Water Quantity, Fish Passage and Screening,” and “Fish Management.” These sections grew out of the original <i>Oregon Plan</i>. When the large dam/hydro</p>

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	<p>section was organized in August, 1997, we were undecided regarding whether it should be a stand-alone section or incorporated into the four existing sections. Hence, the section was written to facilitate cutting it into four sections, if that approach were taken.</p>
<p>3) Page 1 - 3, section 1, para 5, - the summary paragraphs of the major impacts of hydropower projects need to include citations and references to studies that support the statements of impact noted. This doesn't have to be a comprehensive literature review, but at least some citations/examples that serve to demonstrate these are real impacts. This will add credibility to that section. Should also consider changing the degree of certainty you are ascribing to each impact, e.g. "In the worst cases , bypass reaches below "are completely dewatered" ; change to "can become completely dewatered". This holds true for other summary paragraphs as well.</p> <p>4) Page 1, section 1, para 6 - omit "flow of plants" ; this seems like a stretch of the impacts and I am not aware of any project to which the issue of lack of "plant" flow has been raised. Not normally associated with hydropower impacts.</p> <p>5) Page 2, section 1, para 1 cont.(# 2) - need to differentiate impacts between adult and juvenile fish (i.e. upstream passage for adults, downstream passage for juveniles and smolts). I'm not sure of impacts associated with "diminution of homing abilities". I recall some studies in the Snake that demonstrated smolts require only a relatively small amount of time in natal waters (during critical imprinting period) in order to home with high accuracy to natal systems. Provide example/citation on that one.</p> <p>6) Page 2, section 1, para 2 (#3) - discussion on flows as transport vehicle is somewhat confusing; e.g. "salmon ..depend on steady flows to flush them downstream as smolts"; however, smolt out-migration typically occurs in response to high flows (run-off) or pulse flows (freshet/spate) which trigger out-migration. Steady flows imply constant magnitude of flow which is not what smolts are sensitized to.</p> <p>7) Page 2, section 1, para 3 (# 4)- mention should be made that creation of lacustrine environments can also shift biological advantage to exotic or introduced species that can become predatory or compete with native stocks. This warrants mention in a number of other sections as well.</p> <p>8) Page 2, section 1, para 4 (# 5) - need to include spawning and egg incubation among the list of</p>	<p>ODFW: In response to your comments and those of other peer reviewers, the Introduction subsection has been significantly rewritten. It now references two substantive reports which provide detailed scientific citations regarding the effects of dams on fish. The project-specific measures outlined in this section are based on project-specific studies and professional experience. In most cases, such study information was not provided in the description of each measure for the sake of brevity.</p> <p>ODFW: See above comment.</p>

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<p>life stages impacted by temperature change (can delay or accelerate both depending on temperatures). Temperature changes (e.g. lower temperatures) can also affect growth of juvenile fish and therefore timing of smoltification, and outmigrations (potential delay).</p>	
<p>9) Page 2, section 1, para 5 and 6 (# 6 and 7) - Riparian habitat affected by peaking flows? peaking a cause of downstream soil erosion and vegetation erosion? Need to give example; this seems unlikely. However, peaking regimes can create long and sometimes expansive varial zones within which aquatic biota, notably aquatic invertebrates and periphyton assemblages cannot be established and hence, productivity within those areas is much reduced.</p> <p>10) Page 2, section 1, para 7 (#8) - focus of para is on reservoir; need to mention water quality changes in river segments below dams; fluctuations in flow can cause dramatic changes in water temperature, d.o., etc..depending on depth of release water.</p> <p>11) Page 2, section 1, para 8 (#9) – omit reference to impacts on “vegetation” as result of release of oxygen poor water – this should actually benefit plants since CO₂ is their mainstay.</p> <p>12) Page 3, section I, para 1 (#10) – many impacts noted in this paragraph; degree of certainty of some seems weak – e.g. accumulation of heavy metals and pollutants (do you have an example of this?). One of the more common impacts of dams relative to salmonids is the potential elimination of gravel recruitment to downstream sections of the river below the dam. The dam effectively traps the upstream gravel supply and therefore spawning gravels downstream often, overtime, become depleted due to continued transport. Thus, spawning gravels often become depleted or greatly reduced below dams. This is not always the case, provided there are tributaries below the dam that continue to provide gravel to the mainstem river.</p>	<p>ODFW: See above comment.</p>
<p>13) Page 3, section I, para 2 (#11) – add “cavitation” to the list of effects of turbine operations that can injure fish.</p> <p>14) Page3, section I, para 3 (#12) – mention should also be given to “introduced/exotic” species as being favored by reservoir construction – increased predation, competition, etc.</p>	
<p>15) Page 3, section I, para 4 - other operational changes that should be mentioned in context of benefiting the resource include; flushing flow releases to mobilize and transport sediments below dams; pulse flow releases for smolt out-migration, ramping rate limits to minimize/eliminate stage changes and stranding potential, etc.. Seems like a bit more detail could be added to this section.</p>	<p>ODFW: This subsection was intended to provide an overview of the variety of measures that are available for mitigating adverse fish impacts. Although it has been rewritten, it is not intended to be an all-inclusive list.</p>
<p>16) Page 4, section A-1, para 3 - need to add technical references. Need to mention</p>	<p>ODFW: For replies to comment items #16-25, see “DEQ</p>

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<p>inter-dependencies of temperature and other parameters, e.g. D.O., etc.. General Comment: use of term - Overarching Biological Objective seems awkward - suggest different terminology. Objective AI-1 and AI-2 seem like essentially the same thing. By meeting DEQ's standard, won't you more closely mimic natural temperature regimes. Also - how do you define what "natural temperature regime" is? Also - I recommend for each mention of a DEQ standard, that you include the specific standard for that parameter - what is temperature standard? pH standard</p>	<p>Response to Comments on Water Quality Portions of the Hydropower Section of the Steelhead Supplement," which follows this comment section. Regarding the use of the term "overarching biological objective," this term has been changed to "biological objective."</p>
<p>17) Page 4, section A-II, para 6 - this discussion seems technically weak and disorganized. I generally do not consider high sediment loads as a logical consequence of hydropower operations. Indeed, streamflows below dams are generally much cleaner than upstream due to settling out of sediments upstream. This can cause some local scour and erosion downstream as the "hungry" water seeks equilibrium with its energy potential. However, projects which have been in operation for a number of years have already resulted in downstream channel adjustments. Some of the effects cited seem a bit of a stretch - e.g. reference to high sediment loads impairing homing instincts - I know of no situation where this has occurred. Check terminology and sentence structure - e.g. suffocating habitat for macro-invertebrates on which they feed - how do you suffocate habitat? This section needs work and further embellishment.</p>	<p>See attached "DEQ Response to Comments on Water Quality Portions of the Hydropower Section of the Steelhead Supplement."</p>
<p>18) Page 5, section AII , para 3 - does DEQ have a standard for sediment levels in gravels; if not, should consider developing one. This would need to consider baseline/background levels of streams, and could be based on maintaining concentrations of fine sediments below some level. Objective AII-2 seems overly vague and general - what is meant by improve? shouldn't these be quantitative?</p>	<p>See attached "DEQ Response to Comments on Water Quality Portions of the Hydropower Section of the Steelhead Supplement."</p>
<p>19) Page 5, section A-III - lack of D.O. is a common cause, or "can be" a common cause? Low D.O.'s also detrimental to egg incubation and fry development - can result in smaller fry at emergence. I question association of low D.O. and decreased competitiveness with warm water species! Biological Objective seems awkward - D.O. levels suitable for salmonids are fundamental to the propagation and sustainment of aquatic ecosystems that harbor trout and salmon. Focusing on "competitiveness seems mis-directed and reduces significance of the parameter. Rework the objective. Objective AIII - 1 - what is the DEQ D.O. standard?</p>	<p>See attached "DEQ Response to Comments on Water Quality Portions of the Hydropower Section of the Steelhead Supplement."</p>
<p>20) Page 5, section A-IV, para 4 - Overarching ...objective: assume you mean " and" other species</p>	<p>See attached "DEQ Response to Comments on Water Quality</p>

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of concern rather than “of” other species of concern - check other sections for this same error.	Portions of the Hydropower Section of the Steelhead Supplement.”
21) Page 5, section A-V - elevated hydrogen ion activity? Why not just elevated pH levels? on page 6 - what are the direct and indirect effects? death, reduced growth, stress, disease? Does DEQ have pH standard?	See attached “DEQ Response to Comments on Water Quality Portions of the Hydropower Section of the Steelhead Supplement.”
22) Page 6, section A-VI - I don’t follow logic of why “Compromised Biological Conditions” is even mentioned under the section of Water Quality. Seems out of place. What is meant by “Managing projects” as an Objective under this section? Omit.	See attached “DEQ Response to Comments on Water Quality Portions of the Hydropower Section of the Steelhead Supplement.”
23) Page 6, section A-VII - why focus on mercury? I’d suggest keeping this generic, i.e. objective is to keep all contaminants at levels below state standards. Question - what is meant by “naturally occurring toxic chemicals”? aren’t we talking about contaminants that have been introduced?	See attached “DEQ Response to Comments on Water Quality Portions of the Hydropower Section of the Steelhead Supplement.”
25) Page 7 - it is unclear how the “Statewide Measures” factor into addressing the water quality impacts noted earlier. Seems like these should be discussed with each of the specific impacts; e.g. sediment standard discussed when describing impacts of sedimentation. Are the DEQ standard modifications already planned and scheduled for implementation, or are these conceptual recommendations contingent on further agency review and evaluation. The point is timing. Are the proposed revisions by DEQ going to occur soon enough to affect a positive change relative to steelhead survival, in the short term, or are these long term measures which will have little effect on curtailing the need for near term listing.	See attached “DEQ Response to Comments on Water Quality Portions of the Hydropower Section of the Steelhead Supplement.”
26) Page 8 - at this point, the chapter begins discussion of measures specific to individual projects. Organizationally, it may be best to hold off with this until after all factors for decline are mentioned. This would eliminate reference to objectives (e.g. CI-1) that have not been discussed.	ODFW: We received several suggestions, each different, on the organization of the large dam and hydropower section. Since all of the approaches necessitate some cross-referencing or much redundancy, we chose to organize our discussion of factors of decline and measures by the categories used in the four other major sections of the <i>Measures</i> chapter.
27) Page 8 - What is difference between a Phase I and Phase II measure? Phase II measure alludes to Objective AII-1, but that objective pertains to intergravel dissolved oxygen.	ODFW: To clarify, we added a description of the distinction between a Phase I and a Phase II measure to the Introduction.

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	(Phase I measures are those which currently have the resources available for implementation; Phase II measures are those which do not.) This measure is Phase II because it is dependent on the reauthorization of the project.
28) Page 9 - Sandy River - \$20K/year will not provide for much in the way of hands-on actions to benefit SH. Are funding sources available from which the working group can withdraw?	ODFW: The working groups were organized by PGE to coordinate research and broker existing resources. The amounts noted are minimum amounts. They may not be adequate to fund mitigation measures. ODFW hopes that problems related to PGE hydro projects which are identified by the group can be rectified at relicensing.
29) Page 9 - Phase 2 Measure - how will PGE address water temperature problems? This is generally handled with increases in flow, but that is not always an option. Selective gate withdrawal?	ODFW: Depending on the nature of the problem, strategic flow releases certainly are one option of addressing temperature issues at large dam and hydro projects. The issue will be fully studied and the answer to your question determined at relicensing. In this specific case, additional flow may be passed over the spillway or through the fish ladder attraction flow system.
30) Page 9 - Same question as #28 for Clackamas River fisheries group.	ODFW: See reply to #28.
31) Page 10 - Channel “simplification”? Carefully review stated “Overarching Biological Objective” make sure it says what you think it says!!!	ODFW: The term “channel simplification” has been omitted for consistency.
32) Page 10 - Objective BII-1: how can you manage a hydro project to restore woody debris? Same question applies generally to gravel recruitment, i.e. usually must add gravel to streams that have curtailed gravel recruitment due to dams. More detail needed to describe how operations would be modified to address objectives stated.	ODFW: One potential tool is the simulation of natural peak flow events, which recruit woody debris from the floodplain. The placement of gravel downstream of the dam, as you suggest, is also a potential management option. Dam removal, as referenced in BII-1 (now BI-1), also, would be expected to improve recruitment.
33) Page 10 - no discussion of B-III through B-VIII?	ODFW: Since no specific hydro or large dam measures were proposed to address these factors for decline, they were deleted.
34) Page 11 - Measure WRD 1 - suggest changing “Geomorphic” evaluation to Watershed Assessment. What are criteria for determining which projects will require such evaluations.	WRD and ODFW: Based on our understanding, a watershed assessment looks at a broad range of impacts such as road construction, forest practices, and grazing. The use of

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Shouldn't this be required for all projects, unless applicant is able to demonstrate not needed via formal waiver process.	watershed assessment techniques to evaluation mitigation for hydroelectric projects has not been attempted until recently. While a watershed assessment can be a very beneficial basin management tool, it did not seem appropriate to generally require hydro operators to undertake such studies. Our intention is that the State's Hydroelectric Application Review Team will define the criteria for geomorphic evaluation or watershed assessments, as appropriate.
35) Page 11 - Hood River Phase I measure is a repeat of that found on page 8 - I would avoid redundancy. Same comment for Sandy River measure re: work group.	ODFW: As explained in the Introduction, a measure is repeated if it addresses more than one category of factor for decline, as does this one.
36) Page 12 - PGE 4 measure appears will provide substantial funds for enhancement. However, difficult to evaluate value of such without definition of specific programs. Degree to which measures will benefit steelhead is unknown.	ODFW: We agree. PGE was unable to provide specific detail at this point in time. According to PGE, "a process to identify high return projects will be used."
37) Page 13 - repeat of Measure PGE 4.	ODFW: See reply to comment item #35.
38) Page 14 - Objective CI-1 and CI -2 - why the qualifier "adequate" fish passage on the former and not the latter? Objective CI - 3 - I am still unclear what habitat damage occurs relative to peaking and ramping regimes? It is mostly a stranding and varial zone issue.	ODFW: We agree that the original wording is awkward. The text has been reworded for greater clarity.
39) Page 14 - reword Overarching B.O. for C-II - it is awkward.	ODFW: We agree that the wording is not ideal.
40) Page 15 - C-IV - concur with notation that is better placed in habitat section.	ODFW: This objective was originally placed in this subsection because a potential mitigation measure is conversion from "peaking" to "run-of-river" operation, which is a water quantity issue.
(No comment #41 in D. Reiser's comments) 42) Page 15 - is intent of CIV-1 to prevent inundation of all salmonid habitat, or just steelhead and salmon habitat?	ODFW: You point out an important distinction. HB 2990, which governs new hydroelectric development, requires "no loss" of anadromous salmon and steelhead resources, which include habitat.
43) Page 15 - is the statewide measure noted (WRD 2) the only one to address Water quantity and passage issues? Does Oregon have a screening requirement, passage requirement, etc..	ODFW: You are correct in pointing out that Oregon has statutory and administrative standards for fish passage, which

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	includes screening. Since the intended focus of the section was on the development of new measures, we did not include these ongoing programs.
44) Page 16-17: table 1: what is basis for proposing to reduce flows during the months of January - April and in December? Will these reductions have positive biological benefits? If not - how can these be promoted as benefiting steelhead?	ODFW: It was determined from instream flow studies that the significant increase in summer flows proposed would provide a net benefit to fish when compared to current conditions (low flows, temperature, and pH): enhanced migration for juvenile and adults, and rearing, from March to November, with a minimum of impact in winter, during which time we expect spill in addition to required bypass reach flows.
45) Page 17-18: is WRD setting a dangerous precedent by noting it will provide assistance to PacifiCorp in preparing and submitting water rights applications? How much time will this actually save and will this in turn actually be beneficial to steelhead?	WRD: WRD routinely encourages water right applicants to schedule pre-application conferences with staff so they can better understand what is required to process their applications efficiently. WRD's offer to PacifiCorp is in keeping with this policy. This, indeed, does save time. In the past, WRD spent a good deal of time exchanging letters and phone calls with applicants trying to explain what is needed in the way of maps and permits from other local and state agencies. With a good pre-conference consultation, the department can receive all of the information it needs the first time. The very reason for expediting the permit process is so that PacifiCorp can implement the increased summertime flow agreement as soon as possible, which would indeed be beneficial to steelhead.
46) Page 19 - Pacificorp 4 - reservoir passage criteria study - this is laudable effort, but one in which I question the timing of its implementation and completion as providing meaningful results that can be used in the short-term to benefit steelhead production and curtail listing.	ODFW: We agree with your comment. Unfortunately, not all of the problems facing steelhead can be resolved immediately. Developing mid- to long-term strategies for improving conditions is the next best alternative.
47) Page 20 - 21 - minor comments: MFID2 - these project specific measures appear reasonable and useful, but they must be evaluated in the context of the current status of steelhead stocks within those systems. What is status of stocks and will measures that have a timeline of 2007 be beneficial?	ODFW: Measures in this section were offered by operators and agencies with specific authorities to implement specific measures. Although ODFW agrees that additional actions might render faster results in terms of achieving biological objectives, the <i>Plan</i> is a consensus document that recognizes other regulatory processes and economic considerations.

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48) Pages 22-32: no comments/ measures should prove beneficial to steelhead stocks.	
49) Page 33 - suggest adopting a more proactive User Awareness and Education program regarding impacts of poaching on stocks and which advocates “turning in a poacher”. This could prove beneficial in addition to increased enforcement.	ODFW: Your comment has been forwarded to the fish management issue group leader. (PGE: The description of the officer position noted devotes 10% of the person’s time to awareness and education programs.) Thank you for your comprehensive comments on this section.

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<p style="text-align: center;">90701 Georgetown Rd. Junction City, OR 97448 3 November 1997</p> <p>Kammy Korot Jay Nicholas Oregon Dept. Fish & Wildlife</p> <p>Subject: Requested comments on Hydropower/Large Dam Supplement to the Steelhead segment of the Oregon Plan for salmonid restoration.</p> <p>The following are my comments as requested by Ms. Paula Burgess of Governor Kitzhaber's office in a letter dated 10 October. In response to those specific questions:</p>	
<p><u>1: Adequacy of itemization of dam/hydropower factors re steelhead decline:</u></p> <p>I believe the "Dam and Hydropower" chapter adequately identifies, in general terms, the major ecological impacts that are commonly associated with dam and hydropower projects.</p> <p>To comport with the management measures listed in the document, some information might be included to clarify the relationships drawn between water storage and diversion projects and poaching by humans (D-III), maladaptive gene conservation practices in steelhead hatcheries (D-II), and problems associated with legal harvest (D-I) in sport and commercial fisheries.</p>	<p>ODFW: We refer the reader to the fish management section of the <i>Measures</i> chapter, from which the listed fish management factors of decline were taken. These measures were included in this section because they are implemented by a hydro operator (PGE) as part of a package of mitigation for project impacts.</p>
<p><u>2: Are the factors of decline appropriately described?</u></p> <p>The factors for decline associated with dams appear appropriate.</p> <p>Obviously, multiple natural and man-made population suppressing factors other than dam and hydropower projects act to diminish the probability of sustaining natural populations of steelhead.</p>	<p>ODFW: The <i>Plan</i> attempts to address those multiple factors by calling on all relevant parties to offer measures that will reduce the impacts of human development on threatened fish populations.</p>
<p><u>3: Are the factors of decline adequately reflected in the stated biological objectives? Will achieving these biological objectives reverse declines in the identified ESU's?</u></p> <p>In the information provided me, I see no concrete biological objectives expressed in accountable</p>	<p>ODFW: Based on comments, the authors of the five major sections of this chapter agreed to change the term "overarching biological objective" to "biological objective." We agree with your assessment that quantifiable objectives</p>

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<p>terms such as goals for numbers of returning adults or minimum numbers of effective breeding pairs by ESU. The "overarching biological objectives" really appear to address an array of biological, physical, chemical, operational and social problems. Perhaps "overarching ecological concerns" would be more appropriate terminology, as supported by a subhierarchy of underlying biological justifications (Factor for Decline).</p> <p>Achievement of properly quantified numerical biological objectives should provide a genetic baseline population of naturally produced fish capable of sustaining the ESU through periodic environmental extremes.</p>	<p>would be desirable. Unfortunately, available science (as to the measures needed to restore one fish or even "x" number of fish) is not this precise. The best we can do is to improve those conditions that are generally known to be detrimental to fish. Relicensing will allow for further study and discussion to resolve what measures are most needed and beneficial for fish.</p>
<p><u>4: Will the management measures listed in the supplement achieve the biological objectives? Do they move us in the right direction? Can these management measures be implemented to address population declines within the prescribed timeframes? Are there other useful management measures?</u></p> <p>Where specific dam effects actually comprise material factors that suppress populations of naturally spawning steelhead, positive population response should occur, which moves in the right direction. Wise protection decisions target real problems.</p> <p>The affected fish populations may not respond positively to the management interventions and to the degree needed within the prescribed time frames. It is uncertain that the effects of dam and hydropower projects represent the most critical limiting factors influencing these fish populations. Freshwater and ocean habitat conditions, short and long-term climatic anomalies, overharvest, predation, diseases or other limiting factors unassociated with dams may, combined or in isolation, actually be driving the observed population decline(s).</p> <p>Ideally, an objective limiting factors analysis should be performed on each fish population of interest before identifying priority and resources to corrective interventions.</p>	<p>ODFW: See above response.</p>
<p><u>5: Are the analyses and conclusions in the Supplement consistent with scientific literature? Is more research needed? If so, what?</u></p> <p>Scientific literature can undoubtedly be supplied to support all of the included analyses and conclusions. However, scientific literature frequently draws generalized conclusions and inferences gathered at one specific location that does not directly project to another site. Contradictory scientific literature along with site-specific information and economic concerns could most likely be supplied to argue against many of the management interventions proposed.</p>	<p>ODFW: See above response.</p>

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<p>Need for additional information via research automatically generates from a rigorous limiting factors analysis. When assumptions replace credible information, a need for more concrete information is identified, which stimulates a research project.</p>	
<p>General suggestions for collecting helpful information and facilitating the process of protecting steelhead while retaining the social and economic benefits of man-made stream obstructions:</p> <p>First, stabilize the loss of genetic material in critically depleted ESUs, by artificial means if necessary.</p> <p>Determine appropriate guidelines for integrating carefully managed gene-conservation fish culture operations into plans to promote species recovery. Where populations within specific ESUs are critically low, consider germplasm repository in egg-bank programs.</p> <p>Review the results of ODFW's Carson-Willamette Stock Comparative Study as an example of, although inadvertent, successful egg-banking of Upper Columbia River spring chinook salmon genetic material in a lower river tributary. Determine how this concept might be applied to steelhead germplasm conservation efforts in specific ESUs.</p>	<p>ODFW: Thank you for your comments regarding gene conservation. These comments have been forwarded to the author of the fish management section of this chapter. Note that measure PGE 16 of this section does reference a wild winter steelhead broodstock program underway in the Clackamas River Basin. The focus of this section of the <i>Plan</i> was, however, to develop measures to improve habitat for rearing and spawning and to improve fish passage for adult and juvenile salmon and steelhead.</p>
<p>Determine how to most effectively use the (largely retained) fish production potential in stream areas above reservoirs to generate sustainable populations of anadromous salmonids, including steelhead.</p> <p>Refine the technology for collecting smolts from reservoirs and/or from tributaries to large reservoirs.</p> <p>Review the conditions existing at projects that successfully pass (or have passed) steelhead upstream and downstream, and determine how these concepts might be applied to the specific project/ESU in question.</p> <p>Determine which impoundments meet criteria for the successful rearing and emigration of juvenile anadromous salmonids and for retrofitting of effective</p>	<p>ODFW: In response to your comment, note that ODFW IV2 indicates that ODFW will solicit congressional support for construction of a steelhead collection system at Green Peter Dm and in the Upper Willamette ESU. Such technologies are, of course, expensive. As you suggest, fish passage practices and agency criteria applied today have evolved based on models that have proven successful and avoided those aspects that have failed. We agree that we should continue to learn from such models.</p>

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<p>downstream migrant collection systems.</p> <p>Review the evaluation results from projects with fish facilities that "failed". Do different standards of success apply in light of ESA listings? Could these projects have continued to support a viable, self-sustaining fish population at some lower level than was originally deemed desirable? Could they do so if combined with a genetically appropriate fish culture program? Are new fish collection/passage technologies applicable? Did we "allow" specific programs to fail because of lack of resources or as tradeoff with other priorities?</p>	
<p>Since stalemating, time wasting differences of opinion may arise, develop a mutually acceptable process for arbitration of dispute resolution between resource agencies and operators of dams.</p>	<p>ODFW: We agree that having the means to resolve disputes is important. The FERC relicensing process and the new state reauthorization process outlined in HB 2119, developed by both operators and state resource agencies, provide for public participation and mechanisms for dispute resolution. Negotiated settlements between the interested parties are also becoming more common.</p>
<p><u>6: Does it appear that the management measures listed in the Supplement will result in measurable reduction of ecological impacts of hydropower/large dam projects, and over what period of time? Will the improvements occur soon enough to recover the species?</u></p> <p>See the comment related to Question 4 (above).</p> <p>The question associates species recovery with environmental improvements at dams, which may not be direct relationships that can be measured in positive population response.</p> <p>Short-term indications of changes in indirect ecological effects of dams can be measured quickly, comparing pre-to-post-intervention parameters (smolt survival past the project, physical and chemical indicators, etc.) Critically, decisions for ESA listings are most often driven by numbers of effective breeding pairs in an ESU and population trends, not indirect environmental measurements.</p> <p>Corrections of ecological impacts at dams typically are expensive, take time to implement, and often contain no absolute assurance of positive response. Example: Willamette System Temperature Control Study (COE Measure 7).</p>	<p>ODFW: As noted above, we concur that measures to address the ecological impacts of dams can take time to negotiate and implement and are often expensive. We also believe there exist corrective measures to known problems that will yield appreciable positive results over the short term if agreements can be reached to implement them.</p>

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<p>Steelhead populations within a geographic area are often quite variable over time. Measurement of population response to interventions will require assessment of short-term effects over about 8-10 years. Assessment of direction of effects on long-term population trend may require observations extending several years longer.</p>	
<p>Since steelhead require about four years (frequently two years in freshwater and two years in salt) to complete one generation return, it would take a minimum of eight years to examine one replicated test of adult return over four consecutive brood years in relation to intervention effects, which represents only a short-term monitoring program.</p> <p>If the most critical limiting factor(s) suppressing the recovery of any given ESU are not related to dam or hydropower projects, monitoring will continue to detect only further population declines. And, if multiple interventions are practiced simultaneously, cause for positive population response will be masked, and attribution of results to any specific intervention will likely be impossible.</p>	<p>ODFW: Your points are well taken. Given the scientific uncertainty, the best we can do is to improve the conditions that are generally known to be detrimental to fish. Relicensing allows for further study and discussion to resolve what measures are most needed and beneficial for fish.</p>
<p><u>7: Does the Supplement contain adequate monitoring to determine the success of individual measures, to allow for adaptive management, and to assess success of the plan? What additional monitoring of measures is needed?</u></p> <p>See the response to Question 5 (above).</p> <p>Since numbers in the breeding fish populations and population trends are the most critically needed data, documentation of adult return/breeding population response over time is mandatory. Any ESU currently lacking such an inventory process should be supplied one.</p> <p>Short-term changes in indirect measures of environmental indicators (D.O., gravel porosity, river stage fluctuation rates, etc.) resulting from management interventions can be measured relatively short-term, but they need to be compared to a baseline, and the more years of available baseline data the better. Monitoring of these baseline environmental parameters should be currently underway in all important streams in those basins supporting ESUs.</p> <p>Any monitoring program of less than eight years post-intervention to detect adult return response, in the case of steelhead, will probably be insufficient to determine even short-term effects. The monitoring programs listed in the document most often identify monitoring inception dates, not duration. Presumably such details lie beyond the scope of this document. Detailed monitoring plans need to be developed for each ESU.</p>	<p>ODFW: Comments noted. We agree that monitoring of environmental parameters is important. Provisions for monitoring can be included in hydro project license terms and conditions. In response to your comment regarding duration, such details will be determined at relicensing.</p>

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<p>Adaptive management requires that population response to interventions be assessed and, if apparently ineffective, adjustments to the interventions be made. Results of such adjustments also need to be monitored, further extending an already-protracted period of evaluation, time that some ESUs may not be able to sustain without assistance.</p> <p>The relative likelihood of success or failure could be markedly diminished or enhanced by slightly changing sometimes arbitrary and arguable definitions, such as what constitutes a viable geographic ESU, what the effective breeding population must be to effect recovery, and permissible degree of inclusion of hatchery fish component in a given population.</p> <p>Many of the included monitoring projects appear to be "voluntary" efforts on the part of dam operators resulting from real or implied incentives to regulatorily expedite needed project improvements. Quite prudently, regulatory agencies appear willing to expedite normally protracted and contentious regulatory processes in exchange for mutually beneficial early implementation of environmental enhancements at dams and hydroprojects in those locations where steelhead may come under federal listing.</p> <p>Monitoring programs need to be developed for those important tributaries within the geographic ESUs that are not the subjects of imminent relicense actions. Documenting adult returns and/or spawning surveys over time should comprise the minimum monitoring project.</p>	<p>ODFW: We agree. Resources are needed to do this.</p>
<p><u>8: What should be the priority for implementation? Are there management measures that will be ineffective and/or a waste of money.</u></p> <p>Ideally, priorities for implementation would be dictated by an objective limiting factors analysis, with those factors determined to have real probability for direct positive influence on breeding populations being implemented first. Potentially, money and time may be wasted implementing remedies to perceived rather than actual problems, or in activities targeting symptoms.</p> <p>In assigning general priority to remedial actions, those areas of greatest benefit to ESUs identified as being most critically depleted should be addressed first. Lower river fish passage projects should have priority over work in upper river tributaries, because improvements in passage or production at an upstream location may be nullified by problems downstream. Causative effects should take precedence over symptomatic relief (effective watershed restoration is long-term immunization, rolling rocks and logs into a degraded stream as "habitat improvement" is a cough drop).</p>	<p>ODFW: Comments noted.</p>

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<p>The cooperative process suggested in the document has great potential. The steelhead resource will likely benefit from early implementation of many of the environmental enhancements prescribed for dams and hydro projects. Operators of dams and diversions benefit by knowing that regulatory agencies will expedite regulatory processes in the light of early implementation, make their own assessments of the costs involved, and thus have a basis for decision to willingly cooperate. This win-win agreement appears to be in the best spirit of the State initiative to collaborate to avoid ESA listings of stressed steelhead populations. How it will work in practicality depends on timely, good faith accountability and performance by both dam operators and the regulatory agencies.</p> <p>Currently accepted definitions of "wild" populations permit some inclusion of hatchery fish of appropriate genetic heritage (Objective DII-1), apparently up to half of the breeding population. This definition confers a degree of flexibility. Man cultures steelhead effectively, and much has been learned about gene conservation practices in hatcheries. Relegating a part of a rapidly vanishing wild gene pool to direct manipulation via conservation hatcheries and egg bank programs appears to be a straightforward interim intervention with a high probability of assuring continuity of availability of diminishing germplasm and unique life history characteristics while other, more "ecological" interventions are being implemented and evaluated.</p> <p>Resources will be "wasted" when correcting presumed important limiting factors which in reality have poor likelihood of measurably affecting population response. If dam operators honestly judge the cost too great and the effort too poorly justified, the capability of referring the question to an objective independent arbiter will eliminate unnecessary contention and delay.</p> <p>Resources will most likely be wasted when prescriptions for project operations substantially exceed the identical parameters measured in the unobstructed streams tributary to the project. A prime example: ramping rates.</p> <p>Funds dedicated to oversight or steering committees assure only more process, not product. A formal structure of accountability for positive progress must be included.</p>	<p>ODFW: Comments noted.</p>
<p><u>Other comments:</u></p> <p>Attaching an abbreviated step-down format by ESU/subbasin would more clearly tie the biological goals to the associated tasks and activities proposed for remediation, as well as identify disassociation.</p>	<p>ODFW: We considered your suggestion, but chose to avoid any additional duplication. We did include a description of projects by ESU and a summary of measures by party in the attachments.</p>

