



## **Independent Scientific Review Panel**

for the Northwest Power & Conservation Council  
851 SW 6<sup>th</sup> Avenue, Suite 1100  
Portland, Oregon 97204  
[www.nwcouncil.org/fw/isrp](http://www.nwcouncil.org/fw/isrp)

**Memorandum (ISRP 2016-3)**

**February 25, 2016**

**To:** Henry Lorenzen, Chair, Northwest Power and Conservation Council

**From:** Steve Schroder, ISRP Chair

**Subject:** Review of Colville Hatchery Fisheries Management Plan (#1985-038-00)

### **Background**

In response to the Northwest Power and Conservation Council's December 14, 2015 request, the ISRP reviewed the following documents provided by the Colville Confederated Tribes (CCT) Fish and Wildlife Department: "Fisheries Management Plan for Stocked Waterbodies," "Colville Tribes Resident Fish Hatchery Operation and Maintenance / Monitoring and Evaluation" and "Operational Plan: Colville Confederated Tribes Resident Fish Hatchery." These are guiding documents for the Resident Fish Division's Hatchery Program for the following projects: Colville Hatchery (#1985-038-00) and Rufus Woods Net Pen Project (#2008-117-00; recently moved under the hatchery project).

These documents are intended to address a condition the Council placed on these projects as part of the Resident Fish, Data Management and Program Coordination Category Review in July 2012:

Implement with conditions through FY2014. Sponsor to develop a trout stocking plan, including project specific concerns, as described by the ISRP, prior to FY2015. Funding recommendation beyond FY2014 based on favorable ISRP and Council review of the trout stocking plan.

In the 2012 review, the ISRP found that the proposals did not meet scientific review criteria ([ISRP 2012-6](#)) and recommended:

The sponsor needs to develop a trout stocking master plan which guides the annual stocking, provides a basis for Fish and Wildlife Program proposal review, and provides for evaluation of the success of the program. The plan should generally include information requested in Three Step Master Plans for anadromous hatcheries. The plan should critique the resident fish hatchery program for its ability to provide catchable trout on the

reservation while demonstrating efficient and productive practices. The plan should develop hatchery and harvest goals and collect information to evaluate whether these goals are being met. Some documentation of fishing effort is needed on each lake that is stocked; otherwise it is impossible to determine whether the effort is worthwhile. This plan should incorporate the Rufus Woods net pen project and fish purchased and released under the Rufus Woods Habitat/Passage Improvement, Creel, and Triploid Supplementation (200740500).

The Fisheries Management Plan (FMP) describes management actions on the eight waterbodies within or bordering the Colville Confederated Tribes Reservation that receive nearly 98% of the hatchery's annual fish stocking by weight. Management actions are evaluated based on sampling and objectives described in the fisheries management plan.

## **Recommendation**

### ***Meets Scientific Review Criteria - In Part (Qualified)***

***In Part:*** The ISRP concludes that plans to possibly use sterile non-native predators, such as tiger muskellunge, to control the abundance of non-native golden shiners in the Twin Lakes are inconsistent with the ISRP's review criteria and the Fish and Wildlife Program's principles and non-native and invasive species sub-strategy; therefore, these plans should not be implemented.

***Qualification:*** The three recently published reports provided to the ISRP indicate significant progress in the development of a comprehensive fisheries management plan for the stocking of resident trout on the Colville Confederated Tribes land. Together, the documents describe and provide guidance for annual stocking of eight water bodies, develop some quantitative objectives (metrics) for evaluating success through a modest monitoring and evaluation effort, and incorporate the Rufus Woods stocking program into the overall fisheries management plan. The ISRP concludes that the three reports collectively meet the ISRP's scientific review criteria but adds the qualification that a single comprehensive fisheries management plan should be developed by incorporating relevant information from each of the three reports and by addressing additional ISRP comments described below. Addressing other ISRP comments may take some effort, and the ISRP is available to address specific questions, but we do not believe it is necessary for the CCT to provide a response to our comments within the next few months. Instead, we encourage the CCT to consider ISRP comments while managing, monitoring, and evaluating the stocking effort. Our comments can be formally addressed when the CCT prepares an updated comprehensive plan in approximately three to five years. This comprehensive document would better satisfy the previous ISRP recommendation for an integrated stocking master plan.

