Independent Scientific Review Panel
for the Northwest Power & Conservation Council
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Memorandum (ISRP 2007-17) **December 10, 2007**

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

From: Eric Loudenslager, ISRP Chair

Subject: Review of Project 2007-405-00 Rufus Woods Supplementation and Creel Project

Background

At the Council's request of August 2007, the ISRP reviewed proposal 2007-405-00, *Rufus Woods Supplementation and Creel Project*. The Confederated Tribes of the Colville Reservation (Colville Tribe) propose to stock triploid rainbow trout into Lake Rufus Woods to provide increased tribal subsistence and tribal and non-tribal recreational harvest. In addition, the Colville Tribe proposes to evaluate stocking success with creel data collection.

The proposal was submitted to the Budget Oversight Group in early April as part of the third quarter review associated with Fiscal Year 2007. The request was presented to the Council at their August meeting, and they approved sending the proposal to the ISRP for review. The ISRP reviewed the proposal with the same criteria used during the FY 2007-09 project review. The ISRP was not able to reach a final recommendation on the proposal submitted in August because several key issues needed to be clarified to justify the proposal. Consequently, in a September 27, 2007 memo,[1] the ISRP asked the project sponsor to revise their proposal and clarify the issues. On November 2nd, the Council forwarded the project sponsors' revised proposal and requested a final ISRP review. Based on this final ISRP review, the Council will make a funding recommendation on this project.

ISRP Recommendation and Summary

Meets Scientific Criteria (Qualified)

Qualification -- The proposal still does not contain sufficient information on creel sampling, stable isotope analysis, and trout diet analysis to judge whether these elements of the project will fulfill their objectives. The tribe states that they will hire a biometrician who will assist with the design and analysis of the creel study. The ISRP agrees with the need for a statistically valid creel sampling approach and further suggests that the biometrician assist in designing the isotope

[1] ISRP 2007-13 Preliminary Review of Project 2007-405-00 Rufus Woods Supplementation and Creel Project: www.nwcouncil.org/library/isrp/isrp2007-13.htm

and diet studies (if either if these two efforts go forward) as well. The isotope study should be undertaken with caution as many isotope analyses can be expensive, and only after it is shown that stable isotope concentrations can really be used to differentiate between rainbow trout of the five different possible origins in the reservoir. Diet studies should be described in greater detail and should contain explicit provisions for ensuring that a full range of rainbow trout sizes is included in the analysis to determine if prey switching occurs as fish grow larger. The ISRP recommends that a scientifically defensible plan of work be drawn up for each of these three project elements prior to stocking 24,000 feminized triploid rainbow trout. The ISRP is willing to review these study plans for scientific quality.

Responses to ISRP Questions

The ISRP requested that a revised proposal should provide information answering the questions below:

1. Clarify the trout rearing and release program now conducted by the Colville Tribe at the Colville Hatchery. Specifically, the proposal indicates that the Colville Tribe has transitioned from rearing coastal rainbow trout to rearing redband trout since the discovery of this resident form in Bridge Creek in 2001. Are the redband trout reared at the Colville Hatchery derived from a stock established from Bridge Creek?

The proposal states (page 7) "*Although, there is a movement for native redband conservation in Washington state and Tribal waters and local redband brood stocks have been grown in the Colville Tribal Hatchery since their discovery in isolated habitat of Bridge Creek in 2001. Plans to replace coastal stocks were begun immediately and the conversion began with the 2005 plants and complete conversion to redband stocks on Tribal waters is expected in the near future. The Colville Tribal hatchery has made a major effort and since 2000 has moved from diploid coastal rainbow trout stocks to triploid rainbow trout, and is progressing quickly into exclusive stocking of native redbands. In 2007 about 60% of rainbow trout stocked by the Colville Tribal Hatchery will be of native redband origin. This is in compliance with subbasin objectives (2A3 and 2A4) to transform from reliance on coastal stocks to locally adapted native redband stock. The Colville Hatchery currently lacks space to grow sufficient rainbow trout to stock Rufus Woods at the desired levels in addition to the other Reservation lakes and streams.*" Thus it appears that the Colville Tribe is using the Bridge Creek redbands for broodstock. However, from the proposal, it did not appear that any of the redbands propagated at the tribal hatchery are destined for Rufus Woods but instead would be stocked in other lakes and streams within the reservation. This was reinforced by the statement on page 9 that "*The Colville Tribal Hatchery is small and only capable of producing approximately 60,000 pounds of fish each year. There are many other lakes and streams on the reservation that must be stocked so it is unlikely that the Tribal Hatchery can contribute significantly to the Rufus Woods fishery.*" It therefore seems, at least in the short term, that the tribe intends to base its Rufus Woods harvest augmentation program solely on feminized triploid rainbow trout from net pen operations. The one exception is the possible recruitment of redband trout to the reservoir from stocking or natural reproduction in the Nespelem River, but this is assumed to be a minor contributor of rainbow trout to Rufus Woods.

