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MEMORANDUM TO: 151422SWR2004SA9116 (PCTS# 2008/09022)

FROM: 
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SUBJECT: Summary of CALFED Peer Review Results and NMFS' Response

This memo summarizes the major comments from CALFED Peer review panel report and NMFS' response to those comments. In general, NMFS found the peer review to be very constructive and informational. NMFS made many revisions to the December 2008 draft biological opinion (Opinion) that the Panel reviewed in response to their comments. Rhonda Reed was the lead for the peer review, and worked closely with CALFED to develop the peer review charge and review the results. Ms. Reed compiled the summary comments below. NMFS' response was compiled through review by each Division lead and summarized in the below Table.

NMFS' Summary of Positive Feedback from CALFED Review Panel:

- 1) NMFS made a great deal of progress to address important aspects of the 2005 review comments. The three overarching issues in the 2005 review were: lack of a conceptual framework, need for an analytical framework, and use of a life cycle approach.
- 2) The Opinion (and BA) include an enormous amount of scientific information and this information appeared to be, in most cases, up-to-date. Given the complexity of dealing with four species in a complicated system, the comprehensive accumulation of the information is admirable.
- 3) The Opinion (and BA) addressed a major comment of the review of the 2004 Opinion by including climate change in their analyses.
- 4) Using peer review as part of the development of the Opinion is lauded and encouraged.
- 5) The ingredients for a very high quality, transparent, and defensible Opinion are now available. Time constraints imposed by court deadlines may prevent the absolutely best Opinion from being produced right now.



Key quotes from CALFED Peer Review report (Anderson, *et al.*, 2009):

“The BO relies heavily on the analysis of project effects at the individual level by life stage, which was the strong point of the analysis, and then accumulates these effects by making a list of the individual effects to infer higher order (population, species) effects. The population and species level analyses are the weak aspect of the BO that can, and should be, elevated to next level of quantitative analysis, at least for the salmon species.”

“Despite the limits to our review and the shortcomings we perceive in the BO, the Panel is of the opinion that the decisions of jeopardy for the considered species are reasonably based on the preponderance of evidence presented for the numerous individual stressors that affect the species from the upper watershed through the Delta. The Panel understands what led NMFS to their decisions, and the Panel has no basis for thinking that the jeopardy decisions are incorrect.”

“...the convincing accumulation of individual effects at the life stage level related to project operations, the poor general state of the populations, and the requirement to resolve doubt in favor of the species, led the Panel to judge that NMFS’ conclusions were robust.”

“In general, we found the assumptions to be clearly stated and reasonable, and the information and data used in analyses to be current.”

“The framework applied by NMFS does adequately cover the likely important responses and effects, within the limits of available information. There are always more responses and effects that could be examined, but the Panel determined that the list of effects and responses analyzed by NMFS was reasonable.”

“The BO generally addresses the appropriate temporal and spatial aspects of fish and ecosystem needs. The analyses by Divisions help to enable a logical progression from upstream to downstream.”

“The analytical framework does allow appropriate consideration of climate change. The analytical framework works equally well with assumed future climate change as without, and thus is completely compatible with appropriate consideration of climate change.”

“The analyses presented in the effects section of the draft BO support NMFS’ conclusions. The argument is clear – when you collate all of the many individual effects from project operations by life stage, NMFS is convinced that the long list justifies their jeopardy/no jeopardy decisions. The BO is an opinion so expert judgment should and does play a major role.”

Table 1
Comments from CALFED's Peer Review of NMFS' Dec 2008 Draft CVP/SWP Operations Opinion, and NMFS' Responses
Updated May 25, 2009

