



Independent Scientific Review Panel
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MEMORANDUM

February 19, 2005

TO: Doug Marker, Fish and Wildlife Division Director, Northwest Power and Conservation Council

FROM: Rick Williams, ISRP Chair

SUBJECT: ISRP Step 1 Review of the Klickitat Subbasin Anadromous Fishery Master Plan (*YKFP-Klickitat Design and Construction*, Project #1988-115-35). (ISRP 2005-7)

Background

Per the Council's November 18, 2004 request, the ISRP reviewed the updated Klickitat Subbasin Anadromous Fishery Master Plan (*YKFP-Klickitat Design and Construction*, Project #1988-115-35). An earlier version of this Master Plan was submitted to the ISRP in June 2004. In July, as part of the subbasin plan reviews, the ISRP heard a presentation on the relation of the Master Plan to the Klickitat Subbasin Plan. However, the Master Plan was withdrawn from the review process on July 8, 2004.

The Master Plan step submittal is intended to initiate and address the Three-Step Review Process approved by the Council on October 18, 2001. The ISRP review focuses on the Yakama Nation's response to the Step 1 review elements (pages *vii - ix* of the Master Plan cross-reference to the step questions). ISRP comments on the review elements are incorporated in the ISRP's summary comments and enumerated following the summary comments.

Review Summary

The Master Plan outlines significant changes in terms of policy, biology, and cost from previous Klickitat fisheries program proposals. Some proposed actions would seem positive and in line with previous ISRP concerns and suggestions such as for the hatchery-origin fish marking, coho, and steelhead broodstock components of the Master Plan. However, many components of the Master Plan need further consideration and development to meet the ISRP standards of scientific soundness and consistency with the Fish and Wildlife Program's Scientific Principles. The absence of completed HGMPs makes it much harder to evaluate the proposed changes. In general, the Klickitat Subbasin Anadromous Fishery Master Plan (KSAFMP) remains in difference to ISRP comments provided during the 2000 Provincial review, when the Klickitat Fisheries program was reviewed in depth along with the Yakima subbasin fisheries program. Most of the ISRP comments on the Provincial review apply to this Master Plan (*other than*

comments on report organization). The ISRP's seven primary concerns with the Master Plan are described below.

1. Need for a Watershed Assessment

Watershed planning and this Master Plan would benefit from the required and comprehensive watershed assessment. It is this assessment and subsequent prescriptions that should drive the anadromous fishery master plan in the Klickitat subbasin. Much of Chapter 10 in the Master Plan focuses on proposed habitat actions and risks. Objectives H1 (*Assess habitat conditions and evaluate the need for restoration, enhancement, and/or protective measures*) and H2 (*Identify, prioritize, and plan actions that address needs identified in Objective H1*) must be done as part of the recent Subbasin Planning exercise, thus it is curious to find them as objectives in the Klickitat Master Plan. Indeed, where the Master Plan relies on subbasin level planning documents, it cites the 2000 Subbasin Summary, the precursor document to the 2004 Subbasin Plan. Completion and reporting of the watershed assessment and prescription is paramount.

A brief summary of the Klickitat Subbasin Summary is given in Appendix E. The Master Plan calls for increased hatchery production, modification of hatchery operations, supplementation, etc; this initiative must be reviewed and assessed (and justified) in relation to the Klickitat Subbasin Plan. In particular, this Master Plan should integrate aquatic habitat limiting factors with objectives for increased natural production. However, the discussion of the Subbasin Plan and limiting factors is missing or inadequate to justify the Master Plan. Klickitat planners might refer to the Hood River subbasin for examples of watershed assessments and subbasin plans that provide appropriate levels of analysis and identify linkages between inventories, assessments, and proposed actions.

