Independent Scientific Review Panel
for the Northwest Power & Conservation Council
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Crystal Springs Fish Hatchery Program Response Review

Project #2008-906-00

Step One of the Northwest Power and Conservation Council's Three-Step Review Process

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ISRP Response Review of the Crystal Springs Fish Hatchery Program

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ISRP Response Review of the Crystal Springs Fish Hatchery Program

Background

At the Northwest Power and Conservation Council's April 16, 2012 request, the ISRP reviewed responses from the Shoshone-Bannock Tribes (hereafter Tribes) to the ISRP's Step 1 review of the Master Plan for the *Crystal Springs Fish Hatchery and Programs for Snake River Chinook Salmon and Yellowstone Cutthroat Trout*. The Master Plan is proposed through BPA Project #2008-906-00, *Crystal Springs Planning and Operations/Maintenance*. This ISRP evaluation is part of 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. This review focuses on the Tribes' responses to the ISRP's 2011 review (ISRP 2011-17) and Step 1 scientific review elements specified by the Council.

In the 2011 review, the ISRP found the Master Plan to be very well organized, presenting material regarding two fish species (Yellowstone cutthroat trout and Chinook salmon), three different field settings, and a proposed hatchery in a clear and professional manner. However, the ISRP found the proposed hatchery lacked sufficient scientific justification and needed clarification; consequently, the ISRP requested responses on several key issues. Specifically, as presented, the ISRP did not believe the conservation goals of the Yankee Fork, and probably Panther Creek, could be achieved given current conditions, and also believed that additional development was required for the Yellowstone cutthroat trout restoration effort to meet scientific criteria. The Tribes responded to these concerns, and the Council submitted the response to the ISRP.

The ISRP comments below are categorized into the proposed programs for Chinook salmon and Yellowstone cutthroat trout and organized by the primary issues raised in our 2011 review (numbered and *italicized*).

Recommendation

Meets Scientific Review Criteria (Qualified)

The Tribes responses to the ISRP comments are detailed, thorough, and substantial. The responses bring significant clarification, namely that for both Chinook salmon and Yellowstone cutthroat trout the primary goal will be to provide for the Tribes' harvest, cultural, and future conservation objectives. Furthermore, terminal harvest would be the intent for Chinook salmon in both Yankee Fork and Panther Creek. Both of these components are consistent with the Council's Fish and Wildlife Program principles. The ISRP is encouraged that the Tribes are considering the use of weirs and traps as a means to capture surplus hatchery salmon. The use of live-capture gear should be coupled with live-release of unmarked salmon when feasible as a means of enabling the possible development of locally adapted salmon populations.

Qualifications:

Chinook salmon

The Master Plan needs revision to reflect the harvest priority of spawning escapement presented in this response to the ISRP. Continuation of the dialogue on the appropriate broodstock source for Yankee Fork is needed, as is planning for broodstock management. Specific broodstock management questions to be addressed in Step 2 are itemized under Issue 3, below.

Additional modeling of potential harvest is needed, and an estimate of the harvest benefits and likelihood of broodstock replenishment should be performed using empirical data rather than using the All-H Analyzer (AHA) or AHA rollup models (Issue 4).

Further information is needed on how straying rates will be estimated including how hatchery fish will be identified, what locations will be surveyed, how often these surveys will occur, and what the sample size goals will be (Issue 5).

The protocols that will be used to assess potential interactions between hatchery origin fish and fishes resident in Panther, Yankee Fork, and the Salmon River need to be more fully explained (Issue 5).

The traits that will be measured on project smolts during the rearing period and at the time of release need to be developed (Issue 5).

Yellowstone cutthroat trout

The Yellowstone cutthroat trout component has been entirely modified. The artificial production with the objective for a conservation benefit objective will be eliminated from the Master Plan. Instead, up to 5000 five to six inch juveniles will be produced annually for release in a confined oxbow lake on reservation lands. The framework for the Yellowstone cutthroat trout sport fisheries is consistent with the Fish and Wildlife Program principles, but the information provided is too brief for an ISRP evaluation. A more detailed assessment for that program is needed. More details are needed regarding the M&E program for these fish, plus a better description of the potential for accidental escape. A comprehensive plan for native and natural trout management and integration with management for fisheries using hatchery produced trout is needed for specific watersheds and geographic regions, per ISRP programmatic comments for the recent Resident Fish Review (ISRP 2012-6).

