

Comments on the Initial Response to the Technical Review Panel Report For the Battle Creek Salmon and Steelhead Restoration Report

A six-member panel issued the initial Technical Review Panel Report (TRPR) in September 2003. The goal of the review was to provide a comprehensive evaluation of the technical merit of the Battle Creek Restoration Project, CA. The following comments represent the opinions of the Technical Review Panel (TRP) about the initial responses to our report and the draft Adaptive Management Plan. The major areas of our comments include general observations about the overall process and progress of the Project Management Team (PMT) and Adaptive Management Team (AMT), comments on specific responses, and comments on the Adaptive Management Plan.

General Observations

In general, the Battle Creek Project Management Team was very responsive to the TRP Report. The responses ranged from providing an explanation of how a decision or design was developed to specifications changed in response to the TRP Report. We have noted several Project team responses that seemed to dismiss the Technical Review Panel's concerns without adequate justification. Overall, it was apparent that the Team carefully reviewed our report and responded constructively.

The draft Adaptive Management Plan and table of uncertainties is a marked improvement over the plans we reviewed in August 2004. The Team has enlisted assistance for critical aspects of the plan and has made substantial progress. If the Adaptive Management Plan continues to improve at this rate, it will be an important example of adaptive management in large scale restoration projects.

Alternative Project Design

We are pleased to see that the Project and cooperators are carefully examining a broader range of alternatives. With respect to the analysis provided for decommissioning the PG&E facilities, the conclusions are understood that this analysis is in progress. There is an uncertainty assessment with respect to power values and construction cost however, certainty associated with the overall goal of resource restoration and uncertainty with respect to O&M is not addressed. We encourage the participants to maintain a long-term view of the costs and benefits and consider more than power value and construction because the project has more critical elements than these two decision factors.

Comments on Specific Responses

The following specific comments will identify responses that may not have been specific to the issue the TRP was trying to identify.

2.2.3.b: TRPR *"The Panel strongly encourages staff involved in the conceptual designs and interested parties to thoroughly review the final plans prior to contract award and construction."*

The PMT/AMT response did not address the comment of the panel. During our meeting with the PMT and agency staff it became evident to panel members that some staff were surprised at the specific designs in the drawings. An administrative procedure should be

set up to have agency staff review final designs before construction. As designs move from field visits, to concept, to design, and to construction, details that may have been important at the field visit stage are dropped by others as the tasks move from one person to the next. In a large project such as this, where many areas of diverse expertise are required, specifics can be missed. Final design check by agency experts does not need to lead to months of delay. Such a procedure can parallel the decision making process as the AMP and funding issues are addressed.

2.3.1.b: TRPR Abbreviated Comment-b: *“Decision makers should note that the endangered status of winter-run Chinook salmon gives this stock higher priority than other salmonid species and runs in the Sacramento River basin for actions by management agencies;”*

The AMT response: was that “The Recovery Plan does, however, identify a need to prepare a feasibility study for the reestablishment of a winter run Chinook population in Battle Creek.” Given that this project has a heavy fishery emphasis when the benefits are being pitched, the AMT should go further than just saying someone else will take care of that important issue. For example, in the Outline of reconceived version of AMP page 9, E, 3rd bullet “The AMPT could recommend that NOAA Fisheries facilitate development of the feasibility plan by 2006 when the Restoration Project is expected to be fully operational. The plan could include contingencies.” The above text from the AMT plan is a much better response and is in the best interest of CALFED if they are going to fund this project.

2.3.2: TRPR Abbreviated Comment: *“Elimination of cross-basin transfer of North Fork water into the South Fork would be a major benefit for adult and juvenile salmon.”*

TRP comment: The AMT Response reads “The MOU for the Restoration Project includes terms that guard against false attraction to the extent controllable by limiting planned maintenance activities to a wet season period having elevated South Fork flow volume to dilute North Fork water.” DILUTION IS NOT THE SOLUTION. The seasonal nature of juvenile salmon imprinting to stream odors and the seasonal nature of returning salmon adults make the selection of the maintenance periods critical. The timing is more critical than the dilution, because juvenile salmon can imprint on odors in very small concentrations. Furthermore, the imprinting is thought to occur over a relatively short period during the seaward migration. After spending millions of dollars to separate the flows, you will find that it is no substitute for taking into account the biology and physiology of salmon. This issue should be referred to the AMP.

2.6.1.1.1: TRPR Abbreviated Comment d: *“Throttling several feet of head with entrance gates may not provide appropriate fish passage conditions.”*

TRP comment: “PMT Response: This is a very technically complex part of the fishway design.” The TRP concurs with the PMT statement. But the PMT largely ignored the Review Panel’s comments and experience with fish screens in this region. Instead, they suggested that they had consulted with relevant agencies and did not address the Panel’s concerns.