2. Need for Scientific Justification

There is a lack of sound scientific evidence for the actions proposed, which do not include sufficient detail in the monitoring assessment to provide adequate review, let alone to guide the proposed activities within the basin. An EDT or similar analysis is needed, if not already complete, to provide information on capacity production for salmonids. That information, and the state of the stocks, should drive decisions on harvest and hatchery production, and recognize the highly variable nature of abundance and survivals. The Klickitat Master Plan in its current state is one focused primarily on harvest, and previous agreements, at fixed levels; however, as stated previously, it is clearly not the role or intention of the ISRP to comment on such policy-based objectives. Nevertheless, the Master Plan remains scientifically deficient as a planning document.

The Master Plan states that "*It is not cost effective to duplicate in the Klickitat work that is already being done on the genetic risks of supplementation in the Yakima and other Columbia subbasins*", but, the relationship of this project to the Yakima subbasin supplementation studies was not clearly specified. What is meant by statements such as "*It is appropriate to leverage these [supplementation] efforts in the Klickitat basin.*"? Statements such as these two imply linkages between the Klickitat and Yakima projects that need to be made clearer in the Master Plan, if indeed, they exist.

3. Linkage Needed to Council's FWP Scientific Principles

The hatchery operations need to be placed in perspective to the health of the watershed, and with the Council's Eight Scientific Principles, especially Principle 1 (*The abundance, productivity, and diversity of organisms are integrally linked to the characteristics of their ecosystem*) and Principle 8. (*Ecosystem function, habitat structure and biological performance are affected by human actions*). Reviewers could not readily make that linkage.

4. Justification Needed for Proposed Artificial Production Activities

The ISRP remains concerned that the restoration of endemic natural populations within the Klickitat subbasin will be at risk given the supplementation activities proposed in the Master Plan. The distribution, diversity, abundance, status, and productivity of the wild populations are not well described; thus, judgment on the role, scale, impact, and need for supplementation remains deficient. Furthermore, supplementation and harvest plans appear contrary to the Master Plan's stated goals to enhance existing stocks of anadromous fish, while maintaining genetic and ecological resources. The limited information on escapement and capacity levels that is presented in the Master Plan suggests that spring chinook and summer steelhead may already provide adults that could fully seed available habitat to capacity, were it not for, at least in some part, harvest on these stocks within the Klickitat. Hatchery production to supplement this production is unwarranted, and directed primarily at harvest. If harvest is the key objective, as it seems (and is stated), then a different strategy of hatchery production should be analyzed – one where releases are targeted at harvest, and interference with wild production is reduced, consistent with artificial production and subbasin assessment protocols, and scientific principles agreed within the Fish and Wildlife Program's basinwide provisions.

The theme of the Master Plan is to double returns by doubling hatchery production. An independent economic review is suggested, as the stated benefits of fall Chinook returns were estimated at \$1 million (catch of 14,000). Production costs (for 4 million smolts) may exceed this annually. No valid reason for a doubling of production is given, other than to increase harvest. The supplementation argument is weak since habitat (which requires improvement, particularly in the upper basin) seems fully seeded, or soon could be if harvest of wild fish stopped (in-basin harvest rates on spring Chinook were estimated at 35-40%).

5. Linkage Needed Between Production Activities and Habitat Improvements

The habitat chapter (Chapter 10) of the Master Plan outlines a wide variety of strategies and methods (and associated risks) for an array of general habitat improvements, such as **H3b**: "Restore or enhance vegetation conditions" or **H3c** "Repair or replace artificial fish passage obstructions". Specific strategies are not tied to specific problems in identified locations within the Klickitat subbasin. Thus, while the chapter lists logical strategies and methods, it is not possible to tell what actions are being proposed where in the basin to achieve what specific objectives.

