

**CALFED SCIENCE PROGRAM LEAD SCIENTIST AND  
ENVIRONMENTAL WATER ACCOUNT AGENCIES<sup>1</sup>  
JOINT RESPONSE TO 2004 ENVIRONMENTAL WATER ACCOUNT  
TECHNICAL REVIEW PANEL REPORT**

<sup>1</sup> EWA agencies are the California Departments of Water Resources (DWR) and Fish and Game (DFG); U.S. Department of the Interior, Bureau of Reclamation (USBR) and Fish and Wildlife Service (USFWS); and U.S. Department of Commerce, National Marine Fisheries Service (NMFS).

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**Introduction**

The CALFED Science Program Lead Scientist (Lead Scientist) is responsible for evaluating the Environmental Water Account (EWA) each year. The Lead Scientist assembled an EWA Technical Review Panel (Panel) of independent technical experts to conduct a review each year, with the charge of evaluating the scientific information supporting water acquisition and protective fish action decisions. In the final year, the Panel evaluated the first four years of EWA and continuation of EWA. The Panel charge was to evaluate the logical and scientific merits of implementing EWA, but not to provide a recommendation whether EWA should continue. The Panel met for the last time in November 2004, and provided its report to the Lead Scientist in January 2005. The Lead Scientist and EWA agencies<sup>1</sup> have prepared a joint response to the Panel's report.

The Panel acknowledged continuous progress in water supply reliability and acceptable fish protection, reduced political conflict, water acquisition, communication, documentation, and specific areas of scientific investigation and science-based management. The Panel acknowledged recent improvement in understanding of delta smelt and Chinook salmon ecology, water operations modeling, and the CALFED Science Program Proposal Solicitation Package (PSP).

The Panel's greatest concern was the need for EWA agencies to expand the research base and upgrade the quality of science that underlies EWA program decisions. The Panel anticipates that if some EWA funding shifts from public to private sources, those stakeholders asked to help pay will demand more evidence that the program is meeting the objectives of species protection and recovery. This document outlines the commitment of the CALFED Science Program and EWA agencies to implement actions that will provide information to help address the concerns and suggestions in the Panel's report.

The Panel recommended ways to improve the EWA implementation and review process, including using and interpreting operations gaming; using and interpreting fish, climate and salmon mortality models; obtaining model peer review; initiating new research; expanding the review audience; increasing interaction with the Panel during the review; reducing frequency of reviews; and re-evaluating the role of the Science Advisors. The Lead Scientist and EWA agencies are responding to each suggestion by describing an action, a goal, a timeline and commitments from the Science Program and agencies to achieve the goal. This response addresses the Panel's suggestions generally in the same order as were discussed in the Panel's report.

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The original Panel completed its assignment and formally resigned. The Lead Scientist will assemble a new panel with a slightly different structure and a slightly different charge. Some former members may be among the new panel members. The Panel recommended, and the agencies concur, that EWA review frequency occur biennially rather than annually; therefore, EWA agencies will organize an EWA workshop for fall 2005, but not a formal review. Several Panel members may be invited as appropriate.

### **Purpose of Panel Review**

The Lead Scientist is responsible for evaluating EWA at the end of every water year. To meet this obligation, the Lead Scientist assembled a standing panel of technical experts (EWA Technical Review Panel) who have not been involved in the EWA implementation. Panel reviews in each of the first three years focused on: (1) the scientific information underlying actions taken; (2) the incremental changes in the way decisions were made; and (3) the technical basis for those decisions. In contrast, the Year-4 review focused on two topics: (1) the first four years as a whole; and (2) continuation of EWA. As in previous reviews, the 2004 review focused on technical aspects of EWA planning and implementation.

The Panel met from November 8 through 10, 2004. The purpose of this independent review was to evaluate and comment on: (1) technical basis of results and conclusions from EWA operations over the first four years; (2) technical information and tools applied in planning for EWA program continuation; and (3) science priorities and commitments proposed for the continuing EWA program (Attachment 1). The review was not intended to yield judgments about the success or failure of the EWA program, or to obtain a recommendation on whether EWA should continue past Year 4. The Panel submitted its observations and suggestions to the Lead Scientist and the California Bay-Delta Authority (Authority) in a report dated January 17, 2005 (Attachment 2). This document constitutes a joint response to that Report from the Lead Scientist and EWA agencies (DWR, DFG, USBR, USFWS, and NMFS).

