



Independent Scientific Review Panel

for the Northwest Power & Conservation Council
851 SW 6th Avenue, Suite 1100
Portland, Oregon 97204
www.nwcouncil.org/fw/isrp

Memorandum (ISRP 2013-12)

September 16, 2013

To: Bill Bradbury, Chair, Northwest Power and Conservation Council

From: Greg Ruggerone, ISRP Chair

Subject: Final Step 1 Review of the Walla Walla Spring Chinook Hatchery Master Plan 2013

Background

At the Northwest Power and Conservation Council's August 19, 2013 request, the ISRP reviewed the Confederated Tribes of the Umatilla Indian Reservation's (CTUIR) responses to the ISRP's recent review of the Walla Walla Spring Chinook Master Plan 2013 ([ISRP 2013-10](#); also see [ISRP 2010-17](#) and [ISRP 2008-14](#)). This is a Step 1 review in the Council's Three Step Review Process. Step 1 is the feasibility stage, and all major components and elements of a project should be identified.

As described in the Master Plan, the goals of the CTUIR (the project sponsor) for Walla Walla Basin spring Chinook are to provide treaty and non-treaty fisheries in the basin and to restore natural spawning. The purpose of the proposed hatchery is to contribute to harvest and natural spawning in the near term. This is to be done in a manner consistent with the longer-term goal of re-establishing a self-sustaining, naturally spawning population through an "all-H" approach that includes hatchery production and improvements in habitat and fish passage. The program's design is proposed to end the current dependence on imported broodstock, improve survival through local adaptation, and meet harvest and natural spawning objectives. Implementation is proposed to occur in three phases, moving from one phase to another based on the performance of hatchery and naturally spawning fish in the South Fork Walla Walla River, Touchet River, and Mill Creek.

This review focuses on the Tribes' responses to a recent review by the ISRP ([ISRP 2013-10](#)), which specifically requested clarification of 1) the production levels and productivity for each of the three phases, 2) the anticipated duration of the two initial phases, and 3) the precedence of the decision rules and guidelines that will be used to transition from one phase to the next. The ISRP's review provided below of the project sponsor's response follows the organization of that response to the three questions and also addresses responses to other comments raised in the ISRP review.

Recommendation

Meets Scientific Review Criteria for Step 1

The project sponsor's response and underlying analyses presented in the Step 1 response-loop should be fully presented in the Step 2 submittal as supporting documentation with important clarifications of points raised in this final Step 1 review.

ISRP Comments on the CTUIR Responses

Part A. Clarifications of the basin goals and the purpose of the hatchery program

The clarifications provided by the project sponsor are appreciated by the ISRP, especially in regard to immediate-term versus longer-term goals for spring Chinook salmon in the Walla Walla Subbasin. Clear definition of these goals and desired future condition is not a trivial undertaking in the Step Review process as the goals frame the set of assumptions that apply to the proposed program (specifically, for segregated harvest v. integrated harvest v. conservation). Clear articulation of the goals, in turn, influences the decision-rules and objectives (measurable benchmarks) against which the program can be evaluated within an adaptive management context. The latter will be an essential component of a monitoring and evaluation plan (M&E plan) to be detailed in the Step 2 submittal.

In its response, the project sponsor clarifies that the near-term purpose of the artificial production program outlined in the Master Plan is primarily for harvest augmentation. Phases 1 and 2 of the program will necessarily function as a *segregated harvest* program to permit harvest as well as to create the subbasin's natural production capacity using adult returns from the hatchery. The sponsor also clarifies that a possible re-establishment of a self-sustaining natural population will be entertained as a longer-term goal when the population is maintained under Phase 3 conditions – and a self-sustaining natural population will not be likely until additional significant improvements in habitat, fish passage, and other factors have occurred in the subbasin.

