



Independent Scientific Review Panel
for the Northwest Power & Conservation Council
851 SW 6th Avenue, Suite 1100
Portland, Oregon 97204
isrp@nwcouncil.org

Klickitat Step Review

**Review of the Yakama Nation's Response to the
ISRP's Step 1 Review of the Klickitat Subbasin
Anadromous Fishery Master Plan
(YKFP-Klickitat Design and Construction, Project #1988-115-35)**



Reviewers

Richard N. Williams, Chair
Jack Griffith, PRG
Eric Loudenslager
Lyman McDonald
Bruce Ward

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Background

Per the Council's September 2005 request, the ISRP reviewed the Yakama Nation's response to the ISRP's Step 1 review of the updated Klickitat Subbasin Anadromous Fishery Master Plan (ISRP 2005-7; February 19, 2005¹). In the initial review, the ISRP found that Master Plan outlined significant changes in terms of policy, biology, and cost from previous Klickitat fisheries program proposals. Some proposed actions seemed positive and in line with previous ISRP concerns and suggestions, such as the marking of hatchery-origin fish, reductions in coho releases, and use of wild natal broodstock for steelhead components of the Master Plan. However, the ISRP found that many components of the Master Plan needed further consideration and development to meet the ISRP standards of scientific soundness and consistency with the Fish and Wildlife Program's Scientific Principles. The ISRP described seven primary concerns with the Master Plan. In its August 25, 2005 letter to the Council, the Yakama Nation responded to each of the seven ISRP concerns. Below, the ISRP addresses the adequacy of the responses on each of the seven concerns as they apply to the Master Plan in general.

Summary

The ISRP recommends that the Klickitat Subbasin Anadromous Fishery Master Plan remain in the Step 1 stage of the Three Step process until adequate scientific detail and biological justification for the proposed activities are given. The August 25, 2005 response from the Yakama Nation to the ISRP's Step-1 review (ISRP 2005-7; February 19, 2005) provided some additional information, as noted below, but needs to further address many of the previously identified technical shortcomings of the Master Plan. The foundation assessments for the changes to artificial production in the Klickitat subbasin are not yet completed; thus, there is no basis for the ISRP to recommend support to the Council for the changes to artificial production proposed by the Yakama Nation. The ISRP recommends a revised and complete (i.e., stand-alone) Master Plan be developed prior to moving to a Step-2 review. This revised Master Plan should capture the responses, and subsequent responses-to-responses on science and technical details.

The Klickitat subbasin exemplifies the challenges and choices facing communities in the Columbia River Basin. The Klickitat River is inhabited by steelhead, which are on the endangered species list – and this population is not currently cultured – but superimposed on top of this population is a segregated, non-natal serial hatchery line of summer steelhead stocked for recreational and tribal fishing. The river is also inhabited by spring-run Chinook, which are considered depressed, but not listed. Superimposed on the natural component of this population is a cultured subcomponent, in a segregated program that aims to provide sport, commercial, and tribal fishing. Superimposed on all

¹ www.nwcouncil.org/library/isrp/isrp2005-7.htm

of this is the release of 3.5 million non-natal coho smolts, which are from spawning at another location and imported as eggs, and 4 million fall-run Chinook smolts (also non-natal), which are from spawning at another location and imported as eggs.

Establishing an empirical basis for balancing habitat conditions and natural and artificial production was identified by the ISRP and ISAB as a general need in all subbasins during their joint review of subbasin plans. Council recognized this need when requesting the ISRP and ISAB to jointly review the AHA model, a tool to evaluate modifications to production programs. Council also emphasized this challenge to the basin in its APRE (Artificial Production Review and Evaluation) report to Congress.

A thorough assessment of the impact of hatchery introductions is required. Models to assist this assessment must be populated with adequate information from the subbasin. The Klickitat Subbasin Anadromous Fishery Master Plan should include adequate data on population dynamics, habitat condition and capacity, and tools for evaluating hatchery programs to provide a transparent, reproducible analysis upon which decisions are based. This has yet to be achieved. Attachment A: *Klickitat River Spring Stock Assessment and Investigation of Integrated Hatchery Strategies* is an excellent beginning for that process. As detailed below, there are some elements of this analysis that are not sufficiently transparent. Furthermore, the analysis should be subject to peer-review before incorporating it into the Master Plan. That said, this type of analysis is needed for each of the production programs planned in the subbasin to form the foundation for recommendation and final decision-making by managers and administrators.

