



Independent Scientific Review Panel
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Memorandum (ISRP 2009-47)

November 24, 2009

To: Tony Grover, Director, Fish and Wildlife Division, Northwest Power and Conservation Council

From: Eric Loudenslager, ISRP Chair

Subject: Response Request for Step Review of the Mid-Columbia Coho Restoration Master Plan (#1996-040-00)

Background

At the Council's September 24, 2009 request, the ISRP reviewed the Yakama Nation's Mid-Columbia Coho Restoration Master Plan (23 September 2009 revised version) and response documents, as part of Step One of the Council's Three-Step Review process.

The ISRP has participated in numerous reviews of the coho restoration Master Plan and feasibility study including annual reviews of proposals for funding through the Fish and Wildlife Program for fiscal years 1998, 1999, and 2000; a partial step review in 2000 (ISRP 2000-5¹); a provincial review² for fiscal years 2003-2005 funding; a concurrent Step-One master plan review and FY 2007-09 proposal review in 2006 (ISRP 2006-5³); a March 2009 Step-One review (ISRP 2009-6⁴) of a revised master plan that was updated in response to the ISRP's 2006 review. In the March 2009 review, the ISRP found the revised Master Plan did not meet scientific review criteria. The ISRP and Yakama Nation met in May 2009 to discuss a path for responding to ISRP's March 2009 review. An excerpt from the March 2009 review follows:

The Yakama Nation has been involved with coho reintroduction into the Wenatchee and Methow subbasins since the mid 1990s, and has succeeded in establishing a naturalized hatchery stock that returns primarily to the middle reaches of the Wenatchee River (between Dryden Diversion Dam and Tumwater Dam). The project sponsors now want to initiate phased steps to increase the numbers of coho migrating above Tumwater with the goal of establishing a self-sustaining population of 1500 natural-origin fish.

The primary goals of interest are whether a self-sustaining population can be established, whether production can be moved to river reaches above Tumwater, and whether the associated numerical abundance can be achieved.

¹ ISRP 2000-5: www.nwcouncil.org/library/isrp/isrp2000-5.pdf

² See the project under CBFWA's proposal finder:
www.cbfwa.org/solicitation/components/forms/Proposal.cfm?PropID=223

³ ISRP 2006-5: www.nwcouncil.org/library/isrp/isrp2006-5.htm

⁴ ISRP 2009-6: www.nwcouncil.org/library/isrp/isrp2009-6.htm

Coho reintroductions in the Yakima River (Yakama Tribe project), Clearwater River (Nez Perce Tribe project), and Umatilla River (Confederated Tribes of the Umatilla Indian Reservation project) have similarly succeeded in establishing hatchery supported runs to the tributaries but have not achieved natural-spawning populations that are self-sustaining. In each of these subbasins (including the Wenatchee and Methow) if the hatchery program were to cease, coho would most likely become extirpated again. Given this observation, the ISRP concludes that the likelihood of success in achieving a self-sustaining population of any size in either of these subbasins is not large. Therefore, the effort is best undertaken as a carefully designed adaptive management experiment. The basis for an adaptive management program is that information drives decisions.

The Mid-Columbia Coho Master Plan is deficient because:

1. The performance metrics at each stage of the project are insufficient;
2. The reporting of the feasibility studies does not provide explicit status of the appropriate metrics at this time;
3. The rationale for the design of Broodstock Development Phase 2, Natural Production Implementation Phase, and Natural Production Support Phase I and II are not scientifically supported by the results from the feasibility studies or modeling.

In the Yakama Nation's September 21, 2009 cover letter, they identify three questions raised at the May 2009 meeting with the ISRP:

Question 1: Can we successfully complete BDP2 as described in the Master Plan, or will collecting fish at both Tumwater Dam (TWD) and Dryden Dam delay or prevent the process of developing a population of coho that can successfully migrate through Tumwater Canyon? The ISRP suggested we consider the alternative of collecting coho at TWD, rearing their progeny separately, and releasing only these coho upstream of TWD so that local adaptation may be accelerated.

Question 2: What are the appropriate programmatic changes that should be implemented if we are not meeting our phased PNI goals? (PNI goals for the Natural Production phases are in tables 5-17 through 5-22 in Section 5.4 of the Master Plan.)

Question 3: Could we incorporate Peter Galbreath's Reproductive Success Study for reintroduced populations into our proposed program? Does the study represent a means to measure "local adaptation"?

