CALFED
BAY-DELTA
PROGRAM

Executive Summary

Independent Review Panel
on
Agricultural Water Conservation Potential
December 14-16, 1998

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CONCUR

Convened by: CALFED Bay-Delta Program

Facilitated by: CONCUR, Inc.

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INTRODUCTION

The Water Use Efficiency Program is one of the eight Program Elements of the Preferred Alternative. Many stakeholders have voiced concerns that CALFED may be incorrectly forecasting conservation potential, and therefore proposing an inappropriate mix of actions to improve water supply reliability.

As CALFED refines the Water Use Efficiency program, it will be addressing many issues, including concerns raised by stakeholders. To help inform future discussions, CALFED convened an Independent Review Panel on Agricultural Water Conservation on December 14-16, 1998.

The Panel's deliberations were preceded by a preparatory Scoping Session on October 19, 1998, where interested members of the public were briefed on CALFED's rationale for convening the Panel and given the opportunity to provide input on the structure and focus of the Panel's deliberations. Panel members provided significant guidance on the structure of their future deliberations. Both the October Scoping Session and the December deliberations were characterized by a constructive collegial tone that helped the Panel arrive at a consensus position on recommendations.

Based on the discussions during the one-day Scoping Session, the deliberations of the Independent Review Panel were focused to accomplish several broad objectives:

- Review and provide recommendations to strengthen the technical assumptions and approach of the agricultural section of CALFED's report on the Water Use Efficiency Program (Chapter 4).

- Provide guidance on strategies for identifying Bay-Delta problems, as well as structuring solutions and quantifying potential benefits. (This discussion centered on representative case studies developed by CALFED staff.)

- Identify additional data collection and research needs.

These broad objectives were captured in a series of six questions to structure the Panel's deliberations (listed below).

Questions Addressed by Independent Review Panel

Question 1a: ***Review Chapter 4:*** What is the conceptual model that structures the methodology? What is the chosen methodology and is it appropriate given the overall goal of the CALFED Agricultural Water Use Efficiency Program? Are the assumptions contained in the overall conceptual model of the methodology appropriate? Are the data sets available to support the methodology?

Question 1b: ***Review Chapter 4:*** What additions and/or corrections are required to make the real water conservation estimates contained in the Agricultural Section appropriate and defensible for a programmatic-level analysis?

Question 2: ***Identify Problems:*** CALFED staff is to provide the Panel with overviews of representative situations in the Bay-Delta problem area. Please identify the Bay-Delta

problems evident in these situations, with particular emphasis on timing, location and water quality? Which of these problems can be addressed through changes in agricultural water management? Which of these representative situations (please select three) should be analyzed in greater detail as part of the Panel's deliberations?

Question 3: ***Develop Objectives and Possible Solutions:*** Focusing specifically on the three representative situations chosen for greater analysis, please restate the sample problems from Question 2 in the form of objectives. What are the possible solutions, with an emphasis on flow path?

Question 4: ***Choose Preferred Solution & Quantify Benefits:*** For each of the objectives stated in Question 3, choose a preferred solution. What is the preferred approach for quantifying the potential Delta- and tributary-related benefits? What are the measurable indicators of success (benefits) in accomplishing the objectives developed in answering Question 3? State the specific cause and effect expected between each potential action and its expected benefit(s) in the form of an hypothesis.

Question 5: ***Research & Data Needs:*** What additional data collection and research are required to adequately answer the above questions? What experiments would be useful to verify the hypothesis of cause and effect?

Question 6: ***Assurances:*** What does CALFED have to do to ensure that the expected benefits are realized, and that they are in support of the CALFED solution?

Independent Review Panel Participants

The Panel was comprised of five nationally recognized scientists who collectively provided expertise in the areas of irrigation science and engineering, hydrology, plant physiology and evapotranspiration, agricultural economics, and aquatic ecosystem restoration. The deliberations also included eight stakeholder technical representatives with specific expertise in the Bay-Delta system. These technical representatives provided clarification on specific issues as needed, and posed valuable questions and comments for the Panel's consideration. The Panel was convened jointly by CALFED staff and CONCUR, Inc., a professional facilitation team. A listing of Independent Review Panel participants is provided below.