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<p>The concept of including "other fish species of concern" in this steelhead recovery document needs better development. While true that other species may benefit from the environmental improvements envisioned for specific dams and hydro projects, an encompassing plan that effectively addressed an array of species would likely elicit cooperation from operators of other projects that do not impact natural steelhead runs.</p>	<p>ODFW: Agreed. The intent is that the <i>Plan</i> will be broadened to address other species of concern. While the immediate focus of attention was steelhead, an effort is being made to move away from species-specific management.</p>
<p>COE's recent initiatives to seek congressional authorities to give higher priority to project operations that benefit fish recovery has great potential and should be actively supported.</p>	<p>ODFW: We agree.</p>
<p>Steelhead and the many benefits provided by dams are two unique and extremely valuable resources enjoyed by the citizens of the Northwest. Both require careful stewardship. The goal of the steelhead recovery plan in relation to hydropower should be to conserve and protect the best benefits of both resources while conferring the least unnecessary detriment. If the Governor's initiative is to be effective and ESA listings averted, the best solutions lie in mutual cooperation based on enlightened self-interest.</p> <p>Thank you for the opportunity to comment on this draft document.</p> <p>Sincerely,</p> <p>Max Smith</p>	

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<p style="text-align: center;">BUELL & ASSOCIATES, Inc. <i>Consulting Biologists</i> Aquatic Resource Management • Estuarine Ecology • Salmonid Enhancement • Bioengineering</p> <p style="text-align: center;">MEMORANDUM</p> <p>To: Stephanie Burchfield, ODFW</p> <p>From: J. W. Buell, Ph.D.</p> <p>Date: 24 November 1997</p> <p>Subject: Dam and Hydropower Chapter, Supplement to the Oregon Plan</p> <p>Thank you for allowing me to comment on this draft chapter which will supplement the Oregon Plan. As I mentioned to you on the telephone, I have had <i>many</i> other personal and professional obligations demanding my attention over the last few weeks, and I have not been able to give this review the attention it clearly deserves. I do offer these comments, however, in hopes that you can use some of them.</p>	
<p>In general, I believe this chapter is a good and needed addition to the Oregon Plan. I believe it needs some "fine tuning" in terms of emphasis, however, and I will try to emphasize this in my comments. In addition, there is much use of jargon, which I think is inappropriate in a document of this kind; I will point this out in specific cases and recommend changes. Finally, there are several cases in which I believe there is the perpetuation of popularly held misconceptions regarding how aquatic systems containing dams and reservoirs work. It is very important to correct these misconceptions, since perpetuation will put the State in a much weaker position when it comes to negotiating or implementing corrective actions; I will point these instances out and suggest corrections. Unfortunately, I do not have time to comment on the appendices, but I hope this omission will not be too disappointing.</p>	<p>ODFW: As you will note, text in the introduction has been substantially changed. See reply to comments below.</p>
<p>Statement of the Problem</p>	<p>ODFW: We made major changes to this subsection in response to your comments and those of several other peer</p>

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<p>"Stressed aquatic systems" and "fish" is jargon. It is hard to define this albeit popular term precisely, and it tends to mean different things to different professionals. It would be better to use examples, such as elevated stream temperatures from reservoir surface releases; gas bubble disease; impeded nutrient flux from upstream areas; the "bathtub ring" reservoir edge with no allochthonous inputs; etc. N.B.: Not all stress is bad...ask any athlete!</p>	<p>reviewers. We revised the Introduction to refer the reader to other documents where impacts are specifically documented.</p>
<p>How is it possible that a whopping 3,500 dams can all contribute to a mere 176 hydropower facilities? I think maybe <i>some</i> of them do. Try: "There is a total of approximately 3,500 dams in Oregon, including those which contribute to 176 hydropower facilities."</p>	<p>ODFW: Wording was changed to clarify.</p>
<p>This paragraph, especially the last sentence, sets up a rather unbalanced presentation of the situation involving dams and hydropower facilities. This is a good place to present a balanced statement regarding dams and reservoirs and their operations as they relate to fish and other aquatic resources in Oregon. Say that there are both benefits and liabilities associated with these facilities, and that the benefits include recreational fisheries; notable increases in resident (and sometimes anadromous) fish populations in stream reaches below dams where sufficient flows are present and temperatures are not a problem; temperature control capability; etc. Say also that the key in many cases is a <i>balance</i> of operational considerations in light of various resource users/needs, and that this Chapter is intended to address this balance head-on.</p>	<p>ODFW: Thank you for your suggestions. The language was changed to be consistent with your comments and those of other peer reviewers.</p>
<p>These numbered paragraphs are decidedly one-sided. Along with the suggestion above, I recommend balancing the language in all or most of these paragraphs. This will have the effect of starting "conversations" with other stakeholders at a considerably lower decibel level.</p> <p>(1) "Healthy in-stream ecosystems" is a popular form of jargon. Say what you mean, specifically. For example, "diverse assemblages of indigenous fish and other aquatic biological resources, along with diverse and resilient habitats capable of supporting local aquatic biological communities over a wide range of natural and man-induced hydrodynamic conditions." You might make reference to cold-water fish populations in important geographical areas (like the coast range and the west slope of the Cascades and elsewhere).</p> <p>(2) The passage system doesn't have to be "very good", it has to be "good enough" to pass most of the fish most of the time, <i>not</i> all of the fish all of the time. I am aware of few instances in Oregon outside the Columbia River system where "species/ESUs are still jeopardized by the cumulative impact of passing multiple dams." This very strong statement may be true in some</p>	<p>ODFW: In response to comments, these numbered paragraphs were removed.</p> <p>ODFW: See above reply to comment.</p> <p>ODFW: We do not necessarily agree that passage should only</p>

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<p>cases, but it doesn't belong in this paragraph, which is more generic in reference.</p> <p>(3) The statement in the last sentence is false. Anadromous salmonids do <i>not</i> depend on steady flows to "flush" them downstream. On the contrary, these fish rely on <i>unsteady</i> flows in the form of freshets (in combination with photoperiod and sometimes temperature) to stimulate the migratory response in both the juvenile and adult life stages. Unimpaired flows are <i>not steady</i>. What dams do that is bad for migration, in general, is to crop off the peaks of the unimpaired hydrographs, and reduce turbidity (also positively implicated in downstream movement of smolts), thereby delaying outmigration, or making it less conducive to overall survival. Also, adults are <i>not</i> guided to their spawning grounds by river discharge (at least not by flows significantly in excess of those needed for physical migration, like depth), they rely primarily on olfaction and then "exploring". Please change this.</p> <p>(4) I suggest replacing "displace" the first sentence with "replace...with lacustrine", which is more accurate. I am not able to agree with the general statement that this "typically" diminishes the quality of habitat for juvenile rearing and cover. Consider the tremendous historical outputs of coho from shallow coastal reservoirs and lakes, before introduction of bluegill. It seems to me that, properly managed, many reservoirs could produce prodigious quantities of salmonids, compared to the historical stream reaches on which they presently sit. This is another "case-by-case" case.</p>	<p>be "good enough" when threatened species are at stake. The goal should be "all of the fish all of the time." "Very good" acknowledges that some losses are inevitable with the best of passage systems, i.e. 100% of the fish are not passed 100% of the time.</p> <p>ODFW: We concur that it was a poor choice of words. The discussion oriented toward a lay audience was omitted.</p>
<p>(5) In the last sentence, some bias is showing. Salmon and other fishes are just as sensitive to natural temperature regimes as non-natural ones. Take out the "non-". Change the last part of the last sentence to read: "...can negatively or positively affect native populations, depending on the setting and operation of the reservoir.</p>	
<p>(6) Sentence 2. Take out "other" before "extractive". This sounds like <i>all</i> dams result in extreme variations in discharge, which is not true. I suggest modifying the language by inserting "in some cases" or "in extreme cases", and acknowledging that moderated stream flows <i>can</i> be a substantial benefit to resident native fish populations, if properly managed.</p>	
<p>(7) Add the point that reservoir drawdowns for flood management and irrigation or other water supply functions can have the same result, often with a larger impact, since the degree of drawdown is often much greater.</p>	
<p>(8) Again, this is a matter of degree. I suggest adding a statement that, "although aquatic</p>	

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<p>vegetation often has salutary effects on resident fish populations, including salmonids, in nutrient-enriched systems there is the potential for oxygen depletion due to plant respiration during the dark phase of photosynthesis."</p>	
<p>(10) This paragraph, as written, is both a stretch and incorrect, depending on the individual issue. Silt retention <i>can</i> be a blessing in the big picture, depending on the origins of the material and the quantities being delivered to the reservoir. Usually, the proportion of unproductive bottom is quite small, even with less-than-optimum land use practices upstream. The quantity of silt at the head of Valsetz Lake, when it was drained, was astonishingly small, and the stream channel was still there after nearly a century, complete with <i>old, original</i> large woody debris still in place, even though the entire watershed upstream had been clearcut twice! Other lakes and reservoirs show similar features. Abstraction of nutrients is generally a problem to the downstream reaches, even if a benefit to the reservoir biology. My <i>big problem</i> with this paragraph is the statement that sediment "accumulates heavy metals and other pollutants" as if this was bad. It is very true that sediments, "accumulate" heavy metals, but not in the way most people, including "experts" think. Reservoir and lake sediments are, quite literally <i>sinks, not sources</i> of heavy metals. The porewater chemistry in anaerobic layers is such that individual ions literally migrate <i>downward</i> in the sediments, away from aerobic surface layers. This sets up a gradient which means that silts <i>scour heavy metals from the water column</i>, not the other way around. Over the last decade or two we have had to re-learn the implications of, for example, mine tailings disposal in lakes and reservoirs...there is no better place for such materials than under water, albeit preferably in a tailings pond or natural lake rather than in a fluctuating reservoir. Please don't get sucked into the idea that lake or reservoir sediments are generally a source of heavy metals. The opposite is true. I can give you a mountain (reservoir?) of literature on this subject, if you wish.</p>	<p>ODFW: See DEQ's response to comments attached.</p> <p>ODFW: See DEQ's response to comments attached.</p>
<p>(11) I would add a little emphasis here. You may wish to refer to the effects of multiple passes through power facilities on the Columbia, where there is an especially acute problem (the compound interest problem). You may also wish to make a sentence giving the approximate status of screened versus unscreened diversions in the State, with some reference to priorities.</p>	<p>ODFW: We made major changes to this subsection in response to your comments and those of several other peer reviewers. We revised the Introduction to refer the reader to other documents where impacts are specifically documented.</p>
<p>(12) It seems to me that the "active ingredients" here are temperature, which you mention only in passing, and especially nutrient loading (e.g. from agricultural sources). Please bear in mind that bacteria are <i>the most important</i> initial step in the food web, chemically altering detrital inputs into forms which can be utilized by algae. Bacteria are also the primary nutrient source for many organisms near the base of the food chain. Don't vilify these organisms...be very careful with the syntax here. It's all a matter of balance. Don't forget "other fish" as predators.</p>	
<p>Solutions to the Problem</p> <p>I like this "pro-active" paragraph. Some reservoirs are already "there" with respect to these</p>	<p>ODFW: In response to such positive comments, we left this text intact.</p>

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<p>benefits.</p> <p>The beginning of the second sentence is confusing. Do you mean "Under each factor in the 'Factor for Decline' sections..."? </p> <p>As a matter of grammar/punctuation, I believe that a semicolon is a replacement for "and" in a list such as this. I suggest removing all the "and" conjunctions.</p>	<p>ODFW: The response to your question is "no." Measures are grouped by category of factor of decline, not by individual factor. The wording was expanded to clarify the organization of measures.</p>
<p>Say <i>why</i> this chapter does not deal with Bonneville Dam.</p>	<p>ODFW: Language was added to do so.</p>
<p>A. Water Quality...</p> <p>I strongly recommend adding "Nutrient Loading/Cycling" to the water quality list.</p>	<p>ODFW: For responses to your comments related to water quality , see DEQ reply to comments attached.</p>
<p>A-I (Temperature)</p> <p>At the end of the paragraph, I strongly suggest changing "naturally occurring species of predators" to "naturally occurring species of predators and competitors". I am in mind of Gordie Reeves' dissertation which demonstrated the temperature "trigger" which caused redbreasted sunfish to out-compete steelhead juveniles...the effect is dramatic and very significant from a population perspective.</p>	<p>ODFW: For responses to your comments related to water quality , see DEQ reply to comments attached.</p>
<p>"Overarching Biological Objective" Change "levels" to "ranges". This is relatively important, especially for temperature. It isn't the instantaneous temperature of a stream which influences salmonids as much as the <i>diurnal range</i> of that temperature. Daytime (late afternoon and early evening) temperatures can and do exceed the incipient lethal temperatures for salmonids (N.B., as determined in the laboratory), yet these fish thrive and compete successfully, because the amount of diurnal fluctuation is sufficient to favor them. This is very important, and something that DEQ has been unable...or unwilling...to grasp. This ignorance of basic fish physiology on the part of a state agency is very frustrating for me. I urge ODFW to incorporate correct thinking on the temperature issue. Also, change "support steelhead/salmonids" to "support or favor steelhead/salmonids"...a minor suggestion.</p>	<p>ODFW: For responses to your comments related to water quality , see DEQ reply to comments attached.</p>

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<p>"Objective AI-1" I have a big problem with this. See above. I strongly suggest rewording to read something like: "Reduce artificially elevated water temperatures to approach or achieve DEQ's water quality standard in stream reaches below hydroelectric and storage projects where such reductions will benefit steelhead/salmonid resources." I realize this will spawn "discussions" with other stakeholders, but I believe such "discussions" will be beneficial in the long run.</p>	<p>ODFW: For responses to your comments related to water quality, see DEQ reply to comments attached.</p>
<p>"Objective AI-2" Add to the end: "...where natural regimes are more beneficial to steelhead/salmonid resources."</p>	<p>ODFW: For responses to your comments related to water quality , see DEQ reply to comments attached.</p>
<p>A-II (Sediment)</p> <p>This paragraph seems like a stretch in many areas. Certainly many peaking facilities operations result in stream bank scour, such as alluded to here. On the other hand, the flow that scour typically transport even more efficiently; the energy required to maintain particle suspension or movement ("saltation") is significantly less than that needed to mobilize the particle in the first place. Therefore, the same operations scenario which causes scour should rarely lead to "siltation". The attribution of fish mortality, or even reduced growth rates and impaired homing, to "high sediment loads" is inappropriate in my opinion, because the loads to produce these effects are truly extraordinary, and almost never seen. The fattest trout I <i>ever</i> observed came from the White River (on the back side of Mt. Hood) in the summer time, when the river was transporting a prodigious load of sand and silt due to the glacier melt. The literature on effects of sediment has a bunch of papers which <i>try</i> to attribute serious adverse effects on salmonids to sediment, but the "real science" indicates that these effects are actually almost never seen. I think this is a trap, and I suggest avoiding it. See above regarding the degree to which sediments affect lake/reservoir bottoms. The big deal for sediment is when it is delivered by <i>modest</i> increases in flows which mobilize newly delivered sediment sources (usually from land use or channel manipulation "events") and deposit this material onto already-incubating eggs/alevins. The next-biggest deal is disturbance of benthic invertebrate communities, often changing community structure for the worse as far as salmonid food is concerned. I suggest that this should be your focus in this section. Rework your Objectives in this direction.</p>	<p>ODFW: For responses to your comments related to water quality , see DEQ reply to comments attached.</p>
<p>A-III (D.O.)</p>	<p>ODFW: For responses to your comments related to water quality , see DEQ reply to comments attached.</p>

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<p>I like the idea of maintaining "good" oxygen concentrations in the water, but, aside from nutrient source control, how can this be accomplished? Maybe nutrient control is the key. If so, indicate this here, as well as in the water quality section.</p>	
<p>A-IV (Supersaturation)</p> <p>You got the mechanism for embolus formation wrong, but it's complicated enough that this is not the document for the explanation. I suggest rewording the second sentence to read: "...will not remain dissolved, and gas bubble trauma results." Forget the part about depth...fish get bubbles in constant-depth conditions just as fast and often faster (for complicated reasons)!</p>	<p>ODFW: For responses to your comments related to water quality , see DEQ reply to comments attached.</p>
<p>A-V (pH)</p> <p>Although pH is a very important water quality parameter, I am at a loss to see how operation of a reservoir, especially a storage or flood management or hydroelectric reservoir, can affect the pH appreciably. I must be missing something, unless the sudden drawdown of a reservoir <i>after</i> deposition of large amounts of organic material in the head of the pool, such as after a large forest fire (I have personally investigated such an occurrence), would result in a sudden pH spike...but these are usually in the acid direction. If there are other management scenarios or conditions which could lead to elevated pH conditions, I suggest you spell these out. How could management of a reservoir <i>possibly</i> affect pH upstream? I suggest taking out the reference to upstream conditions.</p>	<p>ODFW: For responses to your comments related to water quality , see DEQ reply to comments attached.</p>
<p>A-VI (Compromised Biological Conditions)</p> <p>If all this stuff is addressed elsewhere, why not simply omit this reference. Tell the reader in the "Introduction", if it is important, that "compromised biological conditions" are made up of all the other things this chapter deals with, and not to expect separate treatment in this part of the document.</p>	<p>ODFW: We concur. This factor was omitted.</p>
<p>A-VII (Presence/Accumulation of Toxics)</p> <p>Mercury is the only heavy metal I know of that can be "focused" into the food web by reservoir operations. Therefore, if this is your target, limit your reference to mercury alone. The situation is almost impossible to control, however. You might say that the "focusing" occurs when <i>aerobic</i> water is forced into reservoir margin soils by a rising pool and changes porewater conditions,</p>	<p>ODFW: For responses to your comments related to water quality , see DEQ reply to comments attached.</p>

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<p>resulting in the solubilizing of Hg. At drawdown, the dissolved Hg is "rinsed" from the natural soils (N.B., <i>not sediments</i>) into the water column. The metal is then methylated by bacteria, and becomes "bio-available". The only way to stop the process is to stop the fluctuating of a reservoir altogether. If this is feasible, so be it. If not... I suspect there are few places where this is a real problem, but where it is, attention should be paid.</p>	<p>Mercury is apparently a problem in more reservoirs in Oregon than is generally believed. Your explanation of the potential impacts of "ramping," or fluctuation of reservoirs, where mercury is present is excellent.</p>
<p>A-VIII (Stream Fertility/Carcasses)</p> <p>If all this is addressed elsewhere, why not simply omit this reference. Tell the reader in the "Introduction", if it is important, not to expect separate treatment in this part of the document.</p>	<p>ODFW: We chose to leave the reference to fish carcass inputs here because it is a water quality factor that derives from different causes, including loss of fish passage at artificial obstructions.</p>
<p>Statewide Measure: DEQ 1 -- Sediment</p> <p>See comment on paragraph 4/6.</p>	<p>ODFW: For responses to your comments related to water quality , see DEQ reply to comments attached.</p>
<p>Statewide Measure: DEQ 2 -- Mitigation</p> <p>This is a good provision, especially the "re-opener". I recommend setting out precisely defined monitoring criteria and procedures for measuring compliance which are at the same time realistic and easy to interpret. Make things quantitative, where possible, achievable, and not subject to conflicting "interpretation" (a tall order, but important).</p>	<p>ODFW: For responses to your comments related to water quality, see DEQ reply to comments attached.</p>
<p>LOWER COLUMBIA ESU</p> <p>Measure: Pacificorp 2 -- Replace Powerdale Diversion Fish Screens</p> <p>Although I am certain that this facility needs replacement with one which will be effective in bypassing both sand and fish, meeting current NMFS criteria <i>will not accomplish the mission</i>. Fish screens meeting NMFS criteria are <i>invariably</i> potential sand traps, hence the problem at Powerdale. Often, velocities, exposure times and transport conditions cannot be simultaneously met, or can be met only with extreme difficulty and excessive cost. There is an alternative approach which may be effective here, approved recently by ODFW, which does work in cases like this. This approach was applied to the East Fork Irrigation District diversion on the East Fork</p>	<p>ODFW: While the emphasis in designing the Powerdale screen was on passing fish safely, it was developed with NMFS and PacificCorp's consulting engineers with sediment transport in mind. It provides for the collection and constant flushing of sediment. The EFID model, which uses coanda style screens and passes 3-4 times less water, does not easily transfer to this setting. It requires several feet of head loss, which would result in revenue loss for a hydro operator. A sedimentation basin upstream of the screen, rather than the style of screen itself, addresses the sedimentation problem.</p>

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<p>Hood River (very near Powerdale), and simultaneously sluices sand and safely bypasses juvenile salmonids. I <i>strongly recommend</i> that the Department and Pacificorp immediately contact the East Fork Irrigation District and their engineers and arrange for a site visit. Roy Elicker knows about this diversion. Contact me if you need help.</p>	
<p>B. PROPOSED PHYSICAL HABITAT MEASURES</p> <p>Physical Habitat Factors</p> <p>B-II (Geomorphic changes)</p> <p>Both the "Overarching Biological Objective" and "Objective BII-1 are good, but getting there is extremely difficult, even through dam removal. I believe that the "realistic" objective is to try to restore hydrodynamic processes to the stream, to the extent feasible, to assure hydrodynamic balance (including scour-deposition) and, most importantly, <i>natural succession of riparian plant communities</i>. Even if the "original" condition cannot be attained, an "acceptable" or "beneficial" condition might be attained if a river can behave <i>as if</i> it were operating naturally. Think of a river leaving a large lake, and make "problem" river reaches work like that.</p>	<p>ODFW: Comment noted.</p>
<p>B-III through B-VIII</p> <p>What's going on here?? Let me quickly add a thought for each:</p> <p>Substrate changes Mostly, dams result in a coarsening of substrate materials downstream for some distance (usually shorter than most folks think). Adding spawning gravel sounds good, but only sometimes works.</p> <p>Loss of roughness I'm not sure what this is all about, since reaches below dams usually increase in roughness. Exceptions may be at greater distances, where the effects of abstracting hydrograph peaks may be felt. I suppose "channel forming flows", carefully orchestrated could help, but only in areas where human habitation/industry has not encroached into the floodway.</p> <p>Loss of estuarine rearing habitat Has the Bay of Fundy moved to Oregon? How does reservoir operation affect estuarine habitat, except maybe at the mouth of the Columbia, where dredge spoil disposal has masked virtually everything else?</p> <p>Loss of wetlands Some reservoirs can realize significant mitigation potential, especially if they are not fluctuated too much. Very nice wetlands are common in small headworks reservoirs.</p>	<p>ODFW: Discussion of these factors of decline was omitted due to a lack of related measures.</p> <p>ODFW: Discussion of these factors of decline was omitted due to a lack of related measures.</p>

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<p>Elimination of [riverine] habitat I suggest using "replacement" instead of "elimination" when discussing reservoirs. See above.</p> <p>Direct take Reduce this, or eliminate it, by implementing screening and laddering programs, along with local aggressive fisheries management.</p>	
<p>PROPOSED WATER QUANTITY, FISH PASSAGE AND FISH SCREENING MEASURES</p> <p>It is probably too late, but I recommend splitting this section into a "Water Quantity" section and a "Fish Passage and Fish Screening" section.</p>	<p>ODFW: It was defined as such to correspond with the other others sections of the Measure chapter, as explained in the Introduction.</p>
<p>C-II (Obstruction)</p> <p>Please do not get too committed to NMFS design criteria. In some cases, the criteria make solving passage problems more difficult than they deserve to be. I recommend that ODFW focus on what I regard as the "overarching" mission: unimpaired passage, <i>not</i> satisfying somebody's criteria for their own sake. I strongly recommend removing all reference to "NMFS criteria" from this document, while retaining the option to apply them <i>on your own initiative</i> in the many cases where they are appropriate. Flexibility is an asset.</p>	<p>ODFW: We agree that flexibility is an asset, as long as fish safety is not compromised as a result. Oregon does have statutory and administrative standards for fish passage, which includes screening, and they are generally consistent with NMFS criteria. Site-specific conditions do, indeed, dictate how these criteria are applied. (Note that in the case of FERC relicensing, sec. 18 of the Federal Power Act provides NMFS authority to prescribe fishways.)</p>
<p>C-III (Fish Screens)</p> <p><i>Please do not get too committed to NMFS design criteria. In many cases, especially for fish screens, these criteria are based on questionable or faulty "science"; often the screening criteria make solving passage problems significantly more difficult than they deserve to be. I recommend that ODFW focus on what I regard as the "overarching" mission: unimpaired bypass of downstream migrants, not satisfying somebody's criteria for their own sake. I strongly recommend removing all reference to "NMFS criteria" from this document, while retaining the option to apply them on your own initiative in the many cases where they are appropriate. Again, flexibility is an asset. See comment on page 8, paragraphs 3,4.</i></p>	<p>ODFW: See reply to your comment above. (Note, also that NMFS staff indicate that they know of not a single screen which offers equal or better protection than those screens that meet NMFS criteria.)</p>
<p>1. LOWER COLUMBIA ESU</p>	<p>ODFW: See responses to comments above.</p>

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<p>Measure: Pacificorp 2</p> <p>See comment on page 8, paragraphs 3,4. This is an excellent example of a situation where a system <i>not</i> in strict compliance with NMFS criteria is potentially ideally suited to solving a fish and sand bypass problem.</p>	
<p>Measure: Pacificorp 5 (Ramping rate)</p> <p>This ramping rate seems extremely conservative to me. I have been personally involved with stranding and ramping experiments involving very young chinook fry and other species, and I do not believe that a rate this slow is needed. If you are in possession of good "science" on this issue, I defer to it.</p>	<p>ODFW: The ramping rate is not conservative but typical of what is achieved at many projects. Three inches per hour is the current standard, but two inches is recommended if technically feasible. In the Powerdale case, two inches is technically feasible and more likely to prevent stranding of fish.</p>
<p>Measure: FID 1 (Water conservation plan)</p> <p>This is an extremely interesting and potentially very beneficial project. I would love to see more of this kind of thinking going into problem solving! Gold star.</p>	<p>ODFW: We are glad you support the approach.</p>
<p>Measure: FID 2 (Fish screens)</p> <p>See comment on page 8, paragraphs 3,4.</p> <p>Measure: MFID 1 (Modify diversion; fish screens)</p> <p>See comment on page 8, paragraphs 3,4.</p>	<p>ODFW: See response provided above.</p>
<p>Measure: MFID (Revisions of Coe and Elliot Creek diversions)</p> <p>Again, an excellent, if intricate, integrated solution to several problems at once. Another gold star.</p>	<p>ODFW: Again, we are glad for the positive feedback.</p>
<p>Measure: ODFW 4 (Lake Oswego diversion fish screens)</p> <p>Does the unwillingness on the part of Lake Oswego Corp. extend to discussing the issue or is it</p>	<p>ODFW: Lake Oswego Corporation has been willing to discuss the issue, but is concerned about the cost of the screens, estimated to be \$250,000. ODFW is currently</p>

Peer Review Letter #8	State Response
the nature of the screening facility that is at issue? Making this clear might help the document. Time to get tough?	developing a list of unscreened diversions, so as to prioritize actions for bringing them into compliance with the state's fish passage and screening standards.
<p>Measure: BUREC 1 (Fish screens at Spring Hill and Patton Valley pumping plants)</p> <p>See comments on page 8, paragraphs 3,4.</p>	ODFW: See response provided above.
<p>Proposed Fish Management Measures...</p> <p>D-I. (Harvest Impacts)</p> <p>Last sentence. Revise this sentence to read: "...spend 1-3 years in freshwater, look more like resident trout, and..."</p>	ODFW: Since your comments on this sub-section deal with fish management, they have been forwarded to the author of the fish management section of the Measures chapter.
<p>D-II. (Genetic impacts of hatchery fish)</p> <p>This series of paragraphs is a little misleading, according to the most "progressive" science on this extremely important issue. In general (not always), hatchery populations may not "differ" genetically from wild populations as most people think of being different, they are genetically less diverse. In a population sense, this is a difference, but it seems to me that this document is meant for a wider audience than fish geneticists and other informed professionals, and the distinction should be presented...in "Peter Rabbit language". Loss of genetic diversity, which results in a "narrower set of options" in a population for physiology, run timing, rearing and migration strategies, age at maturity, size at maturity, jacking percentages (in itself an important genetic mixing strategy), and a host of other traits, means a population is much less "resilient" in the face of ever-changing environmental conditions and annual variations in these conditions. I recommend stressing the genetic diversity issue here. This opens the door to implementation of progressive "conservation" hatchery practices for those hatcheries which will remain, reducing the <i>potential</i> for negative hatchery/wild interaction.</p>	ODFW: Since your comments on this sub-section deal with fish management, they have been forwarded to the author of the fish management section of the <i>Measures</i> chapter.
<p>"Objective DII-1" This sentence could be misinterpreted. I recommend changing to read: "Reduce the percentage of hatchery fish passing (?) hydroelectric and storage projects. If hatchery steelhead are derived from native, wild stocks, and if there has also been an infusion of native, wild gametes into the hatchery population, no more than 50% of the total population</p>	ODFW: Since your comments on this sub-section deal with fish management, they have been forwarded to the author of the fish management section of the <i>Measures</i> chapter.

Peer Review Letter #8	State Response
<p>spawning in the wild may be of hatchery origin. If hatchery stocks were derived from non-native stocks, or if there has not been recent infusion of native, wild gametes into the hatchery stock, the percentage of hatchery fish in the population spawning in the wild should be further reduced to as close to 0% as practicable."</p>	
<p>Measure: PGE 15 (Sort and haul hatchery steelhead downstream)</p> <p><i>DO NOT DO THIS !!!</i> This measure, if I understand it properly, would result in the trucking of hatchery steelhead to the lower Clackamas River, where they would be released to swim upstream again so that anglers could fish for them. <i>This is very bad management.</i> The result would be increased fishing pressure on <i>wild</i> steelhead, since they would make up a smaller percentage of the now-enhanced population being exposed to the recreational fishery. CDFG wanted to try this very regressive management approach on the Trinity River in 1979, but, fortunately, they were stopped. I suggest reworking this measure to sort out the hatchery fish and either sell them or haul them to the hatchery of origin, but <i>DO NOT PUT THESE FISH BACK IN THE RIVER!!</i></p>	<p>ODFW: Since your comments on this sub-section deal with fish management, they have been forwarded to the author of the fish management section of the <i>Measures</i> chapter.</p>
<p>I hope these comments are not too late, and will help you. Sorry about the delay HAPPY THANKSGIVING!</p>	<p>ODFW: Thank you for your extensive comments.</p>

DEQ Response to Comments on Water Quality Portions of the Hydropower Section of the Steelhead Supplement

(Reiser's Comments 16-25; Buell's Comments 4/1-7/3; Shrier's Comments on WQ)

A number of comments were received that were largely editorial in nature. Suggested wording was either changed in response to the comment, or left the same if the meaning would have changed in a way that no longer communicated the author's intent. For comments suggesting substantive changes, a summary and response is provided below. Comments that were repeated by more than one reviewer, or that pertain to related topics are grouped into a general comment.