Comments

Chinook Salmon

1. *Provide a more thorough discussion of the need for additional hatchery facilities for spring Chinook production to meet goals of the Tribes' enhancement programs.*

The letter from the Lower Snake River Compensation Plan (LSRCP), and information from the letter integrated into the Tribes response to the ISRP, identifies that the Sawtooth Hatchery is not able to rear the fish intended for the LSRCP spring Chinook program because of cold water and winter icing

conditions. The issue is adequately addressed. Given the water and space requirements demanded by the project, it makes sense to create a facility that can be dedicated solely to the project.

2. *Critically evaluate whether re-introduction and supplementation efforts in Yankee Fork and Panther Creek have a reasonable probability of success at this time given degraded habitat conditions in the watershed, passage issues in the mainstem, and survival at sea.*

In its initial review of the Master Plan for the Crystal Springs Hatchery, the ISRP concluded that the project had two intertwined objectives for spring Chinook salmon. One was to supplement and recover spring Chinook returning to two upper Salmon River tributaries, Panther Creek and Yankee Fork. The other was to provide terminal harvest opportunities to the Tribes at both of these locations. The ISRP also indicated that the creation of terminal harvest opportunities through artificial production is recognized by the Council as a legitimate legal and policy objective regardless of any accompanying conservation benefits. This statement was made because spawning and rearing locations for spring Chinook have been significantly degraded due to mining, logging, road construction, and other factors in both watersheds. The ISRP raised the question of whether a goal of conservation was realistic in the foreseeable future given existing environmental conditions and the scale and timeframe needed for habitat restoration. Unless conditions are ameliorated by habitat improvements, the recruit-per-spawner ratios (R/S) in both streams will continue to be less than one, making it impossible to create self-sustaining populations.

In their response to the ISRP, the Tribes stated that the primary purpose of the project is to provide terminal harvest opportunities to Tribal members in Panther Creek and Yankee Fork. Any conservation benefits derived from the project would be a fortuitous consequence of their smolt planting programs. Adequate detail was provided on the unsuitable habitat of these streams to support self-sustainable populations. The comprehensive Tributary Assessment on Yankee Fork salmonids and their habitat that was finalized in January 2012 by the Bureau of Reclamation provides important information for ongoing activities and planning. Although not directly related to the Crystal Springs proposal, the ISRP notes that the Tributary Assessment evaluated Geomorphic Reach Priorities on three of the five subwatersheds for the Yankee Fork. The upper Yankee Fork and West Fork subwatersheds were not included in the geomorphic reach prioritization because they are within the jurisdiction of the Salmon-Challis National Forest, and the geomorphic reach prioritization objectives in the Tributary Assessment were primarily focused on privately owned lands. In order to fully consider watershed scale processes and conditions, and to develop the most comprehensive restoration strategy, it would be desirable to look at the entire watershed and incorporate information and analysis of reach priorities for these two additional sub-watersheds.

The ISRP recommends that these significant changes in project objectives be reflected in a revised Master Plan (Step 1), if possible. If the Master Plan will not be revised, then the Step 2 report should clearly document the changes made to the initial Mater Plan. The revisions need to reflect the clarified priority for harvest for both Chinook salmon and cutthroat trout.

Given that conservation, supplementation, and eventual recovery are not the immediate objectives of the Crystal Springs Hatchery, the viability of the project rests on two factors: achieving broodstock replenishment and providing an annual harvest of 1000 adults in Yankee Fork and 800 fish from Panther Creek. If the data presented in Table 1 provided by the Tribes reflect future survival potentials, then full harvest objectives would be reached about 36% of the time, as discussed under Issue 4.