CALFED Broad/General Comment (paraphrased by NMFS)	NMFS' Response
<p>1. Quantitative, integrated analysis is needed, using common measures of survival, especially for salmon. The life stage analyses are good as far as they go – but a life cycle model would allow for better quantitative integration of effects in different parts of the system. The Northwest Fisheries Science Center has been a resource for NMFS in the Columbia River Basin. The Southwest Fisheries Science Center should be a resource for NMFS in the Central Valley in developing and utilizing these tools.</p>	<p>NMFS agrees with this comment in part, and disagrees in part.</p> <p>Section 2.4.2 of the Opinion addresses our consideration of a quantitative life cycle approach to the analysis. NMFS did not apply a quantitative life cycle approach to this consultation because: (1) we do not have survival rates at various life stages under both natural conditions (<i>i.e.</i>, “without project”) and those conditions observed with the project in place (<i>i.e.</i>, “with project”); and (2) although life stage specific survival rates are available in the Columbia River Basin, they are not directly applicable to the Central Valley. The CALFED peer review panel acknowledged that the use of the IOS or OBAN models may not be practical for this consultation because of time constraints, and the need for refinements and additional modeling expertise in order to implement the models.</p> <p>A quantitative life cycle analysis would place great weight on abundance. Our analysis using VSP (McElhany <i>et al.</i> 2000) considers much more than a quantitative analysis of the effect of the action on abundance, but includes growth rate, spatial structure, and genetic diversity of the species. Within the broader VSP framework, quantitative analyses are contained throughout the effects section and integration and synthesis where data are available.</p> <p>Additional modeling incorporating a life cycle model (<i>i.e.</i>, IOS model), SALMOD, and Reclamation's Salmon Mortality model were utilized for the analysis of fall-run/late fall Chinook salmon as prey for Southern Resident Killer Whales (Appendix 3, Hannon, J. CVP/SWP operations 2/17/09). This analysis calculated smolt-to adult-survival rates and Delta survival rates (Newman, K. 2008) to derive population level impacts on natural origin fall run Chinook system wide in the Central Valley. As a prey species, the abundance of</p>

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	<p>these non-listed salmon runs is most critical factor to the analysis.</p> <p>In response to this comment, as an integrative tool, NMFS weighted the evidence it relied in terms of both magnitude of effect and certainty of information. This weighting became the basis of the key lines of evidence used in the jeopardy and adverse modification analyses, and further highlighted our use of quantitative analyses, where available, within the larger context of VSP.</p> <p>NMFS agrees that further collaboration with the Southwest Fisheries Science Center on quantitative tools is important. In response to this comment, NMFS has developed a scope of work, and is in discussions with the Southwest Fisheries Science Center regarding further refinement of existing lifecycle models to provide for their application to future iterations of the CVP/SWP Operations.</p>
<p>2. Ocean conditions were not treated as an important stressor for the species. The Panel understood the logic, but felt that given the potential effect of ocean conditions on survival, it is too important to treat casually.</p>	<p>NMFS agrees. Following the Panel's report, Lindley <i>et al.</i> (2009) was published. This report identifies poor ocean conditions as the proximate cause of the collapse of the 2004 and 2005 fall-run brood years, but identifies the degradation and simplification of freshwater and estuary habitats over a century and a half of development, as well as hatchery practices, as the ultimate causes of anadromous salmonid declines in the Central Valley. The importance of ocean conditions on salmon productivity is discussed in detail in the Status section. A discussion of Lindley <i>et al.</i> (2009) has been incorporated into that section as well as into the Integration and Synthesis.</p>
<p>3. Unclear definition of baseline and lack of modeling of baseline condition make the analysis of project effects difficult.</p>	<p>NMFS agrees in part, and disagrees in part. Section 2.3.3 of the Opinion has been modified substantially in response to this comment, to clarify our application of baseline condition, and to ensure that it reflects current case law. Reclamation did not provide us with a model run of the baseline condition, and therefore, we were not able to evaluate operations compared to nondiscretionary deliveries of water, for example. NMFS agrees that the lack of modeling of baseline condition made the analysis of project effects more challenging than if a clear baseline condition had been modeled. Nevertheless, our definition of baseline and analysis are appropriate, are consistent with that of FWS in their Smelt Opinion, and are consistent with case law.</p>