The Master Plan and the Subbasin Plan acknowledge that habitat in the upper watershed has been severely degraded from timber harvest and livestock grazing. These activities have seriously affected natural fish production capabilities and the impacts are continuing (MP p 30-31). Habitat condition is “compromised – ecological function or habitat structure substantially diminished” (MP p 33). Upper watershed habitat conditions would seem most important for steelhead – ESA-listed, with a Master Plan goal of rebuilding natural populations. “The Klickitat steelhead population is listed as Threatened under the ESA, with an overall decline in natural productivity cited as one of the primary reasons for the listing. YN and WDFW managers believe that the supplementation strategies described in Chapter 6 [of MP] are warranted, if not mandated, by the ESA status of this species” (MP p 33). From the ISRP’s perspective, it seems a leap from these observations to an increased steelhead supplementation program – rather, the statements seems to call more persuasively for an aggressive habitat restoration program and a reduction in harvest.

The ISRP has commented several times previously on the need to link habitat restoration projects in the Klickitat to proposed artificial production activities (ISRP Report 2000-9; ISRP Report 2004-13). A quote from our review of the subbasin plans. “For example, one of the significant actions proposed to increase spring chinook salmon distribution in the Klickitat basin is to improve passage at Castile Falls. This action would provide access to 35 miles of upper basin meadow habitats that are typical of highly productive spawning areas for spring Chinook salmon elsewhere in the Columbia River Basin. Nevertheless, the subbasin Assessment (pp. 130-131) describes pervasive long-term negative effects on habitat and riparian condition in the upper river section from over 60 years of intensive grazing. Other habitat impacts in this section include roads in the river floodplain and legacy effects of logging. The subbasin plan should specify that investment in passage improvements at Castile Falls is unwarranted without a simultaneous commitment to stream and habitat improvement activities that positively benefit spawning and rearing for the spring Chinook salmon and steelhead passing the falls.”

Nearly all the upper watershed is owned by the Yakama Nation. From Chapter 10 (Proposed Habitat Actions and Risk) of the Master Plan, it appears that little inventory of watershed condition has been done. It is scientifically unsound to increase numbers of spawners in the area with hatchery supplementation fish without proper inventory of the watershed condition. We note that there is apparently a political decision to not change existing timber harvesting and grazing practices. The ISRP cannot think of any other subbasin where such a set of circumstances exists – at least any longer. The Council should carefully evaluate the investments for hatchery construction in a program that appears to be primarily geared toward increased harvest.

Planners might also consider a management alternative for the Klickitat River that doesn’t appear to have been seriously considered yet. One of the sources of discomfort for most of the reviewers is the commingling of restoration and rebuilding activities with the large scale of releases for harvest augmentation, coupled with the need for a more aggressive and committed plan for habitat restoration in the upper river and the major

mid-river tributaries. An alternative set of fisheries management goals is for planners to focus on harvest augmentation activities in the lower and middle river with fall chinook and coho, and use the Castile Falls trapping facility as the gatekeeper to a wild fish only spring chinook and steelhead rebuilding program that is coupled to habitat improvement. Such a program would require a serious (and trackable) commitment to habitat restoration above Castile Falls and in the mid-river tributaries. This scenario would separate the recovery/rebuilding portion of the program from the lower river harvest augmentation goals.

6. Monitoring and Evaluation

The monitoring and evaluation plan is weak and severely lacking in detail. Throughout, details on risk assessments, marking strategies, stock assessment methods, and related details were lacking. There are no lists of variables to be measured, no descriptions of field methods and no references to published documentation. It would be impossible for any fisheries biologist to know what or how any of the M&E is to be done based on the material provided. There is no evidence of any data collected for monitoring of status and trend of aquatic (or riparian) habitat. Again, this is surprising, given the recent subbasin planning exercise.

There is no indication of cooperation with other subbasins on standardization of indicator variables or methods. The Pacific Northwest Aquatic Monitoring Partnership (PNAMP), Northeast Oregon Hatchery (NEOH) monitoring and evaluation plans, and the Oregon Plan are not mentioned. The words “standardization and standard” are not in the Master Plan. The authors should consult with Tribal and State representatives on PNAMP and with colleagues on M&E in other supplementation and hatchery expansion projects (e.g., NEOH Johnson Creek in Idaho), and other M&E projects. Other projects that should be consulted include: 1) the Action Agency RME Plans, and 2) BPA project no. 2003-017-00 for Pilot Status and Trend Monitoring Program for Salmonids and their Habitat in the Wenatchee, John Day, and Upper Salmon to document progress toward recovery of listed populations (contact chris.jordan@noaa.gov as a source of reports and plans) (also see Merritt, G. 2005. Integrated Status and Effectiveness Monitoring in the Wenatchee Subbasin: 2004 Annual Report for Washington Department of Ecology Habitat Characterization.).