Another important subsidiary goal of the Crystal Springs Hatchery program is to provide natural spawning adults to Yankee Fork and Panther Creek. The Tribes have made it clear that their first priority will be to use returning adults to meet broodstock needs. The inherent variability in expected SAR values, however, means that in some years this goal will not be met, while in others, fish abundance will be great enough to reach broodstock and harvest objectives plus allow the release of naturally spawning adults.

As discussed in the initial ISRP review, there is justification for some hatchery-origin natural escapement to evaluate the performance of hatchery fish, to develop stock-recruitment relationships, and to estimate productivity and carrying capacity of the natural environment. This escapement needs to be monitored appropriately with the intention of evaluating the fish and the habitat to guide adaptive management. Allowing fish to escape to the spawning reaches to provide salmon for traditional harvest is consistent with the ISRP's interpretation of Fish and Wildlife Program guidance on the application of artificial production. The Fish and Wildlife Program establishes that spawning by hatchery-origin (HOR) fish should not exceed the carrying capacity of the environment, and the ISRP suggests that any final program for Panther Creek and the Yankee Fork needs to be designed with those carrying capacity limitations in mind.

To fully understand how the program may function in the future, the ISRP requests further information on the following questions be included in Step 2 documents:

1) In years where adult abundance is below broodstock needs, what process will be used to reach the desired number of adults?

2) In years where broodstock needs can be met by adults originating from the project, how will broodstock be collected to ensure full representation of arrival and maturation timing?

3) What is the functional relationship between harvest rates and natural escapement once broodstock needs have been fulfilled? For example, will harvest rates increase in proportion to adult abundance or will some other sliding scale protocol be established?

4) What rationale will be used to determine where smolts will be released into each watershed? Recent work by Williamson et al. (2010) showed that acclimation site location affects where hatchery adults spawn. They found that if such sites were not adjacent to known spawning areas the reproductive success of hatchery fish was significantly lower than that achieved by fish of natural origin (NOR). Conversely, hatchery origin and NOR adults spawning in traditional areas appeared to achieve comparable reproductive success rates (Williamson et al. 2010). The ISRP recommends that Tribal knowledge of spawning locations and the tributary assessment (Appendix D) be used to help guide the selection of locations for acclimation and smolt release in Yankee Fork.

5) What basis will be used to determine the location of remote site incubation barrels (RSIs) in Panther Creek? Will a tributary assessment similar to that conducted in the Yankee Fork be performed in this watershed to help with the identification of future acclimation and smolt release locations?

The Tribes note that some hatchery salmon will be harvested downstream in non-terminal areas where the salmon will be mixed with natural origin stocks. Sufficient effort should be expended and a management plan developed to ensure that harvests in the mixed stock areas do not over-harvest naturally produced Chinook salmon in response to greater Chinook abundance associated with hatchery production.

3. Critically evaluate brood stocks that might be used in the Program, including use of natural origin salmon from the upper Salmon River rather than the segregated Sawtooth Hatchery stock.

The Panther Creek white paper on broodstock choices and the NOAA letter provide sufficient clarification that this topic is being given appropriate consideration. The issues raised by the ISRP are essentially those identified in the white paper and NOAA letter. There need to be clear goals for management in each tributary. The choice of broodstock should be consistent with management goals and should clearly identify future management options that might be compromised by the choice.