Comment 1: Better Referencing: Suggested that scientific references be included in the text to support statements about the impacts of dams/hydropower projects, and that DEQ's water quality standards be included.

Response: Literature reviews require staff time that was not available during the short timeframe that the hydropower steelhead supplement was being prepared. We agree the document would be improved by such citations, but recognize that inadequate resources exist to provide them. DEQ's water quality standards were also not included due to a concern for resources. In this case, the resource in short supply is paper: DEQ's water quality standards vary by basin, and some standards are quite complex. Rather than quote the standards in response to the comment, we added the internet address where the standards may be accessed.

Comment 2: Sediment Impacts: Suggested that the text describing the effects of dams on sediment is too inclusive and needs to be reorganized with a different focus.

Response: The text has been rewritten to address the narrower set of impacts as recommended by reviewers.

Comment 3: DEQ Sediment Standard: Suggested that DEQ develop a sediment standard and set specific criteria for factors such as cobble embeddedness, particle size distribution and residual pool volume.

Response: One of the actions DEQ committed to as part of the Coho Plan is to determine whether criteria in addition to the existing intergravel dissolved oxygen standard are needed to protect aquatic species from sediment loads generated by human activities. Such criteria may involve numeric ranges for factors such as cobble embeddedness, particle size distribution, and residual pool volume.

Comment 4: Dissolved Oxygen Effects: Suggested that more detail be added to the text that describes the effects on salmonids of insufficient dissolved oxygen, and questioned the importance of competitiveness as an impact of low DO.

Response: Additional detail was added to the text as suggested. We disagree that the text overemphasizes the effects of low DO on interspecies competition, noting that comparatively little is known about this effect, and that it is therefore difficult to judge its importance. However, as DO drops, the adverse physiological effects that are induced in salmonids occur at higher DO levels than they do in warm-water adapted species. Therefore, low DO should affect the competitive equilibrium if it is in the range that is unfavorable to salmonids, but adequate for warm-water adapted species.

Comment 5: Toxics: One commenter suggested that the text describing the effects of dams on concentrations of toxic substances be made more generic or encompassing, rather than just focusing on mercury. Another commenter suggested that reservoirs are sinks rather than sources of toxics and should be considered part of the solution rather than part of the problem.

Response: We agree with the first suggestion, and have changed the text accordingly. We disagree with the second comment for the following reasons: There are natural (such as mercury) and anthropogenic (such as chlorinated pesticides, PCBs, dioxins and furans) compounds that are persistent and toxic which can bioaccumulate into aquatic life and wildlife and endanger the health of those organisms that consume them. Not all such compounds react the same; some are tightly held in sediment, others are more available. For compounds which are not tightly bound,

reservoirs can have an effect on the bioaccumulation of organic compounds by increased duration of exposure and concentration through increased residence time of water and sediments and decreased particle size and increased organic content of sediments. In addition, as the commenter suggested, reservoir fluctuations may affect the availability of the toxics.

Comment 6: Nutrient Loading/Cycling: Suggested that nutrient loading/cycling be addressed explicitly in the water quality section.

Response: We agree that although the influence of nutrient loading/cycling on water quality parameters such as DO and pH was implicit in the discussion of these standards, effects of dams and hydroelectric projects on nutrient loading/cycling are important enough to warrant more discussion, and have added more discussion of this issue.

Comment 7: DEQ's Temperature Standard: Suggested that ODFW should persuade DEQ to change its "instantaneous" standard to one that recognizes the importance of the diurnal range of temperature on salmonids.

Response: DEQ's temperature standard is not based on an instantaneous criterion; rather it is based on a seven-day rolling maximum average. The experts (including an ODFW staff member) who served on the technical committee that recommended the numeric criteria noted that temperature seems to be cumulative over the lifespan of salmonids, and that cooler night-time temperatures do not mitigate for the impacts of excessive warming during the day. Rather, they explained the survival of salmonids in waters that exceed the recommended temperature ranges by the presence of cold water refugia (a spatial, rather than temporal salvation).

Comment 8: Gas Supersaturation: Suggested that the description of the mechanism for embolus formation be changed.

Response: The change was made as suggested.

Comment 9: Dam Effects on pH: Suggested that pH should not commonly be affected by dams, except after a sudden drawdown after deposition of large amounts of organic matter in the head of the pool.

Response: Daytime pH's are commonly observed to increase after a reservoir is created, and may violate DEQ's standard. The exact mechanism is poorly understood, but the primary reason for the observed pH violations appears to be the effect of the reservoir on nutrient cycling. Reservoirs may lead to increased primary productivity (which in turn affects CO₂ levels, and the carbonate-bicarbonate equilibrium) due to changes in substrate behind the reservoir, warming and slowing of the water, and deposition and decay of organic matter.

Comment 10: DEQ's pH Standard: Suggested that DEQ's pH criterion is 8.5, but the text in Objective AV cites a different value as the level at which direct effects begin to result.

Response: DEQ's pH standard was recently modified, and varies depending on the location within the state. The upper limit of the allowable range of pH's in Western Oregon is 8.5, whereas in Eastern Oregon the value is 9.0. The literature suggests that direct, adverse effects on salmonids from pH occur around pH 9.2, but that indirect effects may be important at lower values. Because relatively few studies have been done to determine the effects of high pH on salmonids, the value of 8.5 was chosen for Western Oregon, where pH's may naturally be as low as 6.0 or 6.5. In Eastern Oregon, pH's may naturally be as high as 9.0, so the standard was set with a trigger value at 8.7 that calls for a study to be done to determine the cause of the "high" pH.

**Response to Comments by American Rivers and Trout Unlimited
on the Hydro Section of the Steelhead Supplement**

ODFW:

Thank you for your extensive comments on the hydro section of the Steelhead Plan. Due to the late nature of your submission, we are unable to provide point-by-point responses to your comments. Nonetheless, many of the issues you raised regarding factors of decline and biological objectives were also raised by other peer reviewers, to whom we were able to offer a point-by-point response. We refer you, therefore, to those responses in the preceding pages. Several changes were made to the text that appears in the final version of the *Plan* which are consistent with your suggestions.

We agree with your assessment that more aggressive, action-oriented measures would benefit steelhead recovery. Given the short time-frame and the consensus nature of the effort to compile this section of the *Plan*, it was difficult to comprehensively address the impacts of large dams and hydroelectric problems in the ESUs of concern. It is our intention that these impacts be fully addressed in the context of relicensing. Where license re-openers exist, we are not averse to modifying or adding terms and conditions, outside of the context of relicensing, to protect critical fish resources.

PGE:

General Comment: In a recovery plan for a threatened species, measures are usually directed to correct problems that were identified as the major causes of decline. The State's Plan is attempting to use this opportunity to address as many problems as possible, even those not specifically identified as causes of decline. In many instances, because of a lack of specific information, problems can only be inferred from similar situations. In many instances, such as the flow below Marmot Dam on the Sandy River, there is sufficient disagreement not only on the extent of the "problem," but also what is needed to mitigate it. That is why a number of the measures are "process" oriented, with the intention of identifying specific problems and potential solutions. This approach should lead to a faster, more efficient recovery. The working group measures offered by PGE for the Sandy and Clackamas Rivers are correctly identified as an important forum for identifying problems and designing and implementing recovery measures on the highest priority items first.

In regards to fish passage at River Mill Dam, ODFW is currently working with PGE through the Clackamas River Fisheries Working Group on several studies aimed at identifying any passage problems, so that specific remedial measures can be implemented.

Objective CIV-2: In some cases, particularly in large reservoirs, alterations to habitat can result in loss of salmonid habitat. Studies on the Clackamas in the early 1960s and new, ongoing studies (started in 1993) have shown increased production and increased growth and survival for all juvenile salmonids, particularly coho and spring chinook in the mainstem reservoirs. Reduction in reservoirs should only be requested on a site specific basis where problems have been identified.

Measure PGE 6: See general comment above.

PGE Measures 7 through 13: There are numerous issues that may be found to be problems and several solutions associated with each. Due to the complexity of the issues and the nearness of relicensing, we have chosen that process as the most likely to result in successful recovery. In order for PGE to determine the ultimate disposition of each individual plant, they need to know all that will be required. ODFW has been and will continue to work with PGE, ahead of relicensing, on those issues most likely to result in immediate benefit.

SECTION 6: GENERAL COMMENTS

List of Commenters

Bill Young, Science and Technology Work Group of the Lower Columbia River Estuary Program

Ted Strong, Columbia River Inter-Tribal Fish Commission

Commenter

Richard Culbertson, City of Oakridge

Commenter

Jim Myron, Oregon Trout

Clear Creek Genetics

Jim Myron, Oregon Trout

Jennifer Budhabhatti, Metro Regional Parks and Greenspaces

Commenter

Peter K. Watt, Willamette Valley Livability Forum

Liz Callison, West Mull, Soil and Water Conservation District, Tryon Resource Management Partnership Watershed Council

B. Boswell, P. Wortman, M. Hayward, Wallowa County Court

Carl. F. Ehlen, Georgia-Pacific Corporation

Commenter

Rose Marie Davis, Member of Jackson SWCD Board of Directors

Bill M. Bakke, Native Fish Society

Reed D. Benson, WaterWatch

Glen Spain, Institute for Fisheries Resources

Kimberley Priestley, WaterWatch

William Percy

South Santiam Watershed Council

**Comments on the draft Oregon Steelhead Supplement Action Plan
prepared October 27, 1997 by the
Science and Technology Work Group of the Lower Columbia River
Estuary Program**

The Columbia River estuary provides critical habitat for migratory steelhead, salmon and innumerable other organisms in the lower Columbia River ESU. Over the past 100 years, the lower river's wetlands, tide flats and sheltered bays, so essential to juvenile salmonids, have been greatly altered or diminished as a result of man's activities. Protection and enhancement of this important resource must be considered a fundamental part of the overall steelhead conservation effort. With this in mind, the water quality, habitat, fish management and in stream flows actions described by the Steelhead Supplement Action Plan tie in well with the work of the Lower Columbia River Estuary Program (LCREP).

The goal of LCREP is to develop a comprehensive management plan that will improve and protect the water quality and ecological integrity of the resources of the lower river. A key component of our planning efforts is to provide a forum for consensus building among interested parties and users as we go through the process of identifying environmental problems, evaluating existing management frameworks, and recommending priority actions which will enhance the resource. The Oregon Steelhead Supplement Action Plan provides an opportunity to foster this kind of planning on basin wide scale where it has not always happened in the past.

Development and implementation of LCREP's management plan is the responsibility of a 31 member Management Committee representing a broad spectrum of interest groups on the lower river. Under the oversight of the Management Committee are a number of work groups including a 22 member Science and Technical Work Group. Various members of this work group have reviewed the four part steelhead plan and have a number of comments which are offered below.

GENERAL COMMENTS:

Our overall assessment of the document is positive. The actions identified in the four parts are appropriate and necessary. They should have been undertaken years ago. The plan represents a tremendous amount of work and commitment and, if implemented, should represent a major step forward in effectively managing and restoring the remaining stocks of steelhead. It must be noted, however, that the document is extremely difficult to read and review. Long lists of agency actions, many of which are only indirectly related to steelhead, are practically impossible to evaluate in terms of their potential impact. Our members struggled with this concern and in most cases felt they could not offer meaningful comments. In addition, the readability of the document is very poor. Recognizing that certain protocols must be followed with a conservation management plan, it still seems that a good technical writer could format this into something that

is more readable but still conforms to the conventions of a conservation management plan. Without improving its readability, it would seem that the National Marine Fisheries Service will have a very difficult time determining whether the plan meets their needs.

COMMENTS OF THE VARIOUS SECTIONS:

1. WATER QUALITY (SECTION I)

The current draft incorrectly identifies the Lower Columbia River Estuary Program (LCREP) as a part of the Oregon Dept. of Environmental Quality's Program. LCREP is an separate entity funded by USEPA and the states of Oregon and Washington. As such the description of Agency Management Measures which begins on pg 59 of the Water Quality Chapter should include the following information.:

LCREP MEASURE 1

Summary of Measure: The Lower Columbia River Estuary Program is developing a comprehensive management plan for the lower river to protect and enhance the water quality and biological integrity of the lower river.

Background: In 1995, the Lower Columbia River was recognized as an estuary of national significance through National Estuary Program. The National Estuary Program (NEP) was established in 1987 to identify nationally significant estuaries that are threatened by overuse, development, and pollution. The goal of the program is to facilitate the development of locally developed management plans that will improve and protect the water quality and ecological integrity of these resources. To do so, the program provides a forum for consensus building among interested parties and users, identify environmental problems, evaluate existing management framework, and recommend priority actions.

The Lower Columbia River Estuary Program (LCREP) is a cooperative effort between the states of Oregon and Washington and the federal government. The LCREP study area is defined as that portion of the Columbia River and its tributaries that are tidally influenced. This includes the Mainstem River from the Ocean to Bonneville Dam at River Mile 146, and those portions of tributaries that are influenced by tidal changes. The study area also includes the ocean out to the 3-mile limit, where those waters are influenced by the plume of fresh water from the Columbia River.

From 1990 to 1995, the Lower Columbia River Bi-State Water Quality Program (predecessor to LCREP) collected a substantial body of data on the lower river. It concluded that the Columbia River had suffered degradation as a result of human activities over the last hundred years. The LCREP management committee analyzed the data and identified seven priority issues to address in the management plan. The seven issues are:

- Biological Integrity of the System
- Habitat Loss and Modification

- Toxic Contaminants in Sediments and Fish Tissue
- Conventional Pollutants (pH, temperature, fecal coliform, dissolved gas)
- Impacts of Human Activities and Growth
- Public Awareness and Stewardship
- Institutional Constraints

Goal: To preserve and enhance the water quality of the river while supporting its biological and human communities.

Objective: To develop effective a management plan with specific actions to address the seven priority issues.

Assignments and Responsibility

Task 1: Lower Columbia River Estuary Management Plan

Deliverables: The Lower Columbia River Estuary Program is developing a management plan for the study area. The plan when completed in July 1999, will consist of a series of prioritized actions designed to address the seven priority issues. (The issues include: habitat loss and modification, conventional pollutants, toxic contaminants, human activity and growth institutional constraints, biological integrity, public awareness and stewardship.) Actions included in the plan will identify a party responsible for implementation and a potential funding source.

Responsible Staff: Debrah Marriott - LCREP Director (503) 229-5421

Completion Date: June 30, 1999

Task 2: Action, Planning and Demonstration Project Grants

Deliverables: In June of 1997, LCREP provided funding to six small scale projects on the lower river designed to address LCREP priority issues. Four of the projects funded are located on Oregon side of the lower river, two on the Washington side. The projects focus on providing small grants to local groups for projects to help improve the estuary environment. The first round of grants were awarded to the following projects: (1) a habitat and water quality restoration project for the Chinook River, (2). a stream overflow protection project on Birnie Creek in Cathlamet, (3) a sediment testing and restoration of stormwater control project in East Delta Park Slough, (4) a manual of stormwater assessment and improvement tools for lower river municipalities, (5) a two day workshop for educators on the future health and productivity of the lower river, and (6) the Sandy River Gorge stewardship project. In each case, the projects are expected to address the seven priority issues of the LCREP.

LCREP is soliciting new grant proposals in October, 1997. The total funds available are \$75,000; funds will be awarded in March 1998. The focus again will address priority issues with an emphasis. Monies can be used for action, planning or demonstration projects.

Responsible Staff: Debrah Marriott and Bruce Sutherland - LCREP (503) 229-5995

Completion Date: All projects must be completed by June 1999.

Task 3: Lower Columbia River Ecosystem Restoration Initiative

Deliverables: The Army Corps of Engineers is undertaking a planning project to identify possible areas on the lower river suitable for ecosystem restoration projects. The planning process which will lead to a feasibility study and then a request for project implementation authority is early phases but there is money available for this effort. The location, scope and restoration actions to be undertaken will be developed as the process proceeds.

Participating groups is this to date include: USACE, EPA, the Ports, Washington Fish and Wildlife, Oregon Fish and Wildlife, and LCREP.

Responsible Staff: LCREP - Bill Young

Completion Date: Reconnaissance survey 1998 to 1999, actual restoration work will begin in 1999 pending approval.

Task 4: Temperature Assessment of mainstem Lower Columbia River

Deliverables: USEPA in coordination with Washington Ecology and Oregon DEQ is planning to monitor the lower river for temperature to characterize the cause and extent of elevated temperatures in the lower river. The scope of the study and most of the details are yet to be finalized. A temperature conference will be held on November 6 and 7 in Portland to further define the problem and the study needs. A schedule for implementation is not available yet but authorization to undertake the work has been obtained.

Responsible Staff: LCREP - Bill Young

Completion Date: unknown

LCREP MEASURE 2

Summary of Measure: Long term monitoring for the lower Columbia River.

Background: From 1990 to 1995, the Lower Columbia River Bi-State Water Quality Program collected a substantial body of data on the lower river. An analysis of that data by the LCREP Management Committee determined that a long term monitoring program would be necessary to further define problem areas and to evaluate long term trends in the health of the river.

Assignments and Responsibilities

Task 1: Comprehensive long term monitoring of the Lower Columbia River.

Phase 1: Development of the Long Term Monitoring Plan

Deliverables: The USGS in coordination with LCREP is developing a long term, comprehensive water quality monitoring plan for the lower Columbia River to address problem areas and concerns identified in the Bi-State Water Quality Study of the lower river. The plan will address sediment contamination and its sources, fish tissue contamination, water column water quality, and habitat extent and quality..

Participants in the project include: USGS, EPA, USACE, NMFS, US Fish and Wildlife, Washington Ecology, Washington Health, Washington Fish and Wildlife, Oregon DEQ, Oregon Fish and Wildlife, University of Washington, Oregon State University, Oregon Graduate Institute, Columbia River Intertribal Fisheries Comm., Oregon Trout, Port of Portland, LCREP.

Responsible Staff: Debrah Marriott and Bruce Sutherland (LCREP); Greg Fuhrer (USGS) - Project leader

Completion Date: The plan will be completed in July 1, 1998

Phase 2: Implementation of the long term monitoring plan.

Deliverables: The elements of the comprehensive long term monitoring plan will be implemented by the various agencies participating in the development process. It is expected to be an ongoing effort that will track trends over a number of years. Agreements on responsibilities and priorities and how it will be funded are a part of the implementation process. Key participants in the monitoring are expected to be: USGS, USEPA, USFW, ODEQ, ODFW, WDOE, & WDFW.

Responsible staff: Dependent on agency agreements.

Completion date: Ongoing beginning in 1999.

OTHER COMMENTS AND ADDITIONS TO THE WATER QUALITY SECTION

1. Temperature Bio. Ob 3 & 4 add LCREP 2
2. Temperature Bio Ob 5 & 6 add LCREP 1
3. Page 23 Sediment - Factors for Decline: suggest the following language be added to end of paragraph: “Sediments may also provide attachment sites for contaminants which are then transported downstream, deposited and ultimately ingested by benthic organisms and passed up the food chain”.
4. Sediment Bio Ob 1,2 & 3 add LCREP 2
5. Sediment Bio Ob 4 & 5 add LCREP 1
6. Dissolved Oxy Bio Ob 3 add LCREP 2
7. Dissolved Oxy Bio Ob 5 & 6 add LCREP 1
8. TGD Bio Ob 1 add LCREP 2
9. TDG Bio Ob 2 & 3 add LCREP 1
10. Page 37 Biological Conditions - Factors for decline: suggest the following be included as one of factors which alters biological conditions “introduction of non-indigenous species of plants and animals that compete for good and habitat and predate on juvenile salmonids.”
11. Bio-criteria bio ob 1,2, & 3 add LCREP 2
12. Bio-criteria bio ob 4 & 5 add LCREP 1
13. Toxics bio ob 1 & 2 add LCREP 2
14. Toxics Bio ob 3 & 4 add LCREP 1
15. pH bio ob 3 add LCREP 2
16. pH bio ob 5 & 6 add LCREP 1
17. Stream fertility bio ob 6 & 7 add LCREP 1

II. PHYSICAL HABITAT (SECTION II)

1. Loss/degradation of riparian areas:
under part e. Description of agency measures LCREP 1 will address objective 4
LCREP 2 will address objective 1
2. Channel morphology:
under part e: Description of agency measures LCREP 1 will address objectives
3,4,5
LCREP 2 will
address objective 1
3. Loss of wetlands:
on page 103 part b. Discussion of factor - suggest adding lower Columbia River as an area
where large wetland losses have occurred.

Under part e. Description of agency measures: LCREP 1 will address objectives
2,3,4
LCREP 2 will address objective 1

4. Loss of estuarine habitat

under part e. Description of agency measures:

LCREP 2 will address objectives
1&2

LCREP 1 will address objectives
3&4

III. WATER QUANTITY (SECTION III)

GENERAL COMMENTS: Nowhere in the water quantity section is there any discussion of the problems such as entrainment, spillage, dissolved gases, and flow regulation associated with the dams on the main stem Columbia River. Although the impacts of these dams, particularly Bonneville in the lower Columbia River ESU, are not as well documented for steelhead as they are for salmon, it would seem that any discussion on water quantity, fish passage and fish screening needs to include some description of the impacts of these structures and the actions in place or proposed actions designed to mitigate those impacts.

IV. FISH MANAGEMENT (SECTION IV)

GENERAL COMMENTS: Although it appears that all the right factors are being addressed in this section, a concern with the fish management plan is that it seems to rely heavily on stock manipulation and the continuation of existing harvest levels of steelhead. Recognizing that the key implementing agency (ODFW) has a legislative mandate to provide harvestable fish and wildlife and that they rely heavily on license fees to support their efforts, we believe that moratoriums on sports harvest in critical wild steelhead streams and the elimination of hatchery plants for a period of time until necessary escapement levels are reached would more likely ensure the survival of declining runs. Until we know for certain what the relationship is between wild and hatchery fish, it would seem prudent to err on the safe side by protecting wild fish to the maximum extent possible. This would entail concerted efforts to educate the public and gain their support and that of decision makers for such actions but in the long run, we believe a more aggressive protection approach would have a better chance of success.

Having said the above, the effort to experiment with stock manipulation to see if hatchery fish can be developed which will minimally interfere with wild stocks is important and needs to be supported. Our concern is that this experimentation should not occur at the expense of rapidly declining native stocks but should be carried out in areas where the hatchery fish will not interfere with wild fish.

This concludes the Lower Columbia River Estuary Program's comments on the Steelhead Supplement Action Plan. We appreciate the opportunity to review the plan and are very supportive of the effort. In our role as a coordinating body, we are pleased to offer our services and processes to play whatever role is appropriate to help this conservation plan to be effective. If there are any questions, please direct them to either Debrah Marriott, Director of LCREP or to Bruce Sutherland, staff of the LCREP Science and Technology Work Group. They can be reached at (503) 229-6066.

Columbia River Inter-Tribal Fish Commission
729 NE Oregon, Suite 200, Portland, Oregon 97232

Telephone (503) 238-0667
Fax (503) 235-4228

November 21, 1997

Ms. Paula Burgess
Senior Policy Advisor for Natural Resources
Office of the Governor
Oregon State Capitol
Salem, OR 97310

Dear Ms. Burgess:

The member tribes of the Columbia River Inter-Tribal Fish Commission, the Nez Perce, Umatilla, Warm Springs and Yakama tribes (Columbia River treaty tribes), have reviewed the request to provide comments on the State of Oregon's development of a supplement to the Oregon Plan for steelhead. The tribes understand that the initial impetus for a steelhead supplement was to address the potential listing of Oregon coastal steelhead and lower Columbia River steelhead. It now appears that the steelhead supplement is intended to apply to all steelhead stocks in Oregon, including steelhead destined to pass the tribes' usual and accustomed fishing places and thus subject to United States v. Oregon.

The tribes are particularly concerned that the proposals in Oregon's steelhead supplement appear to have been developed without recognition that these issues fall within United States v. Oregon and the Columbia River Fish Management Plan (CRFMP). In addition, the tribes have serious concerns regarding many of the provisions in Oregon's steelhead supplement because these provisions are inconsistent with the CRFMP and appear to compromise the tribal treaty reserved fishing right. The tribes believe United States v. Oregon is the appropriate forum for further discussion of Oregon's steelhead proposals.

As you may know, the CRFMP was developed by the parties to United States v. Oregon and adopted as an order of the Federal District Court for the District of Oregon in October 1988. Parties to the CRFMP include the United States of America (represented by the Department of Interior's Assistant Secretary of Fish, Wildlife and Parks and Assistant Secretary of Indian Affairs; and the Department of Commerce's Undersecretary for Oceans and Atmosphere), the Nez Perce Tribe, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes and Bands of the Yakima Indian Nation, the States of Oregon, Washington, and Idaho, and the Shoshone-Bannock Tribe (subject to certain limitations).

Among its purposes, the CRFMP is intended to “provide a framework within which the Parties may exercise their sovereign powers in a coordinated and systematic manner in order to protect, rebuild, and enhance the upper Columbia River fish runs while providing harvests for both treaty Indian and non-Indian fisheries.” The provisions in the CRFMP were developed to assist in rebuilding Columbia River salmon runs, based on estimates of fish production and limits to productivity at the time the Plan was developed. The parties to United States v. Oregon recognized that it would be very difficult to achieve the CRFMP’s rebuilding goals and harvest sharing objectives, unless other land and water management activities that impacted the fisheries resource were also addressed. The parties therefore pledged to use their best efforts to integrate the CRFMP’s goals and objectives into other programs and plans required by or adopted under other state and federal laws.

For many years, the Columbia River treaty tribes have worked with various state and federal entities, on efforts to protect and restore Columbia Basin anadromous fisheries. Unfortunately, the tribes have witnessed inconsistent and uncoordinated state positions with regard to fishery resource protection and restoration. Too often, state actions have diminished the fishery resource at great cost to the tribes’ treaty rights and their economy, culture and religion. In this regard, the tribes appreciate the State’s attempt under the Oregon Plan to coordinate salmonid restoration activities among all of its various departments. However, Oregon’s proposals in the steelhead supplement, such as those unilaterally modifying existing harvest management and fisheries production regimes, would adversely impact the integrity of the CRFMP and the co-management process.

Management actions affecting steelhead destined to pass the tribes’ usual and accustomed fishing places must be addressed in the United States v. Oregon forum. The parties to the CRFMP are initiating negotiations relating to the formulation of the current CRFMP which expires in 1998. Steelhead management issues are currently addressed in the CRFMP and will be considered by all the parties over the next year in renegotiation of that Plan. It is incumbent upon the State not to make or implement unilateral policy decisions affecting treaty fishery resources and Oregon’s co-management obligations. Effective restoration of Columbia Basin salmon depends upon the joint efforts of the tribes, states and federal government. The ability of the sovereign parties to United States v. Oregon to develop management and restoration agreements should not be compromised by any one party.

The Columbia River treaty tribes have committed to seriously discuss Columbia Basin fisheries management issues with the other sovereign parties to United States v. Oregon in the CRFMP process. It is in everyone’s best interest to address specific actions for steelhead in the treaty fishing areas through the United States v. Oregon/CRFMP process. The tribes urge the State of Oregon to use its authorities in good faith to negotiate a successor agreement to the CRFMP and address steelhead co-management issues in United States v. Oregon. I hope you and Oregon will understand and appreciate the tribes’ position. If you have any questions, please call me at (503) 238-0667.

Thank you for your attention to this matter.

Sincerely,

Ted Strong
Executive Director

cc: U.S. v. Oregon Policy Committee

FAX TO: (503) 378-6203
Attention: Mr. J. Nicholas
Oregon Plan-Steelhead Review
State Capital; Salem, OR

November 24, 1997

Dear Steelhead Review Committee,

I would like to submit the following comment on the Steelhead Supplement to the Oregon Plan. As a member of the public, I attended several of the Governor's Willamette River Basin Task Force meetings, and I have just finished reading the final draft of their recommendations to the Governor. It is my understanding that Governor Kitzhaber had expected that the Task Force's recommendations could serve as a framework for solving some of the many severe water quality problems facing Steelhead in the Willamette.

I would like to inform your committee that I have serious concerns that the Task Force Report to the Governor lacks sufficient substance on improving water quality to be of very much use in fending off any ESA listing for Steelhead in the Willamette Basin.

My concerns are based upon inadequate provision within this document to set up effective parameters to ameliorate the following causes of water degradation:

CHEMICAL TOXINS & POLLUTANTS
COMMON EXCEEDANCES OF WATER QUALITY STANDARDS
GROUNDWATER CONTAMINATION
EFFECTS OF SEDIMENT DREDGING & EXTRACTION
LACK OF AN EFFECTIVE SYSTEM TO TRACK CONTAMINATION
INSUFFICIENT DIRECTION HOW TO REDUCE LAND USE IMPACTS
LACK OF SPECIFIC IMPLEMENTATION OF "INCENTIVES"
IMPACTS OF DREDGING – I.E. THE PORTLAND HARBOR
AGRICULTURAL IMPACTS – NO REAL "PESTICIDE REPORTING"
NO PROVISION FOR ANY "PHASE-OUT" OF POINT SOURCES

All of these problems are well documented on the Willamette, and all have very serious implications for humans and our environment. I believe the people of Oregon will be sadly disappointed in the Task Force's recommendations because after two years of work on this document, they still have failed to live up to their charge, to communicate the extent of the river's problems and "establish an effective, ongoing monitoring system to track changes in watershed health."

In their report they do acknowledge that "Streams throughout Oregon fail to meet water quality standards because of the presence of pesticides, heavy metals, dioxins and other pollutants." And they admit that, "Oregon lacks a coherent system to track contaminants, identify their sources, determine when dangers exist, and address problems in a consistent and timely way." Still, they do NOT offer very much of an improvement from the existing status quo.

For instance they say that we need “to improve the effectiveness of monitoring” for pollutants and “identify sources of contamination”; but they neglected to recommend real “Pesticide Reporting”. This will make it impossible for scientists to access the impacts of the millions of pounds of pesticides that have been applied to the lands and waters of the state. Researchers have been saying for years that they need that type of detailed data to effectively monitor such pollutants. In fact, almost nothing is said about the contributions that agricultural and forestry industries have made to the sad state of the Willamette. The report only vaguely alludes to Nonpoint Sources by suggesting that we need to “Identify relative amounts of point and nonpoint sources of pollution” (Executive Summary, p. 3)..-while in the sentence immediately *preceding* that they admit that “90 percent of suspended solids are from nonpoint sources.” –Please refer to the attached pages from the USGS report that documents “a total of 36 pesticides” frequently detected. It serves to point up just why we need real pesticide reporting, i.e. “The high frequency of detection of atrazine in contrast to its apparent decline”, and that “its use remains prevalent despite current restrictions on its sale.” (See attachment)

Another example of their circumventing their official charge is how they recommend that we “identify areas of contaminated sediment, and prevent disturbances.” Yet even though they were well aware of the extent of dangerously polluted sediment in the Portland Harbor, they failed to make any mention of it...apparently because of the “economic impacts.”

I consider the alarming prevalence of fish deformities in the Willamette a “canary in the coalmine” alert for the public; yet very few Oregonians have learned of this. The panel’s vague recommendations lack the type of real “teeth” that could have served as a “first alert” to educate the general public. How many people are aware of the organochlorine link to physical deformities in otter populations on the Willamette?

The panel failed to take advantage of their educational platform to alert voters to the severity and extent of the existing problems like the prevalence of surface and groundwater contamination in many parts of the valley. Instead, the report suggests only generalized recommendations; for instance they warn about possible problems that Growth will pose for the valley in the years ahead. The problems are here NOW; and the public deserves to know the severity of the river’s problems NOW.

I will be forwarding a copy of this letter to Governor Kitzhaber. The Task Force has come up with some beneficial recommendations for policy change, but this will never head off an ESA listing. The people of Oregon & *their fish* deserve better.