2.6.1.1.3 Fish Screens (Inskip Diversion Dam)

2.6.1.7.1 Fish Screen Structure (North Fork Creek Feeder Diversion Dam)

2.6.1.8.1 Fish Screen Structure (Eagle Canyon Dam)

The PMT response to comments on fish screen structures generally does not recognize much technical merit in comments by the TRP on fish screen structures. The responses each end in a similar dismissive statement. For example, 2.6.1.1.3a: Fish Screens “if the louvers are kept in the same position, the change would require multiple alterations to the final design plans, but may not pose other significant complications”. 2.6.1.7.1a: Fish Screen Structure, “ if louvers are kept in the same position, the change would require a fair amount of changes to the drawings but may not pose other significant complications.” 2.6.1.8.1a: Fish Screen Structure, The designated representatives from the fisheries agencies were involved in this aspect of the design process and were in concurrence with the original design. (does not answer the question) 2.6.1.8.1b: the change would require multiple alterations to the final design plans, but may not pose other significant complications.” These cookie-cutter responses do not address the issue, which I believe was how consistent flows will be across the screen and will they be within criteria across the entire screen.

Two critical aspects of fish screen design deserve additional consideration: 1) fish screen position in relation to the downstream floor, and 2) screen cleaning brush system.

1. Post construction monitoring of fish screens (velocity measurements) with a similar configuration as proposed clearly demonstrates that the lower boundary condition, the floor, impedes flow in relation to flow through the upper part of the screen which, by comparison, is not impeded. The velocity vectors through the screen are perpendicular to the screen and the floor, again in relation to the upper portion of the screen, creates resistance to flow at the lower portion of the screen that is not experienced at the upper portion of the screen. Setting the screen on an incline is fine however, the benefit of doing so can be reduced with the present configuration for reasons noted above.
2. The entrapment of leaves and debris between brushes has been witnessed on a CDFG designed screen where there was no opportunity for the debris to be removed. This configuration should be avoided even if it requires some relaxation on other parameters for the frequency of screen cleaning.

Our comments were made based on experience of several panel members working on projects, mostly for the Corps of Engineers, which had oversight by a number of agencies, but primarily NMFS. These projects were mostly in the Pacific Northwest. Other panel member had extensive experience with these systems in California. We believe that acceptable design practices differ regionally. Panel members noted that well designed screens should not have fish impinged on them. This also seems to be a regional issue. The use of inclined screens is more common in California.

With the very large amount of money involved in that project, it may be penny wise and pound foolish to make a gate selection based on cost considerations. The actual cost of the gate is not that large when compared to the overall construction and program costs. The PMT Response is 'a vertical swing gate which would have provided better bypass flow conditions'. While they agreed with the central point of the comment, apparently no considerations is being made to change the design. They also mention the issues of having to provide a custom gate. We are not sure that this is really such a major factor. Gates of this size are not size are probably sitting on a shelf somewhere ready to ship.

Regarding the use of a gate at the at the bypass exit. Their response is 'This comment is currently being addressed.' These exit areas are very important to the proper functioning of the screens. We strongly encourage the Project to change this.

2.6.1.7.1: TRPR Abbreviated Comment d: *“The plunge pool shown on the plans is not adequately detailed.”*

The PMT response indicates “construction inspectors with input from fisheries biologists to ensure that the final product will provide the appropriate depths land characteristics to prevent predators from being an issue, but to still provide a safe means of escape for the bypassed fish”. Pretty loose design specifications for multimillion dollar project!

With respect to the Coleman tailrace issue, we were pleased to see that a concerted effort is underway for a permanent barrier. This is was unresolved when we met in Red Bluff.

Comments on Viable Population Sizes and Interim Quantitative Goal for inclusion with AMTT response to Tech Panel.

Page 3, Para 3 *“full expression of life history, dispersal, and the phenotypic diversity that can be distributed among diverse habitats may be as important as maintenance of genetic variation if populations are to remain resilient and productive in the face of natural disturbances (Healey 1994; Healey and Prince 1995; Rieman and Dunham 2000).”*

The above statement is critical if the interested parties really expect Battle Creek to become refugia for winter Chinook in periods of drought and warm conditions. I would sure like to see the authors follow up this statement with a little more consideration of the probability of “natural disturbances” and viable populations rather than dead ending the attachment by “Therefore, we refer the reader to the other non-quantitative aspects of viable populations.....”.

Comments on Outline of Reconceived Version of Adaptive Management Plan.