In the Step 2 submittal, the sponsor should continue to refine and clarify the expected roles for both natural-origin and hatchery-origin adults, as part of the stated goal to “produce adults to meet tribal needs for harvest and *natural spawning*.” The Council's Fish and Wildlife Program Artificial Production strategy requires that hatchery escapement not exceed capacity constraints of the environment. Therefore, the Step 2 submittal should continue to address the linkages to specific plans for habitat and other improvements. A description of ongoing and future habitat improvements in the watershed should be provided in Step 2. Moreover, the Artificial Production Review (APR) principles require an experimental approach to reduce or expand hatchery-origin adult escapement as determined through monitoring and evaluation of existing environmental capacity. Therefore, the M&E plan should include methods to attain

reliable estimates of the number of hatchery-origin fish in the natural spawning escapement and to quantify trends and yearly fluctuations in carrying capacity in the Subbasin as habitat and watershed improvements are completed. It will also be critical for the M&E plan to include metrics to assess and adaptively manage risk posed by the hatchery program.

Part B. Comments on the CTUIR's Responses to the ISRP Requests for Information

1. Additional information on hatchery production levels and estimates of productivity for each of the three phases

Tables 1 and 2 delineate demographic targets for returns, harvest, escapement, brood take, and surplus for each of the Phases. Because of the intrinsic variation in SAR values, the use of ranges is more realistic. The sponsor provides hatchery production levels for each of the three Phases of the program. Each Phase appears to have the same release goal of 500,000 yearling smolts (albeit allowing for reduction under certain scenarios). A model was used to estimate the expected returns back to the Subbasin for fish released from the hatchery during each phase of the program. Projections of returning adults from natural and hatchery origin are presented for each Phase. These outputs (Table 2) indicate that Smolt-to-Adult Survival rates (SAR) are not expected to be high enough during Phases 1 and 2 to reach the program's goal of returning 4,300 adults for harvest and escapement (and brood) to the Walla Walla. The sponsor states that an even greater number of hatchery fish would need to be released to achieve this adult abundance goal, but due to conservation concerns in the basin (as well as incubation water limitations and perhaps other constraints), the number of hatchery smolts released would be limited to the proposed production scheme. Given the likelihood of fewer than planned adult returns, the current plan is to consistently release 500,000 hatchery smolts during each Phase of the project.

Some ongoing questions and issues that ought to be addressed in the Step 2 submittal are described below.

1. How do the proposed or anticipated levels of pre-terminal and in-basin harvest comply with US v. Oregon targets under the current agreement?

2. At full program, the sponsor indicates the Walla Walla Subbasin goal is a return of 4300 adult spring Chinook salmon with 2400 intended for harvest and 1900 for natural spawning. It is unclear how these goals were established. For greater clarity and support, these proposed levels ought to be linked to previous or ongoing analyses or policies, e.g., EDT model runs, the Walla Walla Subbasin Plan, HSRG reports, or other planning documents. Without more information on 1) the source of the goal of 4300 adult spring Chinook, 2) the current state of the subbasin's capacity for hatchery and natural production, and 3) the anticipated trajectory for improvement in habitat capacity, the ISRP is unable to evaluate how realistic the ultimate goals are. For Step 2 it would be more transparent if the rationale and assumptions that produced the harvest and spawning escapement goals (for each of the tributaries) were clearly stated.

3. The ISRP is concerned about the size of the proposed program relative to the capacity for hatchery production, not just in the facility, but afterwards in the Walla Walla River Subbasin. Moreover, the goal to increase the PNI requires that spawners of natural origin survive or return at greater rates than they do now. Thus, even when numbers of returning adults are low, is there not a need to maintain a desired PNI by passing NOR adults to available spawning habitat to promote local adaptation? Ultimately, such trade-offs in allocating NORs to brood stock versus the natural spawning grounds is a key operational decision affecting the development of a local stock that needs to be addressed in Step 2.