The Master Plan presents several tasks and suggests these are interrelated and inseparable. The key construction tasks are: fish passage and capture at Lyle Falls, fish passage and capture at Castile Falls, hatchery construction, and acclimation sites. The key fish-related tasks are: wild fish conservation, wild fish harvest, hatchery fish for harvest, and hatchery fish for conservation. Each of the above construction and fisheries management tasks involve steelhead, coho, and spring and fall Chinook. The Plan should be developed with each species and facility task as separate as possible from the others. Comments from the proponents suggested these were a package, but we are unconvinced this is necessary, and can be better planned otherwise.

An ISRP review is intended to provide an independent assessment that can be used by managers and administrators as they work to establish consistency between overarching policies – such as the doubling of salmon runs – not to establish which policy or law is subordinate to another. An ISRP review of the Master Plan may identify weakness in the objective empirical basis of the goals and intention of the plan because environmental conditions or fundamental biological principles constrain ever achieving the goals. On that basis, the ISRP may advise reconsidering the goals and objectives, implementation methods, or even application of overarching strategies.

1. Need for a Watershed Assessment

ISRP original comment (abbreviated; red italicized font indicates text from previous ISRP review): 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. Completion and reporting of the watershed assessment and prescription is paramount. 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.

ISRP response:

First, the ISRP wants to clarify that the need for a watershed assessment to inform development of the Master Plan is called for in the Council's Step review criteria. The Yakama Nation's cover letter for its technical response to the ISRP infers that the ISRP's call for a watershed assessment amounted to a policy decision by the ISRP, which discounted other policy decisions such as U.S. v. Oregon. Specifically, the ISRP stated, "*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.*" The ISRP based this recommendation on the Step Review elements provided by the Council. Namely a watershed assessment is needed for the Master Plan to positively respond to nearly all of the Step review criteria and specifically A.1, A.5, A.6. and B.1 (the APR (Artificial Production Review) standards). In addition, the ISRP's criteria to review projects for the scientific soundness and benefit to fish and wildlife dictates the need for projects to place their proposed efforts in an ecological context, and thus the need for a watershed assessment. Several thorough watershed assessments have been completed in other subbasins as examples (e.g., Hood River, Wind River) and are well integrated with subbasin plans, as required here.

Now that the Klickitat Subbasin Plan has been adopted into the Council's Fish and Wildlife Program, the findings and recommendations of the Subbasin Plan should be incorporated into a revised Master Plan. The goals for total fish production and partitioning of that production into hatchery and natural components in the Master Plan should be consistent with the goals in the subbasin plan, and consistent with habitat condition and capacity developed in the Subbasin Plan. The Master Plan has very optimistic long-range goals for fish production (i.e., spring Chinook average 20,000 per year) that may not be consistent with the Subbasin Plan. Of greater concern is a short-term (10 to 25 year) goal of 5,000 to 10,000 spring-run Chinook, when the current run is averaging 1,900 fish. The current run is undoubtedly constrained by habitat condition and capacity as well as out-of-basin conditions. Efforts to increase this habitat capacity need

to be evident if the Master Plan is going to serve the subbasin in moving toward those goals.

2. Need for Scientific Justification

ISRP original comment: *There is a lack of sound scientific evidence for the actions proposed, which need to 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.*

ISRP response:

The ISRP's comments and emphasis on this topic are in response to the Council's APR standard (embedded in Step element B.1) that states, "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 also the ISRP responses to Points 4 and 5 below.