### **Positive Findings**

The Panel acknowledged continued improvement in the areas of: (1) assuring water supply reliability while providing an acceptable level of fish protection, (2) reduced conflict between agencies and stakeholders related to water management, (3) water acquisition, (4) program documentation, (5) interagency communication, and (6) some areas of scientific investigation and science-based management. The Panel was encouraged by the improvement in understanding of delta smelt ecology, winter-run Chinook salmon adult spawning estimates, Chinook genetics, juvenile Chinook mortality, the use of water operations gaming, and the release of the CALFED Science Program's PSP emphasizing water operations issues.

The Panel highlighted the scientific information about delta smelt developed over the past four years, and how management has made substantial progress beyond the use of simple "take at the pumps" as the primary management criterion. Although methods

to estimate populations of delta smelt have not undergone peer review, recent investigations are developing a method for calculating population abundance estimates in the future. Because delta smelt are a Federally listed threatened species under the Endangered Species Act (ESA,) the Management Agencies (MAs), consisting of DFG, USFWS and NMFS, must consider “incidental take”. However, over the last four to five years (concurrent with the implementation of EWA), the MAs also have considered such factors as apparent abundance and distribution, maturation stage, duration of spawning season, and relative vulnerability to entrainment when recommending protective actions to the Water Operations Management Team (WOMT), based on the delta smelt decision tree proposed by Nobriga and others in 2001. The new delta smelt decision process developed for the USFWS’s Biological Opinion for the 2004 Central Valley Project (CVP) and State Water Project (SWP) Operations Criteria and Plan included updated information, and a tabular decision matrix in place of the former checklist-style process. The new decision process incorporates new information, defines a new “concern level” for adult delta smelt, adds clarifying footnotes for each of the tools and life stages represented in the matrix, and better represents the process of formulation of recommendations already used by the Delta Smelt Working Group. The new decision process formalizes recent management policy, which is to pro-actively manage to reduce population effects and implement measures intended to minimize incidental take, rather than responding to situations where incidental take has reached levels requiring re-initiation of Section 7 ESA consultation.

### **Improving EWA Review and Implementation Process**

The Panel suggested ways to improve both the review and the implementation of EWA. Responses to those suggestions are provided below. In each case, the Panel’s suggestion is followed by an action or actions to be taken, the goal of that action, the timeline in which we expect to attain the goal and commitments from the agencies and the CALFED Science Program to achieve the goal. This response thus forms the framework of a plan to address the important issues identified by the Panel, with the overall goal of increasing the efficacy of EWA.

**Use and Interpretation of Gaming (Suggestion 1).** The Panel identified the water operation gaming as a powerful modeling tool, as long as the process is transparent and rigorous. It recommended incorporating more biological information and treating uncertainty explicitly.

- A. Action: Document gaming objectives clearly. Set up a technical panel of outside experts on modeling, gaming, ecosystem dynamics, risk assessment and fish biology. Team this panel with appropriate agency scientists/managers familiar with EWA and the broader water operations system.
- B. Goal: Expand gaming to include a more rigorous biological basis, and include uncertainty/probability distributions in decisions for any future long-term EWA.
- C. Timeline: Establish a schedule needed for actions on decisions for any future long-term EWA.

D. Commitments: CALFED Science Program: Establish and fund technical experts. EWA agencies: supply staff participation, organization and logistics.

**II. Interpretation and Use of Models.** The Panel was concerned that there was insufficient, and in some cases, inappropriate use of models to design and size EWA. Despite previous Panel recommendations, the hydrodynamics and Particle Tracking Model (PTM) were not used in planning or real-time operations. The biological models that were used were overly simplistic and lacked biological basis.