## Comments

***1. Does the trout stocking plan describe and provide guidance on the annual stocking? Specifically, do the plan and supporting documents critique the resident fish hatchery program for its ability to provide catchable trout on the reservation while demonstrating efficient and productive practices?***

The Fisheries Management Plan (FMP), which establishes the trout stocking schedule for the foreseeable future is incomplete as a stand-alone document. A complete perspective on the program was possible only after reviewing all three reports provided to the ISRP, i.e., the Fisheries Management Plan, the 2011-2013 Monitoring and Evaluation contract report, and the CRFH Operational Plan. We recommend revising the current management plan to provide a more comprehensive document.

The scientific/ecological foundation of the program needs to be more explicitly presented in the Introduction to the FMP. The plan provides only general statements for Resident Fish Goals (RFG). For example, RFG 1: Maintain and protect viable populations (of native and desired non-native species) of resident fish and their supporting habitats; and RFG 2: Tribal Hatchery management will be defined by using programs of stable, cost-effective artificial production to provide significant fishery benefits while having minimal adverse impacts on the long-term productivity of naturally-spawning fish and their ecosystems. These and the other three RFGs are reasonable, but they should be made more rigorous. For example, they could include operating principles that require: (1) establishment of stocking levels that do not exceed the habitat capacity of the lakes and streams, (2) impacts to both fish and other biota are held within acceptable limits, and (3) achievement of specific harvest objectives. These goals should be further refined by identifying quantitative objectives needed to achieve the goals and to evaluate progress. As noted below, some quantitative stocking goals and catch rates have been created. Timelines for achieving goals should be established to the extent practicable to identify expectations for progress and to facilitate the evaluation of progress.

The Introduction of the FMP (or subsequent section) should provide adequate detail on the methods for evaluating each of the five RFGs, interpreting the results of the evaluation, and developing management strategies consistent with the data. Additionally, a succinct history of stocking and lake management over approximately the last decade is needed to provide context and justification for the ongoing program. Relatively little information was provided on RFGs 4 and 5, such as how the CCT Program is attempting to "conserve, enhance, and restore native fish populations in the blocked region" while also restoring healthy and harvestable salmonid populations through restoration of habitat and ecological function. The FMP specifies that non-native trout are not to be stocked into open-systems except for the long-term stocking of brook trout into Owhi Lake where the broodstock has been maintained for many years. Stocking of non-native trout should be highly controlled, and anglers should be reminded not to transport live non-native species to other watersheds (<http://apps.leg.wa.gov/WAC/default.aspx?cite=232-12-016>).

The FMP summarizes the stocking objectives for trout in each of eight water bodies, but the rationale for the recommended stocking levels is not clear without reading the companion 2011-2013 monitoring report. The stocking levels proposed in the monitoring report appear to be best guesses that are evolving based on an assortment of field observations. The appropriateness of the proposed stocking levels seems highly uncertain, and further refinement using ongoing monitoring data is needed. This uncertainty should be explicitly acknowledged in the introductory section(s) of the management plan and serve as justification for the monitoring program. The CCT might consider experimenting with the stocking schedule to help identify one that is most appropriate for achieving the program objectives. For example, one approach might be to use a ramped stocking approach where stocking levels start small and gradually ramp up as data become available and support higher numbers.

Stocking levels in the FMP were not consistent with recommendations in the 2011-2013 monitoring report and the CRFH Operational Plan, even though each of these reports was published in late 2015. For example, in Buffalo Lake, the 2011-2013 monitoring report called for reducing trout stocking to 3,000 fish in both the spring and fall because trout relative weight (i.e., body condition or robustness) was below expectations. However, the FMP identified stocking rates in Buffalo Lake of 2,000 large trout in spring and 10,000 smaller trout in fall without explaining why this plan differed from the previous recommendation. Furthermore, the monitoring report stated that McGinnis Lake had been overstocked with brook trout and called for a reduction to 2,000-4,000 catchable trout; whereas, the FMP calls for 10,000-15,000 smaller trout (20-40 g). For Rufus Woods Reservoir, the FMP identifies 50,000-75,000 rainbow trout (>400 g) for stocking, but it does not mention the release of 20,000 trout >1,000 g that is identified in the Operational Plan. Also, it was unclear in the FMP whether stocking of brook trout into the North and South Twin Lakes would be stopped (because they may impact native trout). This was recommended in the 2011-2013 monitoring report, yet brook trout were released into North Twin Lake in 2014 and in previous years even though the outlet of North Twin Lake will not have a fish screen until late November 2016. Since some fish may escape from North Twin Lake, continued stocking of non-native brook trout is inconsistent with the plan to stock brook trout into closed systems except for Owhi Lake where brood stock is maintained. These inconsistencies between reports published in fall 2015 *justify* the need for a comprehensive stocking management plan, as described above.