3. Linkage Needed to Council's FWP Scientific Principles

ISRP original comment: *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.*

ISRP response:

The response by the Yakama Nation is internally inconsistent, and is not particularly informative in establishing the connection between a vision of the subbasin and this Master Plan. As an example for Principle 1 (*The abundance, productivity, and diversity of organisms are integrally linked to the characteristics of their ecosystem*), the Yakama Nation's response was that Council pointed out in the 2000 FWP that, "in highly altered systems, the activities necessary to restore the natural system may not be feasible." Sponsors go on to identify that historically productive areas in several creeks will take some time to restore. Are they saying that it is not feasible to restore these areas in the foreseeable future? They go on to assert that they are implementing supplementation and other artificial production consistent with recommendations for AP reform, and that as an

example the HSRG (2005) identified a self-sustaining, naturally spawning population capable of providing adult fish for broodstock each year as a requirement for any hatchery program intending to integrate hatchery fish with the natural environment. The problem is that the steelhead in the subbasin are listed under the ESA, so presumably they are not considered self-sustaining. The logic appears to be that the sponsors believe that the subbasin is so highly altered, that rather than restore critical habitats, they are going to use hatchery production. But to then state that their hatchery production is going to be based on a self-sustaining natural population just does not add up.

For Principle 2 (*Ecosystems are dynamic, resilient and develop over time*), more detail would be needed to relate their management proposal to the principle, but on one point the ISRP and the sponsors just disagree. The sponsors state that “natural ecosystems are dynamic and constantly changing”, which argues for adaptive management, which they apply in all their programs. This seems contradictory to the cover letter that justifies and adheres to production numbers and places initiated under *U.S. v Oregon*. An adaptive management approach would establish these production numbers and places as hypotheses to be reevaluated using empirical tests of their efficacy. Instead, this production appears to be fixed and immutable.

For Principle 4 (*Habitats develop, and are maintained, by physical and biological processes*), the sponsors respond that, “In highly altered systems, it is necessary to ensure that the robust populations do not conflict with the desirable species for that system or further impair the ability of the system to function.” Sponsors then focus on habitat actions that will promote habitat-forming process. What is absent is a consideration that the “robust” populations in this system are hatchery summer steelhead, coho, and fall Chinook introduced each year as eggs, and that they may be impairing the functioning of the natural productivity and capacity of the subbasin to produce spring-run Chinook and steelhead, which are recognized as the desirable species.

For Principle 5 (*Species play key roles in developing and maintaining ecological conditions*) and Principle 7 (*Ecological management is adaptive and experimental*), we are unable to determine what the sponsors’ intentions in the form of actions to address these principles.

4. Justification Needed for Proposed Artificial Production Activities

ISRP original comment: *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%).

ISRP response:

The spring-run Chinook assessment (Attachment A) is a commendable beginning at evaluating the options for this program. We provide a few additional comments and recommendations for further analysis for this assessment. This type of assessment is needed for each of the artificial production programs in the subbasin – including the steelhead, coho and fall Chinook programs under the Mitchell Act and *U.S. v Oregon*. As pointed out below, the elements of the assessments for those latter programs may be different from the spring-run Chinook assessment, but an assessment is needed nonetheless. The end product should be a comprehensive evaluation of all the artificial and natural production in the subbasin that is transparent and reproducible and provides scientifically defensible alternatives for consideration by decision-makers.

For the spring-run Chinook assessment, we examined the Council APRE site (www.apre.info/) and the WDFW HGMP site (cited in the YN response) to try to confirm the input variables used in the spring-run Chinook Assessment. The R:S for natural production on page 5 of the assessment differed slightly from the HGMP posted at the APRE site (1988-0.72 v 0.69; 1989-1.6 v 1.2; 1994-2.09 v 1.97; 1995-3.85 v 2.68; 1997-0.52 v 0.88). Some of these differences are quite small, but others might change the result of the assessment.