A. Fish Population Models (Suggestion 1)

1. Action: The CALFED Science Program PSP called for research supporting development of specific models, including those related to delta smelt and salmon. If approved by the Authority, some of these proposals will be funded in 2006. EWA agencies will continue developing the Delta Smelt Decision Matrix. EWA agencies will continue to support the Interagency Ecological Program (IEP) and other researchers attempting to develop population estimates and models for delta smelt and encourage their submission for peer review and external assessment.
2. Goal: Establish accepted, peer-reviewed model(s) that can be used in informing EWA decisions through modeling population-level effects of water operations.
3. Timeline: Fund CALFED Science Program PSP proposals in early 2006 related to modeling, and a workshop in Fall/Winter 2006 to examine progress of modeling efforts.
4. Commitments: CALFED Science Program: Fund CALFED Science Program PSP proposals as approved by the Authority, and facilitate workshops on delta smelt models with emphasis on developing the framework for ecosystem-level models encompassing delta smelt population effects. EWA agencies: Supply staff participation in workshops, and incorporate modeling into decision making. The Science Program and agencies will develop a protocol for improving the efficiency and use of the PMT.

B. Climate Change Scenarios (Suggestions 2 and 4)

1. Action: Coordinate with ongoing modeling by DWR (Mike Floyd) and USGS (Mike Dettinger) to establish potential future scenarios for water operations (California Water Plan, DWR Bulletin 160 process) for flow, temperature, salinity, and other factors. This may necessitate separate workshops to discuss EWA-specific effects after future scenarios are developed. Actions will require a combination of review, workshops, technical panels and directed research.

2. Goal: Facilitate move from using historical hydrographs for planning future water management strategies to using probability distributions of future flows based on climate and watershed model projections.
3. Timeline: This is a long-term effort lasting over the next five years and will be implemented along with other efforts as appropriate.
4. Commitments: CALFED Science Program: Help coordinate efforts to identify the implications for project operations and EWA with other agencies developing climate change workshops and efforts. EWA agencies: Staff participation in reviews, workshops and research, and incorporate outcomes into long-term EWA acquisition and management decision processes.

#### C. Juvenile Salmonid Mortality Estimates (Suggestion 3)

1. Action: Increase monitoring of juvenile fish, including salmonid emigration and survival through the main-stem rivers and the Delta to develop better estimates of mortality throughout the system. There are additional needs for population models. This will require evaluation of the use, or expanded use, of a variety of monitoring techniques, potentially including bioacoustic tracking, Passive Integrated Transponder (PIT) tagging, coded wire tagging, rotary screw trapping, beach seining, and trawling. The Science Program initiated this effort through the sponsorship of a PIT tag seminar in 2005. The CALFED Science Program PSP selection panel recommended funding for a sonic tracking system. Establish an expert panel for salmonid monitoring technology to inform a request for directed research proposals. Future workshops will be held on potential technologies and applications, followed by a call for directed research proposals. Expansion of salmonid monitoring and research is a high priority for IEP Plus Project Work Team (PWT).
2. Goal: Establish an improved juvenile salmonid monitoring system in the main-stem rivers and the Delta to provide calibration data for models to assist in describing the effects of EWA fish actions on salmonid populations.
3. Timeline: Establish the panel for salmonid monitoring technology by March 2006. Schedule a salmonid monitoring workshop by June 2006. Fund request for directed research proposals by September 2006.
4. Commitments: CALFED Science Program establish expert panel, coordinate workshop(s) on existing salmonid monitoring techniques, and coordinate and fund request for proposals. EWA agencies: Supply staff to participate in workshop(s) and evaluate techniques. A draft proposal to develop a comprehensive monitoring plan is expected from the IEP Plus PWT in early 2006.

#### D. Peer Review of Models (Suggestion 5)

1. Action: Peer review of all models, decision trees, gaming, etc. Modeling should be scoped and constructed to answer specific questions and incorporate and describe uncertainty. Models will be subject to external peer review. Approaching the California Water and Environmental Modeling Forum for advice or assistance is an option; another is funding post doctorates to work with agency scientists to prepare models and decision trees for publication in the peer-reviewed literature, to ensure acceptance by both agencies and stakeholders.
2. Goal: Have all models that are used for management decision making be peer reviewed and available to the public.
3. Timeline: The CALFED Fellows Program cycle is complete for 2005, but it will be available each year with a closing date about mid-May. Agencies should write a proposal for one or more of these post doctorates. Review of specific models could be done via panels, etc, and will need to be developed with agencies to fit into timing of other work/decisions. This should be started as soon as staff and resources allow.
4. Commitments: CALFED Science Program: Facilitate peer review of models. EWA agencies: Supply staff to participate in review process, and incorporate outcome into management decision making.