4. Similarly, in regard to local brood stock - in Phases 1 and 2, the sponsor needs to develop strong arguments for importing eggs if adult return rates are low (as happened in the most recent return years). The scientific, conceptual framework is that using fish that have returned to the subbasin as brood stock, and then using their progeny as brood stock, will lead to improved program performance from adaptation to specific environmental conditions within the subbasin. The corollary is that adaptations improving performance will be delayed if the program insists on using out-of-basin brood stock to maintain the smolt release at 500,000 (requiring 310 brood fish) when that number cannot be produced from adults that have returned to the subbasin. Balancing the goal of local adaptation against that for harvest and total adult production that is maintained with imported eggs is not explicitly treated in the Step 1 or the Response Submittal and should be addressed in the M&E plan provided in Step 2.

5. The sponsor clarifies that harvest is a priority over conservation or restoration. This issue becomes most salient when Phase 3 is achieved. At such a time, would it be feasible to maintain a large-scale, segregated program against the backdrop of an achieved sustainable natural population? Or, would the program transition to a much smaller integrated program with lower harvest potential? While such a decision might still be 15 or more years away, it is important to consider these issues during the initial stages of program development. As a result, potential integration and future program reduction are significant issues that need additional consideration and discussion.

Integration: The response states that the program will not be integrated during Phases 1 and 2 and that program size reductions will be built into Step 2 monitoring if SAR increases and more adults are returning. The response also states that during Phase 3, effective pHOS will be managed using harvest and out-planting. Moreover, it states that managers expect that PNI standards can be maintained without modifying release numbers. Out-planting, presumably into Mill Creek and the Touchet River, should be conducted using an experimental design to evaluate carrying capacity and productivity of those systems. Initial out-planting numbers for those tributaries should be consistent with densities observed elsewhere in similar habitats thought to be stocked near carrying capacity. Monitoring of smolt size and the number of smolts produced per spawner in relation to parent spawners or smolt production could be an effective approach for assessing stream capacity.

Program Reduction and Termination: The Response (and Step 1 Submittal) establishes upper limits at which the program will be phased out. The decision path should also identify lower limits at which the program will be considered unsuccessful, and either modified or terminated. Even if this were to occur, it appears that 100,000 hatchery smolts will continue to be released into the Touchet River as a Demographic Safety Net. How this level of releases will be accomplished should be presented in Step 2. An additional question is whether this latter set of releases is included with the “termination” following a three-year geometric mean of NOR adults reaching 5,500. Step 2 should indicate what is meant by termination of the program. For example, does it mean that smolt releases into the South Fork will cease but smolt and adult releases will continue into the Touchet River and Mill Creek, or does it mean that all releases of hatchery origin fish and translocations of adults in the subbasin will be stopped?

Return Rate Projections: The adult abundance values shown in Table 2 of the response are essentially hypotheses about expected outcomes. Their usefulness and credibility depend on how accurately the model has been able to forecast future performance of hatchery and natural origin fish. Thus, a critically important part of the M&E effort for this project is to empirically determine the survival rates of HOR and NOR smolts to the adult stage. Accordingly the M&E plan presented in Step 2 should clearly describe how smolt and adult abundances will be estimated.

2. Expected duration of the two initial phases

The sponsor responds that a time table is less appropriate than decision rules based on biological criteria and conditions – such as realized SAR values and adult fish abundances – for guiding the transition to subsequent phases. The response implies that the program will quickly transition from Phase 1 to Phase 2, as soon as a local brood line and sufficient return rates can be established. Transition from Phase 2 to 3 (and potentially back) carries significantly greater uncertainty and will be influenced greatly by environmental conditions and capacity within the subbasin (as well as conditions outside of the subbasin).

For the transition from Phase 1 to Phase 2, poor returns and lower than expected SARs would require the importation of out-of-subbasin fish or eggs to the Walla Walla to meet the 500,000 smolt release goal. Such a scenario would delay the completion of Phase 1. In this instance, eggs or juveniles from the founder out-of-basin stock could be brought into the hatchery program. Importing such fish would delay the development of a locally derived brood stock. For the Step 2 submission, the sponsor should indicate the rules that will be used to govern the importation of eggs or juveniles into the program and its impact on PNI.

