

ECOSYSTEM RESTORATION PROGRAM END OF STAGE 1 REPORT

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1. ECOSYSTEM RESTORATION PROGRAM INTRODUCTION AND REPORT OVERVIEW

Purpose

The purpose of this CALFED End of Stage 1 Report is to provide information about the implementation of the CALFED Ecosystem Restoration Program (ERP). The report is prompted by several factors:

1. The CALFED Bay-Delta Program has ended the first seven years (Stage 1) of an ambitious 30-year plan, described in the August 2000 Record of Decision (ROD), to restore ecological health and improve water management for beneficial uses of the Bay-Delta, the hub of California's water system.
2. The single most important difference between CALFED and past efforts to solve problems of the Bay-Delta is the comprehensive nature of CALFED's resource management strategies. The CALFED agencies determined that the four problem areas of water quality, ecosystem quality, water supply reliability, and levee system integrity were interrelated, and that problems in any one program area could not be solved effectively without addressing problems in all four areas at once. Agencies also agreed that any solution must satisfy certain CALFED "Solution Principles," which include being "implementable," and "reducing conflicts in the system."
3. The Preferred Program Alternative chosen in the CALFED Record of Decision (ROD) employs a through-Delta approach to conveyance. The agencies agreed that this approach would be monitored and then assessed at the end of Stage 1 to determine whether it was meeting goals and objectives, consistent with the CALFED Solution Principles. In the event that the chosen conveyance approach was not working, the agencies agreed, consistent with the Program's overriding principle of adaptive management, to evaluate alternative conveyance actions and then make a decision to proceed accordingly.
4. The importance and urgency of CALFED's End of Stage 1 assessment of the through-Delta conveyance approach has been heightened by the confluence of a series of unanticipated events that has led to a crisis in the management of the Delta.
5. Populations of certain Delta fish species have declined precipitously. This has adversely affected water operations, and certain large water supply projects envisioned in the ROD are currently not implementable. The number of major Delta-related lawsuits has increased, including suits challenging the regulatory underpinnings of the joint state and federal water operation

6. In light of all of these new factors, in 2006 the Governor established a major new effort called Delta Vision to write a strategic plan for a long-term sustainable Delta that includes a durable and reliable water conveyance approach. State and federal agencies and stakeholders have also recently embarked on a major new effort to develop the Bay Delta Conservation Plan (BDCP) to protect and improve the Delta ecosystem and its dependent species, while addressing the options for a new conveyance system and other related restoration strategies. It is intended to lead to a major new course of action in the Delta that will secure the relevant regulatory approvals and predictability that is now absent.
7. Consequently, CALFED's End of Stage 1 assessment is necessary, not only to set the course for the future of the CALFED Program as it enters Stage 2, but also to provide vitally important information to the Delta Vision and the BDCP processes as they are finalized over the course of the next several months.

Background

In seeking solutions to the resource problems in the San Francisco Bay-Delta Estuary (Bay-Delta), State and Federal agencies signed an agreement in June 1994 to: 1) coordinate their actions to meet water quality standards to protect the Bay-Delta estuary; 2) coordinate the operation of the State Water Project (SWP) and the Central Valley Project (CVP) more closely with recent environmental mandates; and 3) develop a process to establish a long-term Bay-Delta solution to address four categories of problems - ecosystem quality, water quality, water supply reliability, and levee system vulnerability. This agreement laid the foundation for the Bay-Delta Accord and CALFED. The Accord, (formally called the Principles for Agreement on Bay-Delta Standards) between the State of California and the Federal Government, detailed interim measures for both environmental protection and regulatory stability in the Bay-Delta. On December 15, 1994, the Accord was signed by State and Federal resource agencies, as well as by stakeholders representing many local water agencies and environmental organizations. Under the terms of a December 1999 extension, the Accord formally expired when the CALFED Programmatic Record of Decision (ROD) was executed on August 28, 2000 (CALFED 2000). The CALFED Preferred Program Alternative consists of a set of broadly described programmatic actions which set the long-term, overall direction of the 30-year CALFED Program. The CALFED Program is made up of the Levee System Integrity Program; Water Quality Program; Ecosystem Restoration

Program; Water Use Efficiency Program; Water Transfer Program; Watershed Program; Storage; and Conveyance.