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4. The analysis contains inconsistent treatment of climate change among Division analyses. Climate should be treated as a baseline condition not as an add-on effect.	NMFS agrees. NMFS acknowledges that in the draft Opinion that the Panel reviewed, climate change appeared to be add-on effect after our analysis of effects of the proposed action. The effects of climate change would occur with or without the project, and therefore, is considered a (future) baseline stressor. The analysis of effects, however, is still awkward because Reclamation's model runs add the effects of various climate change scenarios after running the analysis for study 8.0 (full build-out scenario). See response to comment #3. In response to this comment, we have revised the text of the baseline sections and Division sections to be consistent and indicate that climate change is a baseline stressor.
5. The draft document is not well organized for "readability." It contains considerable redundancy.	NMFS agrees. NMFS has modified the Opinion to make it consistent among divisions, and eliminate redundancy. NMFS has received many comments, from Reclamation and DWR, peer reviews, and throughout the internal review process, and attempted to find a balance between reducing redundancy, and being purposefully redundant to ensure that the reader knows that there is not a gap in information presented. Due to the significant complexity of the project description, and the geographic and multi-species scope of the opinion, the opinion is lengthy. We have attempted to improve readability by including summaries at the beginning of every major section.
6. The draft document contains lack of consistency in analyses, particularly among Divisions.	NMFS agrees in part and disagrees in part. NMFS has modified the Opinion, where appropriate, to make it consistent among divisions. However, the division analyses should not be completely consistent because of differences in, for example: (1) the amount of information provided in the project description (<i>e.g.</i> , the project description for the East Side Division was not clear, so operational assumptions, carried through the analysis, were necessary); (2) the quantity and quality of data used in our analysis (<i>e.g.</i> , actual RBDD counts and carcass surveys for winter-run population estimates, versus CVP and SWP fish facilities salvage records and modeling exercises to analyze the effect of Delta pumping on entrainment of juveniles salmonids); and (3) the varying complexities among the divisions (<i>e.g.</i> , Clear Creek with 2 listed salmonids, versus the Delta, with 4 listed salmonids and many more baseline and project-related stressors).

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<p>7. The draft contains inadequate treatment of uncertainty. Opinion does not clearly state the limitations of data, such as small sample size, statistical significance of observed differences, and the risks associated with synthesizing information from multiple sources.</p>	<p>NMFS agrees in part and disagrees in part. Where applicable, we have consistently presented the spectrum of results, rather than rely on individual data points. We have also highlighted potential limitations of the data in our narrative analyses. However, the Opinion is not the platform to analyze scientific reports and papers for their scientific merit. The administrative record for this CVP/SWP operations consultation contains the information/data sources that we used, including but limited to the Biological Assessment, and the analyses that we conducted in order to produce the summary of our analysis provided/presented in the Opinion.</p> <p>NMFS does agree that it is important to use a weight of evidence approach to consistently evaluate risk and uncertainty when considering multiple sources of data and analyses that cannot be readily combined quantitatively. In the final Opinion, we have included this weight of evidence approach consistently and explicitly in our integration and synthesis section and in drawing conclusions.</p>
<p>8. The panel noted a need for additional hydrologic modeling expertise in-house at NMFS to conduct sensitivity analyses (explore understanding of uncertainties) and to conduct direct evaluations.</p>	<p>NMFS agrees. NMFS understands that this recommendation applies to both the short-term and long-term. In the short term, we were able to obtain some outside consulting assistance from Tetra Tech to analyze Shasta storage and Sacramento River actions, and modeling support from the USFWS and another NMFS division to analyze RPA actions (specifically the Stanislaus River flows and San Joaquin actions). Tetra Tech will continue to provide us with modeling assistance beyond this consultation, and in time, we hope to have a modeler in-house.</p>
<p>9. Lack of specifics about steelhead makes quantitative analysis difficult. Use of fall-run Chinook as a surrogate has limitations, such as with analyzing temperature effects on steelhead egg incubation, given that fall-run spawn earlier than steelhead, so they likely would experience warmer incubation temperatures than steelhead. Fluvial geomorphology could be used more effectively.</p>	<p>NMFS agrees that limited information regarding CV steelhead results in uncertainties in the analysis. NMFS used best available scientific information on steelhead. Where specific information on steelhead was lacking, we appropriately used surrogates (<i>e.g.</i>, fall-run) when applicable (<i>e.g.</i>, similar life history needs and timing).</p> <p>In our final Opinion, in response to peer review, we included a greater recognition and analysis of geomorphologic information and effects, for example, in the lower Sacramento River and the Stanislaus River.</p>