The sponsor provides additional perspective on the transition from Phase 2 to Phase 3 for the circumstance where the suitable habitat is more productive than anticipated or continues to be improved. No discussion is provided, however, for the circumstance where habitat proves unsuitable or is degraded (by an unforeseen event or watershed alteration). The sponsors predict that Phase 2 might span 15 or more years due to the anticipated habitat conditions in the subbasin. This prediction appears to be a reasonable. Even so, poor survival conditions

within or out of the subbasin during this phase could also reduce adult abundance to the point where desired adult returns, escapement and smolt production, and release levels cannot be achieved. Here again, the Step 2 submittal should indicate how such a deficit would be handled. For example, if out-of-basin fish or eggs needed to be imported into the program during Phase 2 to reach a smolt release goal, would this reset the program to Phase 1?

Ultimately, while it may be difficult to concede that a program has not achieved its goals, limits should be established on the number of years or generations of salmon that the program can remain in a phase before the program goals and approaches are revisited because of lack of success. For example, if the objectives of Phase 1 could not be met within a couple generations of salmon, then an allowable harvest (an objective of Phase 2) would not be supported except under a change to the decision rules.

3. Additional clarification on the precedence of the decision rules and guidelines that will be used to transition from one phase to the next

The additional description and analytical support of decision rules provided by the sponsor was very helpful. There remain a few sticking points needing clarification in addition to those identified in our preceding comments above.

The description of maintaining the population as a “demographic safety net” – especially for Mill Creek and the Touchet River – was difficult to assess or accept in absence of additional supporting information. In the response (and Step 1 Mater Plan submittal), the demographic safety net was to be provided by releasing hatchery adults into Mill Creek and the Touchet River from adults returning to the South Fork Walla Walla. It is not obvious how hatchery adults returning to the Touchet River and Mill Creek, from smolts produced by adult returns to the South Fork Walla Walla, could be used as a demographic safety net for the South Fork. The Step 2 submittal will need to address this in more detail and provide more information (text and supporting figures) if it is to be retained as a goal. Moreover, the Step 2 submittal will need to acknowledge, and incorporate into the monitoring design, that a demographic safety net is an unproven concept. As such, the sponsor should provide an explicit definition for a demographic safety net and an experimental design to evaluate its effectiveness (as part of the M&E plan).

Figures A-1, A-2a, and A-2b appear to indicate that the first goal of the program is to fulfill brood stock (and ultimately smolt production) criteria, followed by meeting desired escapement goals, and then meeting harvest goals. The Step 2 document would be improved if the decision rules that governed the production of Figures A-2a and A-2b were accompanied by additional description and discussion.

Part C: Choice of Broodstock

The sponsor indicates that it has been in communication with NOAA-Fisheries about its choice of broodstock and has chosen the Carson source for appropriate reasons. While the ISRP offers no specific alternative recommendation to the Carson stock, it simply wishes to highlight the concept that there are multiple populations of spring Chinook salmon in the basin and that the historical pattern/structure of genetic diversity has already created significant and deep “local adaptation.” The sponsor, co-managers, and NOAA-Fisheries might consider carefully which extant spring Chinook stocks in the Columbia Basin might be best to duplicate in the Walla Walla Subbasin. Development of a program in the Walla Walla provides an opportunity to replicate the Carson stock or some other potentially more evolutionarily unique or isolated stock such that the program could serve as a gene bank of sorts.