UNPUBLISHED REPORT SUBJECT TO REVISION

...applied was nearly an order of magnitude greater than the estimated amount of chlorpyrifos atrazine, MCPA, or dicamba, and it was over 3 times the estimated amount of 24-D applied. The high ranking of these compounds' use estimates is largely due to the fact that they each have some estimated rate of application on grass seed crops, and large acreages are planted in grass seed in the study subbasins. Diazinon, chlorothalonil, EPTC, and simazine complete the list of the ten most abundantly applied target compounds in the study areas: these were estimated to be applied in roughly the same amounts. Of these, only chlorothalonil, a fungicide, has an estimated application rate on grass seed crops. The application estimates do not include uses along rights of way industrial settings or landscaping, or any other noncropland uses, so the total application of some compounds in the subbasins was underestimated. There were no application estimates at all for some compounds that were detected in the study but that only had noncropland uses indicated in the literature.

A total of 36 pesticides (29 herbicides and 7 insecticides) were detected basinwide. Five compounds were "frequently" detected, including atrazine (99% of samples), desethylatrazine (93%), simazine (86%), metolachlor (86%), and diuron (73%). Each of these except diuron were detected at every site, and diuron was detected at all except 3 sites. Fifteen compounds were detected "infrequently", in 12-35% of samples, and 16 compounds were detected "rarely" in 1-9% of samples. The list of detected compounds is similar to those from previous studies. All of the compounds detected had been reported previously in Phases I and II of the Willamette River Basin Water Quality Study or the USGS's Willamette NAWQA study. The frequently detected compounds were detected at similar frequencies in these previous studies.

Fourteen compounds that were estimated to have been applied in 1 or more of the study subbasins were not detected at all in this study; four of these had been rarely detected in the previous studies but the rest had not been. Nine compounds were detected for which there were no estimated applications. One of these was desethylatrazine, a frequently detected metabolic breakdown product of triazine herbicides (including atrazine and simazine), and is not an applied compound; the rest were detected infrequently to rarely. No organochlorine insecticides, such as p,p'-DDE (a derivative of DDT), dieldrin, or lindane, were detected.

The high frequency of detection of atrazine is in contrast to its apparent decline in use since it became a restricted use pesticide in 1993. Similarly, the high frequency of detection of metolachlor and simazine are in contrast to their relative lack of use compared to compounds such as 2,4-D and MCPA, which were detected infrequently. Factors specific to certain compounds, such as persistence in the environment, water solubility or even differences in the analytical method, can affect their apparent prevalence in the streams. In this case, however, the disproportionately high detection frequently of these compounds is undoubtedly due in large part to uses that are not accounted for in published literature. The high concentrations of atrazine, 2 of which were higher than the 99th percentile of atrazine concentrations nationwide from about 2,000 samples collected in the USGS NAWQA program, support the idea that its use remains prevalent despite current restrictions on its sale.

Comparisons of the concentrations of compounds detected in the Phase III study with those from the Phases I and II or Willamette NAWQA study indicate that median concentrations in the small streams of the Phase III study were not substantially higher for most compounds but that the upper end of the concentration distributions of 15 pesticides, including the maximum concentrations, were higher than those reported in two previous studies in the Willamette River Basin. Maximum concentrations of 12 of these compounds exceeded the 99th percentile of concentrations reported nationwide in the USGW NAQWQA program. Some of the maxima were one- to two- orders of magnitude higher than those previously reported. The shift towards higher upper end concentrations in the small streams sampled is an indication that pulses of pesticides were sampled in association with runoff, and that these pulses were less attenuated by dilution than those sampled in the larger or higher order streams that were commonly sampled in the previous studies.

State of Oregon water quality standards were exceeded at all sites but one for the indicator bacteria *E. coli*, and at all sites for the previous fecal coliform bacteria standard. Both *E. coli* and fecal coliform bacterial counts were well over 1,000 colonies / 100 mL in many samples, much higher than the State's maximum-count standards, and bacterial concentrations tended to be higher during runoff conditions in the spring or fall than during summer low flow. Nitrate concentrations exceeded the State standard of 10 mg/L at 3 sites, including 4 of 5 samples at one site and 2 samples at another. The temperature standard was exceeded at 10 sites, all during summer, and pH was higher than the state standard at one site during summer. The minimum DO (dissolved oxygen) standard was not met at 4 sites, one of which was an urban site. DO was low at two sites, including less than 1 mg/L at those sites in the fall when flow was still low, and this fact, in conjunction with other evidence, suggests that streamflow at those sites was receiving a relatively large contribution from ground water at that time.

Pesticide concentrations exceeded State of Oregon or USEPA aquatic-life toxicity criteria only for chlorpyrifos, which was higher than both the acute and the chronic toxicity criteria in three out of five samples from one site. Criteria have been established only for four other target compounds, two of which (2,4-D and malathion) were detected during the study. The maximum concentration of chlorpyrifos (3.3 mg/L), from a storm runoff sample, was approximately half of its 96 hour LC₅₀ for rainbow trout; however, it is unlikely that this concentration was maintained for 96 hours.

Several of the frequently and infrequently detected pesticides were associated with one or more of the site groups (I-IV) based on their detection in more than half of the sites in the group. The frequently detected pesticides were associated with all four site groups: 3 of these – atrazine, diuron, and metolachlor – had significantly higher ($p < 0.05$) median concentrations at agricultural sites than at urban sites (metolachlor with slightly lower significance), and Group II (grass seed) sites in particular contributed most heavily to the upper quartile of the distribution of those 3 compounds. The association of atrazine, diuron, metolachlor, and simazine with the urban sites as well, however, is an indication that they were applied to noncropland settings. Four compounds-carbaryl, diazinon, dichlobenil, and tebuthiuron-were associated with both Group III (mixed agricultural) sites and Group IV (urban) sites, but had significantly higher

concentrations at the urban sites than at the agricultural sites. Carbaryl, diazinon and dichlobenil are used on a variety of different crops, but evidently noncropland uses (home and commercial landscaping, for example) can lead to higher stream concentrations in urban basins than in agricultural basins. It must be assumed that noncropland applications of these compounds contribute to the load in agricultural basins, but presumably cropland applications make up most of the load.

When the agricultural basins were split between the northern and southern Willamette valley just north of Albany, atrazine, metolachlor, and diuron all were measured with significantly higher median concentrations at the southern sites. Group II sites contributed the most to the upper quartile of the concentration of these compounds. Because these are the basins where grass seed crops dominate, the occurrence of diuron at high concentrations in the streams draining those basins is probably not surprising. The occurrence of atrazine and metolachlor at very high concentrations in these streams is less easy to explain, and may be an indication these are more widely-used herbicides than is generally recognized.

A few of the associations of compounds with agricultural basis are difficult to interpret, because the compounds have little or no recommended uses on cropland. In particular, prometon, triclopyr, and bromacil are associated with Group II sites. Each of these has uses in landscaping, rights of way, industrial settings, or under asphalt. None, however, are used in large quantities by government agencies in roadside applications. The applications listed do not account for the occurrence of these compounds, sometimes at high concentrations, in the group of sites with the largest percentage of agricultural land use. These compounds can, however, be used by landowners as all-purpose herbicides in many settings, especially where total vegetation control is desired. Prometon, triclopyr, and bromacil may be examples of compounds for which heavy, localized use of favored compounds in noncropland settings is important, but quantifying that type of use was beyond the scope of this study.

Several compounds—pronamide, metribuzin, 2,4-D, ethoprop, terbacil, EPTC, napropamide, carbaryl, diazinon, and dichlobenil—are associated with Group II or III sites, but are much less prevalent at Group I sites. Runoff from the large percentage of forested land in the Group I subbasins may dilute the concentration of these compounds, because most are used on 1 or more crops that are grown in those subbasins.

One of the objectives of this study was to determine the feasibility of quantifying the relation between concentrations of pesticides in streams draining agricultural basins and estimates of the application of the compounds to land within those basins. To that end, stream concentrations and loads were correlated with the estimates of pesticide application to each basin. Simazine, diuron, 2,4-D, EPTC, and metribuzin correlated significantly ($p < 0.05$) with the application estimates on a yearly and/or seasonal basis, although the Spearman's ρ value was generally small. Of those 5 compounds, all but EPTC were also significantly correlated (generally with a higher Spearman's ρ) with 2 basin characteristics—the fraction of the basin in agricultural land use, and the fraction of the basin planted in grass seed crops. Atrazine, metolachlor, pronamide and terbacil, none of which were significantly correlated with their respective estimated application rates, were also significantly correlated with the basin

characteristics. The correlation of atrazine and metolachlor with basin characteristics was found in the immunoassay data as well. In effect, for a set compounds that were detected with a relatively high frequency, and most of which was applied to grass seed crops, more success was obtained in correlating the compounds directly with the acreage of grass seed crops in the basin than with the estimated application rates.

Several compounds were significantly correlated with each other, indicating that the environmental factors that mobilize large amounts of one compound can mobilize large amounts of several others simultaneously. In particular, several compounds including diazinon, metolachlor, metribuzin, pronamide, and terbacil, were significantly correlated with atrazine and not with their respective estimated application rates. Each of these except pronamide and diazinon were also significantly correlated with the suspended sediment concentration. Thus it appears that the hydrologic conditions are as important as the specific amount and timing of application in determining the transport of many compounds to the streams.

The suspended sediment concentration was not, however, significantly correlated with discharge, and of the pesticides only metribuzin was significantly correlated with discharge. This was probably a consequence of collecting water samples at different points in the hydrograph during storm events from the various geographically-separated sites. In this dataset, therefore, there is no simple dependence of pesticide or suspended sediment concentration on flow in the streams. Even though correlations between discharge and pesticide concentration are poor when data are pooled for all sites, the seasonal pattern in both quantities is evidence that transport to the streams is related to discharge and consequently to the amount of runoff. The discharge data show that there were, overall, significantly higher flows in the streams in the spring and fall than in the summer, as was anticipated in the design of the study. Median concentrations of metolachlor, diuron, metribuzin, pronamide, and suspended sediments were significantly higher in the late fall than in summer. Spring concentrations were in general higher, but the medians were not statistically distinguishable from either the summer or fall medians.

That the pesticide concentration varies over the hydrograph was confirmed with 2 special immunoassay studies that involved the collection of, in one case, 8 samples over a 24-hour period during a small storm, and in another case, 14 samples over a 6-day period during a very large storm event that caused flooding. During the large storm, atrazine concentration started to decrease just prior to peak flow, and continued to decrease on the descending limb of the hydrograph, similar to what might be expected of a typical suspended sediment response to a storm hydrograph. The behavior of metolachlor during the large storm and both compounds during the small storm was not as dramatic as this example, but nonetheless showed that concentrations do not remain constant as the stream stage rises and falls.

The prospects for successfully correlating the stream loads of certain compounds with estimates of application rates are probably good *if* current and locally-specific rates of application to various crop types can be obtained. This is most likely to be successful for a compound that meets 2 requirements: first, it is applied in enough quantity and has physical and chemical properties (e.g. water solubility and soil half-life) such that it is detected frequently, and second, it is not a “general-purpose” herbicide or insecticide that is used for myriad purposes by

landowners, in addition to the specific recommended uses on cropland. EPTC probably meets these requirements and it was correlated with its estimated application rates. Diazinon and dichlobenil are examples of compounds that have specific uses on cropland, but are probably used extensively by landowners in many different noncropland settings. Obviously, application estimates based on crop types cannot be correlated with the concentration of a compound like bromacil that has virtually no cropland uses.

Of particular interest are atrazine and metolachlor, which were detected frequently and at high concentrations, therefore satisfying the first requirement. The application estimates for these compounds were clearly low, however, and probably indicated both noncropland *and* cropland applications that simply aren't accounted for in published literature. The cultural practices of growers may be influenced by intangibles like individual preference, and they may not always be determined by generalized guidelines that do not take localized conditions into account.

Atrazine appears to be at least a rough indicator for several other compounds. It was demonstrated in this study that its concentration can be measured relatively cheaply, and with good accuracy and precision, with enzyme immunoassays. A future monitoring plan could probably make good use of this technique to develop relations between hydrology, suspended sediment concentration, and an indicator compound such as atrazine. This might be a viable alternative to the approach of correlating concentrations with estimated application rates, if the goal is to develop a screening mechanism based on the probability of high stream loads.

(541) 782-2258
FAX (541) 782-2250

November 17, 1997

Oregon Plan Steelhead Review
Capitol Building
Salem, Oregon 97310

Dear Sirs:

Thank you for the opportunity to review and comment on the Steelhead Supplement of the Oregon Plan. The City of Oakridge and the citizens are in full support of enhancing salmon and steelhead runs in the Willamette River. We will do our part to protect wetlands, protect water quality and manage our resources wisely. However, we feel that any actions that are to be taken need to include re-establishing the runs above Dexter and Lookout Point Reservoirs. A fish passage around these two dams would open up hundreds of miles of prime habitat under federal control. Such a fish passage could be constructed along a grade similar to the one used by the railroad along these two reservoirs. If runs of wild fish were once again re-established into the headwaters of the Middle Fork of the Willamette Basin, the city could position ourselves to take advantage of the increased visitors that would come to the area to view the runs and increase in fishing opportunities once the fish runs are re-established to sustainable levels.

There is some concern that the cities above the Dexter and Lookout Point Dams may be forced to take additional actions, beyond what would normally be required, to protect the salmon and steelhead runs. However, unless there is something done to re-establish fish runs above the dams, the cities will not receive any economic or other benefits from the enhanced runs. This would put those communities above the dams in the position of subsidizing efforts of the larger, more economically diversified and stable cities of Eugene, Springfield, Albany, Salem and Portland without receiving any of enhanced salmon and steelhead runs. In addition, any action that may be required by the City of Oakridge will be viewed as an unfunded mandate unless the state is willing to provide the funding necessary.

There is also a concern that if history repeats itself, it will be the small cities and rural areas that do not have a lot of political clout that will bear the brunt of the burden to restore these fisheries. A case in point is the storm sewer separation program in Oregon. In the 1970s many of the small cities around the state were forced to develop and implement storm sewer separation plans. However, it has only been in the last couple of years that the State has forced Portland to get serious about correcting their storm sewer overflow problems. If additional regulatory measures are needed, then they should first be implemented in those areas of greatest impact on the whole system, not the areas that are easiest to force into compliance.

There are discussion in the draft plan of utilizing the Army Corps of Engineers dams to supplement the summertime stream flows. It should be noted that the City of Oakridge and the Army Corps of Engineers negotiated an agreement that the pool level in the Hills Creek Reservoir would not be drawn down until after Labor Day. This was done to keep the tourist and recreational use alive for the summer. Any discussion of changes in the draw down policy needs to include the City of Oakridge during the discussion and policy formulation stages and not just during the review period. The protection of the local economies above the dams is of extreme importance. This region of the state has been devastated by the changes in federal timber harvest policy. We do not need to have any more state or federal policies further devastating the economy.

There also needs to be some discussion with the Army Corps of Engineers to make sure the message of enhancing fish habitat and protecting water quality is implemented in the lower ranks of the Corps. As recently as Monday, October 20, 1997, the City of Oakridge was told by the Corps that in order for them to participate in restoring the revetments that protect the City's municipal well field, the city would have to remove all vegetation from the first mile of Salmon Creek from the outboard side of the levee to the outboard side of the opposite levee. In addition, we would be required to remove all gravel bars that have been built up in the past few years. This appears to be in direct conflict with the goals and objectives of the Steelhead Supplement to the Oregon Plan.

The Steelhead Supplement itself is a very difficult document to make any sense of because of the constant references to the Oregon Plan. Without having a copy of the Oregon Plan in hand to reference, it is not possible to ascertain all the impacts on the local region. We recognize the cost of printing the Plan is quite high but each effected community should have access to a plan through the local libraries.

Specific areas that caused confusion was whether the plan was discussing the Upper Willamette Salmon ESU or the Upper Willamette Steelhead ESU. In some portions of the discussion and some of the supporting documentation, it appeared that the Upper Willamette ESU ended at the base of Dexter Dam. In other instances, it appeared to include all the Middle Fork Drainages of the Willamette River, even though salmon and steelhead have long since disappeared from this portion of the system. Adding to the confusion was that there were no definitions of the ESU's or maps included that would define the specific areas and streams.

The organization of the draft plan made it very difficult to follow what was being planned for a specific ESU. All of the information for a specific area was interspersed throughout the entire plan. This caused some of the confusion about whether a specific action, policy or monitoring was proposed for our area.

To increase clarity and understanding of the elements of the draft plan and how it may impact specific areas, all discussions for a specific ESU need to be organized into a single section. These ESU specific plans would make it easier to review, determine impacts as well as increase citizen understanding of what they could do to improve salmon and steelhead runs. Organizing

the Plan and Supplement into ESU specific sections should reduce the cost of production and distribution of these documents to the stakeholders in the specific region. It is our experience that citizens are generally more interested in their specific ESU rather than the entire salmon and steelhead recovery area.

Lastly, the City of Oakridge is interested in developing a partnership with other agencies to begin a Middle Fork of the Willamette River Watershed Council. This would include the mainstem of the Middle Fork, the North Fork of the Middle Fork, Salmon Creek, Salt Creek and Hills Creek. Since a majority of the land surrounding the City of Oakridge is the Willamette national Forest, we, as a city, may not be able to have much of an impact on Salmon and Steelhead recovery. However, the City has an excellent, long standing working relationship with the local ranger district offices of the U.S. Forest Service and we are more than willing to assist in any way that we can in this effort. It is the goal of the City of Oakridge to help work towards the re-establishment of salmon and steelhead runs to this area.

Sincerely,

Richard Culbertson
Mayor

Oregon Plan Steelhead Review
Capitol Building
Salem, OR 97310

November 21, 1997

Dear Oregon Planners:

Here are a few quick comments on the Steelhead Supplement. I have read Section 4, but only scanned the remainder.

First, compared to the CSRI for coho salmon, this plan is cumbersome and difficult to read and interpret. It lacks a table of contents and a summary, and many sections include a tabular listing of various agencies rules that are not clearly integrated into the plan. Hopefully, the final plan will include better documentation of the status of steelhead stocks, a good summary and clearly state action priorities that will enhance recovery.

In my opinion, poor ocean conditions are the dominant cause of the present low returns of steelhead from California to British Columbia during the 1980's and 1990's. I agree that it is therefore imperative to improve freshwater production to buffer these natural trends and to enable rapid recovery when ocean conditions improve. Therefore, it is important to be able to separate freshwater survival from marine survival in order to scientifically evaluate the effectiveness of any restoration efforts. I am please to see that this is a consideration in the plan (ODFW IIC3S), and that smolt trapping will be implemented. This assessment of marine survival of wild steelhead should have high priority.

I also believe that evaluation of the effects of hatchery fish on wild fish is important, due to impacts on wild stocks from interbreeding/genetic fitness and from possible competition in fresh water and estuaries. Again, ODFW should conduct experiments to learn if major reductions of hatchery smolts result in increased survival of wild fish, either by comparisons of major differences in hatchery smolt releases within a system among years or between stream systems with different treatments within years. In general, all efforts for restoration should be conducted as rigorous experiments as much as possible to assess effectiveness of actions.

There is some evidence to suggest that releases of hatchery salmonids may be an attractant to marine mammal predators in bays and estuaries. Hence, hatchery releases of steelhead smolts should not coincide with the smolt outmigration period of wild fish. Again, we need better methods to evaluate the effect of marine predators, i.e., experiments to compare smolt-to-adult survival of hatchery steelhead during different years with different numbers of observed cormorants or hazing vs. no hazing of cormorants.

An editorial comment: on p. 28, it states that all Oregon coho appear to migrate south in the ocean. This is certainly not so for juvenile fish in their first ocean summer. Also tagged steelhead are seldom recovered because they are seldom taken with troll gear in the ocean. But many CWTed steelhead from Oregon, Washington and the Columbia River have been recovered in research gill nets in the Gulf of Alaska. In fact, the proportion of ad-clipped steelhead caught by these research vessels has been very high in recent years, suggesting a decline in the wild

hatchery ratio. Because most salmon fisheries in the Gulf of Alaska have been flourishing since the late 1970's but steelhead, which often migrate directly into the Gulf during their first ocean summer, have declined in recent years suggests that the poor ocean conditions off Oregon are affecting fish during very early ocean life.

I am looking forward to the next draft of this plan.

Sincerely,

O R E G O N T R O U T

September 25, 1997

Paula Burgess
Governor's Natural Resource Advisor
160 State Capitol
Salem, OR 97310

Subject: Implementation of The Oregon Plan

Dear Paula:

When Governor Kitzhaber announced his intent to produce a state plan for the recovery of Oregon's salmon populations, he stated that he did not believe that any new laws were necessary. He also concluded that it would be essential that all existing laws and authorities be adequately implemented. While Oregon Trout does not believe that new regulatory authorities are unnecessary, we do subscribe to the theory that all existing laws should be enforced.

With that in mind, Oregon Trout offers the following list of existing statutes and other authorities that we believe are not now being adequately implemented. This is probably just a partial list of laws that are not being sufficiently implemented. There are undoubtedly others that should also be included on this list.

As an important component of the implementation of The Oregon Plan, we strongly suggest that all of these existing laws be consistently and adequately enforced.

Sincerely,

Jim Myron
Conservation Director

Encl.

C: J. Greer, ODFW
M. Pagel, OWRD
B. Andrews, ODA
L. Marsh, ODEQ

To Protect and Restore Native Fish and their Ecosystems
Smith Block Building • 117 S.W. Front Avenue • Portland, Oregon 97204 • (503) 222-9091 • FAX (503) 222-9187

**EXISTING STATE AGENCY OPPORTUNITIES
FOR IMPLEMENTATION OF
THE OREGON PLAN**

Submitted by Oregon Trout
September 22, 1997

OREGON DEPARTMENT OF FISH & WILDLIFE

State Wildlife Policy: ORS 496.012

Oregon Wildlife Policy states that the wildlife of the State of Oregon shall be managed to: 1) protect indigenous species; and 2) provide recreation and aesthetic benefits to the public. In the past, the ODFW has asserted that it could not give wildlife protection primacy because its dual mandates were to be given equal consideration in implementation. In a July 15, 1997 memo of clarification of this dual mandate, the Director of the Oregon Department of Fish and Wildlife (ODFW) refuted this claim and wrote that it is the Fish and Wildlife Commission's *overriding obligation* to prevent the serious depletion of indigenous species. ODFW should ensure that this clarification is translated into on the ground policy changes for the benefit of all native species.

Oregon Endangered Species Act: ORS 496.172 et seq.

Under ORS 496.172, the ODFW has the authority to petition the Oregon Fish and Wildlife Commission to list threatened and endangered species. Thus far, it has been slow to embrace this authority. State action on threatened and endangered salmonids, however, not only carries with it a legal and ethical imperative, but also would lessen the need for federal involvement and would demonstrate to the federal government that Oregon is serious about salmon recovery.

Fish Screening: ORS 498.311

The ODFW is authorized to require anyone operating a water diversion of over 30 cubic feet per second to install and maintain a fish screen or other by-pass device, at the expense of the operator. The ODFW has thus far not used this authority, even though the agency has identified at least 200 diversions that qualify for screening. Oregon Trout encourages the ODFW to enforce the screening statute particularly in areas identified by the ODFW as critical to salmonids.

Angling Closures/Gear Restrictions

The ODFW possesses the authority to close fisheries for conservation purposes and to restrict the type of gear anglers may use. For instance, the agency can require the use of barbless hooks or flies and lures to protect salmonids. The ODFW needs to assert its authority in this arena for the benefit of salmonids.

OREGON WATER RESOURCES DEPARTMENT

Conservation/Beneficial Use Without Waste: ORS 537.460

Oregon water law declares that the state will aggressively promote water conservation. Water rights are permitted in Oregon with the stipulation that the water be put to beneficial use *without waste*. Existing irrigation methods, however, such as flood irrigation and open ditches to transport water, are highly inefficient. Oregon Trout encourages the OWRD to actively promote conservation in enforcement of Oregon water law.

Administrative Withdrawals: ORS 536.410

The OWRD has the authority to withdraw waters from further appropriation for purposes of the public interest. The OWRD rarely uses this authority. Many creeks, streams and rivers of the state that salmonids use or used in the past are already heavily over appropriated, some even running dry during the summer. Oregon Trout supports the aggressive implementation of this authority for salmonid conservation purposes.

Elimination of Illegal Uses: 536.900, 537.990, 540.710-540.730

Various Oregon water statutes make clear that certain uses are forbidden. Yet illegal uses, such as appropriation without a permit and ‘water spreading’ continue. Oregon Trout supports strict enforcement of the OWRD regulations to eliminate illegal appropriations of the state’s waters.

Establish Serious Water Problem Management Area’s: ORS 540.435

The OWRD may establish ‘Serious Water Problem Management Areas’ (SWPMAs) if the Department finds it necessary because of ground water decline, user disputes or water shortages. The Department has never used this authority, even though streams in Eastern Oregon regularly run dry because of over appropriation, and permit holders commonly appropriate more than is allowed by their permit. Oregon Trout supports the establishment of SWPMAs throughout the state to monitor and reduce water use.

OREGON DEPARTMENT OF AGRICULTURE

Implementation of SB 1010: ORS 568.900 – 568.933

The Oregon legislature adopted SB 1010 in 1993 to protect waters near agricultural activities. Under SB 1010, the State Board of Agriculture may *require* agricultural landowners to perform actions, such as the implementation of pollution and soil erosion abatement projects, needed in order to comply with water quality management plans developed pursuant to the Act. In the Oregon Plan the Department has identified three basins that are high priorities for development of these plans. Oregon Trout encourages the Department of Agriculture to move as quickly as possible to develop and implement these plans and to coordinate with the Department of Environmental Quality in their efforts to address water quality limited coastal rivers.

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

Designation of Outstanding National Resource Waters: OAR 340-41-026

OAR 340-41-026 states that high quality waters, or those constituting critical habitat for a species, may be designated as Outstanding Resource Waters by the Oregon Environmental Quality Commission upon the recommendation of the Department of Environmental Quality (DEQ). Upon designation the DEQ is required to protect and maintain the water quality and water quality values of the waterbodies. It further states that the Department will develop a screening process and *establish a list* of nominated waterbodies for designation. As of this date, no waterbodies have yet been nominated or designated. Oregon Trout supports and is willing to assist the DEQ in initiating this process so that the DEQ can meet the obligation that the state entered into in its Memorandum of Agreement with the National Marine Fisheries Service.

Water Quality Limited Waterbodies

The DEQ has identified Oregon waters that do not meet existing water quality standards. For these waters, the DEQ must establish total maximum daily loads (TMDLs). Oregon Trout encourages the DEQ to work closely with the Department of Agriculture to take those actions necessary to bring coastal waters in compliance with state water quality standards in order to both stabilize and improve coastal coho production and health.

O R E G O N T R O U T

October 24, 1997

Paula Burgess
Governor's Assistant for Natural Resources
160 State Capitol
Salem, OR 97310

Dear Paula:

Enforcement of existing fish, wildlife and environmental laws is an important element of the Oregon Plan. Without adequate enforcement Oregon cannot assure that the plan will lead to the recovery of depressed native fish stocks.

We understand that the Fish and Wildlife Enforcement Division of the Oregon State Police may lose as many as 16 positions this biennium due to budget shortfalls. This level of staff cuts cannot be sustained without a serious reduction in the level of enforcement activity statewide.

Oregon Trout hopes that you will strongly encourage the Superintendent of the Oregon State Police to submit a proposal to the Emergency Board for additional funding to maintain most of these important positions.

Sincerely,

Jim Myron
Conservation Director

To Protect and Restore Native Fish and their Ecosystems
Smith Block Building • 117 S.W. Front Avenue • Portland, Oregon 97204 • (503) 222-9091 • FAX (503) 222-9187

CLEAR CREEK GENETICS
research and consulting

7 November, 1997

Mr. James Greer, Director
Oregon Department of Fish and Wildlife
2501 SW First Avenue
PO Box 59
Portland, OR 97207

Dear Director Greer,

I am pleased have the opportunity to review ODFW's recent technical report "Conservation Status of steelhead in Oregon". I found the report useful and very interesting and have numerous comments following this letter.

The issues of salmon and steelhead recovery are serious ones confronting the entire Pacific Northwest region. Basing our rebuilding efforts and evaluations on the best available science through peer-review, as you are doing, is not only commendable, but is the only avenue through which biologically viable recovery policies and programs can be achieved. My comments are provided from that perspective, and I hope they assist both ODFW and NMFS in resolving the status of steelhead stocks in the Columbia Basin and moving forward into aggressive recovery and rebuilding strategies.

My review, in summary, found the report "Conservation Status of steelhead in Oregon" to be full of pertinent information on stock status and trends in steelhead abundance throughout Oregon. The report highlighted many areas where adequate information has yet to be assembled to allow a rigorous status evaluation. In spite of these contributions, I found the conclusions of the report, predominantly that steelhead stocks in Oregon should be classified as Sensitive, rather than Threatened, to be at odds with the data and observations presented in the report. This occurred due to flaws in the analytical process and insensitivity in the analytical tools used by ODFW to "quantitatively" derive classification scores for stocks and ESU groupings of stocks. Details of my comments are provided below.

Thank you for the opportunity to review and provide comments on the report.

Sincerely,

General Comments

1. The conclusions of the report, that steelhead stocks in Oregon should be classified as SENSITIVE, rather than THREATENED, seem to be at odds with the data and observations presented in the report.

ODFW’s goal with the technical report “Conservation Status of Steelhead in Oregon” was to provide NMFS with an independent assessment of the status of Oregon Steelhead populations. The primary conclusion of the report, is that most steelhead stocks (organized by the NMFS ESUs) warrant classification as SENSITIVE, rather than as THREATENED, as NMFS determined (Busby et al. 1996). The Klamath Basin ESU was classified by ODFW as SECURE. These conclusions are based on an analytical approach that summarizes stock and ESU status through the use of five “indicators” and relies on averaging these values for a single classification values.

Narrative description of population and ESU status, as presented in the Executive Summary, for example, seemed at odds with their classifications. The Mid-Columbia ESU notes that the Deschutes populations has been in near complete reproductive collapse for the last four years and has stray hatchery fish comprising greater than 75% of the run. Downward population trends are observed in all other populations (except 1) and the SF John Day population models to a moderately high risk of extinction. This summary certainly does not sound like it warrants a classification of Sensitive to me. It is clearly Threatened and if trends are not slowed or reversed, is likely to continue on into Endangered.

2. The analytical approach and indicators used by ODFW to measure population and metapopulation (ESU) vulnerability appear to be less sensitive than they should be. This leads to an underestimation of their vulnerability and an overly optimistic classification status (Sensitive, rather than Threatened).

Examination of the summary data table (Table 1 of these comments) points to several problems with ODFW’s analysis and partially explains the apparent disconnect between their status assessment and their narrative summary of stock and ESU status. One of the basic assumptions apparent in the use of the table and the averaging scores methodology used by ODFW, is that the parameters are clearly not providing equally weighted information on stock status and extinction risk or vulnerability. Indeed, two parameters, **DIST** and **Min-Pop**. (shown in bold) appear to be relatively insensitive to measuring extinction related factors and therefore, skew the averaged results downward. This leads, as is obvious in the disconnect between ODFW’s status classification and the narrative descriptions of the various ESU’s stock status, to an underestimation of the extinction risk and vulnerability of stocks and clusters of stocks (the ESU’s) and a correspondingly misleading overestimate of the status and stability of the stocks surveyed.