Following issuance of the ROD, the CALFED Agencies began Stage 1 implementation of the CALFED Program. Stage 1 covered the first seven years of the 30-year program with the intention of building the foundation for long-term program actions. The CALFED Ecosystem Restoration Program is designed to maintain, improve, and increase aquatic and terrestrial habitats and improve ecological functions in the Bay-Delta in order to support sustainable populations of diverse and valuable plant and animal species. The ERP is also designed to recover listed species in the San Francisco Bay-Delta Estuary and watersheds above the estuary as identified in the Multi-Species Conservation Strategy (MSCS) (CALFED 2000d). A foundation of this program element is the restoration of ecological processes associated with stream flow, stream channels, watersheds, and floodplains.

ERP implementation over its 30-year period is to be guided by an ecosystem-based adaptive management approach. ERP goals and objectives for ecosystem, habitat, and species rehabilitation were developed by an ERP Strategic Plan Core Team and are designed to produce measurable and progressive improvements to the Bay-Delta ecosystem. The result should be a healthy ecosystem and species recovery that exceeds existing regulatory requirements. The Stage 1 restoration efforts are structured to significantly improve Bay-Delta ecological health, using a large scale adaptive management approach in which the actions in each stage inform management decisions in later stages of implementation.

Knowing that the success of ERP Stage I actions would be critically dependent on other CALFED program elements, including water quality improvement actions throughout the Bay-Delta watershed, levee system integrity actions, and integration with a watershed management strategy and a water transfers market; CALFED facilitated the development of a single blueprint or coordinated plan for environmental restoration throughout the CALFED focus area. The general priorities for restoration activities were to: first, examine the use of existing public lands, as appropriate; second, to work with landowners in volunteer efforts to achieve habitat goals, including the acquisition of easements; third, use a combination of fee and easement acquisition; and fourth, acquire fee title as necessary to achieve program objectives. Acquisitions were done on a willing seller basis, emphasizing local coordination and partnerships. The intent was to maximize habitat benefits while minimizing land use impacts.

Scientific Review Panel, Strategic Plan Core Team, and Interim Science Board

In October 1997, CALFED convened a panel of eight scientists for a four-day workshop to review the 1997 version of the ERP. The panel offered many constructive comments and recommendations to improve the ERP's restoration approach. Some of these

included using scientists to help develop and review the program; using conceptual models and educational and analytical tools; and developing an adaptive management strategy. A key criticism by the panel was that the 1997 version of the ERP was simply a menu of options lacking a clear strategy for implementation. The panel recommended the preparation of a concise strategic plan document.

Subsequent to the Scientific Review Panel's recommendations, a six-member Strategic Plan Core Team spent four months during the summer and fall of 1998 developing the independent report entitled: "Strategic Plan for the Ecosystem Restoration Program." The focus of the Core Team's effort was to describe the ecosystem-based, adaptive management approach that would be used to refine and implement the ERP. The Core Team developed six strategic goals and numerous strategic objectives, and also identified critical ecological issues that needed to be addressed early in Stage 1.

In January 2000, CALFED convened the Interim Science Board (ISB), comprised of nationally recognized scientists, to help CALFED staff refine the ERP and integrate adaptive management in the ERP implementation. The ISB remained "interim" until the ROD was signed and the final environmental documents were certified. The subsequent agreement on a CALFED governance structure allowed the ISB to continue more formally as the "Independent Science Board."

The ISB assisted CALFED staff by 1) establishing a solid scientific/technical foundation for the ERP, 2) providing scientific review, advice, and guidance, 3) helping to ingrain ecosystem-based adaptive management in the ERP implementation, and 4) engaging the scientific and technical questions at the root of policy issues.