Part D: ISRP comments on the CTUIR’s Partial Response to Four Concerns in Previous ISRP Comments

The data and analyses presented by the sponsor in the response provide additional insight and perspective on the proposed program. At one level, the data demonstrate that a naturally spawning population of spring Chinook salmon is not likely to be sustained in the subbasin – especially in the face of desired harvest. Moreover, weak adult returns and low SAR values in 2011 and 2012 (~0.23, well below the 0.31 value assumed for Phase 1) from previous experimental hatchery releases indicate that it may not be easy to meet program goals with artificial production (especially production of a local stock, and ultimately, sustainable harvest from a local stock). These poor returns merely reinforce the perspective that this program needs to be undertaken in an experimental fashion and with rigorous measurement and evaluation of benchmark indicators.

The sponsor acknowledges there is a need to continue with all H’s if the proposed program is to achieve success – and there is reason to support this contention. The presence and increase in numbers of naturally spawning fish will be an indicator of environmental capacity. Ultimately, production of natural origin smolts will be a key component of the All-H effort to improve conditions in the subbasin. First, annual variation in environmental conditions will influence the productivity and capacity of rearing environments and thus affect the number of smolts produced per spawner. Second, beneficial effects of previous habitat actions may not be fully realized for a number of years or may only gradually become greater over time. And third, additional habitat actions are expected to occur in the future and the effects of these activities are also projected to benefit natural production. Consequently having a multi-year time series of smolt-per-spawner productivity values will not only help estimate the variation in smolt production but also indicate when or if sustainability is likely.

Figure 3 in the response document shows that smolt traps are located close to the mouths of the South Fork (Besal Cellars), Mill and Yellowhawk Creeks, and close to the mouth of the Walla Walla River itself (Pierce’s RV Park) . If the sponsors have not already considered this, we suggest the arrangement of these traps makes it possible to document smolt production from

several discrete parts of the subbasin. These data make it possible to compare smolt-per-spawner productivity values from different portions of the subbasin. Such comparisons may prove useful when future habitat actions in the subbasin are being considered.

The abundance of both HOR and NOR adult spring Chinook is estimated by counting fish at the Dayton Adult Trap (Touchet River) and by video counts at the Nursery Bridge Dam. Both of these locations are located in the upper portions of the subbasin. Currently, pre-spawning mortality is estimated only above the Nursery Bridge Dam. Has any consideration been given to establishing an adult counting location(s) lower in the Walla Walla River? During the latter part of the adult migration period, e.g., June, water temperatures may exceed 20°C in the river and may be lethal to adults. Having a fish counting site located in the lower river would help determine if pre-spawning mortality in this part of the river may be an important factor in reducing adult abundance. It might also serve as an incentive to carry out restoration actions designed to increase the amount of cold, upper basin water allowed to reach portions of the lower river.

The migration of a significant portion of natural origin smolts from the South Fork to lower portions of the river in the fall and early winter means that the lower river is an important habitat area. A part of the M&E effort could be directed toward identifying what areas in the lower river are used for holding/rearing and how abundant such locations might be. Such an examination would help determine if restoration efforts in lower portions of the river should be directed toward providing adequate overwintering holding and rearing areas for spring Chinook. Since Phase 3 of the program includes conservation and restoration of the natural spawning population, Step 2 should describe plans for restoration

The SAR values achieved by spring Chinook from the Walla Walla, Tucannon, Minam, and Wenaha Rivers were informative. For example, out of the eight years examined, the Minam had five years and the Tucannon had four years where returns-per-spawner exceeded replacement (R/S exceeded one). Conversely, the R/S value for Walla Walla spring Chinook exceeded replacement during just one year. Additionally, the Walla Walla fish had the lowest R/S values for five out of the eight years. These data may reflect the relatively poor habitat conditions that currently exist in the Walla Walla River and help substantiate the sponsor's contention that Phase 2 of the project is likely to take 15 or more years to complete. Whether this is the correct interpretation or that other factors are responsible or partially responsible (such as current brood being poorly adapted to Walla Walla River conditions or low passage success, etc.), continuing the All-H approach to actions and evaluation has merit until various causes are eliminated.