Table 1. Summary of scores identified by ODFW for the 5 key “indicators*” involved in their analysis of Oregon steelhead stock status (Chilcote 1997). Scores for several index indicators for Snake River stocks had to be inferred, as they were not specified in the report.

<i>Basin [ESU]</i>	<i>EAM</i>	<i>DIST</i>	<i>Trend</i>	Min-Pop	<i>% Hatchery</i>	<i>Summary Score</i>	<i>Status</i>
Klamath	0.50	0	1.50	0.25	0.09	0.47	Secure
Oregon Coast	0.33	0	2.30	0	0.48	0.62	Sensitive
SW Washington	----	----	----	----	----	----	Sensitive
Upper Willamette	2.00	0	2.00	0	0.40	0.88	Sensitive
Lower Columbia	1.25	0	2.75	0	1.70	1.14	Sensitive
Middle Columbia	0.57	1.00*	2.71	0	0.57	0.97	Sensitive
Snake River	0.67	~0	~1	~0	1	~0.88	Sensitive
<i>Average scores</i>	<i>0.89</i>	<i>0.16</i>	<i>2.04</i>	<i>0.04</i>	<i>0.71</i>		

* The five indicators used by ODFW are:

EAM – Probability of extinction assessment model indicator

DIST – Shrinking distribution of populations indicator

e.g., loss of individual populations within the ESU

Trend – Declines in abundance indicator

Min-Pop – Minimum population abundance indicator

% Hatchery – Interbreeding with Hatchery fish indicator

+ This high value, which is in marked contrast to all other scores in this column, is due to the loss of the Crooked River and Metolius populations. No mention is made of the Squaw Creek population, which was a major steelhead producer in the historic Deschutes system (Nehlsen 1995). Uncertainty also exists concerning the occurrence of steelhead in the Metolius system.

1. Several of the indicators appear to be insensitive to measuring extinction vulnerability particularly indicators “DIST” and “Min-Pop”.

The DIST parameter, which assigns increasing values from 0-3 depending upon the number of populations that have gone extinct within the ESU. Metapopulation theory suggests that losses of individual populations within a metapopulation should be one of the indicators signaling forthcoming losses in abundance, distribution and metapopulation structure. Few would argue with this. The fact that the DIST indicators averages only 0.16 over all seven ESU categories actually indicates that this parameter provides little information for

management and acts only to skew the overall analysis downward and dampen the information provided by the most sensitive indicator parameters: EAM, Trend, and % Hatchery. The indicator Min-Pop, averaging only 0.04 for all seven ESUs, suffers from the same deficiencies as the DIST indicator.

2. Several of the indicators use non-standard and exaggerated thresholds for assigning values for sensitive, threatened or endangered status.

Another factor that affects the sensitivity of the indicator parameters and reduces their sensitivity was ODFW's choice of threshold values within each indicator. For example, few geneticists would agree with the thresholds set for the % of hatchery fish within a natural run that characterize sensitive (30-45%), threatened (45-60%), or endangered (>60%) assessments. ODFW's thresholds are too high by 25-30% to be in line with either longstanding genetic theory or more contemporary thoughts in conservation biology. Inappropriately high thresholds have the effect again, of skewing the results downward and decreasing the sensitivity of the entire analysis for assessing population and ESU vulnerability.

3. ODFW's analysis rests on an assumption that conservation management can be based on the average values for stocks within an area, rather than on a more conservative or cautionary measure.

ODFW's analysis presumes that averaging values for geographic clusters of populations (such as ESUs), represents an appropriate means of measuring the sensitivity of population and ESU vulnerability to extinction and for designing management strategies. Managing for the average or mean, as has generally been the rule for managing Columbia River salmonid populations, will nearly always result in management that is either insensitive or that responds too late to decreasing trends in population abundance or viability. One will never get ahead of the curve when managing for the mean.

Alternatively, management based on indicators from the more vulnerable populations within an ESU will be more likely to address problems and initiate management actions before factors or conditions escalate into a more general decline from which recovery is more difficult.

4. There are political ramifications of underestimating the extinction risk to Oregon's Columbia River steelhead populations and ESUs.

ODFW's classification of most Oregon steelhead ESUs as Sensitive, rather than Threatened as classified by NMFS (particularly given the problems described above in ODFW's analysis), creates an incorrect impression that the Oregon steelhead stocks are in better shape and less vulnerable to continued declines (and extinctions) than is warranted. Persons such as

administrators, policy makers, or the general public, are unlikely to read the detailed document and note the many problems I have described above. Instead, they will rely on the veracity of an accurate and unbiased analysis by ODFW, a view that my review fails to support.

Specific Comments

I am particularly interested in obtaining more resolution on the 26 hatchery populations graphed in Figure 2 (page 17). Specifically, I would like the data for the points plotted and the origin of each population (domesticated strain vs. derived from local wild stock) indicated. Replotting of the figure with different symbols for the stock origin would be informative. The text mentions that examination of the residuals for the two groups did not reveal any pattern, however, without the stocks identified by origin, the reader is forced to take ODFW's word for it, rather than making their own determination.

O R E G O N T R O U T

November 26, 1997

Oregon Plan Steelhead Review
Capitol Building
Salem, OR 97310

Sirs:

Oregon Trout appreciates this opportunity to provide additional comments on the current draft of the Steelhead Supplement. Our Intent in offering these comments is to assist the state of Oregon in developing a viable recovery plan for depleted stocks of native steelhead regardless of whether the National Marine Fisheries Services lists these fish in February of next year under the Endangered Species Act. We encourage the state of Oregon to focus on the fish's recovery, not on the listing decision.

Section 1, Water Quality

DEQ6S, page 56: If the DEQ plans to ensure that "antidegradation" is implemented for nonpoint sources, does this mean that the issue of antidegradation will be addressed in the 401 certification rules currently being developed by DEQ and ODA? If so, that goal should be reflected in measure DEQ31S on page 63.

DEQ31S, page 63: Oregon Trout has been participating in the rules advisory committee that is assisting the DEQ and ODA in the development of the administrative rules for the implementation of the 401 certification process. It is not clear at this time that those rules will "ensure salmon habitat is protected". Please include specific provisions in this measure that clarify how salmon habitat will be protected.

DEQ12S, page 64: Oregon Trout is pleased to see that the DEQ is willing to finally use your authority for designating ORW's. We will be providing you with this opportunity in the near future.

ODFWIB2S, page 72: When will ODFW be identifying the priorities for inventory and monitoring in the two eastern Oregon ESU's?

ODF8S, page 84: Oregon Trout supports the additional review of riparian hardwood conversions within core areas. We do not support the assumption that these conversions are the proper thing to do in all cases.

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ODF9S, page 84: It is very unclear at this time just whether or not the pending N.W. Oregon State Forest Management Plan will assist in the protection and restoration of native anadromous fish stocks. Since the premise of the plan is built around the untested theory of structure based management, we question the wisdom of placing too much hope for salmon recovery on this management plan.

Section 3, Water Quality, Fish Passage and Fish Screening

ODFWIVC4, page 47: Since state law requires the screening of all irrigation diversions larger than 30 cfs at the expense of the irrigator, Oregon Trout does not believe that it is acceptable to simply expect progress by the year 2007. What if federal funds are not available for this activity? ODFW does not have the legal authority to waive the fish screening requirement for the larger diversions. Oregon Trout would like to see this measure reworded to require compliance with the fish screening statutes for all larger diversions by the year 2007. The public may be able to assist in this effort by providing a certain amount of funding, but the ultimate responsibility rests with the irrigator to comply with the law.

Section 4, Fish Management

Oregon Trout has reviewed the comments to this section submitted by Trout Unlimited. We agree with their recommendations, especially with the need to develop a “conceptual foundation” for salmon recovery. We wish to incorporate their comments by reference. The following additional comments are intended to support and expand upon the Trout Unlimited document.

Issue Background, page 1, 2: The last paragraph states that all hatchery programs will be brought into compliance with the Wild Fish Management Policy, but neglects to include a timeline for compliance. Given the fact that the WFMP has been in place for several years, the agency should be able to bring all of its hatchery operations into compliance within the next two years. We recommend that this goal be added to this section of the plan. This paragraph goes on to say that ODFW will explore the possibility of using hatcheries to restore depressed wild fish populations. Oregon Trout is not aware of any scientific protocol for the use of hatcheries in this manner that has been widely accepted by the scientific community. Other than the use of captive brood stock programs to rescue certain fish populations from the brink of extinction, there is not agreement as to how hatcheries might be used to restore wild fish stocks. We suggest that ODFW do critical research on this issue and convene a seminar on cooperation with the National Marine Fisheries Service in an attempt to better define just how hatcheries might be used for this purpose.

Factor for Decline, page 2: The document discounts the effects of harvest in the decline of native steelhead populations. If you are going to make this sweeping statement, it needs to be supported by a sufficient amount of imperial data. If such data is not available, the statement should be deleted from the document.

Biological Objective, page 2: The objective should be reworded as follows: “Manage harvest impacts to attain [strive for attainment of] spawner escapement goals...”. Oregon Trout does not believe that any useful purpose is served by attempting to minimize the effects of harvest and blaming ocean conditions. The document needs to address those sources of mortality that humans have some control over, not waste time lamenting over poor ocean conditions.

ODFWIIIA2S, page 3: Rather than resisting the implementation of further restrictions on the use of bait and barbed hooks in the recreational steelhead and trout fisheries because of their potential effect on license revenues, ODFW should err on the side of conservation and implement protective angling regulations immediately. Oregon Trout believes that this responsibility is clearly articulated in the State Wildlife Policy (ORS 496.012). The logical first place to implement these angling restrictions would be in northeastern Oregon under the incidental take permit current being negotiated between ODFW and NMFS.

Biological Objective, page 12: If ODFW is such a long way from being able to establish realistic escapement goals for steelhead in most basins, it becomes imperative to manage very conservatively in the meantime. This conservative management should include the adoption of regulations requiring the release of all wild steelhead statewide.

ODFWIB1S, Phase 2, page 19: Until such time as funding is available for this purpose, out of basin hatchery stray steelhead should be removed from the Sherars Falls fish trap and not allowed to migrate into the upper Deschutes basin to spawn with native fish. The fish could be provided to the Warm Springs Tribe in return for a reduction in steelhead catch in the tribal gillnet season on the mainstem Columbia River.

ODFWIIIB1S, Phase 2, page 21: Oregon Trout strongly disagrees with the proposal to increase hatchery production of steelhead. No additional hatchery production should occur until after the current review of hatchery operations by ODFW and the NW Power Planning Council has been completed.

Biological Objective, page 22: While hook and release mortality is being evaluated, ODFW should implement emergency regulations to eliminate the use of bait and to require the use of barbless hooks in all steelhead fisheries. If the mortality evaluation concludes conclusively that the use of bait and barbed hooks does not increase mortality significantly, those angling methods could be reinstated. In the meantime, it should be incumbent upon the agency to take a conservative approach to angling methodology.

Factor for Decline, Exotic Fish, page 56: The continuation of restrictive harvest regulations on introduced exotic fish can no longer be supported. Oregon Trout believes that removing all season and bag limits on introduced exotic fish is the right action for ODFW to take and is consistent with the agency's mandate under the State Wildlife Policy. It seems rather foolish to continue a bounty program for a particular species of native fish in the Columbia River while at the same time protecting introduced exotics from being overharvested. It's time for the agency to put its mission before its desire to protect license revenues.

Thank you for this opportunity to comment on this important document. Oregon Trout looks forward to seeing many of our recommendations included in the final plan submitted to NMFS.

Sincerely,

Jim Myron
Conservation Director

c: Burgess, Governor's Office
Martin, Governor's Office
Stelle, NMFS
Bakke, NFS
Curtis, TU
Balliet, SOS

METRO
Regional Parks and Greenspaces
600 NE GRAND AVE. PORTLAND, OR 97232-2736 (503) 797-1850

November 19, 1997

The Oregon Plan Steelhead Review
Capitol Building
Salem, Oregon 97310

This is in response to your request for public input into the Steelhead Supplement to the Oregon Plan (The Oregon Plan). On behalf of the Metro Regional Parks and Greenspaces Department, I would like to comment on the following issues: 1) lack of adequate data on water quality, road crossings that serve as barriers to fish passage, and fish inventory data in the Portland Metro Area; and 2) our interest in protecting water quality and allowing for fish passage in the Sandy River.

There is a dearth of data on water quality, fish passage barrier issues such as road crossings and culverts, and fish stream survey data in the Portland Metro Area. Limited water quality monitoring data has shown that streams in the Metro region do not meet water quality standards. The standard most frequently exceeded is temperature (Metro 1997). A number of urban streams are habitat to steelhead and other salmonids. To protect steelhead habitat in urban areas, it is important to understand the impact of impervious surfaces on water quality.

Urbanizing watersheds face numerous water quality problems, the most important being temperature and stormwater. Studies around the country have tied increasing levels of impervious surfaces to increases in temperature. For example, water temperatures in urban areas are 10 to 12 degrees warmer than agricultural and forested areas. In urban areas, impervious surfaces reduce groundwater recharge which contributes to increased water temperature. The reduced groundwater recharge further affects stream temperature since reduced groundwater discharge into streams represents a reduced source of cool water that would otherwise be released during critical warming periods. Researchers in Piedmont, Maryland have determined that urban streams were consistently warmer than a forested reference stream and the increase in temperature appeared to be a direct function of the increase in impervious surface (Schueler 1994).

Impervious surfaces facilitate the rapid transport of stormwater into streams. High floods caused by normal precipitation results in the scouring of stream banks and beds which contributes to bank erosion and increased sedimentation. Schueler (1994) quantified the relationship between impervious surface and stormwater runoff: the total runoff volume from a one-acre parking lot is about 16 times that produced from an undeveloped meadow.

The Oregon Plan should acknowledge that impervious surfaces in urban areas result in increased temperatures and stormwater. Strategies to overcome these problems should include: 1) research to quantify impacts of imperviousness on temperature and stormwater; and 2) development and implementation of strategies to mitigate the negative impacts on urban streams and salmon/steelhead resources.

The Oregon Plan should support funding the Oregon Department of Fish and Wildlife to update their Oregon Rivers Database to include inventories of road crossings (culverts) across streams and their accessibility for fish passage in the urban areas. A baseline fish inventory for all streams in the urban watershed should be conducted. This data should be available on the Oregon Rivers Database. This information could be used by local government agencies, citizen groups and Watershed Councils for land use decisions, Goal 5 analyses, and for restoration efforts respectively.

The Oregon Plan encourages citizen stewardship and watershed councils to do the bulk of restoration work in the watershed. We support this grassroots level support but advocate for science to direct these well intentioned efforts. For example, results from the above water quality studies and baseline surveys could be used to guide watershed and citizen groups in their restoration efforts in urban watersheds.

Finally, we are pleased to see the Portland Water Bureau taking a lead role in convening a Sandy River working group. As the largest landowner (378 acres) in the Sandy River Gorge, we believe Metro should be offered the opportunity to participate in this group to share steelhead restoration options related to the Bull Run and the Little Sandy Rivers.

Thank you for allowing us to comment on this plan. We support and appreciate the Governor's efforts in protecting salmon habitat in Oregon. If you have any questions, please feel free to contact me at (503) 797-1876.

Sincerely,

Jennifer Budhabhatti, Ph.D., Ecologist, Metro Regional Parks and Greenspaces

Reference

Metro 1997 Policy Analysis and Scientific Literature Review for Title 3 of the Urban Growth Management Functional Plan.

Schueler, T.R. 1994. The Importance of Imperviousness. *Watershed Protection Techniques*, 1(3): 100-111.

Attn: Steelhead Coho Plan

11/24/97

This is regards to the Oregon Plan Steelhead Review.

Where is the protection for the habitat that remains on private and state forest lands? Where is the protections for intermittent streams? The State Forestry Practices Act is totally inadequate in its enforced regulations.

At minimum the Coho and Steelhead Plan needs to adopt the standards and guidelines for all streams from the Northwest Forest Plan. All classes of streams require a buffer of 170 ft. or the site specific tree and double that for a fish-bearing stream. If the state cannot adopt these guidelines at a minimum, I would say and lobby the U.S. Fish & Wildlife to list the coho and steelhead threatened or endangered. Those riparian buffers should also be applied to agricultural lands especially where cattle grazing occurs.

Be assured that I will keep up on these proposals and influence people, activists, politicians, bureaucrats, and U.S. F&W to list the coho and steelhead if the state cannot adequately protect habitat as well as real restoration projects.

I feel that the Steelhead supplement to the Oregon Coastal Salmon Restoration Initiative is inadequate to preserve this fish species. My concerns are as follow:

- Agencies are already overburdened with the approved coho plan, they don't have the resources to take on more
- With no new enforceable regulations I don't believe that industries will do the right thing on their own. The timber and agricultural industries practices are the most to blame for habitat degradation and it will require regulation of these industries if we are really serious about results.

I attended a meeting one evening at the Eugene City Hall and the man promoting the Steelhead Supplement to the OCSRI kept saying that an ESA listing would cause "gridlock" and that nothing would get done. Well, I think that a listing mainly affects timber and agricultural profits. It's about time that they (and therefore all of us) pay the true costs of doing business.

Sincerely,

WILLAMETTE VALLEY LIVABILITY FORUM

November 26, 1997

Oregon Plan Steelhead Review
Capitol Building
Salem, OR 97310

Dear Oregon Plan Steelhead Review Team:

The Willamette Valley Livability Forum is pleased to submit comments (attached) on the Draft Steelhead Supplement to the Oregon Plan. By way of emphasis, we'd like to summarize our comments right off the bat by noting: the Forum is committed to becoming an active partner in helping develop and implement the Oregon Plan's Willamette components.

The Forum was created by executive order of Governor Kitzhaber in December 1996, not as a new layer of government, but as a voluntary gathering of citizens dedicated to creating a 50 year vision for the valley, in part by addressing issues relating to its economic development and physical environment. The Forum has over 80 members, including mayors, county commissioners, tribal representatives, educators, conservationists, small business women and men, corporate representatives, and citizens. These basin residents have already begun drafting a vision that places a very high priority on the natural world:

"In the year 2050, the Willamette Valley is a rich, biologically diverse natural environment, nourished by a network of rivers, streams and tributaries clean enough to be sources of drinking water, safe enough to fish and swim, and healthy enough to sustain thriving populations of native fish, wildlife, and plants."

Partnering with others to make the Oregon Plan a success in the basin is a fitting first step in achieving this vision. We agree with the Oregon Plan: "actions to conserve and restore salmon [and steelhead] must be worked out by communities and landowners, with local knowledge of problems and ownership in solutions. ... Education is a fundamental part of community-based action. People must understand the needs of salmon in order to make informed decisions about how to make changes to their way of life that will accommodate the needs of the fish." We believe the Forum can act as an important community catalyst to help develop and implement successful strategies to recover the basin's declining fish runs. In short, we believe we can be a resource for stakeholder discussions (both private and public sector exchanges), public outreach, and leadership in helping implement the plan.

In closing, if nothing else, we hope our attached comments reflect this reality: that the Oregon Plan and the Forum share a common objective—a basin future in which healthy populations of

salmon, steelhead, and other aquatic species testify to the success of the actions we take today and tomorrow.

Thanks for this opportunity to comment. If you have any questions or need additional information, please don't hesitate to give us a call at 503-986-0196.

Sincerely,

Peter K. Watt, Manager
Willamette Valley Livability Forum

The Willamette Valley Livability forum requests the following information be included with strategies relating to local, community, or regional efforts in future versions of the steelhead supplement.

Willamette Valley Livability Forum

I. Forum Purpose/Relation to Oregon Plan

Executive Order No. EO 96-47 directs the forum to

- “understand and shape the development of the Willamette Valley in the face of rapid growth”
- “educate leaders and citizens about development trends and interrelationship among communities”
- “advise...on issues relating to...economic development and physical environment of the Valley”

The Forum has identified water quality and quantity issues as being key to the future livability of the Valley.

The Forum has drafted the following working vision relating to water and the environment:

“In the year 2050, the Willamette Valley is a rich, biologically diverse natural environment, nourished by a network of rivers, streams and tributaries clean enough to be sources of drinking water, safe enough to fish and swim, and healthy enough to sustain thriving populations of native fish, wildlife, and plants.”

I. “Tier 1” Programs and Activities

1. On-going Efforts

The Forum is undertaking the following actions which are supportive of Willamette basin fish recovery strategies of the Oregon Plan.

1. The Forum, in partnership with the Willamette River Basin Task Force and the Environmental Protection Agency, is developing a watershed health “report card” to convey information to the public on conditions in the Willamette basin and to focus attention on needed actions. The report card will have environmental indicators relating to aquatic species (including salmonids) and habitat.
2. The Forum is working with OSU, the U of O, and EPA to involve the public in a study of river restoration opportunities along the Willamette River. The study is a multidisciplinary approach for balancing ecological needs for, and social constraints concerning, restoration; the objective is developing and demonstrating an integrated system for identifying the potential for restoration of riparian areas. The Forum will

provide basin citizens with information about how restoration on their public lands can be an important part of species recovery.

B. Planned Efforts

The Forum will take the following actions to support of Oregon Plan efforts in the Willamette Basin.

1. Incorporate the steelhead supplement with the Oregon Plan in our resource inventory of on-going planning and research efforts in the basin. This annotated inventory is periodically distributed at public meetings, and is also available upon request.
2. Provide a “top-level” link on our Website to the Oregon Plan internet page, briefly explain the import of the Plan to Forum objectives, and encourage visitation to the OP page.
3. Display Oregon Plan documents and provide other Oregon Plan information at future Forum meetings.
4. Engage the Forum’s vision task force in exploring specific implementing actions supportive of the Oregon Plan in its on-going vision development.
5. Explore including Oregon Plan objectives as parameters for gauging impacts when designing alternative future scenarios (i.e., be able to report on the water, transportation, and land use impacts of selected futures upon salmonid and other species addressed by the OP).
6. Discuss implementation of Oregon Plan strategies at Forum meetings.
7. Include information about Oregon Plan objectives and strategies in Forum public outreach efforts.

III. “Tier 2” Programs and Activities

The Forum will consider undertaking the following, depending on the availability of funding and other resources.

- Sponsoring or helping to sponsor a conference where basin researchers report on their watershed findings, on-going projects, and concerns to their peers and especially the public, in order to better share watershed information and increase its utility to a wide spectrum the non-technical public.
- Including a description of the Oregon Plan and opportunities to help in designing student sustainability curricula in the basin (dependent upon EPA and other finding).

- Helping construct a clearinghouse of information useful to Willamette watershed councils and groups to increase coordination opportunities and facilitate the exchange of successful restoration techniques.
- Sponsoring other specific outreach efforts to inform the public about Oregon Plan objectives and implementation strategies.

To Jay Nicholas, Steelhead Recovery Strategy Group,
State Water Resources Department
Re Oregon Plan Supplement on Steelhead
Date November 24, 1997 comment period for draft supplement
From Liz Callison, Director-West Mull, Soil and Water Conservation District,
Tryon Resource Management Partnership Watershed Council
6039 SW Knightsbridge Dr., Portland, Oregon

This fax submittal includes two pages and 16 attachment pages which I would like circulated with my submittal to the Draft Supplemental.

My comments will focus on the City of Portland's contribution to the Oregon Steelhead Recovery Strategy (OSRS).

The City is not playing a "leadership role," as it claims in the Draft Steelhead Supplement, in watershed planning, or in supporting salmon and steelhead recovery in the Portland area. Similar to Metro regional government, the City is asking for massive density increases in its comprehensive plan, while saying it will do watershed planning "later."

The City lacks a sufficiently protective strategy for fish and wildlife in its comprehensive plans and zoning regulations, and instead has deliberately prevented certain advocacy groups and at least one watershed council from operating effectively to support salmon recovery.

The City ignored stakeholders such as the Tryon Resource Partnership Watershed Council in writing its Contribution to the Supplement. It has also ignored the general unpopularity of its land management practices such as sewer, stormwater and transportation utilities' encroachments in streams, wetlands and riparian areas.

Unfortunately, state agencies such as the Division of State Lands, Department of Environmental Quality and Department of Fish and Wildlife have turned a blind eye to fish habitat destruction within the Portland jurisdiction. In the few cases when ODFW or DEQ staff have tried to intervene for salmon and steelhead habitat, DSL and local permit agencies have ignored comments.

City bureaus, such as sewer, water and transportation, continually ignore state permits, and even minimal local building code requirements while doing construction in floodways, riparian corridors and wetlands. I am able to document this, and can provide other examples from press reports. Often, such construction occurs due to poor enforcement of DSL and Corps wetlands fill and stream-crossing permits.

DSL and Corps' inadequate enforcement and monitoring of fill permits for culverts (stream crossings), sewer infrastructure in streams and wetlands, and the conversion of natural streams and wetlands into stormdrain facilities continues at the local level, as Portland allows its

own bureaus and private developers to take advantage of DSL's inability to protect the public interest for fish and wildlife resources.

This problem of unmonitored and unchecked loss of local resource values has been exacerbated by the State Land Conservation and Development Commission's consistently weak rulings on local jurisdictions' identification, acknowledgement and implementation of protection for habitat resources under statewide Goal 5. For example, LCDC has not even enforced the City's current remands within in its provisionally approved Goal 5 Periodic Review.

LCDC insists that Goal 19 protection for anadromous fish does not apply in river systems except on the coast. Nor does LCDC even mandate that local jurisdictions apply special protections for those anadromous fish under Goal 5. Moreover, under Revised Statewide Goal 5, the LCDC—guided by politics instead of science—seriously underestimated the allowed-minimum riparian buffer strip, while overzealously including utilities and transportation encroachments as allowed uses within the buffer (“riparian corridor”). The compound effects of the utilities' encroachments negates the buffer's effectiveness. (A development-attorney member of the LCDC authored its Goal 5 Revision—in a travesty of representation for the public interest.)

If the Governor is serious about salmon and steelhead recovery, he must improve his appointments to various state boards and commissions. The LCDC and GWEB are primary examples of the problem. Moreover, the Governor's political appointees from tame environmental groups often appear more interested in pleasing powerful utilities stakeholder groups—some of which are government agencies—than in defending public interests for fish protection.

The City of Portland rests its steelhead strategy on a profound misunderstanding of the concept of “stream stability.” The City derives its streambank restoration and enhancement program from the notion that a healthy stream is a confined and controlled stream.

The City also greenwashes its habitat-destructive, flood control measures to accommodate housing development in the floodplains of Johnson Creek and the Columbia Slough. For example, when the City began using, along with Metro government, small local lakes in the Slough area for large scale, stormwater detention, it ignored coldwater fish populations and aquatic species whose populations were being extinguished there—and touted only the new species of birds and small mammals which are drawn to the semi-polluted stagnant waters captured in the slough's new constructed wetlands.

Water conservation in relation to stream flows is hindered in Portland by, among others, the City's traditional encouragement to pipe water away from development sites and send it untreated into the nearest stream. While insisting that it is encouraging on-site detention, the City pontificates that in many cases impermeability of soils and steep slopes create the necessity to culvert stormwater flows away from parking lots, roofs, streets, etc. (Recommendations—1997 Stormwater Policy Advisory Committee, S-PAC) The City, meanwhile, sees no necessity for limiting impervious surfaces, ie., development in floodplains, as another, better option for

dealing with flooding and stream bank erosion. Flooding and landsliding of stream banks will not be alleviated under any plans the City now has.

The “Brookside Wetland” (planned as a Mitigation Bank) is an example of how the City intends to encourage off-site options to developers, at public expense, rather than enforcing habitat protection at actual development sites. Brookside is simply a flood detention facility, with excavated ponds which heat water for addition to the already degraded Johnson Creek system. The ponds were excavated alongside and encroach into the Creek. The Creek banks were sculpted and anchored into place with boulders and rock cribs.

In contrast, U.S. Fish and Wildlife agency staff, while commenting on Metro Special District Plans, clarifies typical misunderstandings about the nature of stream systems. “...stable channels are dynamic systems, with a balanced, natural tendency to meander, move and change. Rigid channels are often artificially created using hard surfaces to “stabilize” the stream channel by armoring streambanks and confining water flow. Artificially created rigid channels result in diminished stream functions and values.”

The writer also notes that while “wetlands contribute to water quality improvement through sediment trapping and nutrient attenuation. However...wetlands should not be utilized purposefully for the functions they provide...unnatural levels of sediments and nutrients should be prevented from entering and degrading wetlands systems...(Russ Peterson, State Supervisor, U.S. F&W, 5/14/97 letter to Metro Growth Management Services).

The City seems to expect that DEQ and DSL will let habitat protection slide, if the City only couches destructive development in acceptable habitat-restoration buzzwords. Since relevant state agencies are neither enforcing permits, nor monitoring City practices in habitat areas, nor advocating effectively for improvements to riparian resources, the City can continue unhindered its destructive practices.

Chief among these destructive practices in steelhead creeks such as Johnson, Fanno and Tryon Creek’s sewer collection system. The City has no plan to remove or redesign this habitat-destructive infrastructure.

In fact, the City Council this month (11/97) signed a contract for herbicide foam to be sprayed in all sewer mains to kill tree roots which have invaded the concrete pipes. According to City and DEQ data, invasive tree roots are a common cause of pipe blockages. When sewer mains are blocked, raw sewage flows out manhole covers and into the adjacent creek or storm sewer. Storm sewers, in much of Portland, flow directly into creeks. The herbicide, a highly corrosive and toxic substance, is known by the City engineer to back up through manhole covers and seep out of pipe joints as normal part of the root killing process.

In an odd twist to this situation, the City has spent a large amount of GWEB and EPA funds in propagandizing under the excuse of public education. The sewer bureau for example is now giving neighborhood associations trees to plant over old sewer and utility excavations for “streambank restoration and enhancement projects” regardless of the fact that in a few years the

tree roots will clog pipes and require herbicidal applications in the riparian area. Rather than design a new system for its growing population, the City intends to increase capacity in streams for the archaic, polluting collection system.

As the City also brags in the Supplement, funds from both GWEB and City sewer/stormwater ratepayers, are spent by the sewer bureau in “assisting” local watershed councils, such as “Columbia Slough, Johnson Creek and Tryon Creek, and the Friends (sic) of Fanno Creek.”

As a member of an independent watershed council, convened by a county, which was ignored by the City in their Steelhead Supplement Contribution, I can attest that what the City sewer bureau supports financially, it expects to control. Its control is, in fact, so effective that most of the urban watershed councils and similarly-funded community groups do not interact in policy advisory as they are supposed to be doing, but act simply as local fronts for official City policy, creating the pretence of local involvement. (As the founder of the disappoint Tryon Creek Watershed Council, I was subjected to warnings from sewer staff assigned to our council, that if our Council discussed the pros and cons of their Bureau policies for sewer and stormdrains in the creeks, Bureau support would be withdrawn. This was a sufficient scare to most others on that steering committee to avoid all controversial issues relating to established City policy even including illegal practices.) As the City demonstrates in its Contribution, it will not fairly collect stakeholder comments on the Steelhead Supplement, and will ignore any group which refuses to compromise the ethical standards of its membership for the sake of going along with established City practice.

I have also found that our West Multnomah Soil and Water District Board, an elected advisory, is ignored by City Council and Bureau chiefs on even the subject of soil erosion.

The City misrepresents facts in its Supplement in a number of instances: a typical example is its allegation to have purchased 22 acres of land for stream conservation in the Tryon Creek watershed. In fact, Metro government purchased and owns this land, and did so under its Open spaces Bond Measure in 1995.

Attached to this comment are a number of pages of Recommendations for salmon/steelhead recovery in the metro area, including Portland. Also attached are articles stating specific problems with the sewer bureau’s management practices. (E. Callison, Portland, 11/24/97).

Editor’s Note: Reference materials are on file with the Office of the Governor.