Early Ecosystem Restoration

The December 15, 1994 Bay-Delta Accord included a commitment to develop and fund non-flow-related ecosystem restoration activities to improve the health of the Bay-Delta ecosystem. This funding source and commitment is commonly referred to as Category III. The Category III Steering Committee was formed to administer the first rounds of funding. In 1996, the administration of Category III funds was shifted to the CALFED Bay-Delta Program's Restoration Coordination Program, which received input from the Ecosystem Roundtable, the Bay-Delta Advisory Council (BDAC), and the general public. The BDAC, consisting of over 30 representative California stakeholder groups, was chartered under the Federal Advisory Committee Act and provided input to the overall CALFED Program. The Ecosystem Roundtable was a subcommittee of BDAC specifically created to provide input from a broad cross-section of stakeholder interests to the Restoration Coordination Program. In 1999, the Restoration Coordination Program began the transition from early ecosystem restoration to implementation of Stage 1 of the long-term ERP.

Regulatory Guidance for Stage 1 and Single Blueprint for Restoration and Recovery

The ROD for the CALFED Bay-Delta Final Programmatic Environmental Impact Statement and Report (EIS/EIR) represented the culmination of the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) processes. The ROD reflected the final selection of the long-term plan (Preferred Program Alternative) and included specific actions to implement program elements, described a strategy to implement the plan, and identified complementary actions that the CALFED Agencies would pursue.

To achieve its objectives, the ERP identified over 600 programmatic actions in all the regions of the Bay-Delta watershed. Those actions were to be undertaken using a science-based adaptive management framework, consistent with the ERP Strategic Plan and on-going scientific review. Additional information on the ERP Science Program can be found in the ERP Strategic Plan. The actions listed here are explained in greater detail in Volumes I and II of the ERP (CALFED 2000a, 2000b) and the ERP Strategic Plan (CALFED 2000c), and ERP Draft Stage 1 Implementation Plan (CALFED 2001). In general, ERP actions include, but are not limited to:

- Implementing large-scale restoration projects on selected streams and rivers including Clear Creek, Deer Creek, Cosumnes River, San Joaquin River and Tuolumne River, in cooperation with local participants.
- Improving fish passage through modifications or removal of the following locally-owned dams: small diversion dams on Butte Creek; eight Pacific Gas & Electric Company diversion dams on Battle Creek; McCormick-Saeltzer Dam on Clear Creek; Woodbridge Dam on Mokelumne River; and Clough Dam on Mill Creek. CALFED Agencies also supported studies to determine if it would be biologically, environmentally, and socio-economically feasible over the long-term to introduce wild Chinook salmon and steelhead to the upper Yuba River watershed. Other fish passage projects were recommended through the Integrated Storage Investigation (ISI).
- Restoring habitat in the Delta, San Pablo Bay, Suisun Bay, Suisun Marsh, and Yolo Bypass, including tidal wetlands and riparian habitat. In addition, 8,000 to 12,000 acres of wildlife-friendly agricultural lands were to be established during Stage 1, in cooperation with local participants.
- Restoring habitat and hydraulic needs on Frank's Tract in the Delta to optimize improvements in ecosystem restoration, levee stability, and Delta water quality.
- Improving salmon spawning and juvenile survival in upstream tributaries as defined by the ERP and Strategic Plan, by purchasing up to 100 TAF per year by

- Completing the protection and restoration of the Sacramento River meander corridor as part of the Sacramento River Conservation Area/SB 1086 program, including easement or purchase of an additional 15,000 acres, revegetation, and restoration of stream meander function by the end of Stage 1.
- Implementing an invasive species program, including prevention, control and eradication.
- Assessing the potential need for additional fish contamination monitoring and consumption advisories in the Bay-Delta watershed.
- Assisting existing agency programs to reduce turbidity and sedimentation; reducing the impairment caused by low dissolved oxygen conditions; reducing the impacts of pesticides, including organochlorine pesticides; reducing the impacts of trace metals, such as mercury and selenium; reducing salt sources to protect water supplies; and increasing understanding of toxicity of unknown origin.
- Improving dissolved oxygen (DO) conditions in the San Joaquin River near Stockton. DO in this area dips below State environmental criteria, causing a migratory block for salmon and threatening other fish. Actions included:
 - Finalizing the investigation of methods to reduce constituents that cause low dissolved oxygen by the end of 2001, to be included in the Total Maximum Daily Load recommendation to the Central Valley Regional Water Quality Control Board (CVRWQCB).
 - Finalizing State Basin Plan Amendment and Total Maximum Daily Load for constituents that cause low dissolved oxygen in the San Joaquin River by the end of June 2002.
 - Beginning implementation of appropriate source controls and other controls as recommended in the Total Maximum Daily Load by the end of 2002.

