

IN-PROGRESS DRAFT - FOR DISCUSSION ONLY

**STRATEGIC PLAN CHAPTER 6.
Strategic Plan Recommendations Regarding a Governing
Entity for the ERP**

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**Chapter 6. Sections A. and B.
Strategic Plan Recommendations Regarding a Governing Entity for the ERP**

General Description: The institutional entity responsible for implementation of the ERP component of the overall CALFED Program.

Scope of Authority: Responsible for administration, coordination and supervision of all aspects of ERP implementation, including restoration, research, monitoring (CMARP), habitat management and information management. Also responsible for direction of public outreach and independent scientific review functions, and environmental documentation/permitting efforts needed to obtain agency approvals for activities necessary to implement the ERP.

6.A. Institutional considerations

Here we discuss some of the consideration for the institutional framework for the ERP. For two reasons we defer further development of these ideas: 1) CALFED must develop an institutional structure for implementing all of its programs, into which the ERP implementation must fit; and 2) CMARP is developing institutional structures for monitoring and research, which must fit with the ERP framework. We hope that this document will provide both with suggestions for developing their programs.

Several alternative models exist for the ERP governing body. We are not prepared to decide among these models, nor have we researched the various extant alternatives. Instead, we present several attributes that the entity will need to have in order to carry out adaptive management effectively.

6.A.1. Ensuring learning and adaptive flexibility

Adaptive management imposes some requirements on the ERP governing body that differ substantially from the needs of most resource agencies. It must be able to learn and adapt based on the new information and understanding obtained. Limitations to active adaptive management will include institutional culture and inertia, availability of resources (water, money, people) to carry out the experiments, and restrictions based on endangered species and other regulations. Inertia can be overcome only with a sincere commitment on the part of the ERP governing body to take active steps to improve knowledge about the system, and close contact between scientists responsible for understanding and overseeing the scientific activities and managers responsible for integration with other CALFED programs and with overseeing system operations.

A good model for the conduct of an adaptive management program is the clinical trial in medicine. A committee oversees these large experiments with new treatments and decides whether to terminate early when the evidence shows that the new treatments are better or worse than the existing methods or to justify further testing on the basis of results to date. Furthermore, Bayesian statistical techniques can be used to judge progress and update probabilities among competing hypotheses. These techniques can be built into the program along with decision rules that may be more socially and ecologically relevant than the 0.05 criterion commonly used in

natural science. The clinical trial procedures may help with developing such decision rules.

Since we are far from certain about the outcomes of various interventions (because of uncertainty in the science but also inherent unpredictability of an ecological system), we cannot avoid actions that have either no effect or are actually harmful. adaptive management requires that the ERP governing body learn from what could be seen in hindsight as mistakes, and that it be prepared to alter course once the evidence suggests it. This will require an almost heroic insistence on flexibility and an ability to defend individual actions as part of the overall program even when they turn out badly.

Endangered-species regulations limit or prohibit actions believed to reduce protection of listed species, regardless of the value of these actions for increasing knowledge or the certainty that protection will actually be reduced. These limitations can be replaced by substantial ecosystem-based programs that can demonstrate a strong likelihood of maintaining or increasing protection over the long term. The analogy with clinical trials is useful here too: if standard treatments are ineffective, a trial of new treatments can be justified but must be closely monitored and either abandoned if it is harmful, or used in place of the standard treatment if it improves protection.

Duties of the ERP governing body

The ERP governing body will need to fit into the entity designed to manage all CALFED programs. Its principal duty will be to ensure that the principles and practices of adaptive management are followed in taking actions, evaluating their effects, conducting research on key issues, and revising actions to respond to changing conceptual models or system responses..

Specific duties may include:

1. Oversee the adaptive management design of the ERP and CALFED as a whole and the essential contribution of CMARP to this design. This is envisaged as an active, ongoing activity requiring familiarity with all of the major CMARP and CALFED activities.
2. Conduct workshops annually, or more frequently if necessary, with CMARP scientists and CALFED staff to disseminate findings, assimilate new understanding, and discuss changes to the program. In addition, conceptual models will be revised or updated during or after these workshops on topics for which new information becomes available.
3. Conduct or direct analyses to evaluate effectiveness of CALFED actions.
4. Based on the above, develop proposals for active adaptive management manipulations, and submit them to the CALFED management entity for approval and implementation.
5. Make key decisions depicted in Figure xx [*AM decision ladder diagram*] regarding the kinds of actions to be initiated and how those actions evolve over time; when to start new projects and abandon old ones. It must also oversee CMARP, working with its top scientists to review programs, evaluate the development of knowledge, and ensure adequate peer review.