The AMP states that “The Adaptive Management objectives outlined in the AMP focus on management of hydroelectric operations within the Restoration Project to facilitate habitat changes beneficial to salmon and steelhead. There is expected to be a corresponding increase in salmon and steelhead populations as a result of these management actions.” It goes on to state that “To determine if the population objectives of the AMP are being met, assessments of population size, trends in productivity, population substructure, and population diversity must be compared to corresponding guidelines set forth by NOAA Fisheries.” These are critical statements of the goal of the Battle Creek Project and subsequent measures of success. These should be a high priority in all decisions, including the analysis of alternative project designs and the subsequent adaptive management plan.

Figure 3. It is not clear why gravel transport is considered part of non-Project restoration efforts. That seems to be a central aspect of the Project.

Pages 1-8 and Table 1 include an impressive list of studies that will serve the larger community well in describing the success, limiting factors, and possibly the failures of the project. If increased flows do not result in sufficient spawning habitat, rearing habitat, or temperature reduction what will be the response? The options at that point are very few, even if the monitoring studies are fully able to document the limiting factor.

The largest perturbations that management can affect change will be Coleman NFH, upstream passage structures, and downstream passage conditions. We understand that at some point, the structures will be deemed acceptable. Our concern is that management agencies are still making small incremental improvements in passage structures in the West built as long ago as 50 years and as recently as last year. With flow, the natural processes in Battle Creek will create the best conditions that can be expected. Natural passage barriers are an exception to this point because they may be corrected with structures or modification of channel. We have much less confidence in the long-term performance of man made structures with respect to fish behavior and survival than with the natural processes that will follow increased flows.

A few comments about salmon survival and the AMP/critical uncertainties are warranted. The use of survival goals or criteria for each life stage of salmon should be an integral part of these documents. The reader should not be referred to the MOU or other documents for information on salmon survival. Salmon survival for some life stages may not be able to be determined or may be very difficult for the near future. However, others like survival during outmigration of juveniles, prespawning mortality of adults, and estimated egg to smolt may be possible. We endorse the use of cohort replacement rates (CRR) as a fundamental goal. It may sound "salmon centric" but the survival of salmonids should be a much bigger driver in the AMP and list of uncertainties.

From Table 1:

"Observe adult congregations below dam and compare to ladder counts"

This is a flawed approach that will result in minimal information. The duration of delay relative to the salmon's point in their migration is the more specific issue. It may be difficult to obtain duration of delay from observing adult congregations.

"Monitor fallback with tagged test fish"

This monitoring needs to go a lot further to obtain prespawning mortality that might be associated with fallback.

"Measure and compare hydraulic parameters at fish screens for calculated and measured diversion rates"

This or associated tasks needs to go a lot further to monitor survival of juvenile fish passing.

Section **I.C.1. Watershed-Based Assessment of Limiting Factors** is a critical framework for the Project and its adaptive management. This section is very important and should be carefully addressed throughout the document.

Conceptual Models 1, 2, and 3 are important tools for explaining the Project and Adaptive Management Plan. These figures do not identify what biological or physical features or processes will be measured. It would be useful to either add a figure that illustrates the monitoring measurements or include these measures within the existing figures (though it may become overly complicated). Particularly in Conceptual Model 3, the proposed measurements could be indicated in bold font.

Draft Uncertainties Table for Reconceived Version of Adaptive Management Plan.

The many “Key Uncertainties” identified in Table 3 present a challenging list of physical and biological features or processes that would need to be measured. It would be wise to prioritize these Key Factors further and identify 1) uncertainties that will be measured within the Project and are absolutely critical for the Adaptive Management, 2) uncertainties that are extremely important and will be measured by the Project if funds are available or by other projects if coordination is possible, and 3) uncertainties that are important but less direct measures of the success of the project and will be measured through other efforts if possible.

The uncertainties with man-made structures and activities are much greater than for natural processes. For example, temperature is an interesting physical variable and knowing what the response to increased flows and returning spring flow to the creek will be of interest to future projects. However, the options are pretty limited after construction of this project. On the other hand, Model and node 3F-3T on Passage/Dams (Page 4, item 8) has been rated as a low risk because: “Not key because literature on this topic is generally accepted and robust. Fish screening has repeatedly been shown to improve outmigrant survival to adequate levels as defined in MOU”.

Spawning and population dynamics “factors” have many high risk uncertainties at numerous nodes. The real question is: So what will the AMP do about a limiting factor identified for that uncertainty? Answer: nothing! The “factor” is beyond the scope of tools currently available.

Consider bolding the uncertainties that might be corrected after construction of the restoration project is complete. Perhaps a rating system could be used, for example, indicating factors such as fish screening more likely to be solved than a shortage of spawning habitat.