For the hatchery production, the numbers of females collected is given, along with the estimate of the egg take, but the numbers and ages of the fish spawned is not given. This detail would be helpful. Using the numbers of females collected, the egg take, survival of eggs to smolt and SAR provided by the HGMP at the WDFW site, we could not generate the numbers of fish reported to have been harvested or returned for each brood year. The specifics on these calculations would be helpful. We could not confirm or establish the R:S for the hatchery production of 2.35 stated as the “hatchery recruitment rate for the current Klickitat Hatchery program” page 23. According to the APRE site HGMP, the mean recruitment from 1988 – 1997 was 1.274. For the years the Beverton Holt stock recruitment curve was built from the natural population, the hatchery recruitment rate

was only 0.823. The hatchery recruitment rate is quite disturbing. The hatchery recruitment rate is lower than the natural recruitment rate. If this is really the case, the hatchery program is less productive than the natural system. Under these circumstances, even if the hatchery propagation could be justified based on the theory that it is adding fish to the system above the natural capacity, removing natural broodstock to populate the hatchery would be of questionable demographic value.

For the reasons identified here, the data used to establish the analysis need to be a bit more transparent, and the analysis peer-reviewed. For the AHA analysis, we did not follow why the NOR Smolt-to-Spawner Capacity is set to 999999999, the NOR Smolt-to-Spawner Productivity set to 0, NOR Spawner-to-Egg Capacity set to 10000000, and NOR Spawner-to-Egg Productivity set to 2500. How do these parameters fit into the output?

AHA was applied to spring Chinook, but was severely compromised by lack of adequate data inputs. In addition, the option of no hatchery introductions above Castile Falls was apparently not included, or at least not presented. This would show that the habitat would be seeded rather quickly (i.e., one generation) by wild spawners, thus no need to supplement to fill habitat. Already, 3% of the escapement utilizes this area. Intrinsic productivity suggests it should build rapidly. Other comments on supplementation and the model exercise are included in more detail below. AHA was not applied to steelhead, and should be. It will likely demonstrate the same; i.e., no need for supplementation once access is provided.

For the AHA analysis, the bottom line is that hatchery recruitment at the current level of 2.35 made the program unlikely to achieve the goals. If the recruitment is actually lower, then the situation is worse. One question is whether the hatchery recruitment can be raised by improvements in culture or improvements in habitat conditions outside the hatchery. If the answer is outside the hatchery, that may mean a corresponding improvement in natural productivity that could raise additional questions about the need for the hatchery production.

The effective population number calculations are not performed correctly. The effective population size of the natural population is not simply the sum of the natural phase plus added natural fish from successful reproduction of hatchery fish that spawned naturally. The integrated population is a meta-population consisting of a hatchery subpopulation and a natural subpopulation with migration between the two. The estimate of the effective population size in a metapopulation is a more complicated calculation. Fortunately a computer program, TUFTO-HINDAR, developed under the Risk Assessment Modeling Project (RAMP: BPA project 2003-058-00, Busack, Currens, Pearsons and Mobernd 2005) is available to perform the calculation.

Based on the Beverton Holt stock recruitment analysis, the assessment concludes that the subbasin has a capacity for 1,175 spring Chinook with a productivity of 2.95 under current conditions and that with the addition of habitat above the falls, the capacity could be increased to 1,847 with a productivity of 3.5. The capacity is very similar to the mean

run size of 1,900 for recent years (hatchery plus natural production). It might be that the subbasin is at capacity for producing spring-run smolts. The hatchery is currently replacing habitat unavailable above the falls, albeit at lower productivity (recruitment rate). Adding more habitat by increasing passage at the falls is probably a good idea, but if smolt production is constrained by rearing conditions and survival during the period when hatchery and natural smolts are together, there might not be increased capacity – just reduced productivity.

Another one of the computer programs available through RAMP is PCD-Risk 1, which estimates the risk of lost production from predation, competition, and disease in freshwater. The Yakima Nation is encouraged to explore the effect the large conventional production of coho, and fall-run Chinook has on natural Klickitat steelhead and spring-run Chinook.

An assessment of the coho and fall-run Chinook programs should be provided. The assessment should include a summary of the APRE findings on the programs (what are their defined objectives, are they achieving them, is the monitoring and data gathering sufficient to evaluate them) and perform an assessment of whether moving this production could lead to improvement in steelhead and spring-run Chinook populations.

A benefit to the steelhead population from elimination of the conventional summer steelhead hatchery program could also be performed as part of this comprehensive quantitative assessment.