#### E. New Research (Suggestion 6)

1. Action: Expand directed research on biological questions related to EWA and increase collaboration between agency scientists and academic scientists to work on these questions. The CALFED Science Program PSP is nearly complete and includes several projects that address EWA issues. Agency scientists are among those who applied for funding through the CALFED Science Program PSP; EWA agencies will work collaboratively with the CALFED Science Program and its grantees in the development of a body of work that further supports the technical basis for resource decisions. The Science Program has also released a call for proposals for post doctorates and research assistants to work on CALFED problems. The IEP Pelagic Organisms Decline (POD) PWT will continue the investigation of reasons for the decline in pelagic organisms in the estuary, including a possible linkage to increased Delta exports.
2. Goal: Incorporate more of the results of directed research into EWA decision process. This will require better and more detailed analysis of existing data sets driven by models and hypotheses. Improve access to and expertise with the PTM and expedite distribution of results.

3. Timeline: CALFED Science Program PSP grants will be out in early 2006; post doctorates will be supported in September 2005 and each year after for five years. The IEP POD PWT research will continue to focus these studies to assess cause and effects, identify potential immediate results, create a directed research proposal including budget for 2006, and initiate a proposal for longer-term program needs. It is anticipated that substantial additional funding will be sought for 2006 and beyond, with the potential to provide information in a very timely manner.
4. Commitments: The CALFED Science Program will fund approximately \$6-10 million of new research starting in 2006. Much of that work is related to water operations and fish populations as approved at the August 2005 Authority meeting. EWA agencies: Supply staff to participate in the IEP POD PWT.

**III. Improving the Review Process.** The Panel recommended some changes to EWA review process to strengthen and improve future reviews with a new panel.

- A. Include Broader Audience and Better Dialog with the Panel (Suggestions 1 and 2).
  1. Action: The Science Program will establish a new review Panel and request assistance from the new Panel members in the development of the agenda/charge/organization of the review. Continue posting meeting notices, meeting summaries and technical material on the CALFED website in a timely manner. Provide more opportunity for non-agency scientists to present data/models/interpretations to the Panel and to be included in the primary record of the review process. More interaction is needed among the Panel, Lead Scientist and Science Program, and EWA agencies' staff during development of the review (all aspects including materials, format, timing, participants, etc.).
  2. Goal: Get a broader perspective on the outcome of EWA decision-making and science needs, and allow the Panel to use its expertise to drive the review process.
  3. Timeline: Next formal EWA review in fall 2006, or when the long-term EWA program proposal (draft EIR/EIS) is available.
  4. Commitments: CALFED Science Program: Facilitate communication among Panel, CALFED Science Program, and EWA agencies. EWA agencies: Increase level of staff participation and communication with Science Program and Panel.



## B. Formalize the Response to the Panel (Suggestion 3)

1. Action: The CALFED Science Program will formalize the response, and make it a permanent part of the review process. The CALFED Science Program will foster a joint response by the Lead Scientist and EWA agencies. The response will provide information regarding the capacity of EWA agencies and Science Program to respond to the Panel's review, clarify any information the Panel may have misunderstood, and identify topics on which EWA agencies/Science Program and the Panel disagree.
2. Goal: Establish a mechanism for provision of a joint response within 3 to 6 months of the issuance of the EWA review.
3. Timeline: Beginning with this response to the 2004 Technical Review and continuing in future years.
4. Commitments: CALFED Science Program: Dedicate staff. EWA agencies: Dedicate staff; provide presentations to the Panel and Authority, including response to Panel recommendations.

