

Addendum
CHAPTER 16
Review of the Steelhead Supplement

An entire revised Chapter 16 will be provided on the Internet at www.oregon-plan.org. Recipients of the December 17, 1997, Steelhead Supplement will be provided only the new materials contained in this section. The contents of this section include:

- Additional State Responses to Dam and Hydropower Chapter
- List of Contributors to the General Comments Section
- Review from WaterWatch

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<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 peer reviewers, the Introduction was significantly rewritten. It includes reports which provide detail on the effects of dams on fish. The measures outlined in this section are based on scientific and professional experience and professional experience information was not provided. The measures are for the sake of better measure for the sake of better</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 reviewed in the draft because some of the dam/hydro section had not included it in the final draft. The statement was 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 you that Water Quantity was intended to parallel the other sections. The four other sections were “Physical Habitat,” Water Quality, “Screening,” and “Fish Management.” The organization of the original Oregon Plan section was organized in a different manner.</p>

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	regarding whether it should be incorporated into the four e; section was written to facilitate that approach were taken.
<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 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</p>	<p>ODFW: In response to you other peer reviewers, the Ir been significantly rewritten substantive reports which p citations regarding the effe project-specific measures o based on project-specific st experience. In most cases, not provided in the descrip sake of brevity.</p> <p>ODFW: See above commen</p>

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fish and therefore timing of smoltification, and outmigrations (potential delay).	
<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>	ODFW: See above commen
<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>	ODFW: This subsection w/ overview of the variety of r mitigating adverse fish imp: rewritten, it is not intended
<p>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</p>	ODFW: For replies to compr Response to Comments on ' Hydropower Section of the

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<p>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>follows this comment section "overarching biological objective 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 Portions of the Hydropower 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 Portions of the Hydropower 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 Portions of the Hydropower Supplement."</p>
<p>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.</p>	<p>See attached "DEQ Response Portions of the Hydropower Supplement."</p>

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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 Respon Portions of the Hydropower 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 Respon Portions of the Hydropower 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 Respon Portions of the Hydropower 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 Respon Portions of the Hydropower 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 the organization of the large Since all of the approaches referencing or much redundant discussion of factors of decline categories used in the four c <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 between a Phase I and a Phase II (Phase I measures are those

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	resources available for impl are those which do not.) Th is dependent on the reautho
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 group coordinate research and bro amounts noted are minimur adequate to fund mitigation problems related to PGE hy by the group can be rectifie
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 r flow releases certainly are c temperature issues at large c will be fully studied and the determined at relicensing. I flow may be passed over the 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 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 i flow events, which recruit v The placement of gravel do suggest, is also a potential n removal, as referenced in B expected to improve recruit
33) Page 10 - no discussion of B-III through B-VIII?	ODFW: Since no specific h proposed to address these f 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. Shouldn’t this be required for all projects, unless applicant is able to demonstrate not needed via formal waiver process.	WRD and ODFW: Based on assessment looks at a broad construction, forest practice watershed assessment techn hydroelectric projects has n

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	While a watershed assessment management tool, it did not require hydro operators to use. The intention is that the State's Implementation Team will define the criteria for watershed assessments, as a
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 repeated if it addresses more 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 4 was at this point in time. Accordingly identify high return projects
37) Page 13 - repeat of Measure PGE 4.	ODFW: See reply to comment
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 context has been reworded for
39) Page 14 - reword Overarching B.O. for C-II - it is awkward.	ODFW: We agree that the v
40) Page 15 - C-IV - concur with notation that is better placed in habitat section.	ODFW: This objective was subsection because a potential conversion from "peaking" 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 in which governs new hydroelectric loss" of anadromous salmon 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 that statutory and administrative includes screening. Since that was on the development of these ongoing programs.

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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 if significant increase in sumr a net benefit to fish when cc (low flows, temperature, and juvenile and adults, and rea with a minimum of impact i expect spill in addition to re
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 enco schedule pre-application co better understand what is re applications efficiently. WI keeping with this policy. TI past, WRD spent a good de phone calls with applicants in the way of maps and perr agencies. With a good pre-department can receive all c time. The very reason for e that PacifiCorp can implem flow agreement as soon as p 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 you of the problems facing steel immediately. Developing n improving conditions is the
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 s and agencies with specific a measures. Although ODFW might render faster results i objectives, the <i>Plan</i> is a con other regulatory processes a
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 ha management issue group lea the officer position noted de

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	awareness and education pr comprehensive comments o

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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 of the <i>Measures</i> chapter, for management factors of decline were included in this section by a hydro operator (PGE) 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 by calling on all relevant parties to reduce the impacts of human 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 terms such as goals for numbers of returning adults or minimum numbers of effective breeding pairs</p>	<p>ODFW: Based on comment sections of this chapter agree "overarching biological objectives" We agree with your assessment would be desirable. Unfortunately</p>

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<p>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>measures needed to restore fish) is not this precise. Those conditions that are getting fish. Relicensing will allow to resolve what measures are 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>Need for additional information via research automatically generates from a rigorous limiting factors</p>	<p>ODFW: See above response</p>

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<p>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 conservation. These comm author of the fish managem that measure PGE 16 of this winter steelhead broodstock Clackamas River Basin. Th was, however, to develop m rearing and spawning and to and juvenile salmon and ste</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 downstream migrant collection systems.</p> <p>Review the evaluation results from projects with fish facilities that "failed". Do</p>	<p>ODFW: In response to your indicates that ODFW will s construction of a steelhead (Dm and in the Upper Willa are, of course, expensive. A practices and agency criteri based on models that have p those aspects that have faile continue to learn from such</p>