Returns of adult spring Chinook to the Yankee Fork from Sawtooth Hatchery smolt releases and to the Sawtooth Hatchery along with returns of spring Chinook NORs to the Yankee Fork will be used to establish the smolt production at Crystal Springs Hatchery. According to both the Tribes and NOAA Fisheries, this course of action will be revisited during evaluation of the Crystal Springs HGMP and as the Salmon River spring Chinook ESA recovery plan is developed. Because a recovery plan is lacking, NOAA indicated that it was not definitive that using Sawtooth segregated spring Chinook stock would be consistent with conservation and delisting. NOAA did confirm that the Interior Columbia River Technical Recovery Team believed that viable status for the Yankee Fork independent population was unnecessary for delisting, and NOAA concludes that a higher risk hatchery program using Sawtooth stock is acceptable for the foreseeable future. The creation of a self-sustaining population in Yankee Fork appears to be possible only if significant habitat improvements in the basin can raise the R/S value above one. Table 5 in the sponsor's ISRP response letter indicates that the current R/S for Yankee Creek is substantially below this value. The tributary assessment (Appendix D) indicates that significant habitat issues occur throughout the basin and at least some of these will need to be addressed to raise R/S values. This remote possibility of establishing a self-sustaining population is the justification for developing a terminal harvest program using a segregated hatchery stock. However, even if the prospect of raising the R/S in this system seems remote, the use of an upper Salmon River stock suitable for conservation might ultimately assist in the full recovery of upper Snake River Chinook salmon. Consequently the final choice of Yankee Fork broodstock needs further consideration in Steps 2 and 3.

The choice of broodstock to be used for Panther Creek is complicated by the recent stocking and apparent successful recolonization of South Fork Salmon River spring Chinook from the McCall Hatchery. Salmon were extirpated from Panther Creek because of environmental degradation caused by mining activities. Subsequently, a series of sporadic spring Chinook introductions followed. DNA samples collected by the Tribes from NORs returning to Panther Creek have shown that these fish probably originated from releases of McCall Hatchery Fish. Although not part of the upper Salmon River Major Population Group (MPG), McCall Hatchery fish clearly survived in Panther Creek and returned to spawn. Accordingly, one of the broodstock options the Tribes considered in the white paper for the Panther Creek portion of their program is the McCall hatchery stock. They also conferred with NOAA-Fisheries and solicited advice regarding an appropriate donor population. The NOAA response (Appendix A) suggested using spring Chinook from the Pahsimeroi Hatchery. These fish are from a system that is geographically close to Panther Creek and are also part of the upper Salmon River MPG. It is not clear to

the ISRP whether a final recommendation from NOAA will be forthcoming, but the Tribes have indicated they will give this recommendation serious consideration.

At present a decision has been made to use Pahsimeroi Hatchery spring Chinook as the broodstock for Panther Creek. An unanswered question is what should be done with McCall NOR fish that return to Panther Creek? Should they be included or excluded from project broodstock and should they be allowed to spawn naturally in Panther Creek? Ultimately NOAA and the Tribes will have to decide on what to do with these fish. The ISRP points out that these fish have demonstrated two significant biological competencies: the ability to spawn and produce offspring in Panther Creek and the capacity to successfully return to the stream as adults. As such they represent an important genetic resource that the ISRP concludes should be considered for incorporation into the broodstock or at a minimum be allowed to spawn naturally. Additionally, we concluded that using spring Chinook from the Pahsimeroi hatchery as broodstock, as suggested by the Tribe and NOAA, is reasonable given all the circumstances. As the project continues, interbreeding will occur between McCall NORs and newly introduced Pahsimeroi fish, either via hatchery crosses or under natural conditions. This interbreeding will eventually lead to a dilution of McCall genes and thus make the Panther Creek population another potential candidate that could be used for ESA recovery. As in Yankee Fork, significant habitat improvements in Panther Creek will have to occur in the future to make this a possibility.

4. *Provide estimates of adult returns and harvests based on actual data from the Snake River basin, including information recently documented by the Lower Snake River Compensation Program. How many hatchery origin and natural origin salmon might be harvested if the goal is to develop a self-sustaining natural population? Although a terminal fishery was not identified by the Tribes, this approach should be discussed along with information on whether the Tribes might consider this approach combined with periodic attempts to re-establish self-sustaining natural production.*