Although the revised proposal indicated that redband trout reared at the Colville Tribal hatchery originated from Bridge Creek, it was still difficult to discern how many other locations on the reservation are being stocked using fish from the Colville Hatchery and the species composition of the outplants. Apparently brook trout and Lahontan cutthroat trout are also being reared and released, but there was no mention of either of these species being stocked in Rufus Woods or its tributaries.

2. On page 6, the proposal indicates that triploid rainbow trout are being produced and released by the Colville Tribal Hatchery. Is the Colville Tribal Hatchery producing triploid redband trout?

The proposal was somewhat vague on this point, but the cover letter from the Colville Tribe states that triploid rainbows from WDFW's Goldendale hatchery are currently being reared at the tribal hatchery. The cover letter also claims that in recent years 100% of the Colville tribal hatchery production was released elsewhere on the reservation, so none of these fish are apparently destined for Rufus Woods. The feminized triploid rainbow trout stocked in Rufus Woods are produced at Columbia River Fish Farms from Troutlodge coastal rainbow stock.

3. The proposal notes that two aquaculture operations exist on Lake Rufus Woods, and they produce five million pounds of trout annually. Please provide additional details on the nature of the operations. Are they net-pens? Are these Tribal businesses? The proposal indicates that a processing plant is planned for the near future. What is the anticipated future production of trout from these commercial operations? How many of these fish escape and contribute to the Lake Rufus Woods fishery?

The material provided to the ISRP indicated that the Colville Tribe does not have a direct financial interest in the net pen operations where the triploid rainbow trout for harvest augmentation will be produced. Fish will be purchased by the tribe from the farm. The net pens currently produce 4 to 4.5 million pounds of triploid rainbows annually. Future production plans of the aquaculture business, including the processing plant, are not discussed in the proposal, although the cover letter claims the total production from the net pens could be increased to 7 million pounds annually. It was stated that few fish escape the net pens each year; however, the contribution of escaped net pen fish to the Rufus Woods fishery was stimulated by an initial escape of 8,000 trout in 1995 and 2,000 trout in 1996, and occasional subsequent escapes have occurred (including at least one in 2006). Large numbers of escaped fish are almost always associated with major storm events. The proposal notes that the net pens are inspected and maintained frequently, but it does not indicate if additional storm-proofing safeguards have been implemented. The net pens will be the source of approximately 24,000, 2-pound triploid rainbow trout for deliberate stocking in Rufus Woods.

4. What is the current stocking program for Lake Rufus Woods? Please clarify whether both triploid rainbow trout and native redband are being propagated and stocked? Is the proposal to add additional stocking or to take on the program the Colville Tribe is currently supporting from other sources?

This question was not fully addressed in the response. The information was requested to help the ISRP understand how many fish are currently being stocked into Lake Rufus Woods, by whom, at what size, under the auspices of what program? The reason for asking the question was to obtain a better understanding of the existing fishery. The sponsor asserts, based on a 2007 creel census, that there are 50,000 angler days on the reservoir and that the catch averages around one fish per angler-day. What is the source of these fish? The proposal provided somewhat unclear answers to what the current stocking practices are. This leaves open the question of whether implementing the proposed stocking will add additional fish for sport harvest, thus supplementing current stocking levels, or replace existing stocking that has been carried out by other organizations.

As stated in the proposal there may be five sources of rainbow trout in Rufus Woods: 1) entrainment from Lake Roosevelt through Grand Coulee dam, 2) escaped net pen fish, 3) fish purchased from net pen operators and released into Rufus Woods, 4) stocking from WDFW or the tribal hatcheries in the reservoir or its tributaries, and 5) natural reproduction. Deliberate stocking is only one of the potential ways this species can get into the reservoir. The narrative was ambiguous about what the current stocking program was in terms of total numbers or pounds of fish released, although it implied stocking was limited to triploid rainbows and did not include redbands. The proposal was reasonably clear that funding is being sought for additional purchase and release of triploids from Columbia River Fish Farms. Tribal hatchery production will not be diverted from other sources into Rufus Woods.

5. The proposal seeks to purchase 50,000 pounds of trout for stocking. What size and numbers of trout will be stocked? What is the anticipated stocking schedule? What is the rationale for the stocking schedule?

Approximately 24,000 feminized triploid rainbows will be stocked according to the proposal; therefore, the average weight will be approximately two pounds. The 24,000 figure is ten times the number of trout released in 2007, unless other rainbow trout were stocked in 2007 that were not described in the proposal. Fish will be released in all months except August and September. Three release sites are mentioned in the cover letter, but their locations are not given. The rationale for the stocking schedule is to spread the fish out in space and time so they will be available for angler harvest year round. The proposal did not address the question of how many trout the reservoir could support. The ISRP interpreted this omission to mean that most of the stocked fish are assumed to be harvested soon after release.