## C. Revised Review Process (Suggestion 4)

1. Action: Change the review period from annual to biennial, to allow more progress on key science issues between reviews and better preparation for the review. Use a smaller Panel and incorporate stakeholders into the biennial review process. Change balance of expertise among Panel members to include more biological/ecological and engineering scientists and fewer social scientists. In the off years, certain Panel members may be invited to participate in EWA-related workshops and become more involved in other EWA activities, to keep them informed of key issues and results. For example, this year Jim Cowan participated in a predation workshop.
2. Goal: Make the review process more responsive to broader issues rather than reporting incremental changes in information.
3. Timeline: Begin planning in 2005 to implement the new review process for the 2006 review (two years after the 2004 review).
4. Commitments: CALFED Science Program: Facilitate incorporating broader EWA issues, focus on key science issues, fund workshops and Panel members to participate in EWA activities or workshops. EWA agencies: Participate in review, and develop substantive material for review.

#### D. Role of the Science Advisors (Suggestion 5)

1. Action: Clarify the role of the Science Advisors and their interaction with Panel and the EWA agencies. This will require a change in the charge to the Science Advisors and possibly a change in Science Advisors that will be developed by the Lead Scientist to address important unknowns in the science related to EWA management.
2. Goal: Define the detailed role and level at which the Science Advisors will offer independent evaluation and analysis of data associated with EWA fish actions or science needs for the CALFED Science Program.
3. Timeline: Before the scoping for the next EWA technical review begins, preferably by early 2006.
4. Commitments: CALFED Science Program: Provide staff and clarify role of Science Advisors. EWA agencies: Provide staff and input into the role of Science Advisors.

#### **Increased Scrutiny**

The Panel believes that if EWA becomes a long-term program and some of its funding shifts from the public sector to specific water user groups, then stakeholders who are asked to pay will require evidence that the program is meeting its stated objectives of protection and recovery of threatened and endangered species and other at-risk species. The CALFED Science Program and EWA agencies acknowledge that this increased scrutiny will occur, and that future evaluations must focus on providing credible evidence of success in protecting and restoring threatened and endangered fish species. Many factors have contributed to the decline of the Bay-Delta system and the CALFED agencies have pursued restoration efforts that are intended to positively impact more than one stressor, rendering the differentiation of the effects of individual restoration projects problematic. EWA has been used primarily to reduce the effect of entrainment at the SWP and CVP export pumps, and EWA agencies acknowledge that it has been difficult to quantitatively assess these effects. The Panel also recognizes that it is difficult to distinguish the EWA effects from that of other environmental restoration programs being implemented. Performing a thorough science-based assessment of EWA will require EWA agencies to allocate additional resources, including dedicating sufficient staff time to perform the analyses and providing access to the services of biometricians and other specialists, to assist, advise, and bridge any gaps in agency expertise. Actions by the Science Program and EWA agencies described elsewhere in this document, if they can be implemented, also will help provide the means to conduct the type of assessment that the Panel, the Science Program and EWA agencies agree is needed.

## **Biological Consequences of Water Purchases**

In prior reviews, the Panel recommended evaluating both the benefits and costs to the environment of EWA actions to maximize the net benefit to listed species. A similar comment from the Panel in 2004 focused on water purchases. Effects may occur in the Delta or in aquatic ecosystems upstream.

For example, the transfer of EWA water from the north, through the Delta, to the export service area may have positive effects in the stream of origin and negative effects in the Delta. Such transfers typically occur during the summer months when the requisite hydrological conditions prevail. Fish impacts are presumed to be minimal because few salmonids are present and other species, including delta smelt, are located in the western Delta and not vulnerable to entrainment as the transferred water is re-diverted in the south Delta. The recently prepared "Interagency Ecological Program 2005 Workplan to Evaluate the Decline of Pelagic Species in the Upper San Francisco Estuary" (May 25, 2005) identifies water project operations, including higher summer export pumping, in a conceptual model of general factors that may be acting individually or in concert with other factors (toxins, invasive species) to lower pelagic productivity. A screening level study in 2005 will try to better define the degree to which each of these factors may be responsible and guide priorities for future use of program funds and resources. Depending on the results of the IEP POD PWT investigation, a number of CALFED program elements, including EWA implementation, may need to make adjustments to current plans and practices.

The Panel implied that purchases in the export area would be preferable to purchases from sources upstream of Delta. It should be noted that some of the water available to be purchased in the export service area was exported from the Delta initially, so not all export area purchases will result in avoiding the Delta export impacts associated with upstream of Delta purchases.