Brief comments on hatchery practices:

1. The Colville Tribes should consider (experiment with) using a buffered saline solution in their spawning operations to increase fertilization rates, rather than just using “ovarian fluid” or water to activate sperm cells in milt (Brown et al. 1994<sup>1</sup>).

---

<sup>1</sup> Brown, D.R., J.B. Shrable, and W.H. Orr. 1994. The use of various fertilization media and their effects on rainbow trout gametes. Ennis National Fish Hatchery, U.S. Department of the Interior, U.S. Fish and Wildlife Service, Ennis, MT.

2. The wild captured Lahontan cutthroat trout and brook trout from Omak and Owhi lakes, respectively, should be regularly screened for pathogens by a state, federal, or tribal fish disease lab.

***2. Do the plan and supporting documents provide for evaluation of the success of the program? Specifically, does the plan develop hatchery and harvest goals and collect information to evaluate whether these goals are being met? Are these provided for each lake that is stocked?***

The FMP approach seems to use relative weight to decide if stocking has exceeded lake carrying capacity, and catch-per unit effort (CPUE) to evaluate angling success. The monitoring report includes some data on fish growth post-stocking, but this does not appear to be part of the evaluation scheme. Post-stocking performance should contain information on growth as well as relative weight. The program evaluation should include estimates of total angler catch, not just CPUE. Total catch is needed to describe the extent to which resident trout stocking is providing “in-kind replacement of lost access to anadromous fisheries resources upstream of Chief Joseph Dam.” Total catch and effort would enable estimation of the percentage of stocked hatchery fish that are harvested, and the associated costs and benefits. Harvest goals should be developed for each water body where trout are stocked. For example, the Hatchery Scientific Review Group (HSRG) recommends the development of harvest goals for anadromous salmonids produced by hatcheries as a means for evaluating progress. Quantitative harvest goals are needed for resident hatchery trout, too.

More thorough treatment of the dynamics of the self-sustaining and exploited largemouth bass, kokanee, brook trout, and native redband trout populations is warranted. Assuming all stocked hatchery trout are fin-clipped, relative weight should be evaluated separately for hatchery versus natural origin fish of the same species. Likewise, creel surveys should identify whether harvested fish were fin-clipped or not. This information is needed to evaluate whether harvest rates support sustainable natural fish production, especially for native fishes such as redband trout in the Twin Lakes. According to the FMP, there is a question of whether Owhi Lake could have a reasonable fishery based on production from the naturalized brook trout population. The ISRP recommends an analysis of natural trout production in Owhi Lake (and other lakes) to produce an empirical, scientific basis for establishing a management strategy consistent with the Council’s Fish and Wildlife Program. This type of assessment has been recommended by the American Fisheries Society (1995. “Considerations for the use of Cultured Fishes in Fisheries Resource Management.” American Fisheries Society Symposium 15:603-606).

Stream stocking is evaluated by the presence or absence of hatchery trout in the stream one and two months after stocking, as a means to evaluate the extent to which stocked fish have emigrated from the area. A more informative approach would be to evaluate the extent that

angler catch and effort declines over time after initial stocking. Additionally, if feasible, the application of PIT tags on a representative sample of released hatchery trout coupled with the installation of downstream detection arrays may be helpful in estimating emigration timing and rates.

For all of the proposed metrics, an evaluation document or appendix is needed to show the sufficiency of the data and methods to make population inferences and to adaptively manage the stocking effort. Few measures of precision are provided for estimates of metrics in the *Colville Tribes Resident Fish Hatchery O&M/M&E* document, but it is evident from the small sample sizes reported that the estimates are not precise. Some of the gill net and many of the creel census activities have only limited coverage so that uncertainty in the estimates is likely high. Relative weight and size is often documented for fish captured with gillnets, but gillnets are highly size-selective and this bias may compromise the evaluation of whether or not stocking capacity has been exceeded, i.e., where competition for food is high. For example, do size-selective gillnets underrepresent fish with lower relative weights thereby inhibiting detection of competition and the need to scale back trout stocking? The data collections need to be robust (i.e., sufficient sample sizes and representative of the population) for evaluation and informing management decisions.