6. What is the rationale for stocking 50,000 pounds of trout? Why not more? Why not less? What is the carrying capacity of Lake Rufus for stocked rainbow trout? For other sport fishes?

The revised proposal provides little new information regarding this important issue. The rationale for stocking 24,000 trout is to increase the target catch rate to 1 fish per hour. Whether this number of fish is sufficient to achieve that objective could not be determined from the information provided to us. However, the ISRP wonders if the objective of catching 1 fish per hour year round is realistic. The 2007 release of 2,400 triploids increased the catch rate from <0.25 fish/hour to >0.40 fish/hour, but according to the proposal that increase was limited

primarily to about two weeks post-release and to an area within 10 miles of the release site. For a 51-mile long reservoir, over an entire year, these data suggest *many* trout would have to be stocked to achieve the target catch rate. That could have negative implications for some members of the native fish community (e.g., through predation or competition) and for other introduced game fishes. The proposal did not describe any monitoring that would help address these concerns.

Although the sponsors briefly described the past rainbow trout fishery in Lake Rufus Woods and summarized the sources of fish that potentially contribute to the fishery, the carrying capacity of Lake Rufus Woods was not discussed in any detail nor were other sport fisheries described that could be impacted by expanding the triploid rainbow trout fishery. The extent has not been determined to which entrainment and passage of fish such as kokanee fry from Lake Roosevelt downstream to Rufus Woods influence the carrying capacity of the reservoir for rainbow trout (either through competition for zooplankton or by serving as prey). Finally, the question of whether stocking additional trout would lead to lower growth rates of trout in the reservoir through density-dependent food limitation has not been addressed. All of these issues deserve a thorough, well-designed monitoring program.

7. Additional detail is needed on the creel census to determine that it is sufficient to provide the monitoring of all the metrics identified in the proposal.

Of the 24,000 triploids proposed for release, 20,000 will be tagged. In 2007, 2,400 fish were released, 900 of these were tagged, and 300 tags were returned. Based on these results 20,000 tagged trout seems like a reasonable number. The proposal states all fish that are creeled will be censused. Because there are only five boat launches on the reservoir, it should be possible to sample catches by boat anglers with reasonable accuracy. However, the proposal acknowledges that shoreline anglers will be sampled by roving creel census on 4 of 7 days each week, and difficult to access sites will only be visited twice monthly. This will yield somewhat reduced accuracy in estimating catches by bank anglers. However, the proposal claims a biometrician will be hired to help design the creel study.

Insufficient details were provided on the stable isotope study for the ISRP to judge this part of the proposed work. No “proof of concept” evidence was presented showing how stable isotope analysis could be used to determine fish origin in Rufus Woods. The ISRP believes this method does indeed hold promise, but analyses are relatively expensive and should not be undertaken without a good understanding of the effectiveness of the technique, the sample size needed for accurate determination of catch origin, and the procedures needed to properly obtain and process stable isotope samples. Additionally, if the plan is to tag 20,000 of the 24,000 fish to be released, tag returns should give a very clear picture of the contribution of those fish to the fishery and the use of stable isotope analysis may be unnecessary, unless it is desirable to know how many harvested fish originated from other sources.

More details were also needed for the diet analysis component of the creel survey. In particular, it will be helpful to verify that triploid rainbows stocked in Rufus Woods do not, as preliminary evidence suggests, become piscivorous. It may be that the trout remain generalized macroinvertebrate and plankton feeders as they grow, similar to the pen-reared rainbow trout

stocked in Flaming Gorge reservoir, Utah (Haddix and Budy 2005).[2] However, the largest trophy trout (including lake trout) in Flaming Gorge feed on other fish. Because the target harvest size in Rufus Woods is five pounds or greater, and because rainbows from the reservoir have exceeded 20 pounds, the potential for piscivory by very large individuals exists and should be monitored. With the annual recruitment into Rufus Woods of several hundred thousand fish from downstream entrainment at Grand Coulee dam, an ample forage base of small fishes such as juvenile kokanee must exist in the reservoir. Studying the dietary habitats of the stocked rainbows will be a key to understanding why the Rufus Wood trout attain such large size, and if this growth can be sustained at much greater stocking rates. The ISRP also feels that if dietary analysis shows an important food item to be an at-risk species, then heavy stocking should not proceed without an appropriate analysis of the effects of piscivory or competition on the at-risk species.

The sponsors should also encourage the owners of the net pens to implement a systematic monitoring program for escapes from the net pens. Even without storms it is likely some fish will escape - that is certainly the experience with salmon net pens on the coast.

[2] Haddix, T., and P. Budy. 2005. Factors that limit growth and abundance of rainbow trout across ecologically distinct areas of Flaming Gorge reservoir, Utah. North American Journal of Fisheries Management 25:1082-1094.