# A Novel Way of Managing Water to Protect Fish: Review of California's Environmental Water Account

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# Objectives of this talk

- Be as brief as possible so there is time for questions/discussion!
- Goal and objectives of article
- Methods
- Next steps
- Summarize main discussion points

# Primary Goal

- Make EWA experience available to the scientific/management community through the primary literature
  - Must be concise
  - Must be focused
  - Must be understandable to those unfamiliar to the system

# Objectives of the Article

- Evaluate selected aspects of the EWA during its first four years, including:
  - Ecological aspects of the program, particularly the magnitude of the benefits provided to target fish species
  - The approach used to evaluate the program and its consequences
- We do not evaluate:
  - The water acquisition program or its possible unintended consequences
  - EWA's economic costs or benefits
  - Other programs using water for environmental purposes, although some are briefly discussed as context for EWA

# Methods

- Read a lot of EWA reports and related materials from first 4 years
- Calculations of EWA benefits to winter-run Chinook salmon and delta smelt (Wim's portion of talk)

# Article Outline

- Introduction
- Scope and Context of EWA
- Implementing the EWA
- Science Within the EWA
- Likely Effects of EWA on Fish Populations (Wim's numbers)
- Discussion (my part)

# Next Steps

- Previous draft was submitted to the management agencies and other local and outside experts for review
- Present draft will be circulated again for further review
  - Calculations have been separated from the rest of the paper as an Appendix
- Two journal articles
  - The review article
  - A calculations article

# Important Features of EWA

The four-year trial EWA was an innovative program from several perspectives:

- water purchased water on the open market by a government agency.
- water used for environmental purposes.
- provided flexibility in application of environmental regulations (i.e., flow requirements).
- responsive to new information regarding the best use of water for fish protection.
- included a substantial degree of review and scrutiny.
- demonstrated that a rather complex consortium of agencies can work together to effect change.

# Has EWA achieved its objectives?

To be successful EWA must (EWA EIR/EIS 2004):

1. Protect at-risk species affected by SWP/CVP operations and facilities
2. Contribute to the recovery of these species
3. Allow timely water-management responses to changing environmental conditions and changing needs for fish protection
4. Provide reliable water supplies to water users in SWP/CVP export areas
5. Cause no uncompensated water loss to users.

# Has EWA achieved its objectives?

First, it appears that elements 4 (reliable water supplies) and 5 (no water loss to users) were achieved during the trial period. (CBDA 2004):

- Water was purchased on the open market or obtained through operational flexibility and relaxation of regulations.
- No uncompensated export curtailments were mandated by the MAs
- Thus, at least from a reliability perspective the EWA has reduced uncertainty as intended.

# Has EWA achieved its objectives?

Element 3 (timely responses) was also achieved.

- The organization established to decide on EWA actions has been remarkably effective.
- Decisions were made rapidly through a consensus process, involving many agencies with different missions.

# Has EWA achieved its objectives?

Element 1 (protect at-risk species) arguably has also been achieved.

- Since EWA water has been used mostly to reduce entrainment in the south Delta, and reducing export flow almost certainly reduces entrainment, the result has been fewer fish killed at the export facilities.

# Has EWA achieved its objectives?

The central question about the effectiveness of EWA hinges on Element 2 (contribute to recovery). During first 4 years:

- additional increment to the winter-run Chinook salmon cohort replacement rate (148%) of <1%
- The relatively small amount of EWA water used from mid-March to late-April was likely effective for young delta smelt, but the effect on the population was modest
- post-VAMP period (late April to July) of curtailment of exports likely did not make a large contribution toward recovering the population

# Has EWA achieved its objectives?

- The contribution of EWA to VAMP, intended to improve survival of emigrating San Joaquin fall Chinook smolts, could have a substantial impact, with ancillary benefits to delta smelt

# Has EWA achieved its objectives?

If EWA were to be applied under the most optimal conditions:

- substantial population-level effects on young delta smelt in the spring of dry years
- moderate effects on adult delta smelt in late winter
- mostly small effects on winter-run Chinook salmon
- whether such gains in abundance would be a sufficient contribution to recovery to justify the expenditure is beyond our scope

# Is EWA an Adaptive Management Program?

All actions should be seen as scientific experiments but in EWA:

- export manipulations are modest compared with other flows (weak signal)
- immediate responses have low signal-to-noise ratios (difficult to see signal)
- lack of willingness to experiment with the system
  - ESA emphasizes take rather than population recovery
  - implies that current actions are known to be effective in protecting the populations

# Is EWA a Science-based Program?

From the beginning the EWA program has been identified as a science-based program;

- The most important scientific element has been peer review, achieved principally through the annual review panels.
- These panels and the work they engendered in the agencies led to significant improvements in how the EWA has been operated.

However,

- lack of funding to improve the scientific basis for EWA

# Is EWA a Science-based Program?

- based on conceptual models of how export flow affects fish
  - These have evolved over time, but
  - No attempts to test or verify them by experiment (ESA issues)
- little effort to compute the magnitude of the benefits of EWA either alone or in the context of other restoration efforts (e.g., VAMP, CVPIA).
- little interest in placing the EWA in a larger context such as biological populations,

# Is EWA a Science-based Program?

- Thus, in spite of its emphasis on flexibility and response to events, the EWA has evolved into a management system with the fairly static goal of limiting entrainment at the export pumps.

# Advantages of a Science-based EWA?

Depends on the development of the long-term version of EWA

- If designed only to reduce entrainment at the export facilities, then the current, low level of scientific activity is commensurate with the scientific content of the program.
- If meant to accomplish quantitative improvements in fish populations, then
  - incorporate science (experiments and monitoring) fully and thoroughly in the program.
  - make weaknesses and uncertainties in the current conceptual models, including ours, explicit and available for testing.

# What is Needed to Make EWA a Science-based Program?

- Science is explicitly incorporated in the existing or new guiding documents
- Science becomes an integral, funded part of the program

# Why pick on EWA?

Singling out EWA for intense scrutiny may seem unbalanced, in that other programs within CALFED and other organizations do not undergo annual reviews or any external scientific oversight (e.g., VAMP).

- EWA should be congratulated on maintaining the review process
- We also want to acknowledge the efforts of agency staff and stakeholders who have done their best to improve EWA under often difficult circumstances.