CITY OF WALLOWA

STATE OF OREGON

(541) 426-4543 Ext. 11
Fax (541) 426-0582

Office of the County Court

101 S. River St., Room 202
Enterprise, OR 97828

Steelhead Supplement Review
Wallowa County Natural Resource Advisory Committee
Recommendations to the County Court
November 1997

Wallowa County Court is very concerned that the time available to review this plan was less than a month, and that the closest public meeting to the Eastside of the Cascades was held in Portland.

The plan recognizes the efforts made by the state agencies and uses the broad brush approach to identify basic actions and responsible parties, however, it fails to connect to the actual on the ground parties and actions that are currently being implemented, particularly in the eastern part of the state. The plan makes vague references to supporting watershed councils such as the Grande Ronde Model Watershed Plan and other grass roots efforts. However this is not adequately addressing the massive efforts that are locally being implemented, nor does it adequately identify the appropriate parties that are responsible for the implementation.

The plan needs to identify the local SWCD offices, NRCS, OSU Extension Service offices, industry organizations and local citizen advisory groups in addition to the watershed councils that are working directly with the state agencies and the private land owners to implement local plans. Actual implementation many times occurs due to these local efforts and would strengthen the Steelhead supplement as well as more fully represent the efforts being utilized in eastern Oregon.

An example of such an effort is the Wallowa County Nez Perce Tribe Salmon Habitat Recovery Plan (copy to be mailed). The implementation of this 1993 plan that is in essence a multi-species habitat recovery strategy is on-going in Wallowa County. The incorporation of the Salmon Plan in the Comprehensive Land Use Plan and Ordinance makes the Plan law in Wallowa County and ensures that habitat conservation shall be considered along with social, economic stability in the County. This plan, and others like it around the state should be included in the supplement as examples of how these various agencies and entities can actually fulfill their commitments on the ground.

The innovative nature of the Wallowa County approach is expressed in both the product and the process of the Salmon Plan. We know of no other fisheries habitat management plan which considered aquatic habitat from ridge-top to ridge-top as this one does. We feel that only addressing the habitat from a holistic approach could all environmental elements be adequately considered. Another unique feature is that each stream was analyzed reach by reach. We feel

that this approach resulted in a large scale plan which has undergone site specific analysis. Upon being reviewed by professionals in natural resource management, the plan has received as much positive comments for the process which was used to develop it as for the content of the Plan.

About 125 watershed enhancement projects have been completed during the past five years since the Salmon Plan has been initiated. Over \$4 million has been spent on a variety of cost-share projects including modification of irrigation diversions, fencing of riparian pastures, development of low-flow channels, control of noxious weeds, development of off-stream livestock watering, and installation of catch ponds along roads. Projects on public land administered by the Forest Service have been submitted to the review criteria of the Salmon Plan. Projects on private land, in addition to investment by the land owners have been supported by a number of cooperating state and federal agencies, including Bureau of Reclamation, the Bonneville Power Administration, the Oregon Watershed Health Project, the Grande Ronde Model Watershed Plan and the Northwest Power Planning Council. In addition to the projects, educational efforts have been emphasized to encourage participation with land owners and managers and to gain support of the general public as well as decision makers.

Wallowa County is currently talking with NMFS and USFWS as to options available through the Wallowa County Nez Perce Tribe Salmon Habitat Recovery Plan for Section 7 and Section 10 consultation under the Endangered Species Act. Complete documentation about implementation of the Plan in Wallowa County was included in the public comments to USFWS during the public comment period for possible listing of the Bull Trout. For more information contact the Wallowa County Court.

General Comments:

- There is minimal reference to the activities being conducted by the federal agencies. This is somewhat understandable since this is a state plan, however, in the Snake River Basin ESU these activities should be included as they are a significant part of the restoration efforts. Landscape planning does need to be done ridge-top to ridge-top, therefore, all ownerships have to be included.
- Many actions are identified to be accomplished through the Watershed councils including a significant amount of watershed analysis, surveys and plans. Example page 104 sec 2 “On non-forested land increased watershed council efforts will add mileage to the survey” This process is first identified to run through 2007, second phase even longer. We are concerned that this will create an even larger bureaucracy at the council level and question whether these actions will be or could be done at that level. We recommend that such actions be done at a more on-the-ground level.
- Each set of objectives seems to lay out watershed assessments and action plans for each and every basin. These are identified to do specific items and seems to not be integrated into existing plans or multi-species analysis. With all the species listings affecting the same watersheds they should be integrated.
- PFC’s are identified as a positive outcome but are not regularly defined (other than in a footnote)
- Specific issues:

- Section 2 page 5 “Watershed councils and other grass roots efforts show promise as a new mechanism to manage and restore salmonid habitat at the watershed scale.” – habitat is not usually managed by watershed councils, it is managed by agencies and private land owners.
- Sec 2 page 11 PACFISH is identified as a requirement on Eastside National Forests. This should be changed so when PACFISH changes then the Oregon plan will be consistent.
- Standards are identified in the plan for various objectives and habitat conditions. Rather than hard standards, guidelines should be developed more fully on a site specific, case by case basis. Examples:
 - Loss/Degradation of Riparian Areas Objectives – 75 trees per 1000 ft of stream length for 60% of fish bearing streams.
 - Channel morphology objectives –for 60% of stream channel length there will be more than 5-8 channel widths between pools.
 - Objectives of LWD ii – the interim objectives – West side requirement of 3 functional pieces of large woody debris per 100 meters of stream length.
 - Objective vi of LWD – 5% of deficient streams repaired each biennium? Is this doable? How many stream miles is this?
- Section 3 “Water Rights Compliance”It is encouraging that policies to work cooperatively with landowners and local agency representatives is identified as the priority strategy in dealing with water right compliance.
- Section 3 page 8 – Identifying wasteful water use issue. “first promoting voluntary conservation measures to improve efficiency, and later identify standards to regulate against waste.” The identified actions discuss in the future of changing the definition of wasteful use. Caution should be exercised when “redefining” waste and establishing standards.

Benjamin M. Boswell, Judge

Pat Wortman, Commissioner

Mike Hayward, Commissioner

Wallowa County – Nez Perce Tribe
 Salmon Recovery Plan – August 1993
 Book on file @ GNRO

Georgia-Pacific Corporation
Georgia-Pacific West, Inc.
A wholly owned subsidiary

Forest Resources
900 S.W. Fifth Avenue
Portland, Oregon 97204-1255
Telephone (503)222-5561
Fax (503) 248-7107

November 24, 1997

Oregon Plan Steelhead Review
Capitol Building
Salem, OR 97310

To Whom It May Concern:

Georgia-Pacific Corporation has reviewed the "Oregon Plan Supplement on Steelhead" and would offer the following comments:

- The supplement is well written and seems to follow the Oregon Salmon Plan for coho salmon and we commend the state for developing it under such a short time frame.
- One concern focuses on the addition of new core areas, over and above those for coho salmon, for steelhead. As other salmonid species are considered for listing, such as chinook salmon, additional core areas are being mapped as well. Depending on where these core areas fall, some landowners could pick up an unfair portion of voluntary management actions which could lead to economic disparity. We would suggest that at some point in time, landowners who feel they may be disadvantaged in this manner be able to discuss their concerns with the Department of Fish and Wildlife to see if opportunities exist for mitigation to ease any inequality without compromising the salmon restoration strategy.

Thank you for this opportunity to comment.

Sincerely,

Carl F. Ehlen
Western Region Manager
Environmental Affairs

cc: R. J. Olszewski
G.A. Myers
B.A. Holman
P.A. Sato

November 23, 1997

Oregon Plan Steelhead Review
Capitol Building
Salem, OR 97310

Introduction

First of all, Thank you! As a concerned citizen I appreciate the considerable work by all parties involved in preparing this interagency plan to address diminishing salmon and steelhead populations and habitat. I also appreciate the Natural Resources Office for taking a proactive planning approach towards sustaining native steelhead and salmon populations through increasing water and habitat quality in Oregon. Finally, from a governmental perspective, I appreciate and want to acknowledge the complexity of this issue and the willingness to integrate all public agencies into the process. Whenever land use and growth management issues, sustaining waterway health, and management regimes to increase declining species and habitat are synthesized, the resulting governmental and managerial landscape becomes very complex and exceedingly more difficult to effectively ascertain doable policies. Listed below are my general comments and additional conservation actions regarding the Steelhead Supplement to the Oregon Plan.

Time Frame to Evaluate Plan Effectiveness

General Comment

To address land use activities, riparian protection, and nonpoint source pollution attributes that impact native steelhead populations, the Plan appears to primarily rely on voluntary compliance with no additional regulations to met these objectives. This will require a “grassroots”, localized approach to mitigate the impacts of nonpoint source discharge and detrimental land use activities.

Recommendation

Based on these observations, I do agree with the plan’s focus on voluntary compliance and the means to support and enhance this perspective, but if the citizens and the agencies do not respond what happens. I would want a full evaluation of the Plan in 5 years to evaluate expenditures, effectiveness, and level of voluntary compliance. If voluntary compliance is not meeting the objectives of NMFS or the State a more regulatory approach to land use, especially in the agricultural and urban area, should be initiated and enforced.

Agree with Plan being Science-based

Maintaining a science-based perspective throughout implementation and monitoring is essential to overcome political forces that would desire to mitigate plan effectiveness and funding.

Water Quality and Measuring Results

General Comment

Being able to measure BMP and program effectiveness related to land use activities and nonpoint source pollution can be complex given the cumulative impacts overtime. With the reality that certain restoration projects may not exhibit tangible results in certain water quality parameters

within a short time frame, political funding to continue restoration projects or more educational oriented programs may not withstand budget cuts.

Measuring Results

- 1) Report card approach, which produces Benchmarks, is great for overall state direction regarding primacy obligation.
- 2) A more localized approach, *Measuring results for local waterway quality*, is based on localized (Sub-Basin) Benchmarks to alleviate water quality limited segments and address more local efforts and understanding of expenditures that tend to be more qualitative in nature.

Recommendations

Develop and prepare a biennial *Measuring Results of Waterway Quality and Health*

The purpose of this recommendation is to:

- * provide a crucial component in a Water Quality Management Plan for NPS/point source monitoring that helps evaluate and measure immediate and long term effectiveness of BMPs.
- * measure water quality improvements and progress towards meeting water quality standards.
- * provide councilors, watershed coordinators, and county commissioners information regarding the effectiveness of political expenditures and justification of determined stormwater fees and rate structures.

The waterway health report should include:

- three GIS maps:
 - 1) identifies current NPS/point source potential, by management segment, to illustrate relations between land use activities and water quality parameter problems;
 - 2) identifies past NPS/point source potential to help illustrate improvements or decreases;
 - 3) projected future scenarios, based on software developed by Dr. Hulse at the University of Oregon, of the impacts of land use activities on water waterway health.
- * Utilize mapping and data to measure the conversion of natural land use to developed sites and the potential cumulative impact on floodplain management, water quantity, water quality, and natural resources.
 - detailed analysis (concerns, findings, and conclusions) of:
 - * current environmental conditions (water column, sediments, aquatic life);
 - * identification of point and nonpoint source pollutants;
 - * ecosystem health (fish and wildlife habitat, riparian areas, wetland areas, floodplains)
- water quality data analyzed and synthesized for public consumption
- programs in progress, programs completed, implementation record of BMPs, pilot projects, and land acquisition.
- reviews pre-determined indicators to evaluate and measure BMP effectiveness.
- citizen survey and visual observation to produce more clearer qualitative waterway characteristics
- volunteer efforts

- maintenance records
- trend analysis of conventional parameters.

**This information can then be compiled for utilization of communities to address water quality issues. Communities can look at previous information and circumstance within a watershed to better evaluate implementation methods. (i.e., residential zones within two different watershed may exhibit similar run-off patterns and pollutant loads)

Sportfishing Considerations

- Consider rotating seasons within the Upper Willamette, Santiam, and coastal area ESUs. This means that certain watersheds (or sub-watersheds) are closed to fishing for 1-2 years and then re-opened to fish for a period of 1-2 years. Initially, one-third of all critical steelhead watersheds would be closed, while two-thirds of the watersheds would remain open. Interior basin or coastal zone management would then re-schedule openings/closure annually from an entire ecosystem strategy.
- With every fishing license, provide a 3x5 card (or whatever appropriate size) that explains the steelhead situation, stream segments affected (map), briefly characterizes measures underway to protect native steelhead, and the top five things the average fisherman can do to help. This is meant to educate fisherman in pursuit of other game fish that may have native steelhead as a by-catch. One side should have a map illustrating river segments impacted and other side devoted to information. Another possibility is to have a space for the person receiving the license to sign his/her signature to acknowledge reading the information (and pledging to be aware of individual behaviors that can impact steelhead).
- I agree with decreased intermixing of hatchery rainbows in native steelhead areas within the Molalla, North & South Santiam and Calapooia watersheds.
- I feel regulations requiring fishing with barbless hooks should be implemented in core native steelhead areas.

In stream segments that have an active recreational component (boating, hatchery rainbow fishery, other water reaction activities), consider banning boating along certain stream segments downstream of these public recreational areas. With boating limited, approximately 60% of the surface waterway becomes inaccessible for recreational fishing. In addition, within these areas, make regulations that require barbless hooks and possible flyfishing only, and promote these areas as “trophy” fishing areas.

Hydroelectric and water detention facilities

- Agree with objectives to manage flow regimes that better simulate geomorphic processes and having power companies be involved and support financially watershed councils to address these issues. However, with energy deregulation and competition for power markets around the corner, these types of efforts could be lost under competition. Also, the proposed 3% voluntary “tax” deals only with public purpose issues around renewables and energy conservation. Therefore, more secure, on-going funding needs to occur that is derived from

this industry. Possible, a non-bypassable service fee attached to the “wires” end of the market that would not create an economic disadvantage.

- Screening of all intakes should be mandatory and compliance should be stringently monitored.

Watershed councils

The role of watershed councils to assess, restore, and monitor local watersheds is a good role to increase education and develop peer pressure in a voluntary compliance regime.

On-going funding

Without on-going funding the Plan appears destined to fall short of the desire objectives. A bottle tax or mil service charge on energy bills, or .5% wholesale tax on lumber, manufactured goods, and agricultural products needs to be developed.

A Proactive Approach Towards Intergovernmental Water Relations

In a non-regulatory, localized approach for implementation of the Oregon Plan and considering decreases in local funding consistent intergovernmental coordination and communication and a thorough knowledge regarding current and proposed water programs, projects and all water-related agency objectives needs to be established. The basin council should facilitate intergovernmental coordination and link this information to watershed councils to increase their ability to implement

A. *Establish a consistent line of communication between the federal, state, and local agencies.*

The purpose of this recommendation is:

- to develop a better understanding for local agencies on what is going on with state and federal water policy directives and how local agencies may be effected.
- to increase local agencies ability to implement programs that fall within the purview of federal and state statutes.
- to be actively involved in state level discussions regarding regional Willamette Valley issues.

A. *Establish a water information data base for critical ESUs, the So. and No. Willamette Valley area*

The purpose of this recommendation is:

- to keep track of programs, projects and workplans being pursued by water-related agencies, in an attempt facilitate information flow and technical assistance between all agencies. This information could be disseminated quarterly.
- to better understand how the different aspects of each agency is interrelated, or not interrelated, with other agencies across the designated area. The goal is to develop an organizational chart.
- to keep track of programs and projects outside of the So. Willamette area to remain abreast of new developments in water planning and management.

- A. *Establish the Interagency Technical Assistance Team* and provide coordination support and data base management for this team

The purpose of this recommendation is:

- to coordinate technical assistance to local governments, share information, mapping, and facilitate dialogue within agencies and private entities to address watershed management, nonpoint source pollution, stormwater, wetlands, etc.

Water Management Conference

The *Water Management Conference* is recommended as a starting point to begin a discussion regarding about cross-jurisdictional issues, the feasibility of an integrated water management plan, regional water issues, and begin a dialogue about the communities' water objectives and priorities. The goal of the conference would be to establish which objectives would require intergovernmental leadership and coordination, how to prioritize them, who or what agencies would be responsible for spearheading the objective and begin a process of implementation (see RECOMMENDATION 3 for an anticipated agenda for the *Interagency Water Coordination Group*)

The purpose of this recommendation is:

- to prepare for a more regionalized approach in water quality and water quantity management.
 - to increase local accountability and implementation of management plan.
 - nonpoint source pollution is a regional issue.
 - to increase information sharing, management strategies, technical expertise sharing
 - address infrastructure and water issues of smaller water districts and communities.
 - to begin a discussion about regional water conservation and supply plans
 - to begin a discuss about regional water quality plans
 - to begin a discussion on what a integrated water management plan would consist of and what the spatial scale of the plan would be
 - to discuss the feasibility of a So. and No. Willamette Valley Watershed Council
- a) I would recommend that several groups be organized based on specific areas. The goals of these groups would be to develop objectives and options and what the trade-offs and costs are between the objectives. These groups are:
- The Technical and Scientific Group (which would become the *Interagency Technical Assistance Team*)
 - The Managers and Directors Group
 - The Community Involvement and Citizens Group
 - The Financial Strategies Group
 - The Water Policy and Implementation Group
- b) I would recommend that these Groups convene to discuss results and begin a process (possible utilizing the Integrated Resource Planning technique that is design to develop a spectrum of trade-offs between objectives) to establish objectives. Then engage, utilizing conflict resolution strategies, to prioritize the objectives.

- c) There will also need to be a discussion regarding the effects of desired water objectives on land-use planning. This discussion could also include the feasibility of mandating certain water supply plans, nonpoint source plans and watershed protection plans.
- d) Dedicate the *Interagency Water Coordination Group* and water agency intergovernmental relations departments to carry out the goals and agendas that surface from the conference and to develop periodic meetings of individual groups to assess the effectiveness, discuss areas of conflict, and progress. An intergovernmental coordination plan and agreement would surface out of this conference.

December 2, 1997

Oregon Plan Steelhead Review
Capitol Building
Salem, OR 97310

As a plan, agencies need to follow the statement from the **Oregon Watershed Assessment Manual**: By identifying the areas currently used by fish and areas with the highest potential for restoration users will be able to prioritize areas for restoration and determine the types of restoration measures which will be most effective. These areas could be those designated as core areas for coho and critical or high priority for steelhead; or any areas which the agencies mutually agree on. ODFW has stated on page 78 (Section 1): “Prioritization of habitat restoration will be based on assessment of limiting factors and projects which contribute the most to long term salmonid sustainability.” There needs to be coordination among the agencies on a coordinated plan as to where their limited resources will be used to achieve the greatest results. ODFW and ODF appear to be coordinating their efforts on coho core areas and on high priority steelhead basins. DEQ appears to be covering a tremendous amount of area doing a myriad of tasks. Can their personnel and efforts have greater focus and more coordination with other agencies? Coordinated work of the agencies would also be more apparent to taxpayers as to how the **Oregon Plan** was being implemented and set a model for watershed council coordination.

The tables and figures placement in the first portion of the document are confusing. Suggestion: Have the discussion for Table 1 in proximity, then Figure 1 with a discussion of what it shows, et cetera, rather than a statement such as “Figure 3 displays the most significant water quality parameters from Table 3.”

Page 57-“OAR 340-41-026 etc . . cleaner than the water quality standards would allow. A similar statement is on page 56 under DEQ6S. Use require in place of would allow; it is less confusing—is there water so clean DEQ will not allow it or is it cleaner than DEQ requires?

DEQ16S: Revising SRF loan criteria for protection of critical salmon habitat would be a good move.

DEQ refers several times to steelhead ESUs. DEQ needs to narrow the focus to the critical portions of the ESUs, for example, watersheds with critical habitat streams.

ODF and DLCD both address wetlands and estuaries. Do other agencies need to show a cognizance of wetlands and estuaries?

ODOT Management Measure 6-Protection of Aquatic Habitat: Soil bioengineering use needs a stronger statement than “. . . will be used preferentially over riprap where appropriate” (action 13). Areas damaged during the New Year’s flood in this area have been extensively restored with riprap. Bioengineered designs are needed as alternatives for these areas and for areas where bank stabilization is a problem.

Section 2, page 4, paragraph 1, lines 3 and 4: “. . . this plan covers . . . half of Oregon states land area.” What does this mean: half of Oregon’s land area? half of state owned lands?

Loss/degradation of riparian areas section strong.

Coordinating rules with those of Washington state can only help in the restoration of salmon. It makes sense to have similar rules and practices not only for the salmon which are indifferent to political boundaries, but also for the people of the two states. ODFWIIIC2S states they will coordinate with California on any proposed research—Excellent!

Section 4: Fish Management is especially informative. Part IV. Factor for Decline: Ocean Productivity should be widely distributed for the general population’s information. People tend to have little information or be misinformed on the role of the ocean in salmon restoration.

The City of Portland measures build an awareness among city personnel and, hopefully, among Portland residents that they have a responsibility in the restoration of anadromous fish. The process of every city/town drafting such measures would be an excellent learning process.

Education: Most of the agencies do have an education or outreach component. Education will be the ultimate key to the success of the **Oregon Plan**. DEQ should consider a stronger educational component. Rigid training in stream monitoring for high school science/environmental teachers and a practicum for college environmental education students would prepare a source of knowledgeable people who can serve during their student years and post school years as gathers of valid monitoring data to relieve pressure on DEQ staff. It would also help to raise expectations for the quality of data citizens gather as expressed on page 68 of Watershed Design.

Dam and Hydropower Chapter with Appendices A, B, and C are highly informative; presents a clear picture of the dam situation in Oregon.

The effort, the thought, the dedication necessary to produce the **Oregon Plan** and the steelhead supplement are deeply appreciated.

Proofreading: effect, not affect on page 54, Section 4: under A, line1 and under Phase 2, line 5.

Thank you for the opportunity to comment.

Rose Marie Davis (signature)
Member of Jackson SWCD Board of Directors

NATIVE FISH SOCIETY
P.O. Box 19570
Portland, Oregon 97280
503/977-0287

Comments on the draft Oregon Plan Supplement on Steelhead

By Bill M. Bakke, Director

November 14, 1997

The following comments are confined to Section 4: Fish Management of the Oregon Plan Supplement on Steelhead.

0 Harvest Impacts to Spawner Escapement

This section sets no spawner abundance and escapement goals by ESU or component populations. The only direction provided is that ODFW will “strive for attainment of spawner escapement goals.” This objective cannot be evaluated and provides no accountability.

Spawner abundance goals should be established per ESU reflecting delisting criteria the state or federal agencies would use. Based on the genetics literature, long-term gene conservation can be achieved with an escapement of 5,000 adults (Nelson and Soule 1986). An effective breeding population per ESU and by component populations must be established. The WDFW recommendation is for 3,000 adults divided by the generation age of the population. For steelhead the average generation age is four years. This would provide an effective breeding population of 750 per population. The WDFW based their gene conservation goal on an effective population of 50 to 500 adults per year and did not use the recommendation for 5,000. If the 5,000 adults per year were used, divided by the average generation age structure of four years for steelhead, the effective population size would be 1,250. The Oregon Wild Fish Management Policy calls for a minimum management population of 300 and does not distinguish between a census and effective breeding population. Compared to the work of WDFW and the updated recommendations of Nelson and Soule, the ODFW management goal (adopted in 1992) falls far short. However, as stated, the ODFW makes no escapement goal recommendation in the Oregon Plan for steelhead.

Spawner abundance escapement goals should also include nutrient capital enrichment. Dr. Bilby’s research in Washington state on nutrient enrichment from salmon carcasses, recommends an optimum carcass goal of 200 per kilometer. Steelhead carcasses should be counted on for contribution to nutrient enrichment of streams, but the bulk of the carcasses will come from salmon species. Since steelhead are less numerous in most watersheds than salmon, and because they survive spawning (about 15% spawning survival) the bulk of nutrient enrichment must come from increased spawner abundance from salmon species. Because steelhead and cutthroat have the longest freshwater life history, they are dependent upon salmon

carcasses to improve the productivity of their home streams. Consequently, salmon management, specifically spawner abundance management must address the nutrient enrichment needs for steelhead and cutthroat trout.

Dr. Bilby's recommendation of an optimum 200 spawners per mile far exceeds the past and projected spawner escapement for coho salmon in Oregon streams. The ODFW, in fact, has recommended the reduction of the coho spawner escapement goal through its amendment 13 to the Pacific Fishery Management Council. Coho salmon spawner escapement is particularly important because coho salmon tend to migrate into the upper portions of watersheds and into small headwater streams where steelhead, cutthroat, and spring chinook are found. So coho salmon carcasses may be more important to steelhead rebuilding than other salmon species. Under the Oregon Wild Fish Management Policy the management floor is 300 spawners per population. This compares to a management floor of 200 per kilometer for optimum nutrient import. If a spawning stream is ten miles long, Oregon would require only 300 adult steelhead compared to Dr. Bilby's 2,000, and a gene conservation goal of 1,250.

Unfortunately, the Oregon Steelhead Plan fails to establish a spawner escapement goals and it fails to develop linkage between spawner escapement and important ecological functions such as gene conservation and nutrient enrichment. Consequently, the Oregon Steelhead Plan fails to provide the objectives that can be evaluated for accountability. Therefore, the NMFS should ask ODFW to improve its section on spawner abundance escapement and subject it to independent peer review before adoption as sufficient to merit not listing the steelhead as a federal protected species.

111A2S: Manage Fisheries To Minimize Impact On Wild Steelhead

The discussion of harvest impacts on wild native steelhead is merely an account of what the state has done to minimize harvest impact on native steelhead. The Oregon Steelhead Plan fails to describe what more needs to be done to stabilize native populations, reverse their decline, and rebuild populations. Past actions by the state have not reversed the decline for most, if not all populations, therefore, more actions are called for. But the Oregon Steelhead Plan fails to do this.

The Oregon Steelhead Plan admits that the mortality rate for released wild steelhead is unknown, so the actual effect of mixed stock sport fisheries on native steelhead remains unknown. Evaluation of this mortality is put off to some unspecified future time. This only adds to the list of critical uncertainties contained in this plan, making it unaccountable and a poor replacement for listing steelhead as a federal protected species.

In this section the Oregon Steelhead Plan proposes to continue with the Columbia River Fish Management Plan (CRFMP) harvest impacts on native steelhead. The Oregon Steelhead Plan also fails to mention that the CRFMP is due for re-negotiation in 1998 and that major improvements for native steelhead could be accomplished in the Columbia River Basin through this re-negotiation. Why is that crucial fact left out? Why does the ODFW fail to identify the problems this plan has created for native steelhead conservation in the Columbia? Why does

ODFW not use the Oregon Steelhead Plan as a place to identify problems and solutions that could be used by the state in re-negotiating the CRFMP?

The 1997 CRFMP All Species Review identifies problems with this plan that ODFW could have included in the Oregon Steelhead Plan. Some of those problems are that native wild steelhead escapement goals, even though they remain an issue among the parties to the plan, have not been met since adoption of the CRFMP in 1987. Since that time two Columbia River wild steelhead ESUs have been listed as federal protected species. So the requirements under the CRFMP to rebuild wild steelhead populations is a complete and obvious failure.

To make no suggestions for revision of the CRFMP in the Oregon Steelhead Plan is remarkable in and of itself, but surely it is at least an inappropriate response to the NMFS as Oregon's answer to steelhead recovery. Consequently, the Oregon Steelhead Plan is an unacceptable alternative to federal listing of steelhead as a protected species.

The remainder of this section continues the existing management program for steelhead, it preserves the status quo.

Section 111A3 Trout Fisheries

In recent years ODFW has been eliminating hatchery trout fisheries in salmon and steelhead streams, to end conflicting management missions and to improve salmon and steelhead protection. However, not all salmon and steelhead streams have had hatchery trout fisheries removed. In some streams such as the John Day, hatchery trout stocking continues, even though this river is dedicated to wild salmon and steelhead management. Such conflicts continue in most if not all ESUs being considered for steelhead listing. There is an artful twist on the Grande Ronde where spring/summer chinook have been listed since 1992 and steelhead were listed this year. The ODFW uses hatchery steelhead as catchable trout. The hatchery steelhead residualize in great numbers, so Oregon has developed a fishery around them. This fishery is justified, the agency says, because it removes fish that would otherwise compete with wild fish in the rivers where they are released. Rather than reduce the hatchery stocking, solve the residual problem, or end the steelhead hatchery program using non-native stock, the state continues to practice that does not support the recovery of listed species.

The "late opener" for trout fishing is used to protect smolts and the size limit is used to protect smaller fish, but these measures are not enough to protect rearing juvenile salmon and steelhead and cutthroat in rearing streams. Until nursery waters are closed to all angling, there will be insufficient protection for native steelhead.

The Oregon Plan fails to provide adequate protection for rearing juvenile steelhead by designating nursery waters as sanctuaries for native salmonids. While Oregon, through the Oregon Plan, fails to adequately respond to juvenile steelhead protection in trout fisheries, the state is forgoing one of the most necessary and effective means to increase the productivity of native steelhead in state rivers.

Harvest Impacts on Spawner Escapement

Snake Basin ESU

For the Snake Basin ESU the Oregon Plan proposes to continue the escapement goals for steelhead adopted under the Columbia River Fish Management Plan (CRFMP) in 1987. These are described as short-term goals, but no timeline is provided to determine just how short term these will be. The CRFMP is to be reviewed and renegotiated in 1998 and short term should be defined by this process in the Oregon Plan. The Oregon Plan states the long-term goal should be 60,000 wild steelhead over Lower Granite Dam, which would increase the escapement goal from the current 30,000 (20,000 A-run and 10,000 B-run steelhead), but no time line is provided for this recommendation. Also, it is unknown if this increased wild steelhead escapement goal is adequate for wild steelhead in the Snake Basin and for Oregon tributaries. The 60,000 is based on earlier estimates established under the Lower Snake River Compensation Plan. The estimates developed at that time should be re-evaluated to determine whether they are adequate to natural production needs. By adequate, I mean developing escapement goals that link numerical goals with ecological functions important for the protection of wild native steelhead populations. These would include gene conservation criteria and nutrient enrichment criteria by population. Setting escapement goals for Grande Ronde and Imnaha rivers by June 30, 1998 must include these ecological goals to be derived from spawner escapement.

Two Coastal ESUs

The priority should be changed to include adult escapement enumeration for Tenmile and Cummins creeks where there is now an on-going data base on smolt out-migration and summer juvenile abundance estimates. By adding adult escapement counting for these streams, the data base will improve and help relate summer juvenile abundance and smolt yield to adult escapement. This is important work for a long term data series that should not be put off to some indefinite phase two process.

The volunteer effort counting redds on the Salmonberry River should be augmented with a smolt trap on that river to evaluate the relationship between redd counts and smolt yield. This data is missing for most wild steelhead streams and should be a priority for the Salmonberry rather than put off.

S.W. Washington ESU

Spawning surveys should be expanded so that they run from March 1 to June 15 each year to take in the full spawning time for native winter steelhead. This should be standardized for all wild winter steelhead spawning surveys in Oregon.

Lower Columbia ESU

Hood River: There should be no passage for hatchery summer or winter steelhead above Powerdale dam. The upper river should be protected from hatchery introgression. All trout stocking in the basin should be terminated.

Sandy River: No stocking of hatchery non-native summer steelhead above Marmot Dam is required to provide protection for wild winter steelhead from hatchery introgression and ecological effects of competition, predation, and potential disease transfer. There should also be no stocking of non-native winter steelhead above Marmot Dam to protect wild winter steelhead in the basin above the dam from hatchery introgression and ecological interactions. A fish trap should be installed in Marmot Dam to allow fish sorting and the removal of hatchery fish to prevent migration into the upper basin. There should be no release of non-native hatchery summer steelhead and winter steelhead below Marmot Dam. The effect of hatchery winter steelhead on wild winter steelhead below Marmot Dam should be evaluated and the hatchery program changed to dampen any effects. Conduct a study on the river regarding genetic and life history characteristics to create a baseline for the wild population. A hatchery program for this ESU should be converted from using domesticated non-native stock in using local brood stock in combination with written hatchery operation plans incorporating gene conservation protocols and annual evaluation.