The Yakama Nation's September 2009 submittal is intended to address those concerns and discussions.

ISRP Recommendation

Response Requested - the Master Plan does not currently meet scientific review criteria.

The ISRP raised three primary concerns in its March 2009 review of the Master Plan and concludes that at this time the concerns have not been sufficiently addressed in the revision. In addition to these three, the updated contingency plan and decision process (section 4.3.5, page 91) need a clearer description of the performance objectives for each phase that will trigger contingency actions and especially the analysis of monitoring data that will be used to decide on the causes of not achieving production objectives (see Issue 4 below).

ISRP Specific Comments

March 2009 ISRP Issue 1. The performance metrics at each stage of the project are insufficient

November 2009 ISRP comments: The September 2009 submission of the Yakima Nation's Mid-Columbia Coho Master Plan identifies and lists performance metrics at a general level, which are appropriate for a Step-One submittal. The project proponents propose creating locally adaptive, self-sustaining, and ultimately exploitable populations in the Wenatchee and Methow Subbasins. The ultimate goal is to achieve a self-sustaining population averaging 1500 natural origin spawning adults. The project proponents propose to approach this goal through a step-wise reintroduction in five stages – BD1 through NPSP-II. As such, each stage needs its own implicit goals amenable to measurement.

While the project proponents outlined and explained performance metrics during a meeting in May 2008, the ISRP judges it necessary to explicitly establish numerical goals for each primary metric at each stage of the program to evaluate progress on achieving stage-specific and overall objectives. At this juncture, the “key goals and management strategies for the five phases in each subbasin” summarized in Tables 4-1 and 4-2 (page 83 and 84) are incomplete.

The benefit of a systematic and step-wise approach permits the project proponents to realistically predict success at the subsequent step, to evaluate implementation progress, and to identify at which life-stages survival or other factors might need to be improved in the situation where performance standards are not met.

Included in the specific goals and associated metrics for the Wenatchee Subbasin is the number and the proportion of the returning recruits that pass the Tumwater Dam (or reach one of the upper basin tributary traps) for each Master Plan stage. At this time the project proponents indicate that Broodstock Development Phase I has been achieved for the Wenatchee. The goal is 1312 broodstock collected with 25% collected at Tumwater (Table 4.1, page 83). Neither the Master Plan nor the 2002 HGMP actually present the data that this goal has been achieved. According to Table 3-1 on page 66, from 2003 through 2007, 1706, 1450, 1406, 1248, and 1015 adults have been collected for broodstock. It seems the $N = 1312$ goal can regularly be reached, but there is no information on broodstock collection at Tumwater Dam or weirs in upper subbasin tributaries.

March 2009 ISRP Issue 2. The reporting of the feasibility studies does not provide explicit status of the appropriate metrics at this time

November 2009 ISRP comments: A comprehensive summary of the program (as requested) appears to be missing and remains a critical piece of information needed by the ISRP to judge whether projections are biologically realistic. Such a summary may resemble Tables 1a and 1b in Appendix D (the 2002 HGMP) and Table 3-1 in the Master Plan. The feasibility studies are expected to provide the empirically derived baseline information against which the program's success (probability) can be predicted and ultimately evaluated. Specifically, such a summary should include all releases of hatchery fish by location/date and provide the fate of the released cohorts (survival to designated downstream locations, contribution to harvest, adult returns to the Columbia River, numbers and proportions migrating to the destination reaches in the Wenatchee and Methow Rivers

respectively, collection of surviving adults for hatchery production, escapement for natural spawning, establish egg-to-smolt production and survival from natural spawning, and the natural- and hatchery-origin SARs). Ultimately this summary will establish the initial planning assumptions and identify where life-stage survival needed to achieve the goal of mid-Columbia coho reintroduction is not yet met. The plan can then establish changes needed for each year and phase.

March 2009 ISRP Issue 3. The rationale for the design of Broodstock Development Phase 2, Natural Production Implementation Phase, and Natural Production Support Phase I and II are not scientifically supported by the results from the feasibility studies or modeling

November 2009 ISRP comments: In a July 27, 2009 Memo to Council, the project proponents responded regarding the mating and release designs for the Wenatchee River component of this project. The memo stated that CRITFC geneticists and senior scientific staff were consulted and concluded that maintaining the composite genetic diversity in the Wenatchee coho stock by interbreeding fish collected at Dryden and Tumwater dams thus maintaining a single population and releasing them from lower subbasin sites (Leavenworth hatchery - Icicle Creek, Dryden) and acclimation sites above Tumwater was the preferred choice. The proponents identified as an important decision criterion that a loss of genetic diversity (presumably in the subpopulation migrating to Tumwater Dam) from subdivision might compromise natural re-colonization during the Natural Production phase.