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<p>10. Lack of specifics about green sturgeon make analysis difficult and using salmon as a surrogate has limitations. The Panel offered new references from other Northwest populations that could offer better comparative information. The panel also verified that VSP framework can and should be applied to sturgeon.</p>	<p>NMFS agrees. NMFS revised the Opinion to incorporate sturgeon information provided by the panel into the appropriate sections. Additional recent references were also included in the analysis of green sturgeon effects. NMFS used the VSP framework for analyzing project effects on green sturgeon.</p>
<p>11. Delta planning processes (Delta Vision, BDCP) and other future-looking studies (Lund et al. 2008), should be incorporated at some level into the interpretation part of the BO (e.g., as part of cumulative impacts). These efforts examine possible changes in the Delta ecosystem into the future which can greatly affect project operations and the population dynamics of the endangered species.</p>	<p>NMFS agrees in part, and disagrees in part. NMFS agrees that these broader Delta efforts are important for understanding the overall context of how this Section 7 Opinion will likely need to be re-initiated, and therefore change, over time. NMFS communication about this Opinion will reflect this broader array of possible future actions in the Delta.</p> <p>NMFS disagrees that these actions should be included as a formal part of the Opinion (e.g. as cumulative effects). Standards for including future actions into the cumulative effects section are that they need to be reasonably certain to occur, and cannot have a Federal nexus. The BDCP process is mentioned in the RPA, and is also included as a section 7(a)(1) conservation recommendation. BDCP, Delta Vision actions, or future actions being considered will have a federal nexus and therefore will trigger additional or revised Section 7 analyses and biological opinions.</p>
<p>12. The lack of quantitative integrative tools will hinder the development of RPA, because NMFS cannot presently quantify the relative contributions of the different project effects to population status nor can NMFS quantitatively determine the potential benefits of specific remedial actions to population recovery. Without this information, it is difficult to rank the</p>	<p>NMFS agrees in part and disagrees in part. NMFS acknowledges that the lack of quantitative integrative tools limits the analysis to some degree, but also is concerned that a strictly quantitative abundance oriented analysis would not represent the best available science, because it does not follow a VSP framework or TRT reports. (See NMFS responses to comments #1 and 8).</p> <p>NMFS has received assistance from contractors and USFWS to use existing tools to determine the feasibility and water costs of various actions within the RPA.</p>

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many possible remedial actions by their biological effectiveness relative to their fiscal and social costs in order to logically develop an optimal mix of actions.	The RPA was substantially changed following the draft that the peer review panel reviewed and after the Panel's report. The methodology for developing the RPA is fully explained in the RPA section of the Opinion. The RPA actions do address the most important adverse effects of the project on the listed species in an explicit and logical fashion, and are economically and technologically feasible, as required by regulation.

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- Lindley, S.T., C.B. Grimes, M.S. Mohr, W. Peterson, J. Stein, J.T. Anderson, L.W. Botsford, D. L. Bottom, C.A. Busack, T.K. Collier, J. Ferguson, J.C. Garza, A.M. Grover, D.G. Hankin, R.G. Kope, P.W. Lawson, A. Low, R.B. MacFarlane, K. Moore, M. Palmer-Zwahlen, F.B. Schwing, J. Smith, C. Tracy, R. Webb, B.K. Wells, and T.H. Williams. 2009. What caused the Sacramento River fall Chinook stock collapse? Pre-publication report to the Pacific Fishery Management Council. March 18. 57 pages plus a 61-page appendix.
- McElhany, P., M. H. Ruckelshaus, M. J. Ford, T. C. Wainwright, and E. P. Bjorkstedt. 2000. Viable Salmonid Populations and the Recovery of Evolutionarily Significant Units. NOAA Tech. Memo. NMFS-NWFSC-42. U.S. Dept. of Commerce. National Oceanic and Atmospheric Administration. National Marine Fisheries Service. 156 pages.
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