Given the ISRP’s comments about the poor condition of habitat (here and below), we recommend that a probabilistic procedure be implemented for status and trend M&E (e.g., BPA Project # 2003-017-00, see above reference). The ISRP also recommends that sites selected for habitat status and trend M&E could also be used for reconnaissance survey for expansion of spawning activity, rearing areas, spawner numbers, redds, etc. We see no reason why the sponsors should propose that the Klickitat Master Plan’s M&E be an inferior effort relative to activities in other watersheds and subbasins. The M&E plan does not require expensive research level M&E, but should include basic pedestrian field work based on a valid probabilistic sample of sites, perhaps stratified into two strata: 1) where they think the fish and good habitat are or will be, and 2) everything else.

7. Steelhead Supplementation

One positive feature of the steelhead supplementation plan is the manager's plan to phase out use of the non-native Skamania stock in 2006 and to use natural-origin Klickitat steelhead as hatchery broodstock. We support and encourage that. Another is their marking of hatchery-origin fish so they can be enumerated separately from natural-origin fish on their return from the ocean. We support and encourage that.

The intensity of supplementation could be defined by the broodstock mining rate, or the proportion of the naturally spawning mixture that is of hatchery origin. In this project up to 50% of the natural-origin (NOR) adults can be taken as broodstock each year. This is quite high, and we recommend that it not exceed 25%, and only then if adequate justification is provided. There is no limit specified on the number (or proportion) of hatchery-origin (HORs) adults in the naturally spawning mixture. Only NORs should be used as broodstock; they should adopt a conservation measure of not having more HORs than NORs in the naturally spawning mix.

Specific comments on the Klickitat Master Plan

1. Production objectives and issues.

A. Justifications Need to be More Clear

1. Development of a tribal dipnet fishery at Castile (pg 48) appears contrary to rebuilding goals, at least in the near term.
2. Justification for the Wahkiacus Hatchery and acclimation facility is inadequate. Later, the report indicates potential problems with water quality (pg 45). Release of 1,000,000 coho smolts and 4 million fall Chinook to generate a harvest of 14,000 of each generates negative interactions with other species. The release and catch could be distributed elsewhere, or at least below Lyle Falls. Both releases should be terminated, and none raised and released from Wahkiacus, should it be built.
3. It is unclear if native wild escapement above Castile results in numbers that fully seed available habitat, which is in need of improvement (pg 18). The latter should be the priority.

B. Chinook Production

1. It is unclear how production numbers are derived. E.g., Why 800,000 spring chinook smolts? It is not clear if this is based on need (harvest) derived from expected survivals and catch rates, and how this might be related to supplementation requirements (if any).
2. Is release of four million fall Chinook smolts for a harvest of 14,000 an appropriate scale? Releases of this magnitude have associated risks to wild fish. This needs further examination.
3. No reasons were provided for the “thinning release” (?) of spring Chinook fry out-planted in the upper basin above Castile Falls. This release seems unnecessary and likely to confound other suggested projects and their analyses.

C. Coho Production

1. The efforts to reduce coho releases should be applauded, and should occur ASAP. The (fixed number of 14,000) coho harvest may be transferred elsewhere. Direct stream releases of coho has high risk and should be eliminated immediately, particularly if there is concern for steelhead and Chinook.
2. Impacts of coho and fall Chinook on wild steelhead and spring Chinook require more careful consideration.