Terminal fisheries at Yankee Fork and Panther Creek were identified by the Tribes as the primary goal of the Crystal Springs Hatchery Program. To evaluate the number of adults that could be produced by the project, the sponsors used the AHA model to estimate gains in abundance under a variety of circumstances. The AHA model provides useful heuristic assessments about ongoing or planned supplementation programs, but NOAA's Recovery Implementation Science Team (RIST) cautions that the assumptions of the model limit its quantitative usefulness (RIST 2009). The ISRP believes that estimates based on empirical information collected on Salmon River and other Snake River spring Chinook Populations may provide a more realistic picture of potential benefits. Although apparently not used in their analyses, the Tribes provided SAR data from three hatcheries (Table 1). These values spanned a twelve year period making it possible to estimate mean SARs, 95% CIs around the mean and median values. SARs for Sawtooth and Pahsimeroi were included, and we recommend that they be used to estimate the range of potential adult production. We used the SARs provided and estimated that broodstock needs would be met about two thirds of the time and that full harvest opportunities would occur about 36% of the time.

Additionally, R/S data for eight upper Salmon River populations and seven Grand Ronde/Imnaha populations were presented (Table 5). Single R/S estimates were provided for each population, so it was not possible to estimate how variable these may be within the same population. They were nonetheless informative. For example, estimates of adult production from NORs spawning in Yankee Fork and Panther Creek could be generated. We recommend that the sponsors make such assessments as it will

help to craft harvest and natural spawner allocations when adults from their program begin to return. This kind of predictive exercise also provides an impetus to improve spawning and rearing areas as well as evaluate strategies designed to facilitate passage through the hydrosystem. Gains in survival at single or multiple points in the life cycle will increase R/S ratios and thereby increase population productivity. Consequently, we encourage the Tribes to continue gathering SAR and R/S data specific to this project. Such information will help refine the benefits derived from the program and may also shed light on the effects of any habitat improvements or other strategies used to improve survival.

Additionally, the response to the ISRP (page 21, second paragraph) states: "The MP proposes to continually test whether runs are sustainable by allowing NOR and HOR adult fish to spawn naturally when run-size exceeds broodstock needs. Offspring from these spawners will increase the number of adults returning to the subbasin in subsequent years and contribute to harvest and escapement." The ISRP remains unconvinced of this anticipated benefit, at least in the near term, based on the TRT viability analysis. However, if meaningful numbers of adults can be produced in Yankee Fork by natural spawning by hatchery adults there should be a response from the recent releases of adult salmon before the Crystal Springs Master Plan is complete. The response reports that some 500,000 juveniles have been produced, but adults from this juvenile production do not begin returning until 2012, so results are not yet available. Empirical observations from these experiments should be used to revise the SARs used in project modeling.

5. *Evaluate the effect of releasing 200,000 to 600,000 large smolts on natural origin smolts within and downstream of the release watershed.*

The sponsors performed an exercise using the PCD-Risk 1 Model to estimate predation by hatchery smolts on wild juvenile Chinook that predicted 3.2 to 10.5% wild fish mortality. The response mentions that Tribal and IDFG biologists feel that in reality such predation may not occur, and the ISRP agrees. In any case, the sponsors intend to evaluate it in the project area and make changes if it exceeds 5%. That appears to be a prudent approach. Beyond this initial examination, however, the Step 2 documents need to expand upon the recognition of predation and competition as an important uncertainty and design a monitoring program to evaluate the consequences of these releases on other important resources such as natural spring Chinook, bull trout, and steelhead. A decision tree is needed that guides the program based on the accomplishments realized.

The planned smolt quantity and their size-at-release have multiple potential biological consequences: straying of adults into adjacent watersheds; competitive, predaceous, and pathogen interactions with NOR conspecifics and other fish species; and demographic consequences ranging from increases in minijack and jack production to decreases in body size at maturity. All of these potential effects are recognized and discussed by the sponsors, but further refinements in how they will be monitored and evaluated need to be presented in Step 2 documents.