The ROD also called upon the CALFED Agencies to establish a single blueprint for restoration and species recovery within the geographic scope of the CALFED ERP, specifying that the ERP would be the Program's blueprint for restoration of the Bay-Delta. The MSCS is not a separate blueprint or supplemental restoration program and does not supplant the ERP. The measures and goals in the MSCS are derived from, or are consistent with, the ERP's measures and goals.

While the ERP is the CALFED Program's blueprint for restoration and recovery, the MSCS is the Program's conservation and regulatory compliance strategy. The MSCS

addresses the potential adverse and beneficial effects of all Program actions (including ERP, levee system integrity, water storage and water conveyance) on plant and animal species. Based in large part on the ERP, the MSCS' premise is that the Program as a whole, including all program elements, will improve and increase aquatic and terrestrial habitats and improve ecological functions in the Bay-Delta. The ERP, therefore, serves two purposes: 1) to achieve Program objectives for ecosystem restoration; and 2) to enable actions from all Program elements to be completed in compliance with the Federal Endangered Species Act (FESA), the California Endangered Species Act (CESA) and the Natural Communities Conservation Planning (NCCP) regulations.

To serve both of these purposes, ERP implementation must be informed by the best available scientific information and by information about the implementation of other program actions. Information about other program actions is necessary to ensure that they do not conflict with or limit the success of the ERP. ERP restoration actions must also be implemented concurrently with, and at similar levels to, the other Program actions in order to ensure that the Program as a whole continues to increase aquatic and terrestrial habitats and improve ecological functions in the Bay-Delta.

The MSCS-ERP Milestones identified by the United States Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS) and the California Department of Fish and Game (CDFG) were intended to establish a group of actions derived from the ERP Plan that 1) established an adequate level of ERP implementation during Stage 1, 2) for the first four years, could be implemented with annual ERP funding of \$150 million, 3) would not be inhibited by proposed Stage 1 actions in other program elements, and 4) would enable proposed Stage 1 actions in other program elements to be completed in compliance with FESA, ESA and the NCCP.

The MSCS served as the biological assessment for the CALFED program and initiated a programmatic consultation under Section 7. The USFWS and the NMFS prepared programmatic biological opinions for CALFED based on the MSCS and other relevant information.

USFWS, NMFS, and CDFG developed MSCS-ERP Stage 1 Milestones (Milestones) to ensure that the ERP maintained programmatic FESA, CESA and NCCP compliance for all program elements. The three agencies determined, based on the best information available at the time, that if ERP implementation met those milestones, as specified in the Programmatic Regulatory Determinations, this would be sufficient to achieve the MSCS's species goals. USFWS, NMFS, and CDFG expected that the Milestones would be achieved with annual ERP funding of \$150 million, as described below (see Funding below).

To ensure that substantial progress was made to achieve the Milestones, the USFWS, NMFS, and CDFG participate in an annual process with the ERP and Science Programs to: 1) develop annual and long-term ERP implementation priorities and strategies; 2)

develop annual implementation plans; and 3) assess the implementation and performance of ERP actions, including measuring progress towards achieving the MSCS-ERP Milestones. USFWS, NMFS, and CDFG expect that the Milestones may be revised to reflect new information derived in the process. Additional information on the Ecosystem Restoration Program can be found at: <http://www.dfg.ca.gov/erp/>.

Funding and Expenditures

To be successfully implemented, the ERP identified a need for at least \$150 million from dedicated funding sources annually, with a total cost over \$1 billion through Stage 1. ERP projects would be implemented following priorities established in the Strategic Plan (CALFED 2000c). These expenditures would be in addition to funds necessary for the EWA. An additional \$50 million annually for the first four years was identified as needed to support the EWA as well as additional funding for remaining years based on further refinement of needs and opportunities.

For the ERP, the CALFED Agencies proposed a combination of State funding, Federal funding, and user fees. Following issuance of the ROD, the CALFED Agencies committed to working with local interests to develop State legislation to create a broad-based user fee that would generate approximately \$35 million annually. The CALFED Agencies were also to consider the availability of Federal funds. By the end of Stage 1, CALFED was to reevaluate the level of dedicated annual funding from State, Federal, and user sources to achieve the ERP goals.