5. Linkage Needed Between Production Activities and Habitat Improvements

ISRP original comment (abbreviated): 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. 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). 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.

Planners might also consider a management alternative for the Klickitat River that does not 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.

ISRP response:

The assessment of hatchery production recommended in 4 above should lead directly into a corresponding habitat assessment. The YN response does not add the detail the ISRP recommended.

Consistent with item 1, the need for a watershed assessment, the YN should provide additional details on the location, sequencing, and timeframe for habitat improvements throughout the basin, and particularly in the upper basin above Castile Falls. This would integrate the production program and habitat program. The reason to put this information in the Master Plan is to provide for both transparency of the process and to support institutional memory. In several years, when all the current cast of participants are no

longer available, the new cast will have a better understanding of why decisions were made.

With respect to upper river habitats, stock and watershed assessments, the “specific comments” section of the response (on p. 1) indicates that the YN analysis of those upper river stocks and habitats has indeed been done (but apparently was not included or alluded to earlier in the Master Plan). This analysis consists of EDT model runs for 133 stream reaches, and the response directs the ISRP to 30 pp of the Subbasin Plan "which show factors limiting natural production and actions to address them by Assessment Unit." Consequently, we checked that section of the Subbasin Plan, hoping there would be information to allay ISRP concerns. Unfortunately, little help was provided by the Subbasin Plan. The material is one single table, giving a set of broad, generalized key findings and strategies (example: key finding = increased percentage of fine sediment from background levels in spawning gravel; strategy = implement road management actions that decrease fine sediment inputs, study fine sediment inputs, restore riparian conditions and channel morphology, etc.). There is no evidence that most critical stream reaches have been identified for restoration/preservation, and there was no evidence of any prioritization of proposed actions. The text of the Subbasin Plan immediately preceding that mega-table, however, does have a brief EDT summary of the habitat status and a ranking of restoration potential, by reach for steelhead and Chinook. Thus, some of what reviewers were looking for does appear to have been done. However, while the EDT analysis is an important first step, to argue that "it was used by Subbasin planners and YKFP staff in lieu of comprehensive watershed assessment" (p 1) is simply not defensible.

6. Monitoring and Evaluation

ISRP original comment: 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.

ISRP response:

Much of the detail requested by the ISRP in our review earlier in 2005 has been provided in Appendix G; however, the specific details that permit peer-review of the protocols remain missing. For example, one can state that age structure of the returning adults will be determined, but what is needed is the statement of how and where that will take place. Scale samples taken from all adults as they pass a weir? From adults sampled at one of the falls? At the hatchery? What are the quality control measures and how will error in the values be estimated? Consequently, many of the ISRP's criticisms and suggestions (shown above in earlier response) remain pertinent. The suggestions from the ISRP, and the YN response should be incorporated into an updated monitoring plan within the Master Plan.

7. Steelhead Supplementation

***ISRP original comment:** 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.

ISRP response:

The steelhead supplementation program must undergo a stock assessment similar to the completed spring Chinook assessment in Attachment A. The specific management rules (broodstock mixing rates, use of HORs in serial use in the hatchery phase, and proportions of HORs mixed with NORs on the natural spawning grounds) should be tested to determine if the system is likely sustainable under the typical adult-to-adult replacement rates observed for steelhead in the wild in this system and in culture under other systems. AHA may be able to perform this analysis; however, if it is not adequate, Goodman (Montana State University: <http://www.esg.montana.edu/outplwb.html>) has an on-line model that can be used to evaluate supplementation. Other features of the system might need to be assessed using the models identified above developed by the RAMP (BPA funded) project.

Specific Comments

Below are specific comments on the Klickitat Master Plan that should be of value in revising the Master Plan. Most of the specific comments are repeated or slightly revised from our earlier review.