6. Coordinate with other CALFED programs. Since it is not clear whether the other programs will incorporate adaptive management, there may be friction between the ERP and the other programs over the need for flexibility and changing practices based on new knowledge. In addition, the ERP must be consulted by other programs proposing actions that may affect the ecosystem, and must be allowed to develop an adaptive management alternative to an action proposed by another program.
7. Ensure scientific quality in the ERP; this will include (at a minimum) setting up a process whereby all scientific personnel are expected to publish scientific findings in peer-reviewed journals, and holding periodic outside reviews of the adaptive management program (see below).
8. Ensure accessibility of results of adaptive management actions, and of CMARP data and findings to all interested individuals and institutions both inside and outside CALFED.
9. Provide public outreach about ERP activities including workshops, an up-to-date web page, and newsletters.
10. Determine permitting requirements for anticipated future activities including CMARP sampling, and establishes schedules for early application to prevent delays of actions.
11. Have resource and budgetary control. The ERP governing body must have the capability to establish contracts, set up and administer budgets for projects, receive funds, acquire or purchase property, acquire permits, issue grants, and all of the other administrative activities associated with managing a diverse suite of projects.
12. Establishment and management of the information database needed system to support implementation of the adaptive management framework and overall ERP operations
13. Authority to apply for, process applications and serve as the "permittee" for necessary regulatory permits/approvals, including the ability to prepare or supervise preparation of the environmental documentation (CEQA/NEPA documents) necessary to obtain such permits/approvals
14. Budget authority, including control of operating funds and investment control over any endowment Funds
15. Authority to receive lands, easements, funding in support of ERP implementation
16. Authority to initiate purchase of lands and easements recommended under the adaptive management approach.
17. Authority to convene and conduct public hearings as appropriate to support implementation of ERP activities.
18. Authority to employ personnel, both professional and administrative, that it determines to be necessary to conduct restoration, research, monitoring and other adaptive management activities.

Attributes of the ERP governing body

There is an inherent tension between several pairs of attributes that the body must have:

Assurances vs. adaptive management: The body must be structured to provide assurances about actions it will take and demands it will make for resources. This is in fundamental conflict with the need for flexibility that is an essential attribute of an adaptive management program.

Independence vs. connection: The body must be independent to prevent political and other concerns from interfering with the scientific aspects of the program. Yet, it must retain connections with stakeholders, agencies, and the other CALFED programs to ensure coordination.

Science vs. other activities: The practice of adaptive management requires scientific expertise in a number of fields. Many of the other activities (e.g., public outreach, project management, coordination) will have little if any scientific content. Although these disparate needs can be accommodated in a standard organizational structure (e.g. any of the resource agencies), this structure may fail to elevate scientific decision-making to the level required by the ERP.

Based on the duties and the tensions described above, we believe the ERP governing body should have the following attributes:

1. It should be non-regulatory. This will eliminate the inherent conflict of interest that occurs when regulatory organizations also incorporate scientific investigations of the subjects of their regulation.
2. The structure should provide for an independent scientific oversight group responsible for reviewing and advising on the scientific duties above. The purpose of the scientific oversight group is to help ensure ERP actions are not taken if they do not have suitable scientific backing. This can occur through a process of both informal advice and formal recommendations from the group to ERP management staff and other CALFED program managers.
3. The ERP governing body, on advice from the scientific oversight group would be empowered to establish, on short notice, one or more teams whose purpose would be to respond rapidly to new findings or new developments (e.g., levee failures) that may affect the success of ERP actions, or to take advantage of opportunities for improving management of increasing knowledge (e.g., through unusual flow events).
4. The scientific oversight committee should comprise about 8-12 accomplished individuals not directly connected with CALFED activities (at least 2 should be from outside California) capable of understanding, analyzing, and deciding on key technical issues. These individuals should serve on this committee for periods of 2 years or more to allow for an adequate level of commitment and familiarity with the program.

6.B. Monitoring, Research, and Scientific Oversight

6.B.1. Monitoring and Research Program

Monitoring and research are essential components of the strategic Plan and of CALFED's operational philosophy of adaptive management. Monitoring is essential for evaluating progress toward CALFED objectives, and provides the empirical basis for learning under adaptive management. However, monitoring alone is insufficient. Adaptive management includes targeted research to address fundamental questions relevant to calfed programs and adaptive probing to distinguish among alternative hypotheses about the best management solutions. Furthermore, even routine restoration actions where there is broad agreement about their projected benefits need to be carefully designed if they are to provide a good opportunity for learning. Such actions need to incorporate careful experimental design with monitoring as an integral component of the design to ensure that changes are detectable and attributable to the action.

CMARP The United States Geological Survey (USGS), San Francisco Estuary Institute (SFEI), and Interagency Ecological Program (IEP) are developing a Comprehensive Monitoring Assessment and Research Program (CMARP). This program is described in the Stage I report and proposal for Stage II, developed by the CMARP steering committee (April 24, 1998). CMARP is intended to address needs for monitoring and research of all of the CALFED programs. In addition, it will incorporate elements of existing monitoring and special studies programs such as the SFEI Regional Monitoring Program, the Department of Interior Comprehensive Assessment and Monitoring Program, the CALFED Operations Group Real-time Monitoring, the Vernalis Adaptive Management Program, and the IEP environmental monitoring activities. Thus, CMARP is intended to meet many of the monitoring needs in the estuary.