Panelist	Affiliation	Expertise
Ken Cummins, Ph.D.	Distinguished Scientist, Ecosystem Restoration Department, South Florida Water Management District	Aquatic Ecosystems Restoration
Mark Grismer, Ph.D.	Professor of Hydrology and Agricultural Engineering, UC Davis	Irrigation Science & Hydrology
Theodore Hsiao, Ph.D.	Professor of Water Science and Plant Physiologist, UC Davis	Plant Physiology & Evapotranspiration

Jack Keller, Ph.D.	Professor Emeritus of Agricultural and Irrigation Engineering, Utah State; Founder and Chief Executive Officer, Keller-Bliesner Engineering	Irrigation Engineering & Conservation Verification
Charles Moore, Ph.D.	Agricultural Economist and Lecturer in International Agricultural Development, UC Davis; Consultant	Agricultural Economics
Technical Representative	**Title**	**Affiliation**
Vashek Cervinka, Ph.D.	Staff Scientist	Department of Water Resources
Lloyd Fryer	Policy and Administration Manager	Kern County Water Agency
Peter H. Gleick, Ph.D.	Co-founder and President	Pacific Institute for Studies in Development, Environment, and Security
Richard E. Howitt, Ph.D.	Professor of Agricultural Economics	University of California, Davis
Roger Reynolds	Senior Engineer	Summers Engineering, Inc.
Tracy Slavin	Water Conservation Specialist	U.S. Bureau of Reclamation
David Sunding, Ph.D.	Director	Center for Sustainable Resource Development at the University of California, Berkeley
Marc Van Camp	Engineer/Principal	Murray, Burns, and Kienlen
Facilitation Team Member	**Title**	**Affiliation**
Tom Gohring	Program Manager	CALFED
Maria Prokop	Assistant Engineer	CALFED
Scott McCreary, Ph.D.	Principal	CONCUR, Inc.
Bennett Brooks	Associate	CONCUR, Inc.
Lisa Whitman	Associate	CONCUR, Inc.

Prior to the deliberations, CALFED provided both panelists and technical representatives extensive background materials. The deliberations themselves were open to the public, and the agenda specifically allocated time for public comment. Attendees included representatives of environmental, urban, and agricultural interests.

Over the two and one-half day period of its deliberations, the Panel met and participated in the facilitated scientific review. The first two days focused primarily on deliberations using the series of questions developed to structure the agenda. On the evening of the second day, the panelists met with the facilitators to review their deliberations and synthesize their recommendations. On the third day (morning session only), the Panel reported their findings and recommendations to the public.

OVERARCHING FINDINGS AND RECOMMENDATIONS

The Panel yielded a number of important findings, recommendations and suggested next steps which are generally centered around two elements of the Water Use Efficiency Program Report:

- Agricultural Section of CALFED's Report on the Water Use Efficiency Program (Chapter 4)
- Program Development and Implementation Recommendations

Below is a brief review of the Panel's major findings and recommendations. A more detailed recounting of the Panel's deliberations on these and other issues is located in Section II of the Panel report.

A. AGRICULTURAL SECTION OF WATER USE EFFICIENCY PROGRAM REPORT

The Panel spent much of the first day discussing the Agricultural Section of CALFED's Report on the Water Use Efficiency Program (Chapter 4) and recognized many important contributions of that section. The Panel's findings on Chapter 4 include:

- Chapter 4 provides a reasonable initial estimate of overall agricultural water conservation potential and offers important insights regarding the magnitude of agricultural water conservation potential in the CALFED Solution Area. (Chapter 4 shows that irrecoverable losses are expected to be reduced by 2020. The reduction estimates range from 118,000 to 307,000 acre-feet per year without CALFED, and from 206,000 to 540,000 acre-feet per year with the CALFED Water Use Efficiency Program.)
- The methodology used in Chapter 4 to calculate agricultural water conservation potential provides an important first step in compiling and synthesizing large amounts of information to support the development of CALFED's Agricultural Water Use Efficiency Program. Similarly, the Panel noted that Chapter 4 devises a constructive way of looking at agricultural water conservation potential by distinguishing between "irrecoverable losses" and "recoverable losses."
- Chapter 4's methodology can be strengthened to make it more defensible, more

accurate, and more prescriptive. Panelists identified a series of potentially important shortcomings in the current methodology that could limit its usefulness and undermine its credibility with stakeholders. In particular, the Panel found that the current methodology should be refined to: 1) estimate region-specific conservation potential; 2) incorporate a more elaborate analysis of evaporation and transpiration; and 3) include prescriptive information to guide and support planning on a regional basis.