Mid-Columbia ESU

Deschutes River: Strays are identified as key factor in decline of native steelhead in the system (Chilcote 1997). The priority action should be the following:

1. determine the # of strays and how many are breeding in the system, including tributaries.
2. block all strays at Warm Spring National Fisher Hatchery
3. use trap at Sherars Falls to remove as many strays possible
4. stop strays from migrating up Shitike Creek
5. for all tributaries below dams do the following:
 - develop restoration plan for habitat and populations
 - inventory life history attributes and genetic structure
 - determine abundance and distribution
 - set spawner escapement goals for each and monitor with spawner and redd counts
 - establish floating traps to monitor adult and juvenile migrants
6. Convert RBH to conservation program to maintain genetic and life history traits of native steelhead in the system including tributaries. Eliminate existing mitigation and production agreement through relicensing by hydro projects.
7. Close Deschute sport fishery to all angling when water temperature is 65 F or more
8. Establish no fishing (sport and commercial) zone at mouth of the river.

ODFW IIIA4S – Mark all hatchery steelhead

The Oregon Plan makes an exception to marking all hatchery fish, saying “except in special circumstances.” These special circumstances need to be defined and limited to specific written criteria.

ODFW IIIBIS – Maintain selective harvest on hatchery steelhead

Hatchery releases to support fisheries should be evaluated in each case to determine the effect on wild steelhead. Some factors to evaluate are:

- overharvest of wild population through mixed hatchery/wild fishery
- creating potential interbreeding with wild spawners
- specific limits on impacts to wild steelhead should be agreed to and monitored
- risk analysis for each case

In all recommended program the ODFW should identify the level of risk associated with using local, wild brood stock in hatchery programs. Some factors to consider are:
the level of risk to locally adapted wild native steelhead that is acceptable
level of acceptable straying and interbreeding
level of acceptable ecological competition

These factors should be displayed for each program and included in evaluation programs. Genetic fitness risk and ecological risk needs to be defined for each hatchery program and standards set that are included in the evaluation program.

Ocean Productivity

The Oregon Steelhead Plan says it will regulate fisheries in response to poor oceanic productivity, but ODFW has no established track record. For example, the 1982-1983 El Nino event and the ten year drought that followed, caused native, wild steelhead populations to decline. The ODFW, however, took no action during this period to protect wild steelhead on the Deschutes River, a river with a known wild steelhead production problem. The Oregon Plan does not propose to take specific actions in response to changing oceanic or climate conditions that could be unfavorable to wild steelhead production. The Oregon Plan is vague and unresponsive to these problems.

Loss of Genetic Adaptation of Wild Populations from Interbreeding With Hatchery Fish

Oregon Wild Fish Management Policy requires independent scientific review

This section and the objectives are based on the Oregon Wild Fish Management Policy (WFMP) adopted in 1992. The WFMP has never been peer reviewed by a body of independent scientists. Therefore, using it as a foundation for controlling interbreeding between wild and hatchery steelhead should not be relied upon as being consistent with current scientific knowledge. For example, the WFMP calls for a minimum population of 300 to maintain genetic variation in wild populations, while in the scientific literature support can be found for 5,000 spawners to maintain long-term genetic diversity in the population (Nelson and Soule 1986). The state of Washington, in their Wild Salmonid Policy, recommend 3,000 spawners divided by the average generation age for the species. This means that 750 spawners per year are needed to maintain genetic variation in a Washington steelhead population, but only 300 in an Oregon steelhead population. If the minimum population number were used that is consistent with the

scientific literature the minimum population in both states would be 1,250 fish. It is unknown whether the numerical standard of 300 under the WFMP in Oregon is the census or the effective breeding population. The Native Fish Society asked ODFW this question in May 1997 but have not received the pleasure of their answer. There are similar problems with the number of hatchery steelhead that would be allowed to interbreed with wild steelhead, based on genetic similarity. The point is the WFMP used by Oregon is no longer a reliable set of criteria for basing a steelhead recovery or management plan on until it is updated to reflect current scientific thinking and is subject to independent scientific peer review.

Oregon Hatchery Guidelines have not been completed.

Another problem with the Oregon Wild Fish Management Policy that would affect the state's proposed recovery program is that hatchery guidelines are required by the policy to protect genetic resources, but those guidelines have not been developed nor have they been implemented. This issue was brought to NMFS's attention regarding coho salmon as well in an earlier review by the Native Fish Society.

ODFW lacks institutional support for wild steelhead recovery

In addition to the scientific problems with the WFMP, there are numerous institutional problems that should be taken into account by the NMFS before making a decision. When the policy was first adopted it had program status with five full time staff. It now has one staff and is no longer a program within the fish division. Through ODFW reorganization job titles were changed but the natural production program remains a poor stepchild in a family of harvest managers and hatchery personnel. Also, ODFW, through reorganization did away with the statewide steelhead species program manager position. Now the steelhead program has been added to the responsibilities of other staff. The point being that Oregon has not supported the technical staff needed to manage wild, native steelhead populations and this lack of administrative support has resulted in loss of staff and program emphasis. Consequently, ODFW is not in a position to effectively provide the institutional support and management required to take over recovery measures for steelhead. The NMFS should continue to retain authority over steelhead listing and recovery.

ODFW policy on hatchery and wild interbreeding needs independent scientific review

Through the Oregon WFMP, the proportion of hatchery fish that would be allowed to spawn with wild fish and meet policy guidelines, ranges from 5% to 30% if the wild and hatchery populations are dissimilar genetically, and up to 50% hatchery spawners if the hatchery and wild populations are similar. However, it is uncertain what similar and dissimilar mean. Without hatchery guidelines to conserve genetic resources in place, it would be difficult to know which hatchery fish were similar enough to the wild fish to meet the standards of the policy. Allowing the natural spawning population to be composed of 50% hatchery fish needs to be supported by reference to the scientific literature. Likewise, the other values need to be reviewed to determine whether they are consistent with gene conservation.

Adjustments in hatchery stocking proposals need timeline

While Oregon proposes to adopt changes in the way hatchery fish are used in a watershed to support a fishery and to minimize impacts on wild fish, those changes need to be on a schedule so that Oregon makes a commitment to change by a specific time and Oregon can be evaluated against their own timeline. These changes would include those recommended for each ESU and cover changes such as recycling hatchery fish, acclimation, wild brood stock collection, spawning time selection etc.

Continued use of non-native hatchery steelhead should be rejected.

ODFW proposes to continue the release of non-native steelhead in the Lower Columbia ESU (Hood, Clackamas, and Sandy rivers). In 1997 non-native summer steelhead were passed above Powerdale Dam on Hood River. Precluding hatchery steelhead above Marmot Dam on the Sandy River requires the construction of a fish trap to stop non-native steelhead from reaching spawning grounds. Also, the ODFW commission approved a staff proposal in October 1997 to continue to release non-native summer steelhead in the Sandy River above Marmot Dam.

The NMFS should evaluate ODFW's commitment to their proposal to stop non-native hatchery steelhead from spawning with wild steelhead in each ESU. For example some coastal ESU streams, such as Yachats River and Tenmile Creek, are constantly exposed to high stray rates from non-native hatchery fish, even though these streams are designated wild steelhead management waters.

COMPETITION WITH HATCHERY REARED FISH

In this section ODFW proposes to cut hatchery production and to shift production away from natural production areas and wild fish populations. ODFW does not provide information on how many hatchery steelhead are released by stream or ESU so that it is possible to evaluate the meaning of the proposed cuts and shifts in hatchery production. this information should be added to the plan so the public can better understand what ODFW is proposing.

In 1992, ODFW released about 8 million steelhead into Oregon streams. Some of that product has been reduced since then. However, the Oregon Steelhead Plan proposes only to reduce steelhead stocking in Nehalem River by 50,000 smolts by 1998. All the other cuts in steelhead stocking have already been done. So the Oregon Steelhead Plan is not proposing to make any major reduction in steelhead hatchery production. The apparent lack of reduced hatchery production should be closely evaluated by NMFS and the public should be provided with better information about just how many hatchery steelhead have been produced annually and how much ODFW proposes to reduce it to protect wild steelhead.

The Oregon Steelhead Plan is full of information about changes that have been made in the past, but contains very little information about what changes will be made in 1998 and beyond to protect wild steelhead. Since wild steelhead populations continue to decline, ODFW

should be making further changes in management and hatchery production to protect wild steelhead.

Low Density and Reproductive Failure

This section is about how to preserve the ODFW hatchery program more than about solving problems for native steelhead. It fails in a number of areas important for steelhead rebuilding. It fails to identify by ESU those component populations that are experiencing negative recruitment (less than one adult progeny per adult spawner); it fails to assess reductions or loss of genetic characteristics by population including loss of rare alleles, and it fails to assess the loss of life history diversity by population. The Oregon Steelhead Plan not only fails to provide this information it does not provide detailed measures to correct these problems.

This section is based on numerical values, that is, increasing the number of adults (using hatchery production) rather than rebuilding healthy native wild populations based on stock recruitment values, stabilizing declining trends, and maintaining life history and genetic diversity among and within native, wild populations of steelhead.

Using hatchery propagation as the primary tool to rebuild native, wild populations is bogus, that is, the proposal ignores the experimental nature of using hatchery fish for this purpose, and fails to lay out an experimental design, evaluation procedures, and a risk analysis by population to be treated.

Consequently, the NMFS should reject proposals in this section as incompetent and require a rebuilding program that is based on genetic and life history diversity, increasing abundance of locally adapted populations and their distribution in their home watersheds. All measures that rely on hatchery propagation must include an experimental design, evaluation plan, and independent scientific evaluation of the proposal.

Nutrient Enrichment of Streams from Salmonid Carcasses

This section identifies an experiment to evaluate the use of human distributed salmonid carcasses to evaluate the value they have for increasing stream productivity. Like the previous section, this one describes yet another purpose for the ODFW hatchery program and tries to create a justification for its continued operation as a distribution center for salmon carcasses.

This research proposal duplicates work already in progress and research that has been completed in Washington and British Columbia. Dr., Robert Bilby has already identified an optimum number of salmon carcasses to increase stream productivity. His research shows that 200 carcasses per kilometer should be the goal of fish managers. Dr. Bilby says that harvest management has not been conducted to provide the necessary nutrient enrichment streams and salmon populations need to remain productive (Hunt 1997).

In British Columbia Lark and Slaney (1997) indicate from their research that small populations of anadromous salmonids are not getting the benefit from nutrient enrichment from

salmon carcasses because intense commercial and recreational fisheries are preventing the needed spawner escapement. The only streams benefiting are large systems that are being enhanced by hatchery propagation. But the bulk of the streams are not enhanced.

Oregon should be providing the measures that would increase nutrient enrichment through increased salmon and steelhead spawner abundance in all streams rather than merely advancing a proposal to test nutrient enrichment through artificial means on a few streams.

ODFW's proposal should be rejected and the agency required to establish salmon and steelhead spawner abundance goals that meet the 200 carcass optimum identified by Bilby and evaluate the results.

For the coastal ESUs, ODFW is proposing harvest management actions that would limit nutrient enrichment. In November, ODFW proposed to and lobbied the Pacific Fishery Management Council for a coho salmon harvest policy that would reduce coho salmon escapement goals and allow fishing to take place before declining coho populations had recovered. Nutrient enrichment of steelhead streams will be dependent upon the spawner abundance of coho, chinook, chum, and pink salmon. Coho salmon are of particular importance because they spawn high in a watershed, and in small streams, thus they are able to naturally distribute carcasses throughout a watershed that is also producing steelhead.

On the Columbia River tributaries, the Columbia River Fish Management Plan adopted in 1987 and to be renegotiated in 1998, sets the spawner abundance goals for salmon and steelhead based on subbasin spawner escapement needs. However, spawner escapement goals for spring chinook, summer chinook, coho, and summer steelhead have not been achieved through this plan. In addition, the plan calls for wild salmonid rebuilding including steelhead, but this has not happened in the ten years since plan adoption. And spawner escapement goals are not linked to ecologically important functions like nutrient enrichment or gene conservation.

Given these two examples of how harvest management is operating against spawner abundance to support nutrient enrichment in watershed from salmonid carcasses, the NMFS should question ODFW's intentions. The Oregon Steelhead Plan should provide NMFS with measures that will increase spawner abundance and therefore nutrient enrichment naturally and a evaluation plan to measure results.

Predation by Pennipeds and Sea Birds

This section is a research proposal to evaluate the effect of predation on rebuilding native, wild salmon and steelhead. The problem with this research proposal is it will use hatchery releases as a surrogate for wild salmonids. This is based on an assumption that hatchery fish behave like wild fish in terms of predator avoidance as juveniles and adults. Hatchery fish do not mimic wild salmonid migration in timing and abundance. It may be that the timing and abundance of hatchery releases attract predators. There is some evidence to support this such as cormorant staging in anticipation of salmon releases from net pens in Youghs Bay. Hatchery adult salmon tend to have an earlier freshwater entry time than wild salmonids and their

migration can be delayed by low flows, keeping them in coastal bays where seals are attracted, as opportunistic predators, to the salmon abundance. Also, predators attracted to hatchery fish may also have a large predation effect on co-mingled wild salmonids.

However, the proposed research will not evaluate the role of hatchery fish in accumulating predation. Consequently, the NMFS should subject this research proposal to independent scientific review and request a research proposal that specifically address predation on wild salmonids and the contribution hatchery programs make toward increasing that predation.

This research should not be used as an excuse to not list steelhead as a federal protected species. This research proposal is operating on the wrong premise and research of this kind should be the management responsibility of the involved agencies independent of the question of listing steelhead.

Exotic fishes

This research proposal should be confined to a workshop to determine effective control of exotic species. The Native Fish Society recommended holding this kind of conference to NMFS in 1996 but we were rejected by NMFS Portland staff, using the excuse that as conservation advocates we were unsuited for organizing this workshop. Nevertheless, this workshop should be held and we have already lost two years in doing it.

As a function of management, the ODFW ought to review Oregon policy and enforcement programs to determine whether the ODFW is doing all it can to effectively control introduction of exotic fishes. After all, it is ODFW and other state fish agencies that have been the primary reason exotic fish have been introduced into western rivers. For example, ODFW spent \$130,000 in 1995-1996 for introductions of exotic char and salmon. The agency also spent \$51,000 on introducing exotic warm water species into state waters.

Research on exotic fish introductions should not be used to prevent a listing of steelhead as a federal protected species. This research is a management function the NMFS should encourage the state to conduct.

Comments on Oregon's Steelhead Status Review

Based on my review and supported by comments from Dr. Richard Williams (ISAB), the conclusions of the stock status report by ODFW are at odds with the data and observations. The ODFW assigned steelhead a "sensitive" rather than a threatened status based on a model developed to determine steelhead status. For example, the status report states that in the Mid-Columbia ESU, the Deschutes wild steelhead have been near complete reproductive failure for the last four years, and these fish have to cope with a hatchery steelhead stray rate of 75%. According to the Status Report, only one recruit is produced for every ten spawners, and concludes "the Deschutes wild steelhead are not self-sustaining...", "the status of this ESU is

more tenuous than presented in this report” if populations do not respond positively to improvements in passage, climate cycles, and stray rates.

Dr. Williams, in his letter to Director Greer of November 7, 1997, said: “The analytical approach and indicators used by ODFW to measure population and metapopulation (ESU) vulnerability appear to be less sensitive than they should be. This leads to an underestimation of their vulnerability and an overly optimistic classification status (sensitive rather than threatened).

Based on these problems, the NMFS should carefully review the ODFW Steelhead Status Report and provide it to the Independent Scientific Advisory Board for review and comment. As it stands now, ODFW has provided the NMFS with an overly optimistic status review that underestimates the true condition of wild steelhead populations in Oregon. The recommendations of this status review should not be relied upon for making a listing determination on steelhead.

SUMMARY COMMENTS

The Oregon Plan Supplement on Steelhead is a collection of on-going measures, many of which were put into effect by the agency a few years ago. Conservation of native, wild steelhead is improved by these early shifts in management direction. However, native steelhead continue to decline in Oregon even though these measures have been implemented. This suggests that additional conservation measures are needed to stabilize and rebuild native steelhead.

The Oregon Plan suggests new measures, but many are vague and lack a timeline for completion. Many research measures are also proposed that will not benefit declining native steelhead in the near future. The Oregon Plan does not identify critical uncertainties related to steelhead rebuilding measures, it does not display operating assumptions, a conceptual framework is not stated, funding support is not identified by measure, and evaluation and monitoring questions remain unanswered.

The Oregon Plan also omits obvious measures that should be included such as the to be added to the revision of the Columbia River Fish Management Plan. The Oregon Plan fails to set standards and criteria for rebuilding native steelhead populations such as specific spawner abundance criteria that are linked to ecological functions like gene conservation and nutrient enrichment from spawner carcasses. Many measures to rebuild native steelhead cannot be evaluated and are not accountable.

Scientific and public comment on the Oregon Steelhead Status Review support the view that its conclusions are at odds with data and observations presented in the report, that the vulnerability analysis underestimates the risk of extinction and are overly optimistic. The conclusion that native steelhead are sensitive but do not qualify for listing as threatened or endangered species is not supported by the data and review of the methodology.

On harvest impacts to spawner abundance the Oregon Plan sets no spawner abundance goal by ESU or component populations. The only direction ODFW supplies is that it will “strive

for attainment of spawner escapement goals.” The crisis facing steelhead is acute enough that it would seem the agency would want to do more than merely strive to achieve spawner goals. The biological objective advanced in this section cannot be evaluated and provides no accountability. Gene conservation and nutrient enrichment from salmonid carcasses are not mentioned as a function of these goals.

The Oregon Plan fails to describe what more needs to be done to stabilize and rebuild native populations. Under a federal listing there would be delisting criteria, but under the Oregon Plan there are not criteria presented by which efforts to rebuild steelhead populations can be evaluated.

The Oregon Plan fails to develop a coherent juvenile steelhead conservation strategy in rearing streams. Rearing stream sanctuaries are not discussed, and many steelhead streams are still being stocked with non-native fish.

The Oregon Plan is based on the Oregon Wild Fish Management Policy in put, but this policy has never been peer reviewed by independent scientists and it contains standards that are not adequate for native steelhead conservation management or rebuilding. Such standards are th3 00 spawner floor, and percent of allowed by hatchery fish interbreeding.

This review concludes that the Oregon Plan should not be a replacement for listing steelhead as a federal protected species.

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WaterWatch
Rivers Need Water

November 26, 1997

Governor John Kitzhaber
State Capitol
Salem, OR 97310

Dear Governor Kitzhaber:

WaterWatch appreciates the opportunity to comment on the draft Steelhead Supplement to the Oregon Coastal Salmon Restoration Initiative (henceforth, the Steelhead Plan). WaterWatch is a nonprofit conservation group working throughout Oregon to restore and protect streamflows sufficient for fish and wildlife habitat, water quality, recreation and other public values. We represent over 400 members.

We commend those who worked hard to put together the latest draft of the Steelhead Plan. It represents a major effort by the state government, federal agencies, local entities including watershed councils, and others to develop a credible steelhead recovery program. It is very similar to the Oregon Plan for coastal coho salmon, which provided a basis for the federal government to avoid listing most Oregon coho under the Endangered Species Act. But the success of this Plan must be judged not on whether it averts a federal ESA listing, but whether it brings steelhead back to Oregon's rivers.

WaterWatch limits its comments to Section 3, part I of the Steelhead Plan, dealing with water quantity and streamflows. The Plan identifies inadequate instream flows as one of the major factors behind steelhead declines. It also notes correctly that state water law, based on the prior appropriation doctrine, will make it very difficult to restore flows needed for fish. Oregon for decades gave away permanent water rights with no regard for fishery impacts and no protection for instream flows, realizing too late that we need to preserve some water in our rivers. The state does a better job today, but Oregon water law will make it almost impossible to make swift or significant progress in restoring instream flows for fish. In other words, even if state agencies do the best they can under existing law, that may not be enough to provide the water steelhead need. Oregon may need new legislation to restore and protect instream flows for fish recovery.

Working within existing state law, the Steelhead Plan proposes over twenty measures the State (chiefly the Water Resources Department) will take toward maintaining and restoring instream flows. In general, the Plan touches on the right issues, such as enforcement of existing water laws and rights, preservation of remaining streamflows, and reduction of wasteful and inefficient uses. But while the Steelhead Plan contains some positive measures, it falls well short of what the State should do—and *could do under current law*—to provide the flows needed to restore steelhead populations.

WaterWatch believes the Plan must be strengthened in three priority areas: (1) improving water law enforcement, (2) limiting new water withdrawals, and (3) promoting water conservation. In each of these three areas, we specifically propose new Steelhead Plan measures or revisions of existing measures.

1. Improving water law enforcement.

We propose revising two existing measures of the Steelhead Plan, WRD S-8 and S-20:

WRD S-8. INCREASED DISTRIBUTION AND ENFORCEMENT. Revise to read as follows: *Beginning immediately, WRD will increase enforcement of Oregon laws governing water use by taking actions including (1) ordering headgates and measuring devices where they are not now adequate, (2) halting unauthorized diversions, (3) enforcing water right terms and conditions such as rate, duty, and season of use, (4) regulating the use of hydraulically connected ground water on the same basis as surface water, (5) regulating diversions in favor of senior instream water rights, and (6) identifying and halting wasteful water uses. WRD will give the highest priority to these actions in those basins where salmonid habitat is most dependent on streamflow restoration as identified by ODFW IVA8.*

By June 30, 1998, WRD will develop a plan in consultation with ODFW, DEQ and OSP to carry out these actions. The plan will evaluate the extent to which these actions can be implemented with existing resources or greater use of ODFW staff and volunteers, and will also identify increased staffing needs to carry out these actions in each basin within a steelhead ESU. Each agency will actively seek funding for these increased staffing needs.

By January 31, 1999 and annually thereafter, WRD will publish an Oregon Water Law Enforcement Report identifying its activities and progress by basin in implementing this measure.

Explanation: Our proposed measure would revise the current draft of WRD S-8, which makes a very limited commitment to improved water law enforcement. The current measure commits the state agencies only to producing a plan in 1998, and then giving “increased priority to distribution and enforcement” on critical streams *as permitted by existing resources.*

Our proposed measure would strengthen WRD S-8 in four important ways. First, in contrast to the Steelhead Plan’s general statements about state efforts, our measure would commit the agencies to take specific actions in improving enforcement. These actions are necessary steps to restoring and protecting streamflows, and it is important for federal and state agencies, water users and the public to know what must be done.

Second, our measure would commit the agencies to improve water law enforcement immediately and unconditionally. The current S-8 would put off any improvements until 1999, and not even then unless permitted by existing resources.

Third, our measure would commit the agencies actually to seek funds for the increased staff necessary to carry out enforcement actions. The current S-8 calls for a plan to identify increased staffing needs, but says nothing about any effort to obtain funding. In fact, the commitment to improve enforcement only as permitted by existing resources seems to indicate that the agencies do not anticipate adding enforcement staff.

Fourth, our measure requires an annual report on water law enforcement in Oregon. Such a report is needed because there is very little public information on what the agencies are actually doing in carrying out their enforcement responsibilities, or on the status of water law compliance. The report would allow all interested observers to track any changes in staffing, enforcement activities, and compliance with Oregon water laws. Such a report would not only provide a measure of accountability, it would also assist efforts to identify and address problem areas throughout the state.

WRD S-20. **SERIOUS WATER MANAGEMENT PROBLEM AREAS.** Revise to read as follows: *By March 31, 1999, will ask the Water Resources Commission to designate Serious Water Management Problem Areas in all area identified as high priorities for flow restoration under ODFW IVA8.*

Explanation: The Steelhead Plan acknowledges that the Water Resources Commission may require water use measurement and reporting by all permit holders within a designated area, known as a Serious Water Management Problem Area (SWMPA). Unfortunately, the Steelhead Plan only commits WRD to decide whether SWMPAs are basically a good idea. Frankly, we see no serious downside and potentially major benefits to water use measurement and reporting. These steps are simply common-sense water management. SWMPAs should be designated in all areas identified by ODFW as high priorities for streamflow restoration, and our proposed measure would commit WRD to seeking that designation.

2. Limiting new water withdrawals.

We propose two new measures and one revision of an existing measure in the draft Steelhead Plan:

WRD S1-A. **CLOSE BASINS TO FURTHER APPROPRIATION.** [new measure] *By March 1, 1999, WRD will request the Water Resources Commission to withdraw from further appropriations the waters of any area listed by ODFW as a priority for flow restoration under ODFW IVA8.*

Explanation: Oregon law authorizes the Water Resources Commission to withdraw waters from further appropriation where necessary to protect the public interest. ORS § 536.410. The Steelhead Plan should call on the Commission to close those basins identified by ODFW as priorities for flow restoration.

Our proposed measure WRD S1-A is superior to the current S-1 in several respects. First, it would stop the current practice of issuing new permits which are so restricted (especially as to

season of use) that they provide the water user with little benefit, but which nonetheless may harm steelhead by further altering the natural hydrograph. Second, it would reduce enforcement problems by eliminating the need for already-overworked watermasters to ensure compliance with these new restricted permits. Third, unlike the current S-1, it would cover “exempt” uses such as new domestic wells, which do not require a water right but which may have a cumulatively severe impact, particularly on small steelhead streams in rapidly developing areas.

WRD s-26. RESERVATIONS. Add a new second paragraph: *By May 1, 1998, WRD will request the Water Resources Commission to deny all pending reservation requests for direct flow.*

Explanation: The Oregon Department of Agriculture has requested a reservation of staggering amounts of water for “direct flow” use: Over 1.5 million AF from Columbia mainstem, 580,000 AF from the Snake, and 60,000 AF from the John Day. All of the water would go to new out-of-stream uses, primarily irrigation. These requests are pending before the Water Resources Commission.

These direct flow reservation requests directly conflict with federal and state efforts to augment streamflows for salmon migration in the mainstem Snake and Columbia. Unlike the reservation requests for “future multipurpose storage” which purport to benefit instream values, the direct flow reservation requests can only mean bad things for steelhead and other struggling fish populations in the Columbia/Snake. The Department of Agriculture should do its part to support state effort to restore salmon and steelhead, and simply withdraw these requests. Failing that, WRD should recommend that the Commission reject them.

WRD S-27. EXTENSIONS OF TIME. [new measure]: *Beginning immediately, WRD will intensify its review of requests for extensions of time to develop existing permits. In analyzing whether “good cause” exists to grant an extension, WRD will consider whether full development of the permit would reduce flows to the detriment of salmonid habitat.*

Oregon law requires a water right permittee to begin construction under the permit, complete construction, and apply water to beneficial use within specified time frames. Failure to act within these time frames results in permit cancellation. ORS § 537.410. Oregon law also allows WRD to authorize extensions of time for some purposes, but these extensions are not automatic; among other things, the applicant must show “good cause” for an extension. ORS § 537.230. Until recently, however, WRD rubber-stamped extension requests with virtually no scrutiny.

An Attorney General’s opinion of June 26, 1997, clarifies the law surrounding permit development time frames and extension requests. Among other things, the opinion concludes that WRD’s “analysis of whether good cause has been shown may include whether the water would be of greater value for other uses or should remain allocated to the currently permitted purpose. For example, the department could find there is not good cause to extend the limit because there was now a greater demand for the water to protect endangered fish runs...” Having obtained this legal advice, WRD should begin considering the impacts of extension

requests on salmonid habitat, and should actively seek to cancel permits which have not been timely developed.

3. Water conservation and efficiency.

WRD S-12. IMPROVING EFFICIENCY AND PROHIBITING WASTE. Revise to read as follows: *WRD will carry out each of the implementing strategies prescribed in the Oregon State Water Resources Policy on Conservation and Efficient Water Use (December, 1990). WRD will implement these strategies within the original time frames, counting forward from February 1998 rather than December 1990. A primary goal of these actions will be the implementation of conservation projects and the allocation of conserved water for instream purposes under ORS 537.455 to 537.500, consistent with salmonid life cycle needs.*

In implementing Strategy No. 8 of the State Water Resources Policy on Conservation and Efficient Water Use, WRD will form interdisciplinary working groups by October 30, 1997, in priority basins for flow restoration identified under ODFW IVA8. WRD will adopt rules and efficiency standards for these basins by October 30, 1999, which will take effect by March 1, 2000. For all other basins within a steelhead ESU, WRD will establish such rules and efficiency standards that will take effect no later than March 1, 2005. In each basin, these rules and standards will include a definition of waste which WRD will use as the basis for regulatory action.

Explanation: We applaud the Steelhead Plan for recognizing that WRD must take action to define efficient water use and enforce against waste. We also commend WRD for including a mention of the Conserved Water Statute, which provides a legal means of converting a portion of senior water rights to instream use. But WRD S-12 in the steelhead Plan is significantly weaker than the same measure in the original Coastal Salmon Restoration Plan, in that it has no deadlines for action. (The Coho Plan called for working groups to form in priority basins by December 1997, and standards by June 1999.) Our proposed measure restores these timeframes and adds new ones, since the Steelhead Plan covers more of the state.

Our proposed measure simply commits WRD to carrying out Oregon's existing program to promote water conservation and efficiency. The current program is far more comprehensive, progressive, and specific than anything proposed in the Steelhead or Coho Plans. Implementing this sound program could produce substantial benefits for steelhead and other salmonid fish populations that have been hurt by inadequate streamflows. In recent years, however, WRD has not taken strong action to promote greater water conservation and efficiency. Dusting off the current program and putting it into practice could help show that Oregon is truly serious about taking the steps necessary to restore steelhead.

WaterWatch appreciates the opportunity to comment on the draft Steelhead Plan. While we commend the efforts of all those who clearly worked hard to put the plan together, we believe that the water quantity section of the Steelhead Plan must be strengthened significantly. We urge you to adopt our recommendations for new and revised measures in three priority areas: water law enforcement, new water withdrawals, and water conservation and efficiency. In addition, we

will submit more detailed comments on the draft Steelhead Plan to the Water Resources Department within a few days. We look forward to working with you in developing and implementing a solid approach to save Oregon steelhead.

Best regards,

Reed D. Benson
Executive Director

cc: Paula Burgess
Roy Hemingway
Martha Pagel
Jim Greer
Will Stelle
Oregon fish conservation groups

Comments received from December 15, 1997 through February 5, 1998

**THE
INSTITUTE
FOR
FISHERIES
RESOURCES**

Northwest Office
P.O. Box 11170
Eugene, OR
97440-3370 USA
Tel: 541/689-2000
Fax: 541/689-2500

Oregon Plan Steelhead Review
Capitol Building
Salem, OR 97310

December 9, 1997

RE: Comments on Steelhead Plan

Dear Review Team:

Following up your suggestion to submit additional comments on the Oregon Plan Supplement on Steelhead, hopefully these comments will be helpful and will be able to be considered in developing the final version to be submitted to NMFS. Our comments are also submitted on behalf of the Pacific Coast Federation of Fishermen's Associations, with which we are affiliated.