Another example of an EWA action that may have unintended consequences is obtaining water from the Delta for the EWA by pumping more than the export:inflow (E:I) standard in the 1995 Bay-Delta Water Quality Control Plan when that standard limits SWP/CVP pumping. Pumping above the allowable percent of inflow, at the discretion of the fish agencies, provides the EWA with water south of the Delta at relatively low cost (power to operate the pumps). It was done in the past only when relatively few fish were being entrained. EWA agencies have recently reconsidered use of E:I standard flexibility in the spring months primarily due to the potential for adversely affecting delta smelt larvae that are too small to be observed in the Delta or counted in fish facility samples and the possibility that the harm to delta smelt while obtaining water this way is greater than the benefits for delta smelt from EWA actions taken at another time using this water. Unless information is obtained that indicates this concern is not warranted, this method of obtaining EWA water may be used infrequently in the future.

EWA agencies try to purchase water from upstream sources such that in-stream habitat values can be enhanced when the water is released and conveyed to the Delta for export. Location of willing sellers and constraints on when EWA water may be

transferred through the Delta limit this type of benefit from EWA transactions. It is important to note that, while EWA agencies are actively seeking opportunities to maximize the benefits by releasing purchased water from reservoirs upstream of the Delta at times when instream uses are important, rarely has EWA water been used solely for instream purposes. Fall temperature control actions to improve spawning conditions on the lower American River involved purchases of power rather than water. Some fall reservoir releases (e.g., Merced River and lower American River) have been timed to yield instream flow benefits, but the water was released knowing it would be recaptured in the Delta and delivered to the Projects to repay the cost of export pumping curtailments at other times.

Despite our best efforts, unanticipated events can sometimes preclude intended uses of EWA water. In 2004, due to unforeseen circumstances (seller provided water later than planned, rules for use of b(2) water established base case flows for EWA accounting purposes that precluded release of EWA water, unacceptable impact of increasing pumping on south Delta water levels) 15.4 thousand acre-feet (TAF) of 18.7 TAF of EWA water purchased on the American River was released in the lower American River to provide instream benefits, when it was recognized that the water could not be re-diverted in the Delta. The remaining 3.3 TAF was displaced from Folsom Reservoir when the reservoir reached the maximum allowed storage and USBR initiated flood control operations on February 1, 2005. In the future, EWA agencies will continue to try to achieve the maximum benefit possible from EWA water purchases and minimize the unproductive disposition of EWA water. We also will adjust our practices if new information warrants change.

## **Program Integration**

As in previous reviews, the Panel recommended further program integration using a systematic approach. They were encouraged by the conceptual agreement to integrate the IEP with the CALFED Science Program. They still believe there are opportunities to more fully integrate the several environmental water programs and the Ecosystem Restoration Program. As presented at the EWA Workshop and for EWA Technical Review, EWA agencies presently coordinate environmental water planning across programs, principally through the WOMT, the B2 Interagency Team (B2IT) and the CALFED Operations Group. Since the 2004 EWA Technical Review, an additional team, the Interagency Water Acquisition Group, has been formed by the USFWS and meets as needed to coordinate purchases of water for environmental purposes, such as instream flow augmentation and wildlife refuge water supplies (CVP Improvement Act Level 4 requirements). These programs should be and are implemented in a coordinated fashion, but cannot be fully integrated or consolidated given the differing mandates, water sources, funding, and purposes of the various environmental water programs. EWA agencies believe that, to the extent possible, program integration and coordination of planning is presently occurring and that opportunities for synergistic coordination will continue to be evaluated and implemented in the future.

## **Conclusion**

The Science Program and EWA agencies appreciate the efforts of the Panel and commend its dedication to improving the scientific foundation for the EWA program. We intend to follow through on the Panel's recommendations to the extent practicable, given current and foreseeable levels of funding and staffing. The Science Program and EWA agencies look forward to further improvement through continued evaluation in cooperation with a new Panel, to be convened in 2006. Our goal is to ensure that EWA contributes to a multi-objective, long-term water management strategy for restoration of the Bay-Delta system.