D. Steelhead Production

1. Acclimation sites for steelhead carry significant issues of residualism in steelhead. Numbers tabled for acclimation site rearing specifications were not justified in the text, nor were concerns about residualism. The timing of smolt releases should be relative to wild smolts. Timing of the wild smolt migration was not presented.
2. There is no indication that 120,000 summer-run steelhead from Skamania Trout Hatchery (marked?) are re-building the steelhead run. Have any of the past hatchery programs resulted in an increase in wild smolt yield?

3. Is the (underestimate- pg 19) steelhead escapement adequate to seed to capacity smolt production? If not, harvest is unjustified. The wild steelhead population should be capable of rebuilding on its own, and rapidly, if left unharvested.
4. Table 3 provided steelhead harvest and run size estimates, but it combines wild and hatchery, summer and winter fish. Present separate values. The assumption that there are 2.5 fish/redd (used for salmon and steelhead) requires validation.
5. Reported presence of resident rainbow trout (pg 27) should be examined in relation to residualized steelhead and/or resident males.
6. Stocking of 6,000 catchable rainbow trout into the Klickitat drainage requires review, and very likely should be eliminated. Where does the stocking occur, what is the source (genetic and facility) of the rainbow trout? What are the potential for interactions with native trout, steelhead, and salmon?

E. Hatchery, Broodstock, and Risk Issues.

1. Table 18 provided assumptions about spring Chinook brood collections and survivals. It suggests a 1.4 in 800 (0.18%, or 1418 returns for 800,000 smolts released) return rate, and that returns must be >0.28% SAR survival for “success”, i.e., $R > S$. This appears unsustainable. It is not clear why there is a need for “200,000 upper basin acclimation site release goal”.
2. If 450 spring Chinook (assumes adequate distribution) are sufficient to fully seed presently available habitat (pg 52), why is there a need for supplementation?
3. In Tables 11, 12 and 13, numbers appear too low for valid statistical comparison of marks or types.
4. A template for assessing ecological risk was presented (pg 61), but no detail was provided on how this information will be gathered. Numbers in subsequent tables in risk (Tables 15, 16, and later, 18 and 19) contain values with no source. However, there is the recognition that no impact on wild steelhead rearing is adequate. Therefore, impacts such as residualized steelhead from hatchery releases and acclimation sites, coho fry, fall Chinook fry, and other hatchery releases involving risk to juvenile steelhead are unjustified.
5. Not enough information was provided to assess the objective to monitor and evaluate the genetic changes in spring Chinook (pg 63).
6. Why 200,000 hatchery steelhead smolts?
7. Steelhead smolt release size should be sufficient, and approximately 60g to 80g. The release of smaller age 1 hatchery fish into the river so that they may stay and smolt as 2+ is high risk and impact to wild fry, parr and smolt production. Many of the hatchery fish, perhaps up to 30%, may fail to migrate, causing further impact. Release hatchery smolts as 1+ fish at the river mouth or as near as possible to the steelhead fishery to avoid impact on wild fish.

2. Stock assessment.

1. Methods of stock assessment using rotary screw traps are not defined adequately. Successful assessment typically requires sufficient marking and recapture at separate sites – single sites for both marking and recapture are questionably reliable. Likewise, rate of tagging and recovery of PIT tags requires consideration and documentation of sample size needs in the many treatments and release

- groups tabled. The same applies to the radio-tagging project, which also lacks detail for adequate review. These projects, and DNA work, are vague and undeveloped.
2. Information on cutthroat trout is inadequate and further points to the need for watershed assessment.
 3. Other options for fish counting at Lyle Falls (and Castile Falls) may be possible.

3. *Habitat.*

1. The habitat chapter includes general prescriptive statements about how various sources of habitat degradation will be controlled or their impacts lessened, but does not provide specific details about how these actions will be accomplished. Many of the ISRP comments in their review of the Klickitat fisheries program in the 2000 provincial review remain pertinent to this Master Plan.