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<p>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 a mutually acceptable process is important. The FERC relicensing process often excludes both operators and state resource agencies. Negotiated settlements between operators and state resource agencies are 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>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>ODFW: As noted above, we agree that the ecological impacts of dams are often exacerbated. We will continue to exist corrective measures to address these impacts. Appreciable positive results can be reached to implement these measures.</p>

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<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 we uncertainty, the best we can that are generally known to Relicensing allows for furth what measures are most nee</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>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>ODFW: Comments noted. environmental parameters i: monitoring can be included conditions. In response to y such details will be determi</p>

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<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. Resour</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>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</p>	<p>ODFW: Comments noted.</p>

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<p>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 you any additional duplication. projects by ESU and a sumr attachments.</p>
<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 broadened to address other : immediate focus of attention made to move away from sq</p>

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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.	ODFW: We agree.
<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, te substantially changed. See</p>
<p>Statement of the Problem</p> <p>"Stressed aquatic systems" and "fish" is jargon. It is hard to define this albeit popular term</p>	<p>ODFW: We made major ch response to your comments</p>

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<p>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 I other documents where imp</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 chan,</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 changed to be consistent wi 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 cases, but it doesn't belong in this paragraph, which is more generic in reference.</p>	<p>ODFW: In response to com were removed.</p> <p>ODFW: See above reply to</p> <p>ODFW: We do not necessar be "good enough" when thr</p>

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<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>goal should be "all of the fish" acknowledges that some loss passage systems, i.e. 100% the time.</p> <p>ODFW: We concur that it is a discussion oriented toward :</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 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>	

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<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 respon</p> <p>ODFW: See DEQ’s respon</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 ch response to your comments reviewers. We revised the I other documents where imp</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. Bacterial 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 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>ODFW: In response to such text intact.</p> <p>ODFW: The response to yo grouped by category of fact factor. The wording was ex</p>

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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.	of measures.
Say <i>why</i> this chapter does not deal with Bonneville Dam.	ODFW: Language was added
<p>A. Water Quality...</p> <p>I strongly recommend adding "Nutrient Loading/Cycling" to the water quality list.</p>	ODFW: For responses to your quality , see DEQ reply to comment
<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 reddsides shiners to out-compete steelhead juveniles...the effect is dramatic and very significant from a population perspective.</p>	ODFW: For responses to your quality , see DEQ reply to comment
<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>	ODFW: For responses to your quality , see DEQ reply to comment
<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</p>	ODFW: For responses to your

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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.	quality, see DEQ reply to c
"Objective AI-2" Add to the end: "...where natural regimes are more beneficial to steelhead/salmonid resources."	ODFW: For responses to yc quality , see DEQ reply to c
<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>	ODFW: For responses to yc quality , see DEQ reply to c
<p>A-III (D.O.)</p> <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>	ODFW: For responses to yc quality , see DEQ reply to c

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<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 yc quality , see DEQ reply to c</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 yc quality , see DEQ reply to c</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 f</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, 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>ODFW: For responses to yc quality , see DEQ reply to c</p> <p>Mercury is apparently a pro Oregon than is generally be potential impacts of "rampii where mercury is present is</p>

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<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 t here because it is a water qu different causes, including l obstructions.</p>
<p>Statewide Measure: DEQ 1 -- Sediment</p> <p>See comment on paragraph 4/6.</p>	<p>ODFW: For responses to yc quality , see DEQ reply to c</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 yc quality, see DEQ reply to cc</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 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>ODFW: While the emphasis screen was on passing fish : NMFS and PacificCorp's cc transport in mind. It provid flushing of sediment. The I style screens and passes 3-4 transfer to this setting. It re which would result in reven sedimentation basin upstrea style of screen itself, addres</p>

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<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>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>ODFW: Discussion of these due to a lack of related mea</p> <p>ODFW: Discussion of these due to a lack of related mea</p>

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<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 su others sections of the Meast 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 flexi safety is not compromised a statutory and administrative includes screening, and they NMFS criteria. Site-specifi how these criteria are applie relicensing, sec. 18 of the F authority to prescribe fishw.</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 c NMFS staff indicate that th which offers equal or better meet NMFS criteria.)</p>
<p>1. LOWER COLUMBIA ESU</p> <p>Measure: Pacifcorp 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>ODFW: See responses to cc</p>

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<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 what is achieved at many projects, but is technically feasible. In the technically feasible and more 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 su</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 provi</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</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 the nature of the screening facility that is at issue? Making this clear might help the document. Time to get tough?</p>	<p>ODFW: Lake Oswego Corp discuss the issue, but is con screens, estimated to be \$25 developing a list of unscreen actions for bringing them in passage and screening stand</p>
<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>	<p>ODFW: See response provi</p>

Peer Review Letter #8	Stat
<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>	<p>ODFW: Since your commercial fish management, they have the fish management section</p>
<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>	<p>ODFW: Since your commercial fish management, they have the fish management section</p>
<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 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>ODFW: Since your commercial fish management, they have the fish management section</p>
<p>Measure: PGE 15 (Sort and haul hatchery steelhead downstream)</p>	<p>ODFW: Since your commercial fish management, they have</p>

Peer Review Letter #8	Stat
<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>the fish management section</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 you</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.

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

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. Beshta'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.