Based on the Panel's findings and its extended discussion of the methodology, the panelists recommended the following actions to make Chapter 4 even more useful to the CALFED program and more transparent and credible to stakeholders:

- Refine baseline data to be as region- and crop-specific as possible.
- Look more critically at data and put more effort into assessing and characterizing the derivation and accuracy of the numbers underlying calculations.
- Estimate all ET, in addition to ETAW, and separate E and T. Panelists recommended that CALFED estimate ET independently of the ETAW; provide estimates of precipitation; compare ET and precipitation with ETAW; and delineate productive and non-productive crop and environmental water use.
- Screen water conservation actions for cost-effectiveness at both the grower/district and CALFED Solution Area levels.
- Omit discussion of efficiency characteristics because they were not actually used in calculations and can be potentially misleading.
- Develop region-specific programs that identify gains that are cost-effective with and without CALFED involvement.
- State assumptions clearly.
- Develop confidence bars around key figures.
- Define terms, explain their derivation and use them consistently.

B. PROGRAM DEVELOPMENT AND IMPLEMENTATION

The Panel found that the Agricultural Water Use Efficiency program requires greater definition and specific strategies to meet its objectives and provided the following program development and implementation recommendations:

1. Refine and utilize a flow path strategy to link promising agricultural conservation actions and Bay-Delta objectives and incorporate information on:

- timing of water supply and demand within a season or year and among years;
- location;
- quality;
- primary and secondary objectives;
- cost-benefit analysis; and
- potential multiple benefits (water supply reliability, ecosystem restoration and water quality).

2. Establish regional measurable objectives as a basis for planning and tracking desired outcomes. The regional objectives should:

- be as specific as possible;
- relate to timing, location and target conditions;
- be developed with the active input and involvement of stakeholders;
- incorporate adaptive management strategies; and
- be rooted in realistic assessments of baseline conditions.

3. Build on existing work and use existing tools and information wherever possible. This includes building on research now conducted at the plot level, and models and other means to scale up the plot results to field and regional studies that examine full biohydrogeological systems. The Panel specifically suggested expanding research efforts into separation of crop evapotranspiration (ET) into evaporation (E) and transpiration (T) components.

4. Move towards measurement of water use (both surface and groundwater) to help state policy-makers and stakeholders fully understand and realize water use efficiency potential. Panelists agreed that CALFED should account for the following elements in advancing water measurement:

- Distinguish between urban and agricultural flows and recognize the challenges of measuring water use in the agricultural sector;
- Allow for regional flexibility;
- Create a mechanism for district-level accountability; and
- Seek to better understand both surface and groundwater use and their interaction.

5. Structure a package of assurances to strengthen the credibility, accountability, and effectiveness of the agricultural water use efficiency program and put together a package of "next steps" to ensure successful implementation. The panel specifically recommended the following actions:

- Adopt a "report card" technique to evaluate the agricultural water use efficiency program by focusing on effort, process and outcome indicators;
- Ensure ongoing mid-course independent technical review and evaluation with strong linkages to the stakeholder community.

6. Foster cross-disciplinary dialogue with other CALFED programs including convening joint work sessions with counterparts advising other CALFED programs.

7. Develop conceptual models as a way of understanding ecosystem demands and limitations, creating target windows and incorporating issues related to location, timing and CALFED objectives.

8. Use economic screening at the grower/district and CALFED levels, for each individual situation and region.

9. Develop baseline data so the results of future efforts can be tracked, measured, and assessed. Efforts across the country are often undermined by a lack of solid baseline data.

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