The revised version of the Adaptive Management Plan for Battle Creek that was reviewed for the 13 Feb. 2004 meeting in Red Bluff included some substantial improvements over the earlier version of the plan. In particular, the sediment and geomorphic monitoring program proposed by Stillwater Science seems to address many of the issues raised by the review panel. However, three issues remain to be addressed with respect to monitoring during and after dam removal.

- 1) It will be important to conduct field measurements during dam removal operations in order to monitor turbidity and fine-sediment deposition on the streambed caused by construction activities and sediment mobilization associated with dam removal. Turbidity should be monitored during dam removal work, and for at least 1-2 days following the cessation of each episode of work.

- Fine-sediment deposition should be monitored during the first 2-3 days following cessation of each work episode and, if substantial deposition occurs, monitoring should continue until this sediment is flushed from the study area.
- 2) The sediment/geomorphic studies need to be tied more explicitly to riparian monitoring studies. For example, establishment, type, and density of riparian vegetation need to be correlated with locations and magnitudes of sediment erosion and deposition, and with type and stability of geomorphic surfaces along the river corridor.
 - 3) The sediment/geomorphic studies need to be tied more explicitly to monitoring of fish abundance and location, as well as to habitat assessments. Spatially and temporally explicit correlations between fish presence and stream condition will require that the various study teams coordinate sampling times and locations.

The AMP states that “The AMP sets policy regarding the management of Restoration Project-related fish populations, habitat, and passage when the MOU does not specifically address a policy issue. However, in cases where the language in the AMP may conflict with the MOU, policy regarding these topics will be set by the MOU. The MOU prevails in any discrepancy between policy specified in the AMP and that set by the MOU.” It would seem more appropriate for any differences to be resolved through ADAPTIVE MANAGEMENT. What is this process intended to accomplish if there is a loophole that one document “trumps” another document?

Again we want to emphasize that the Review Panel strongly endorses the use of cohort replacement rates (CRR) as measures of the success of the Project for fish population goals and objectives.

The Population Objective Four, there is no mention of juvenile life history stages. The AMP still does not address juvenile life history stages. Apparently none will be measured. This would omit a critical piece of the information that is essential to understand if and why the Project succeeds in meeting its goals. Much more attention should be devoted to integrating the monitoring measurements into a full life cycle monitoring system. The Project could coordinate and gain valuable experience from similar integrated life cycle monitoring sites that have been established in Oregon by Oregon Department of Fish & Wildlife.

Habitat Objectives are poorly described. It will be critical to measure use of habitat types by different life stages of salmon and steelhead, but the AMP is extremely vague about what will be measured, when it will be measured, and where it will be measured. This section of the AMP could be improved substantially.

Fish passage efficiency will be measured only through indirect evidence of aggregations of fish. This is a very indirect and poor assessment of passage success. Distribution is important BUT direct measure of passage efficiency is essential. Tagging studies will be needed. This is a critical aspect of the restoration, and strong quantitative measures are essential. The AMP states that “Passage of fish at fish ladders may be studied with tagged fish if warranted.” The Review Panel recommends strongly that it is warranted!

The AMP states that “Juvenile abundance will be determined at the sites by direct counts, by species and by size class.” We encourage the Project to calibrate the direct counts with electroshocking (mark-recapture) for a small portion of the sampled area.

We also encourage the Project to measure the abundance of non-salmonids. Many of them are important resource issues in and of themselves, and all species may influence the carrying capacity and success of the Project.

The Battle Creek Project is EXTREMELY important opportunity to gain an understanding of an important question for the Pacific Northwest. How do salmon and steelhead use coldwater refugia at the scale of stream networks, stream reaches, bedforms (pools and riffles), or microhabitats. Every effort should be made to guarantee that we learn from this valuable opportunity. Regional agencies and universities should be contacted to let them know about the research opportunities. We encourage the Project to publish a small overview of the project in Fisheries and invite researchers from around the country to coordinate and expand the monitoring and research effort.

Data management, public availability of data and syntheses, and a regular process for sharing the information is critical. This could be tied to the annual decision-making process. This section of the AMP needs additional information.

At the start of the AMP, there needs to be a discussion of the prioritization of the key factors, the implications for selection of measurements (direct, indirect, models, regional information, none), and links to funding availability

If the Adaptive Management Plan is not going to be a stand-alone document, then there needs to be a road map or cross walk that leads readers to the right information in appropriate documents. If it is going to be a stand-alone document, more information must be included in appendices.

Again, the Technical Review Panel emphasizes the major improvements that we found in the Adaptive Management Plan and the Project Management Team's responses. We appreciate the straightforward discussions and hope these comments and observations contribute constructively to the process.

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*Gathard did not participate in this response due to his involvement in assessment of alternatives.