The CMARP Stage I report seems to be an excellent start. However, we articulate several additional aspects of a successful program that we suggest should be integrated with CMARP.

Science oversight committee. Our main concern is to ensure that the principles and practices of adaptive management be incorporated in CMARP administration. This is the role of the Strategic Planning team, since CMARP itself has no control over system design or operations. The adaptive management program will require an organizational framework that has sufficient scope, depth and breadth of understanding, and authority to recommend changes in CALFED operations as well as in the CMARP program itself. This implies a standing oversight committee that is independent but sufficiently familiar with CALFED operations to offer insightful review. This committee is described further below under 'Institutional Framework'.

Peer review This is always an issue in using science to guide management. The Bay-Delta-River arena has seen decades of management based on studies that have not passed peer review. Although these studies may have considerable scientific merit, they have not been subject to the process of quality control concerning the relevance of the findings and the accuracy of the interpretation that characterize main-stream science. This kind of legitimacy is provided in science through peer review.

Science used to justify CALFED management decisions should be published in national, peer-reviewed journals. This approach, used in management of the Everglades and Chesapeake Bay,

provides a means of obtaining review from technical experts, free of charge, in a reasonably timely manner (Because it often takes more than 1 year from date of submission to final acceptance in peer reviewed journals, and another year or longer for the article to appear, "timely" review of management decisions or rationale may require parallel time frames). It also provides important contact with the broader scientific community that can be very useful in establishing review teams (see 'Institutional Framework' below).

This approach has been suggested at several annual meetings of the Interagency Ecological Program with only spotty success. Staff scientists need the time to write and publish their findings in more than just internal technical reports and their career progress should be judged, in part, on such publication. They also need more opportunities for collaboration with university and other scientists to help them get their findings out into the broader arena. Both of these requirements demand commitment by the overseeing institution to provide the necessary time and opportunities.

6.B.2. Scientific Review of the Adaptive Management program

There will be three levels of review in the adaptive management program: review of progress toward goals of the ERP, review of proposed and ongoing adaptive management actions, and review of individual research and monitoring projects within CMARP.

Review of the entire program to ensure that it is making progress toward goals of the ERP should happen on an annual basis, possibly in conjunction with an annual meeting of the science oversight group. The reviewers would comprise a body of scientists similar in makeup (and perhaps identical) to the 1997 CALFED Science Review Panel. This review should produce a report summarizing the "State of the CALFED region", or "Status of the Scientific Basis for CALFED actions".

The review of individual actions will occur annually as well, but with a rotation schedule so that not all actions are thoroughly reviewed every year; but each action would be reviewed periodically. The interval between reviews will depend on the nature of the action, but should be based on the time scale of expected system response determined through preliminary modeling. In addition, actions would be reviewed in the event that new information became available that impinges on their outcome.

Review of individual research and monitoring programs under CMARP should occur on a rotating basis as for the CALFED actions. In addition, these programs should be peer-reviewed at the proposal stage. CMARP targeted research projects should additionally be held to some minimum standard of publication of findings; for example, specific questions should be answered in the scientific literature within two years of completion of the project, or two years of completion of the stage of the project investigating the questions. These reviews should be separate, and performed by different people, from the reviews of ERP actions.

Many pilot projects and large scale interventions may be difficult to approach as subjects of independent scientific peer review. The projects should be reviewed at the proposal stage, but it may be unrealistic for a "peer scientist" in Michigan, for example, to comment on a proposal to

flood delta islands or set back levees on the San Joaquin River? To judge these projects (except for certain design aspects) requires considerable local knowledge. For many projects, the ERP will have to depend on internal review with oversight by the scientific oversight committee or locally constituted committees comprised of individuals with both technical background and local experience or familiarity with the affected resources and the geographic context.

Reviews of actions and CMARP programs should address several key questions about the progress and direction of the program, and the need to occasionally correct course:

1. Is this program doing what it was intended to do (i.e., was the action taken, was the monitoring or research conducted more or less as proposed)?
2. Is the program accomplishing its objectives (i.e., is the action having the desired effect, are the questions being answered, are the results being published)?
3. Does this continue to have the priority it had when first proposed and authorized (i.e., if CALFED priorities change should resources continue to flow to this program)?
4. Should the action or program be expanded to encompass larger scale projects, or designed to affect a larger geographic area, or be implemented on more tributaries?
5. Should the action or program be continued, but modified and refined in particular ways, based on lessons from the initial implementation results and on evaluation by the oversight group and others?