Three Step Review Questions

The Council has emphasized that an important part of the Three Step Review Process includes an ISRP review of the responses to the technical elements listed below. The Council is looking for a full explanation of how the project is consistent with these elements. The Council revised the original review elements, developed in 1997, to better reflect and clearly refer to the 2000 Fish and Wildlife Program (e.g., artificial production and subbasin assessment protocols). The Council specified that the ISRP apply these elements or similar standards as a reflection of the current state of the science. The ISRP addresses these elements in detail in the review summary above, because the ISRP felt many of issues applied to several technical elements and would be best presented with a summary approach.

A. All Projects

Does the Klickitat Subbasin Anadromous Fishery Master Plan:

- 1) address the relationship and consistencies of the proposed project to the eight scientific principles (see 2000 Columbia River Basin Fish and Wildlife Program, Basinwide Provisions, Section B.2) (Step 1)?

The eight Scientific Principles:

1. The abundance, productivity, and diversity of organisms are integrally linked to the characteristics of their ecosystem.
2. Ecosystems are dynamic, resilient and develop over time.
3. Biological systems operate on various spatial and time scales that can be organized hierarchically.
4. Habitats develop, and are maintained, by physical and biological processes.
5. Species play key roles in developing and maintaining ecological conditions.
6. Biological diversity allows ecosystems to persist in the face of environmental variation.
7. Ecological management is adaptive and experimental.
8. Ecosystem function, habitat structure and biological performance are affected by human actions.

ISRP Response: An apparent lack of an adequate watershed assessment, including stock assessment information, precludes an ability to respond positively to this question. The focus of the plan is, for the most part, towards harvest, with less concern for wild fish production. Plans within could pose threats to the wild fish populations. Due to insufficient detail and information, further questions cannot be answered. Particularly, the Master Plan doesn't seem consistent with principles 1 and 8, as discussed earlier.

- 2) describe the link of the proposal to other projects and activities in the subbasin and the desired end-state condition for the target subbasin (Step 1)?

ISRP Response: If those links to habitat rehabilitation in the upper Klickitat were fully described in the Master Plan and are as weak as they seem, the proposed hatchery production of steelhead, by itself, would seem incompatible with the goal of natural production.

- 3) define the biological objectives (see 2000 Columbia River Basin Fish and Wildlife Program, Basinwide Provisions, Section C.2 (1) and (2), and Technical Appendix) with measurable attributes that define progress, provide accountability and track changes through time associated with this project (Step 1)?

ISRP Response: Adequate in terms of objectives, but a more detailed M&E plan needs to be described to track changes through time.

- 4) define expected project benefits (e.g. preservation of biological diversity, fishery enhancement, water optimization, and habitat protection) (Step 1)?

ISRP Response: Benefits would be fishery enhancement (only).

- 5) describe the implementation strategies (see 2000 Columbia River Basin Fish and Wildlife Program, Basinwide Provisions, Section D.2) as they relate to the current conditions and restoration potential of the habitat for the target species and the life stage of interest (Step 1)?

ISRP Response: Only done in very vague and general terms

- 6) address the relationship to the habitat strategies (see 2000 Columbia River Basin Fish and Wildlife Program, Basinwide Provisions, Section D.3) (Step 1)?

ISRP Response: No the Klickitat Plan does not adequately address the habitat strategies in the Fish and Wildlife Plan.

- 7) ensure that cost-effective alternate measures are not overlooked and include descriptions of alternatives for resolving the resource problem, including a description of other management activities in the subbasin, province and basin (Step 1)?

ISRP Response: Links cited in Chapters 1 to 3 reports reviewing alternatives.

- 8) provide the historical and current status of anadromous and resident fish and wildlife in the subbasin most relevant to the proposed project (Step 1)?

ISRP Response: Mostly adequate, but more work needs to be done on relation of steelhead in relationship to resident rainbow trout, see ISRP specific comment D.5.

- 9) describe current and planned management of anadromous and resident fish and wildlife in the subbasin (Step 1)?

ISRP Response: Adequate.