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. Technical justification for the Wahkiacus Hatchery and acclimation facility is inadequate; particularly as later in the report (p. 45) potential problems with water quality are described. Additionally, releases of 1,000,000 coho smolts and 4 million fall Chinook smolts in order to generate a harvest of 14,000 for each species, raises concerns about negative interactions with other species, particularly steelhead and spring Chinook juveniles. The release and catch could be distributed elsewhere, or at least below Lyle Falls as a way to decrease ecological and behavioral interactions.
3. It is unclear in the Master Plan if native wild escapement above Castile Falls results in adult numbers that fully seed available habitat, which is in need of improvement (p. 18). Documenting the number of wild returning adults above Castile Falls and the planned extent and sequence of habitat improvements there will lead to a clearer understanding of the role and need for the proposed artificial propagation activities for steelhead and spring Chinook in the upper Klickitat subbasin.

B. Chinook Production

1. It is unclear how production numbers are derived. For example, 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.
4. Report sample sizes for recruitment calculations (page 4). Report the estimate for each parameter and the error.
5. Three recruitment relationships were presented. How are these justified, and although graphically different, were formal statistical procedures used?
6. Capacity was estimated as 1175, but graphically it appears much lower, and ~900 (Fig. 3). A productivity of 2.975 suggests a harvest is possible, but this must include all losses (e.g., dams, other fisheries). Later, harvest rates are tabled, but what is the overall exploitation rate? Modeled in AHA?
7. Effective breeders do appear low, but note that Ardren and Kapuscinski (2003) refers to steelhead, not Chinook. Ne will increase naturally once the area above Castile falls is re-populated with wild fish (in process). No need for supplementation here? Ne includes wild fish and broodstock for hatchery fish, not the hatchery returns. The effective population size from the hatchery is the number of brood fish used, not the number of returns.
8. Integrated versus segregated. 600,000 spring Chinook smolts (?) are released for harvest in sport and Treaty fisheries. What is the target harvest number? What happens to unharvested fish? There is no more discussion on the impact of this decision/policy, and there could be many impacts to wild ESA-listed fish. This too should be modeled with AHA or similar (e.g., Sharma et al. 2005).
9. Recruitment functions used in the model likely do not represent the values above Castile, which are likely lower than d/s. R/S values are typically lower in colder, nutrient-limited headwater areas. The R/S values used in the model were much higher than those from the (limited) historic Klickitat data (5.9 vs 2.98). A hatchery R/S of 2.35 appears low, even the higher survival in the hatchery (lower in the ocean). Check values in Appendix A, Table A1. Even at SAR of 0.5%, reviewers get R/S of 14.

3800

0.92

0.82

2866.72

14.3336

10. Section 3.1.4 has nothing to do with hydro-survival rates, and is unclear.
11. Section 3.1.5 genetics and fitness parameters need to be adjusted and explained. Both wild and hatchery fitness values should not be equal (nor 100%). The lifetime fitness of hatchery fish released into the wild as smolts is not 100%.
12. The author comments on model conclusions; “either the model inputs were wrong or the data (observed values) were wrong.” We suggest that both may be wrong. The Klickitat suffers from a lack of useful monitoring data, thus inputs to models suffer, and comparison of model outputs to observed trends will also suffer as a consequence.
13. The rest of the model results document various brood fish mixes of wild and hatchery brood. The bottom line was that an 800,000 smolt release “may not provide the desired benefits,” but perhaps 200,000 smolt release had a lower impact on the PNI (proportion of wild native fish in the run), but nonetheless, a potential impact. There is no hatchery impact, if the area above Castile is left to populate naturally, which the modeling suggests it now can do.

C. Coho Production

1. The efforts to reduce coho releases should be applauded, and should occur as soon as possible. The (fixed number of 14,000) coho harvest may be transferred elsewhere. Direct stream releases of coho have high risk, and the ISRP recommends immediate termination of the practice, 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?
7. Stock assessment similar to that presented for spring Chinook in Attachment A is needed for steelhead. It should include AHA modeling to examine different scenarios of rebuilding and habitat improvements including a range of artificial production interventions (including none).

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 of hatchery smolts as 1+ fish at the river mouth or as near as possible to the steelhead fishery to avoid impact on wild fish should be considered.

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.