The concern raised by the ISRP in the March 2009 review and May 2009 meeting was that the proposed guidelines for the reintroduction phases would diminish selective forces promoting finer-scale local adaptation. In fact, “local adaptation” to a new place (habitat and environmental conditions) by a colonizing population is not well-defined, examined, or documented. Hypothetically, reproductive isolation, differing local selective gradients, and sufficient time can lead to adaptive divergence; however, the rate at which this occurs is highly speculative in the absence of information about the shape and intensity of selective pressures as well as the extent, structure, and heritability of genetic variance for important traits.

In the ISRP’s view, a modeling (simulation) exercise could greatly facilitate comparisons and expectations of the genetic and phenotypic consequences of alternative program designs. The ISRP had hoped that this would have resulted from the consultations with geneticists. In the proposed plan’s current state of development, the ISRP is unable to judge the likelihood that the plan can achieve the intended objectives. The plan has specified the number of generations in each phase (Broodstock Development II, Natural Production Phase I and II) but maintains an option to extend these phases if certain performance metrics are not achieved (1312 broodstock collected with a 50:50 split of Dryden Dam versus Tumwater Dam for Broodstock Development II; > 600 natural-origin adults for Natural Production Implementation; > 900 natural-origin adults for Natural Production Support). There is a contingency plan to evaluate why the goal in any phase is not achieved. However, the data and analysis that would be used to decide among the various internal and external factors is not developed and therefore may not be achievable after-the-fact unless designed to specifically do so. It is unclear whether such diagnosis based on proposed broodstock collection, mating, marking, and release program is sufficient to evaluate causation.

Under ideal circumstances one program design would involve splitting the combined production into lower and upper releases, each with unique tags, in the first generation. These two groups would be

genetically identical for all practical purposes. The proportions (or numbers) of each of these two groups that arrive at Tumwater Dam would be compared. In this first generation, this would measure the environmental effect of the different release sites on the migration distance within the subbasin. In the second generation, fish that returned to Dryden and fish that returned to Tumwater would be mated within return locations. Paired releases of the progeny of these parents would be conducted both in the upper and lower sites in the river. The contrast of return site between the two subpopulations released from the same location would serve as a measure of response to selection (adaptation). The magnitude of the response would serve to predict the number of generations required to achieve the goals for each of the program phases and facilitate establishing causation, which is needed if the contingency plan needs to be implemented. If a program like this was used it would make a significant contribution to documenting genetic and environmental sources of variation influencing an attempt to reestablish a self-sustaining extirpated population.

ISRP Issue 4. An unambiguous course of action to be taken if performance goals are not met within a defined period of time (that time to be specified in the Mid-Columbia Coho Master Plan)

The ISRP realizes that there is always uncertainty in setting timetables. Unforeseen events can happen during the implementation phase of the project that could delay key steps in the program, resulting in subsequent delays in evaluating the outcomes of particular management actions. Nevertheless, we also believe that programs such as the Mid-Columbia Coho Master Plan deserve to have real milestones and checkpoints that will allow for a systematic and effective approach to re-establishing sustainable, naturally reproducing coho populations. If it becomes clear after a reasonable evaluation period that a key goal of the program cannot be achieved, appropriate steps should be outlined in the Master Plan for either amending the goal or terminating the aspect of the program that is not working. As stated above, the ISRP has concerns about whether some of the goals in the plan are achievable, based on information presented to us. We therefore request that the Master plan include for each of its stages – BDP2, NPIP, NPSP-I, and NPSP-II goals for natural-origin returns, hatchery-origin returns, hatchery and natural adult-to-adult replacement rates – a timetable for determining whether the goal can be met and the metric(s) that will be used in the evaluation of success or failure. This should be followed by an explicit set of steps that will be taken in the event one or more of the goals cannot be achieved. The contingency actions in section 4.3.5 and monitoring data in section 7 are appropriate starting points. That section provides a timeframe for evaluation but needs a clearer description of the performance objectives for each phase that will trigger contingency actions and especially the analysis of monitoring data that will be used to decide on the causes of not achieving production objectives.