- 10) demonstrate consistency of the proposed project with NOAA Fisheries recovery plans and other fishery management and watershed plans (Step 1)?

ISRP Response: No. HGMPs were not included. It is difficult to believe that proposed action for steelhead would be consistent with a recovery plan.

- 11) describe the status of the comprehensive environmental assessment (Step 1 and 2)?

ISRP Response: Impacts of proposed acclimation facilities and fish collection facilities were mentioned

- 12) describe the monitoring and evaluation plan (see 2000 Columbia River Basin Fish and Wildlife Program, Basinwide Provisions, Section D.9) (Step 1, 2 and 3)?

ISRP Response: Some M & E detail was provided, however the detail was not adequate as described above.

- 13) describe and provide specific items and cost estimates for ten fiscal years for planning and design (i.e. conceptual, preliminary and final), construction, operation and maintenance and monitoring and evaluation (Step 1, 2 and 3)?

ISRP Response: No comment.

B. Artificial Production Initiatives

Does the Klickitat Subbasin Anadromous Fishery Master Plan:

- 1) address the relation and link to the artificial production policies and strategies (see 2000 Columbia River Basin Fish and Wildlife Program, Basinwide Provisions, Section D.4 and Technical Appendix) (Step 1)?

Primary strategy: Artificial production can be used, under the proper conditions, to 1) complement habitat improvements by supplementing native fish populations up to the sustainable carrying capacity of the habitat with fish that are as similar as possible, in genetics and behavior, to wild native fish, and 2) replace lost salmon and steelhead in blocked areas.

The APR standards:

- The purpose and use of artificial production must be considered in the context of the ecological environment in which it will be used. (See A.1 and A.6)
- Artificial production must be implemented within an experimental, adaptive management design that includes an aggressive program to evaluate the risks and benefits and address scientific uncertainties. (See A.12)
- Hatcheries must be operated in a manner that recognizes that they exist within ecological systems whose behavior is constrained by larger-scale basin, regional and global factors. (See A.1)
- A diversity of life history types and species needs to be maintained in order to sustain a system of populations in the face of environmental variation. (See A.1)
- *Naturally selected populations should provide the model for successful artificially reared populations, in regard to population structure, mating protocol, behavior, growth, morphology, nutrient cycling, and other biological characteristics.*
- The entities authorizing or managing an artificial production facility or program should explicitly identify whether the artificial propagation product is intended for the purpose of augmentation, mitigation, restoration, preservation, research, or some combination of those purposes for each population of fish addressed. (See A.3)
- Decisions on the use of the artificial production tool need to be made in the context of deciding on fish and wildlife goals, objectives and strategies at the subbasin and province levels. (See A.2)
- *Appropriate risk management needs to be maintained in using the tool of artificial propagation.*
- Production for harvest is a legitimate management objective of artificial production, but to minimize adverse impacts on natural populations associated with harvest management of artificially produced populations, harvest rates and practices must be dictated by the requirements to sustain naturally spawning populations. (see B.3)
- Federal and other legal mandates and obligations for fish protection, mitigation, and enhancement must be fully addressed. (See A.10)

See the 2000 FWP for details on Wild Salmon Refuges, Harvest and Restoration Hatcheries, and Experimental Approach.

ISRP Response: Readers were referred to the Yakima operations for assessment of supplementation risks. See ISRP summary comments above. The Master Plan needs to better address these standards.

- 2) provide a completed Hatchery and Genetic Management Plan (HGMP) for the target population (s) (Step 1)?

ISRP Response: No.

- 3) describe the harvest plan (see 2000 Columbia River Basin Fish and Wildlife Program, Basinwide Provisions, Section D.5) (Step 1)?

ISRP Response: A harvest plan is presented, but the relationship of competing goals of harvest and rebuilding/recovery is a key issue needing consideration in the further development of the Master Plan.

- 4) provide a conceptual design of the proposed facilities, including an assessment of the availability and utility of existing facilities (Step 1)?

ISRP Response: Adequate.

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