To date, ERP has funded and executed 490 projects for a total of approximately \$629 million (Tables 1 and 2, Figure 1). For example, the ERP has funded fish screens, fish ladders, land acquisition, habitat restoration, and focused research and monitoring designed to provide information that will improve future restoration efforts. Funding sources have included contributions from the California Urban Water Agencies, Proposition 204 State bond funds, funding from the Federal Bay-Delta Act, and EPA watershed funding.

In addition, outside the geographic scope of the ERP and CALFED area, \$19,491,762 was spent on the Lake Davis Northern Pike Containment and Eradication Project, in order to prevent the predatory and invasive northern pike from entering the Sacramento River and the CALFED area.

Table 1. Total ERP Stage 1 expenditures by fund type.

Number of Projects^{1/}	Total Expenditure^{1/}	Fund Source
5.0	\$1,257,237	Clean Water Act, Section 104(b)(3)
33.5	\$24,646,811	CUWA: Category III
2.5	\$255,956	CVPIA: Anadromous Fish Restoration Program
1.0	\$39,400	CVPIA: Habitat Restoration Program
110.4	\$123,858,879	Federal Bay Delta Act Funds - (Water and related resources)
2.0	\$7,177,428	Proposition 13: Dissolved Oxygen
0.5	\$17,555,436	Proposition 13: Flood Protection Corridor Program
4.0	\$1,860,121	Proposition 13: Mine Remediation
277.1	\$356,249,953	Proposition 204: Chapter 7
53.9	\$94,867,374	Proposition 50
0.1	\$1,252,295	Proposition 84
490.0	\$629,020,891	All Funding Sources

^{1/} Does not include projects that are approved for funding but have not been executed.

Table 2. ERP restoration investment by Topic Area.

Topic Area	Total Expenditure¹	Number of Projects¹	Percent of Total Expenditures (%)
Administrative or Program Support	\$21,279,932	17	3.5
At-Risk Species Assessment	\$41,757,723	42	8.6
Ecosystem Water and Sediment Quality	\$73,934,281	60	12.2
Environmental Education	\$ 7,051,745	33	6.7
Environmental Water Management	\$8,057,853	9	1.8
Estuary Foodweb Productivity	\$1,815,662	3	0.6
Fish Passage	\$42,879,884	14	2.9
Fish Screens	\$103,189,377	56	11.4
Harvestable Species Assessment	\$8,949,093	10	2.0
Hydrodynamics, Sediment Transport, and Flow Regimes	\$35,262,324	28	5.7
Local Watershed Stewardship	\$18,528,298	53	10.8
Lowland Floodplains and Bypasses	\$38,908,752	26	5.3
Mine Remediation	\$647,000	3	0.6
Non-Native Invasive Species	\$32,920,616	33	6.7
Riparian Habitat	\$46,085,821	29	5.9
River Channel Restoration	\$22,347,541	16	3.3
Shallow Water and Marsh Habitat	\$67,248,829	43	8.8
Technical Support	\$510,115	2	0.4
Upland Habitat and Wildlife Friendly Agriculture	\$57,136,817	12	2.5
X2 Relationships (Freshwater-Seawater Interface)	\$509,222	1	0.2
Totals	\$629,020,891	490	100.0

¹ Does not include projects that are approved for funding but have not been executed.