ISRP Summary Comment for the whole section:

The YN response did not specifically address each of these elements. In their text response to the ISRP review, sponsors generally rejected the ISRP recommendations. The spring-run Chinook stock assessment provided the technical analysis to support decisions on spring-run Chinook production. Unfortunately the spring-run Chinook analysis and decision was not carried to the end point. That is, project sponsors got to an integrated production program of 200,000 smolts using 100% NORs for broodstock, but did not discuss how to increase the hatchery recruitment rate, which appears to be an underlying limiting factor. Other production alternatives were also not discussed.

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 Initial Review Comments: 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.

ISRP Comment:

No change from the initial MP. The response is superficial. Needs to be addressed in a revised Master Plan.

- 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 Initial Review Comments: *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.*

ISRP Comment:

The information provided is insufficient to assess.

- 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 Initial Review Comments: *Adequate in terms of objectives, but a more detailed M&E plan needs to be described to track changes through time.*

ISRP Comment:

No change. The response on the M&E plan is insightful, but not sufficient. The M&E section needs attention to detail per comments on that section

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

ISRP Initial Review Comments: *Benefits would be fishery enhancement (only).*

ISRP Comment:

No change. The assessments and additional information reinforce the impression that the Master Plan is geared toward harvest. The text provides evidence that YN appreciates the need for improvement in habitat conditions and changes to the implementation of artificial production. The latter, however, is largely determined by the recruitment rate of hatchery fish, which appears either very similar to, or worse than natural fish. Thus, modified hatchery production is unlikely to even provide demographic benefits for additional harvest.

- 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 Initial Review Comments: Only done in very vague and general terms

ISRP Comment:

YN response is still general and vague.

- 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 Initial Review Comments: No the Klickitat Plan does not adequately address the habitat strategies in the Fish and Wildlife Plan.

ISRP Comment:

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 Initial Review Comments: Links cited in Chapters 1 to 3 reports reviewing alternatives.

ISRP Comment:

YN responses are adequate.

- 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 Initial Review Comments: 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.

ISRP Comment:

The APRE reviews and HGMPs and other pertinent facts and analyses for each of the species need to be added. The spring-run Chinook summary is not adequate to get a clear picture of the production dynamics in the Klickitat. We suspect the same situation exists for the other species. What is in the Master Plan is OK. It is just that when you decide to recalculate a few parameters, or ask about some parameter, and then go back to those sections and look for data it is usually not there. And, it is not clear whether it exists or not.

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

ISRP Initial Review Comments: Adequate.

ISRP Comment: Adequate

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

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

ISRP Comment:

HGMPs should be incorporated into the plan. The Master Plan, like the APRE reports and HGMPs, should be available on-line. Then when components of the Master Plan or updated, amended, or accomplished, the on-line version can reflect those changes. We did not look for whether this production is covered by a Biological Opinion, or how these programs were evaluated in the SSHAG process (NOAA). As part of the Species Status Review last year, NOAA went through all the hatchery programs and identified where they stood in relationship to natural production. These summaries could easily be captured into this Master Plan. In the interest of better understanding the production dynamics of this system, we went out of our way to look at the APRE and HGMPs, but in general the ISRP expects pertinent parts of other plans to be included in the Master Plan, rather than being directed to sections of other plans, such as the subbasin plan (as YN does on page 4 of their response) to look for information. Master Plans need to be stand-alone documents.

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

ISRP Initial Review Comments: Impacts of proposed acclimation facilities and fish collection facilities were mentioned.

ISRP Comment:

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 Initial Review Comments: Some M & E detail was provided, however the detail was not adequate as described above.

ISRP Comment: See M and E above. No additional comments.

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 Initial Review Comments: *No comment.*

ISRP Comment: 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 Initial Review Comments: 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.

ISRP Comment:

No change from our previous comment. This still needs to be done.

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

ISRP Initial Review Comments: No.

ISRP Comment:

No change. They should be provided.

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

ISRP Initial Review Comments: 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.

ISRP Comment:

A harvest plan was presented. The impact of the harvest using models is needed. The spring-run Chinook assessment begins that process, for that population. Those are needed for each of the populations, and then the material needs to be added to the MP, not just sent to the ISRP as an attachment to a response.

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

ISRP Initial Review Comments: Adequate.

ISRP Comment:

No additional comment.

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