The Tribes have established a straying rate rule that states 5% or fewer of the fish spawning in non-project streams can be of project origin. If project fish account for more than 5% of the fish present, actions designed to reduce straying will be implemented. To monitor straying rates, two challenges must be overcome. First, some unambiguous way of identifying project fish must be available such as Parental Based Tagging (PBT) or some other type of tag (e.g. CWTs, PIT) or mark (e.g., an adipose clip accompanied by thermal otolith marks). Next, regular surveys must be conducted in stream basins or at hatcheries where strays may occur. An obvious question is how many fish should be sampled to

estimate the proportion of hatchery origin fish that might be present? In this situation two types of fish potentially exist, strays and non-strays. Confidence intervals can be placed around the observed proportion of both types of fish. The width of these CIs will be affected by how many fish are sampled, and by the value of the estimated proportion. The closer a perceived proportion is to 50% and the smaller the sample size, the greater the span of the CI and thus the greater the uncertainty of the true proportion. Adult spring Chinook returning to spawn in upper Salmon River tributaries are likely to be uncommon; inspecting them for origin will be challenging. Consequently, obtaining a reasonable estimate of stray rates may be a daunting task. For instance, if the true proportion of strays equals 5%, a 20 fish sample would have an approximate ± CI of 9.6 percentage points. Conversely a 400 fish sample would have a ± CI of 2.1 percentage points. Under these circumstances how will stray rates be assessed? Specifically, what locations will be sampled, how will hatchery fish be identified, what will sample size targets be, and what potential strategies are being considered to reduce straying (e.g. introduction of pre-smolts to within basin acclimation sites to enhance later imprinting on stream odors at smoltification)?

Determining competitive, predaceous, and disease effects of released hatchery smolts on other fishes will also be a significant challenge. As a starting point to monitor and assess potential ecological interactions between project smolts and other fish species, we suggest that the Tribes consider protocols such as those established by Todd Pearsons and colleagues (Pearsons et al. 1998; Pearsons and Hopley 1999; Ham and Pearsons 2001; Pearsons et al. 2002). Briefly, three steps are used in the interaction assessment procedure developed by Pearsons. First, determine whether spatial overlap occurs between released hatchery fish and other species of fish. Second, if overlap occurs, field methods are used to determine if changes in abundance, spatial distribution, size, or biomass have transpired during the supplementation period. And third, if changes have occurred, can they be reasonably attributed to supplementation. The approach was used to examine the impact of a spring Chinook supplementation program in the Yakima River system (Pearsons and Temple 2007; Pearsons and Temple 2010). This methodology could furnish the Tribes with an objective procedure that can examine the effects of their hatchery smolts on fish species living in Yankee Fork, Panther Creek, and the Salmon River. The field work and data obtained while performing this assessment may also generate information that can be used to quantify benefits associated with ongoing habitat improvement projects.

The Tribes' plan to evaluate the effects of smolt size in two ways. The first way is by comparing SARs, migration timing, age structure, straying rates and five other attributes of project smolts released at 10 fish per pound (fpp) (46 g) and at 20 fpp (23 g) over the first five years of the project. The ISRP recommends that size-at-age, fecundity, and egg size data also be collected during their size effects study. Additionally, although not implicitly stated, we assume (a) that releases of the two types of smolts will be paired so that the consequences of release location and date of release can be controlled, and (b) that the study will evaluate the effect of smolt size in both Yankee Fork and Panther Creek. The second way that the effects of smolt size will be evaluated is through the occurrence and frequency of minijacks. The sponsors cite work by Cassinelli et al. (2012) that indicates minijack rates in Sawtooth Hatchery spring Chinook are quite low and they expect that precocious maturation will be minimal in their project smolts.

The minijack rates obtained by Cassinelli et al. (2012), however, were estimated by using PIT tag data collected on minijacks as they migrated upstream in an attempt to reach their spawning grounds. Larsen et al. (in review) found that minijacks use three different life-history strategies; some become stream

residents, others migrate downstream and live in rivers or hold in freshwater reservoirs, while still others migrate to saltwater before migrating back upstream. Thus, using PIT tag recovery data may underestimate the occurrence of minijacks because some may never migrate far enough downstream to be detected in an upstream migration. In lieu of using PIT tag data, the ISRP recommends that plasma levels of the reproductive steroid ketotestosterone (11-K-T) be measured on smolts at, or just prior to, release (Larsen et al. 2004). Males with 11-K-T levels greater than 0.8 ng/ml are considered to be maturing minijacks (Larsen et al. 2004). A less sensitive method, determination of the gonadosomatic index (GSI) of sampled male smolts, may also be employed by the project. GSI values are ascertained by dividing the testes weight by the body weight of a male and multiplying the quotient by 100. Individuals with GSI ratios $\geq$ 0.1% are considered to be maturing males (Campbell et al. 2003; Larsen et al. 2004). These two methods would provide the project with an immediate and objective assessment of precocious maturation in males.