Voluntary creel surveys and angler interviews are important for evaluating success of the stocking program. In the past, surveillance of creel boxes has been used as a means to estimate total angler use of some lakes such as Omak. To what extent is surveillance used now and could it be expanded to other lakes in an effort to produce more accurate and complete harvest data? Alternatively, could reporting of catch and effort on catch cards be required? The report notes that creel reporting is required on Omak Lake, but there is no enforcement; thus it is reportedly no better than a voluntary creel survey. More outreach and education are needed to inform anglers why accurate catch records are important. To what extent can outreach and education be implemented? Methods to improve the creel census program and total catch estimation for each lake or stream should be described in the updated comprehensive FMP.

In the management plan for each water body, it is mentioned that both stocking and fishing regulations are components of management. However, there is no mention of the regulations being applied, why they are applied, or how they may be affecting the fisheries. The success of the resident fish hatchery program cannot be assessed without consideration of the role of harvest regulations.

How monitored metrics are used in making management decisions within the adaptive management process is not clear. For example, CPUE and the proportional size distribution for largemouth bass are measured in some lakes by electrofishing. What management decisions (or actions) might be taken if the objectives are not achieved? A decision framework is needed for stocking effects on the fish and harvests.

The FMP mentions that sterile non-native predators, such as tiger muskellunge, may be used in the future to control the abundance of non-native golden shiners in the Twin Lakes. The ISRP strongly cautions against the introduction of non-native fishes. Furthermore, although the FMP identifies the concern for numerous golden shiners in the Twin Lakes, it does not provide evidence that these fish are inhibiting the achievement of harvest objectives (catch rates and large size). In fact, small golden shiners may provide important prey for targeted largemouth bass and large trout.

The FMP describes stocking objectives for eight water bodies that together represent 98% of CCT's fish stocking *by weight*. On the surface, this seems fairly comprehensive. However, Table 3 of the CRFH Operational Plan identifies 17 water bodies where trout are stocked each year (or every other year in Simpson). Nine additional water bodies receive up to 5,000 trout per year, yet there is no description of the stocking plan for these water bodies. The revised FMP should incorporate information about the objectives and management for these nine water bodies.

***3. Do the plan and supporting documents incorporate the Rufus Woods net pen project and fish purchased and released under the Rufus Woods Habitat/Passage Improvement, Creel, and Triploid Supplementation (200740500)?***

The Rufus Woods Lake net pen project is described in the three documents provided to the ISRP. The program has experimented with the release of smaller trout (<400 g) and determined that most of these fish only resided in the reservoir for one month due to entrainment through Chief Joseph Dam and to harvest. This loss led to the current stocking of larger, catchable-size trout that may be less likely to be entrained. Recent changes in the program, such as the release of larger trout spread over time, should be evaluated and reported to ensure objectives are being met. The current annual trout harvest objective is more than 40,000 rainbow trout. Is this harvest a reasonable expectation given that only 50,000 to 75,000 trout are stocked each year? The FMP provided information on the large size of trout caught by fishermen (up to ~2.5 kg), and the decline in catches of very large trout, but data on total harvests and catch per hour were not provided. How many captured fish might be from natural production, which is briefly noted as present, and could this harvest adversely affect populations of native trout? Or does entrainment severely reduce natural production as well? What is the creel sampling design and computational methodology for estimating total harvest? How are harvest regulations modified to achieve the objectives, as implied in the management actions? As noted above, the FMP did not mention the release of 1,000-g trout, whereas the Operational Plan identified the release of 20,000 trout at 1,000 g each (2.2 lb.). The recent documents should be consistent.

The FMP notes that all-female triploid (sterile) trout will be used in Rufus Woods Reservoir and elsewhere on CCT lands to minimize potential genetic impacts on native trout. The triploid success rate is reportedly monitored prior to release and triploidy must be greater than 95%. Nevertheless, this implies that up to approximately 3,750 large diploid trout may be released

into the Columbia River each year. Some of these fish will escape the fishery and potentially spawn with native rainbow trout. The trout, which are shipped from a triploid hatchery in Sumner, Washington, are likely genetically distinct from local trout. What risk do these stocked trout pose to the genetic composition and fitness of the native trout?