Although IFR is solely responsible for these comments, we were assisted in preparing these comments and in the analysis of the Plan Amendment by Mr. Steven R. Curtis who, among other things, is a planning Policy Analyst and GIS Specialist as well as a former Commissioner of the Eugene Water and Electric Board. We hope you will take them into account in your revisions of the Plan. Our specific comments follow:

* * * * *

Time Frame to Evaluate Plan Effectiveness

General Comment. To address land use activities, riparian protection, and nonpoint source pollution attributes that impact native steelhead populations, the Plan appears to primarily rely on voluntary compliance with no additional regulations to meet these objectives. This will require a "grassroots", localized approach to mitigate the impacts of nonpoint source discharge and detrimental land use activities. There are also real questions as to whether Oregon's existing laws alone – even if enforced – will result in substantial improvements in habitat or changes in hydropower operations. In any event, the Plan needs to be tracked carefully and its effectiveness continually evaluated over time.

Recommendation: There should be a comprehensive evaluation of the Plan at 2, 5 and 10 years to evaluate expenditures, effectiveness, and level of voluntary compliance. If voluntary

compliance is not meeting the objectives of NMFS or the State, a more regulatory approach to land use, especially in the agricultural and urban area, should be initiated and enforced.

The Plan Must Be Science Based

Maintaining a science-based perspective throughout implementation and monitoring is essential to overcome political forces that would work to undermine the Plan's effectiveness and funding. The Scientific Review Committee model of independent evaluators of the Plan's effectiveness needs to be formally extended to this amendment.

Water Quality and Measuring Results

General Comment: Measuring BMP and program effectiveness related to land use activities and nonpoint source pollution can be complex, especially given the cumulative nature of these impacts. Certain restoration projects may not exhibit tangible results in improving water quality parameters within a short time frame. Funding to continue restoration projects or more educational oriented programs may not withstand future budget cuts. Every effort must be made to *institutionalize* funding so that it is independent of the political process as well as perpetual – i.e., dedicated trust funds, endowment funds, independent revenue generating sources, etc., paid directly to salmon restoration efforts without the need for biennial appropriations.

Recommendations

Measuring Results:

- 1) A report card approach, which produces Benchmarks, is the best approach. These Benchmarks need to be quantified, and a monitoring program developed to ascertain whether targets are being met over time.
- 2) A more localized approach, *measuring results for local waterway quality*, should be used based on localized (Sub-Basin) Benchmarks to alleviate damage to water quality limited segments and address more local efforts.

Develop and Prepare a Biennial Report *Measuring Results of Waterway quality and Health*

The purpose of this recommendation is to:

- * provide a crucial component in a Water Quality Management Plan for NPS/point source monitoring that helps evaluate and measure immediate and long term effectiveness of BMPs.
- * measure water quality improvements and progress towards meeting water quality standards.
- * provide watershed councils, watershed coordinators, and County Commissioners information about the effectiveness of political expenditures and to provide a justification for storm water fees and rate structures.

The waterway health report should include:

- three GIS maps:
 - 1) One which identifies current NPS/point source potential, by management segment, to illustrate relations between land use activities and water quality parameter problems;

- 2) The second which identifies past NPS/point source potential to help illustrate improvements or decreases;
- 3) A final one with projected future scenarios of the projected impacts of land use activities on water waterway health. Such a system could readily be based on a software already developed by Dr. Hulse at the University of Oregon.

Track and Evaluate Land Use Changes for Cumulative Impacts

* Utilize mapping and data to measure the conversion of natural land use to developed sites and the potential cumulative impact on floodplain management, water quantity, water quality, and natural resources. Such a system could be readily developed from existing GIS data bases to provide:

- detailed analysis (concerns, findings, and conclusions) of:
 - *current environmental conditions (water column, sediments, aquatic life);
 - *identification of point and nonpoint source pollutants;
 - *ecosystem health (fish and wildlife habitat, riparian areas, wetland areas; flood plains)
- water quality data analyzed and synthesized for public consumption
- programs in progress, programs completed, implementation record of BMPs, pilot projects, and land acquisition.
- Review pre-determined indicators or Benchmarks to evaluate and measure BMP effectiveness.
- compile citizen surveys and visual observations to produce clearer indications of qualitative waterway characteristics
- track volunteer efforts
- maintain records
- do trend analysis of conventional parameters.

This information can then be compiled for utilization by communities to address water quality issues. Communities could then look at previous information and circumstances within a watershed to better evaluate implementation methods or duplicate successful models elsewhere (i.e., residential zones within two different watersheds may exhibit similar run-off patterns and pollutant loads).

Sportfishing Considerations

*Consider rotating seasons within the Upper Willamette, Santiam, and coastal area ESUs. This means that certain watersheds (or sub-watersheds) would be closed to fishing for 1-2 years and then re-opened to fish for a period of 1-2 years. Initially, one-third of all critical steelhead watersheds should be closed, while two-thirds of the watersheds should remain open. Interior basin or coastal zone management would then re-schedule openings/closure annually as part of an entire ecosystem recovery strategy.

*With every fishing license, provide a 3x5 card (or whatever appropriate size) that explains the steelhead situation, stream segments affected (map), briefly characterizes measures underway to

protect native steelhead, and the top five things the average fisherman can do to help. This is meant to educate fisherman in pursuit of other game fish that may have native steelhead as a bycatch. One side should have a map illustrating river segments impacted and the other side should be devoted to information in a readable format.

*We agree with the goal of decreased intermixing of hatchery rainbows in native steelhead areas within the Molalla, North & South Santiam and Calapooia watersheds.

*Regulations requiring fishing with barbless hooks should be implemented within core native steelhead areas. Barbless hooks should be the norm in order to reduce hook mortality.

*In stream segments that have an active recreational component (boating, hatchery rainbow fishery, other water recreational activities), consider banning boating along certain stream segments downstream of these public recreational areas. With boating limited, approximately 60% of the surface waterway becomes inaccessible for recreational fishing. In addition, within these areas, adopt regulations that require barbless hooks and possible flyfishing only, and promote these areas as “trophy” fishing areas.

Hydroelectric and Water Detention Facilities

*We agree with the objective of managing flow regimes that better simulate natural hydrologic and geomorphic processes. Additional ways need to be found to have local power companies be involved and financially support watershed councils. However, with energy deregulation and competition for power markets around the corner, these types of efforts could be lost under competition. Also, the proposed 3% voluntary “tax” deals only with public purpose issues around renewables and energy conservation. Therefore, more secure, on-going funding needs to occur that is derived from within the power industry. Possibly, a non-bypassable service fee attached to the “wires” end of the market could be developed that would not create an economic disadvantage.

*Screening of all intakes should be mandatory and compliance should be stringently monitored.

Watershed Councils

The role of watershed councils will be to assess, restore, and monitor local watersheds. We support the concept of local watershed councils because they play an important role in increasing education and the development of peer pressure in a voluntary compliance regime. However, most watershed councils have neither the technical expertise nor funding to carry so much of the restoration burden. More effect needs to be put into developing and matching local watershed councils with appropriate expertise and considerably more long-range and stable funding.

Without an on-going funding mechanism the Plan appears destined to fall short of the desired objectives. A bottle tax or mil service charge on energy bills, or .5% wholesale tax on lumber, manufactured goods, and agricultural products should be considered as appropriate and non-

burdensome funding sources, to be placed in a “Salmon Restoration Trust Fund” out of which as much of this money as possible will go to actual stream restoration work.

A Proactive Approach Is Needed Towards Intergovernmental Water Relations

Intergovernmental coordination and communication systems need to be established.

Coordination and cooperation is especially important considering the consistent underfunding of this process. The Basin Council should facilitate intergovernmental coordination and link this information to watershed councils to increase their ability to implement Plan measures. Among other things that could be done to improve coordination are:

A. *Establish a consistent line of communication between the federal, state, and local agencies:*

The purpose of this recommendation is:

- to develop a better understanding for local agencies of what is going on with state and federal water policy directives and how local agencies may be affected.
- to increase local agencies’ abilities to implement programs that fall within the purview of federal and state statutes.
- to be actively involved in state level discussions regarding regional Willamette Valley issues.

B. *Establish a water information data base for critical ESUs, and in the So. and No. Willamette Valley area:*

The purpose of this recommendation is:

- to keep track of programs, projects and work plans being pursued by water-related agencies, in an attempt to facilitate information flow and technical assistance between all these agencies. This information could be disseminated quarterly.
- to better understand how the different aspects of each agency are interrelated, or not interrelated, with other agencies across the designated area. The goal is to develop an organizational chart for this entire effort.
- to keep track of programs and projects outside of the So. Willamette area so as to remain current on new developments in water planning and management.

C. *Establish the **Interagency Technical Assistance Team** and provide coordination support and data base management for this team:*

The purpose of this recommendation is:

- to coordinate technical assistance to local governments, share information, mapping, and facilitate dialogue within agencies and private entities to address watershed management, nonpoint source pollution, storm water, wetlands, etc.

Water Management Conference

The *Water Management Conference* is recommended as a starting point to begin a discussion regarding about cross-jurisdictional issues, the feasibility of an integrated water management plan; regional water issues, and to begin a dialogue about the communities' water objectives and priorities. The goal of the conference would be to establish which objectives would require intergovernmental leadership and coordination, how to prioritize them, who or what agencies would be responsible for spearheading the objective and to begin a process of implementation.

The purpose of this recommendation is:

- to prepare for a more regionalized approach to water quality and water quantity management.
 - to increase local accountability and implementation of management plans.
 - in recognition of the fact that nonpoint source pollution is a regional issue.
 - to increase information sharing, management strategies, technical expertise sharing.
 - to address infrastructure and water issues of smaller water districts and communities.
 - to begin a discussion about regional water conservation and supply plans.
 - to begin a discussion about regional water quality plans.
 - to begin a discussion on what an integrated water management plan would consist of and what the spatial scale of the plan would be.
 - to discuss the feasibility of a So. and No. Willamette Valley Watershed Council.
- a) We recommend that several groups be organized based as part of this effort on specific areas. The goals of these groups would be to develop objectives and options and determine what the trade-offs and costs are between the objectives. These groups would be:
- *The Technical and Scientific Group (which would become the *Interagency Technical Assistance team*)
 - *The Managers and Directors Group.
 - *The Community Involvement and Citizens Group.
 - *The Financial Strategies Group.
 - *The Water Policy and Implementation Group.
- b) b) We recommend that these Groups convene to discuss results and begin a process (possibly utilizing the Integrated Resource Planning technique that is designed to develop a spectrum of trade-offs between objectives) to establish objectives. Then engage, utilizing conflict resolution strategies, to prioritize the objectives.
- c) There will also need to be a discussion regarding the effects of desired water objectives on land-use planning. This discussion could also include the feasibility of mandating certain water supply plans, nonpoint source plans and watershed protection plans.
- d) Dedicate the *Interagency Water Coordination Group* and water agency intergovernmental relations departments to carry out the goals and agendas that surface from the conference and

to develop periodic meetings of individual groups to assess the effectiveness, discuss areas of conflict, and progress. An intergovernmental coordination plan and agreement would surface out of this conference.

* * * * *

Thanks for the opportunity to comment, and we remain available if any detail of these admittedly sketchy proposals or concepts are required.

Sincerely,

Glen Spain
For IFR/PCFFA

WaterWatch
Rivers Need Water

January 14, 1998

Oregon Plan Review
State Capitol
Salem, OR 97310

Dear Oregon Plan Review:

WaterWatch has previously submitted detailed comments on the Steelhead Supplement on November 26, 1997 and December 9, 1997. A cursory review of the most recent draft reveals that most, if not all, of our comments have not been addressed. Our concerns with the most current draft are identical to our previous concerns. Thus, we take this opportunity to resubmit our last two comments.

Feel free to call if you have any questions.

Sincerely,

Kimberley Priestley
Assistant Director

enclosures

EDITOR'S NOTE: For previously submitted comments, see pages 77 – 82.

Geoff Huntington
Water Resources Department
158 12th Street NE
Salem, OR 97310

December 9, 1997

RE: Steelhead Supplement of the Oregon Coastal Salmon Restoration Initiative

Dear Mr. Huntington:

On November 26, 1996 WaterWatch submitted comments to the Steelhead Plan to Governor Kitzhaber. These comments outlined WaterWatch's three priority areas: (1) improving water law enforcement, (2) limiting new water withdrawals, and (3) promoting water conservation. In each of these three areas, we specifically proposed new Steelhead Plan measures on revisions of existing measures which we are urging the Department to adopt.

As noted in the November comments, WaterWatch has additional comments and suggested revisions to the Plan, that, while not included in WaterWatch's "three priority areas", are of importance to the development of a solid approach to saving Oregon steelhead. We offer the following additional comments (see attached letter for November comments):

1. Measure WRD S-1, PUBLIC INTEREST TEST TO PROTECT SALMONIDS. We propose the following additional language:

S-1A (new measure), CLOSE BASINS TO FURTHER APPROPRIATION, see November 26, 1997 comments.

S-1B, (new measure) PUBLIC INTEREST REVIEW STANDARD OF "NO LOSS OF HABITAT" ON ALL WATERWAYS WHERE STEELHEAD ARE LOCATED. *As part of the public interest review of applications for new uses of water which may affect any waterway of the state where steelhead are located the WRD shall apply the standard of "no loss of habitat", in addition to existing public interest tests.*

Explanation Currently, the WRD applies the standard of "no loss of habitat" to waterways that support threatened or endangered species via their Sensitive Stock Rules (Division 33 rules). The state hopes to stay federal listing of steelhead by committing to the various restoration efforts contained in the Steelhead Plan. If this is achieved, steelhead will not be a threatened or endangered species covered by the sensitive stock rules. Nor are steelhead currently listed as sensitive under the state act. Thus if the state is successful in their efforts to stay listing, the protective measures of existing rules will not apply to steelhead. To achieve restoration of steelhead stocks this protective measure, at a minimum, must be applied.

S-1C, (new measure) WATER QUALITY CONSIDERATIONS IN PUBLIC INTEREST REVIEW. *The WRD shall not issue any water rights on streams that are listed as 303(d) water quality limited for flow. Moreover, it shall not issue any water rights for uses that will contribute to existing parameter violations.*

Explanation: In the draft plan, the WRD commits to “considering” water quality, with special attention to sources either listed as water quality limited or for which TMDLs have been set and sources classified as outstanding resource waters as defined in OAR 340-41-006(42). While this language does acknowledge the relationship between steelhead recovery and clean water, it does not really commit the WRD to doing anything. The WRD in the past has limited water right applications on 303(d) listed streams at the request of DEQ. Obviously, it is within their discretion to do so.

2. Measure WRD S-2, TRANSFER REVIEW FOR FISH CONCERNS

S-2A (new measure), PUBLIC INTEREST REVIEW OF TRANSFERS. *The WRD will support legislation in 1999 establishing a public interest review of transfers.*

Explanation: Water right transfers allow a water right holder to change the use, place of use, point of diversion or point of appropriation of water. Essentially, a transfer is a renegotiation of a water right, yet transfers do not undergo the same scrutiny as a new water right application. Currently the only limit on transfers is that they cannot “injure” an existing water right nor can they enlarge the original right. The injury test might be adequate to protect streamflow habitat in streams where adequate instream water rights are held. However, there are many waterways of this state that support steelhead that do not yet have instream water rights. Steelhead habitat in these streams is not protected against possible detrimental effects of transfers. These effects include both quantity and quality considerations. A public interest review would go much farther in ensuring that transfers do not jeopardize steelhead habitat than the currently limited no injury test. Transfers should also be held to the “no loss of habitat” standard suggested for new water right applications.

3. Measure WRD S-4, ISSUANCE OF INSTREAM WATER RIGHTS At the very least, add language committing WRD to *proposing to issue any future ISWRs, at the level requested by ODFW within 8 months of receiving the application.*

Explanation: In ODFW measure IVA3 and IVA8, ODFW commits to identifying streams where flow is limiting and establishing priorities for obtaining new ISWR. Correspondingly, the WRD should commit to issuing the requested ISWR at the amounts requested. WRD has committed, by rule, to the policy of establishing an ISWR on every stream, river and lake which can provide significant public benefit. OAR 690-410-030(1). This commitment should be reiterated in this plan.

S-4A (new measure), INSTREAM WATER RIGHTS TO CAPTURE PEAK FLOWS NEEDED FOR STEELHEAD. *The WRD will propose to issue ISWRs at the level requested by ODFW above the estimated average natural flow to capture peak flows that ODFW has determined are*

necessary to trigger biological responses in steelhead and to provide access to and from winter spawning grounds.

Explanation: Currently the WRD does not issue ISWRs for amounts greater than the estimated average natural flow. Often times ODFW requests flows that are higher than the estimated average natural flow. These requests include amounts needed to trigger biological responses in fish necessary for the successful completion of their lifecycles and to provide access to and from spawning grounds. These flows are necessary for the reestablishment of the natural timing and quantity of peak flows necessary to restore the natural salmon populations and fisheries to productive and sustainable levels. Oregon rules specifically allow ISWR to be issued in amounts greater than the estimated average natural flow for uses that are significant. OAR 690-77-015(4). The rules use an example “high flow events that allow for fish passage or migration over obstacles.” *Id.*

4. Objective 1A-3: Ensure that existing ISWRs are filled in accord with priority date of issuance. Amend to read: *Ensure that existing ISWRs are fulfilled in accord with priority date except for when an unpermitted “senior” application directly conflicts with a “junior” instream water right. If this is the case, the out of stream application must be subordinated to the existing ISWRs whether the ISWR status is “applied for”, “permitted” or “certificated.”*

Explanation: The objective, as proposed, is flawed because the WRD has authority to fulfill ISWRs without regard to the priority date if the public interest value of such a water right is higher than the private use applied for. See Attorney General Letter Opinion: Conditioning of Permits and Certificates, DOJ File No. 690-003-G0029-86 and Cookingham v. Lewis, 58 OR 485 (1911).

5. Objective IB-1: Delete the word “significant”; replace the word “highly” with “most”.

Explanation: These changes will make the objective consistent with the correlating ODFW measure ODFW-IVA8. The ODFW measure commits to identifying all streams where quantity of flow is limiting steelhead production and then establishing priorities for obtaining new ISWRs. Then, in addition to this, ODFW commits to establishment of schedule for annual incremental restoration of flows in areas where steelhead habitat is most dependent of restoration of streamflows. These are two mutually exclusive action items. The objective should reflect the full extent of these commitments.

6. Measure WRD S-6, IDENTIFY UNMET INSTREAM FLOW NEEDS. Add sentence stating: *ODFW and WRD will make available to the public both the criteria for identifying unmet flow needs and the date on where such needs are not being met.*

7. Measure ODFW IVA8, IDENTIFY INSTREAM FLOW PRIORITIES. Add sentence stating: *ODFW will make the priority list available to the public.*

8. Measure WRD S-8, INCREASED DISTRIBUTION AND ENFORCEMENT. See November comments at page 2.

9. Measure WRD S-9, INSTALLATION OF MONITORING STATIONS. Change the date to develop the funding proposal for the Southwest Washington, Lower Columbia River, Upper Willamette & Snake River Basin ESUs to *Fall of 1988* so that it can be considered in the 1999 session.

10. Measure WRD S-12, IMPROVING EFFICIENCY AND PROHIBITING WASTE. See November 26, 1997 comments at page 6.

11. Measure WRD S-13, AGRICULTURAL WATER CONSERVATION PROGRAM. Revise to read as follows: *WRD will carry out each of the implementing strategies prescribed in the Oregon State Water Resources Policy on Conservation and Efficiently Water Use (December, 1990).*

Explanation: The state already has in place a plan that is much more comprehensive with regards to conservation and efficiency than the measures proposed in the Steelhead Plan. All that needs to be done is for the state to implement these measures.

12. Measure WRD S-14, MUNICIPAL WATER MANAGEMENT PROGRAM. Add language: *WRD will carry out each of the implementing strategies prescribed in the Oregon State Water Resources Policy on Conservation and Efficiency Water Use (December, 1990).*

Amend sentence one, paragraph two to state: *All communities receiving new water rights or extensions will be required to prepare plans that satisfy the mandates of the municipal water management rules (OAR Chapter 690, Division 86) before they get a water right.*

Add sentence: *All communities that currently hold water rights on any stream in which steelhead are located will prepare a water management and conservation plan by December 31, 1998.*

Explanation: Oregon law mandates that “major water users shall prepare water management plans” (OAR 610-410-060(2)(b), OAR 610-086-0010(1)). Exploring a municipalities “willingness to explore” the possibility of preparing “voluntary” water management plans will not help to restore steelhead runs. The language is too weak to be effective. Municipalities may not be willing to spend the time and money needed to create a thorough and effective plan.

13. Measure WRD S-15, INSTREAM LEASES AND TRANSFERS. Add language: *WRD will convene a task force to study and propose means of increasing funding for instream flow acquisitions.*

Additionally, do not limit the discussion to “leasing”; i.e., paragraph two and Oregon Coast & Klamath Mountain Province paragraph speak only of leasing, it does not encourage actual purchase or transfer which, in the long run, is much more resource protective.

14. Measure WRD S-16, WATER RIGHT FORFEITURE. Strike “or leasing” and the last sentence of the explanation.

Explanation: Allowing for the leasing of a water right that could be forfeited could create potential problems. The lease will expire, and the water will still be needed for instream uses. Further, money payment given through a lease arrangement essentially rewards the user who has been hanging onto a water right without using it for five years. The transfer of forfeited water rights, on the other hand, is a good idea. Transfer should be the only option offered other than cancellation to the water right holder who has not used their water for five years.

15. Measure WRD S-17, PUBLIC OUTREACH AND INFORMATION. Add language: *WRD will revise its public notices of water right activity (water rights, transfers, limited licenses, etc.) to reflect the presence of sensitive, threatened or endangered fish.*

Explanation: Currently the public notices only publish the most basic of information (name, location, proposed use). Unless one has an intimate knowledge of the affected water source, there is no way to glean from the public notice if there are any potential effects on fish. It would be extremely helpful to the public, as well as other state and federal agencies, if, at the very least, the notices note that the proposed use is within a steelhead (or other imperiled fish) ESU. Core areas should also be noted.

16. Measure WRD S-18, GROUND WATER STUDIES. This section does not address exempt wells, and should. At the very least, language should be added committing the WRD to: *inventory the number and location of wells that are classified as “exempt” and reexamine its policy toward exempt groundwater uses that are hydraulically connected to surface waters.*

Explanation: Currently, certain groundwater uses under a specific amount are “exempt” from the regular permitting process. These uses are not managed conjunctively with surface water. Interference between these exempt groundwater uses and nearby streams could jeopardize steelhead recovery efforts. These uses pose especially significant risks to streams that are already overappropriated.

17. Measure WRD S-19, OFFSTREAM STORAGE. Add sentence: *All new storage projects shall operate subject to conditions imposed to protect peak flows for fish.*

Explanation: See discussion of measure WRD S-21.

18. Measure WRD S-20, SWMPAs. See November 26 comments at page 3.

19. Measure WRD S-21, PEAK FLOW. The value of peak flows is described primarily in the context of “triggering the biological responses” of salmonids and allowing for the flows necessary for fish to migrate upstream. However, there are other equally important function of peak flow such as maintaining channel integrity, moving bedload and creating gravel beds for salmon redds as well as providing necessary habitat for many species of salmonids at different periods of their life histories. These functions need to be recognized and articulated more clearly in the plan. A more complete description of the value of peak flows could be revised to read: *“Annual and semi-annual peak flows are important to salmonids for access to and from winter spawning grounds and for triggering biological responses. These peak flows may also wash out fine sediments, thereby preventing holding pools from being filled in. Peak flows also maintain channel integrity as this is the only time bank full conditions are achieved. Further these flows are needed to move bedload, create gravel beds for salmon redds and provide necessary habitat over the floodplain for salmonid species at different periods of their life histories.”*

There is an inherent inconsistency with the way that the plan currently addresses protection of peak flows. For example, paragraph two states that a peak flow work group is “working to provide WRD with information and advice on how to protect peak flows in a systematic, scientifically based manner as permit decisions are made,” connoting that peak flows are fair game for further appropriation when surface waters are fully appropriated (emphasis added). Ironically, the last sentence commits that a policy will be developed that “ensures” that peak flows will be protected; seemingly running counter to the policy articulated above which ensures that these flows are available for further appropriation. At the very least, *the plan ought to articulate that “no touch streams” are identified so that core habitat areas streams or reaches of these streams are protected from further appropriation of these much needed high flows.*

To fully protect these flows, they must not be appropriated as a solution to water scarcity problems in basins where surface waters during irrigation season are over appropriated. Currently these flows provide a respite from the relentless appropriation of surface water that is occurring throughout Oregon. To allow for appropriation of these flows is to ensure that flows will be diminished on a year round basis, channel integrity will not be maintained, and salmonid habitat will be lost. This measure rather than protecting peak flows gives the nod to further appropriation of flows that are currently unappropriated. This is not a salmon protection measure, but a user protection measure.

Suggested revision to paragraph three: *“Permitting processes must ensure that storage projects do not capture peak flows for storage in any watershed, particularly in watersheds where surface water is completely appropriated during the irrigation season.”*

See also, WW comments to Measure S-4, issuance of instream water rights regarding the issuance of instream water rights to protect peak flows.

20. Measure ODFW IVC2: SCREEN DIVERSIONS LESS THAN 30 CFS. The deadline for screening diversions is currently listed as 2007. This deadline is too attenuated into the future to be effective. Especially in the Southwest Washington ESU where one diversion remains to be screened this deadline seems arbitrary, where it may be more appropriate for the Upper Willamette River ESU and the Oregon Coast ESU which have from 400 to 600 diversion that need screens. The deadline should relate to the amount of work needed to accomplish screening in each ESU and should be correlative to the number of diversions that remain to be screened.

21. Measure WRD S-24: PROTECTION AGAINST DIRECT HABITAT LOSS. Extended to address existing storage projects.

Explanation: WRD should attempt to offer incentives or ask current storage water rights holders to voluntarily reexamine their permit conditions in light of salmonid habitat restoration.

22. Measure WRD S-26, RESERVATIONS. See November 26 comments at page 4.

23. Measure WRD S-27, EXTENSION OF TIME. See November 26 comments at page 5.

Thank you for the opportunity to comment.

Sincerely,

Kimberly Priestley
Assistant Director

Renee Moulun
Staff Attorney

cc: Martha Pagel, Director, WRD
Paula Burgess, Governor's Natural Resources Advisor
Roy Hemingway, Governor's Salmon Advisor
Jim Greer, Director, ODFW
Jill Zarnowitz, ODFW
Will Stelle, NW Regional Director, NMFS
Ann Squire, NMFS

Editor's Note: Received comments via e-mail.

January 23, 1998

From: William Pearcy

To: Bev Goodreau

Bev:

I'm not sure who these comments should be directed to. After scanning selected chapters of the massive Steelhead Supplement, I'd like to pass on a few notes to Jim Martin or Jay Nicholas.

1. Chapter 4-11. Since the drift net fishery in the North Pacific is a common scapegoat for declining fish stocks, we should state that a ban on this type of fishing was passed by the United Nations outlawing drift net fishing after December 31, 1992. This should be stated. And please check your citation of "over a million pounds" of salmon, by inference from high seas drift nets, were imported into the U.S. "over the past six years" – 1992-1997??
2. Under Ocean Conditions, 4-15, the PNCERS program is mentioned. The U.S. GLOBEC program should also be included. This program is funded and will specifically address the key question of "large-scale oceanic and atmospheric processes" that affect productivity in the ocean for salmonids, as stated in 15B-34.

Under Life History, 4-4 para. 4, I'd say that there is quite a bit of information on the ocean distributions of steelhead, mostly from INPFC in the 50s and 60s, and from recent research by both Canada and U.S. Of interest is the fact that most stocks of salmon that migrate into the Gulf of Alaska have flourished since the late 1970 regime shift, but steelhead from the Pacific Northwest have not. Why not? One conclusion could be that ocean migrants must migrate through estuaries and coastal waters before reaching the subarctic Pacific. This could be the vulnerable bottleneck in the ocean life history, and more research should be planned to test this hypothesis.

SOUTH SANTIAM WATERSHED COUNCIL

USDA Service Center, 33630 McFarland Road, Tangent, OR 97389
541-967-5927 FAX 541-928-9345

January 15, 1997

Oregon Plan Review
State Capitol
Salem, OR 97310

Dear Oregon Steelhead Supplement Review,

The South Santiam Watershed Council respectfully submits the following comments on the Legislative Review Draft of Supplement I-Steelhead to the Oregon Plan. Comments are submitted regarding Chapters 15B, 14D, and 14A. Thank you for your consideration.

Chapter 15B Monitoring Programs for Coho and Steelhead for the Oregon Plan Pacific Salmon Restoration

This is a very comprehensive monitoring program. The report was thorough and presented well. The review comments that follow are meant to be constructively critical.

Subject Areas of Monitoring Issue Teams:

- 1) The Fish Population Team does not address fish disease issues. Steelhead are extremely susceptible to IHN, furunculosis, and other diseases. All animal and human populations are modulated by disease.
- 2) The Water Quality Teams do not address pollutants either chemical or biological (fecal coliform).

Goals and Key Questions Needed to Monitor:

- 3) Historical Levels: There is a dichotomy between wild stocks and hatchery stocks in determining whether the conditions in the stream will allow natural fecundity in the face of a degraded natural environment. Admitting that the natural environment is degraded, how do you determine how to restore salmon populations to historical levels given that you do not have records of these historical levels? This question is not adequately answered.
- 4) Physical Monitoring: The agencies are installing weirs and counting stations which directly impact migrating fish: interfering with natural up-stream migration.

Is this impact justified? What impact will man's monitoring make on the populations of salmon?

- 5) Tasks: There is some mention, but little "high science" in the methodologies used. For instance, we know some of the chemical pollution load in surface waters [unreadable text].

Chapter 14 D Agency workplans: Oregon Department of Forestry

- 9) The plan for forestry should concentrate on the fish bearing streams.
- 10) Any increase in the riparian buffer should be backed up with facts about the benefits of the additional buffer.
- 11) No private property rights should be taken without just compensation.
- 12) There should be provision for maintaining the timber harvest in areas impacted by this plan.

Chapter 14 A Conservation and Restoration Measures

- 13) **Chapter 14A Measures/Analysis.** Page 14A-5. "Annual Review"
How will the Annual Review with state and federal natural resource agencies and watershed councils be accomplished? Will the state and federal natural resource agencies meet with all individual watersheds or only the chosen few?
- 14) **Chapter 14A. Measures/Analysis.** Page 14A-6. "Technical Advisory Committees for Watershed Councils."
If watersheds do not have qualified people within their group, is funding available to hire such advisory people as needed?

[unreadable text]

The following comments are made in response to comments made on the first draft of the Steelhead Supplement:

- 16) Response to Beschta's Comment 5 and others regarding the random selection of monitoring sites per the EPA Environmental Mapping and Assessment Program. We support Beschta's proposal for a stratified sampling scheme stratified by stream order, elevation, land use, etc. We disagree with the state response that "Analogous situations exist on both forested and agricultural lands which should enable us to take positive actions..." There is no analogy in the forest for water diversion, degradation, and return to streams after irrigation of crops or pasture.

- 17) We also agree with Beschta's Comment 13 with regard to maximum efficiency versus random monitoring and also the establishment of benchmark sites (which the South Santiam Watershed Council has initiated in our area).
- 18) We strongly support Dr. Beschta's (and other) concerns about the lack of emphasis on agricultural, urban, and estuarine land use practices. (Forestry has committed to many.)
- 19) The State's response to Krueger's Comment 12 was confusing on fisheries habitat experts think that the lack of channel complexity and temperature are the key issues limiting fish throughout most of Oregon." Yet the response to Krueger comment 9 states "The water quality workgroup felt that temperature and sediment were the two most significant water quality parameters affecting steelhead recovery." We agree with the Steelhead Plan approach to monitor turbidity during winter storm events.