Determination of early maturation rates in project fish is important. Factors such as lipids and energy stores in artificial feeds, and size and growth rates at specific times of the year can strongly effect the production of minijacks (Rowe et al. 1991; Hopins and Unwin 1997; Silverstein et al. 1998; Shearer and Swanson 2000; Larsen et al. 2006; Larsen et al. in review). If early maturation rates are high then a reduction in the overall productivity of older and larger fish will occur. Also, meaningful modifications in smolt size and growth patterns cannot be made without an understanding of how these and other fish cultural conditions affect smolt traits. Further, this analysis may be useful when interpreting SARs of the release groups. Thus, careful annual monitoring of smolt attributes needs to become an important part of the monitoring and evaluation plan for the project.

Yellowstone Cutthroat Trout Program

1. Provide a plan and schedule for restoration of Yellowstone cutthroat trout in Fort Hall Reservation waters.

This information is no longer needed specifically for the Crystal Springs Master Plan, but the ISRP suggests it might be developed in the near future as a way to integrate the Fort Hall habitat project evaluated in the Resident Fish Review, the subbasin plan, and the sport fishery enhancement anticipated from the Yellowstone cutthroat trout production at Crystal Springs.

The Yellowstone cutthroat trout program was significantly altered by the sponsors. It now consists of annually raising up to 5000 fingerling cutthroat trout and releasing them into an oxbow lake located on the Fort Hall Reservation. Once released the fish will be allowed to grow and forage on their own, eventually becoming available to a Tribal and non-tribal trophy fishery.

The ISRP has some additional questions regarding this program:

1) What will the broodstock source be?

2) Will eggs be incubated and fry reared at the Crystal Springs Hatchery?

3) If so, what type of incubation and rearing methods will be employed?

4) What procedures, if any, will be implemented to reduce the immediate loss to avian predators of newly-planted cutthroat fingerlings once they are released into the oxbow lake? Will night releases be used? Will artificial food be provided? Will underwater feeders or other methods be employed to reduce the surface orientation of the reared fingerlings?

5) What is the risk of fish escaping and what precautions will be instituted to prevent these fish from escaping the oxbow lake?

6) How often will creel surveys occur and will any effort be put into assessing different rearing and release strategies on recruitment to the creel?

2. Incorporate key information on habitat conditions, genetics, and population status (especially recent published reports by Meyer et al. 2006, IDFG 2007) that is relevant to the Fort Hall Reservation and to this Step 1 Draft.

See comment above for #1.

3. Reviewers anticipate that larger adfluvial cutthroat trout might be most desired for harvest by tribal members and fee-paying non-tribal anglers in Fort Hall bottoms streams, but this aspect of the Master Plan was not emphasized and minimally described. A more thorough description of this aspect of the program is needed. Such activity would be justified and consistent with the Council's program and should be discussed in more detail if anticipated.

See comment in the recommendation. More information needs to be provided on the anticipated fishery in the oxbow lake.

Comments on Other Step Issues

The proposed Crystal Springs Hatchery will be located approximately 255 road miles away from potential release locations in Yankee Fork and some 240 road miles away from Panther Creek. The transport of smolting spring Chinook salmon to release locations is a logistical and biological challenge that the sponsors should discuss in Step 2, including a description of vehicles needed. Furthermore, it appears that adults returning to Panther Creek and Yankee Fork will be retained as broodstock, again presenting significant transportation and holding challenges. How these issues will be addressed needs to be described.

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