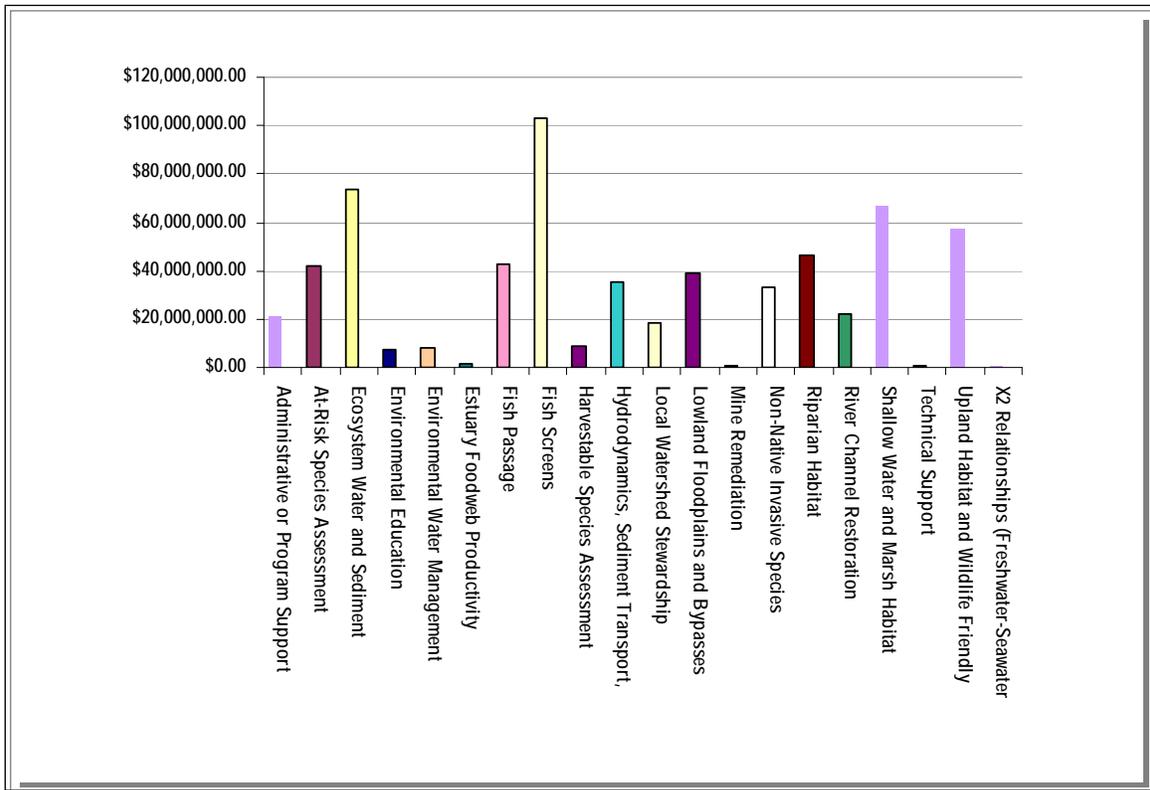


Figure 1. ERP restoration investment by Topic Area

Approach for Evaluating ERP Stage 1 Activities

ERP has reached the end of Stage 1 activities and is obligated to review the achievements of its first 7 years. This evaluation will serve as the basis for planning subsequent Stage 2 activities.

Although a major success criterion for ERP at the end of Stage 1 is the degree of implementation of the MSCS Milestones, a review of the entire ERP program is warranted to provide a broader ecological perspective of ERP Stage 1 activities. The Milestones are focused on the needs of specific species with specific needs, and are assessed in a separate document (CALFED 2007). In addition to engaging projects that contributed to Milestones needs, ERP has also encouraged projects that are less directly related to specific species, but still contribute to ecological health, stability, and sustainability. This review will look at ERP projects from that broader perspective and captures effort that could be excluded from the milestones evaluation.

The evaluation is organized by Ecological Management Zones (EMZ), Ecological Management Units (EMU), and Regions as described in the original Ecosystem Restoration Program Plans, Strategic Plan, and Implementation Plan (CALFED 2000a,b,c; 2001). Figures 2 and 3 illustrate the geographical boundaries of the Regions and the EMZs/EMUs within the CALFED program. Additional projects are organized by topics reflecting the ecosystem elements outlined in the Ecosystem Restoration Program

Plan (ERPP). The depth of the evaluations reflects the uneven distribution of projects over the various zones, units, and elements. The significant contributions of non-ERP programs toward reaching ERP goals are also touched upon.

The ERP Projects database is a live relational database created by Pacific States Marine Fisheries Commission. The intent of the database is to make programmatic and fiscal data more available to the ERP Implementing Agencies for the purpose of tracking and reporting on projects funded by ERP. The database is continuously updated throughout the life of any given project.

When a project is initially entered into the database it is assigned to all applicable ecosystem elements. The ecosystem elements originate from Volume I of the ERPP. Since more than one ecosystem element can apply to a given project, each assigned element is given a priority of 1 or 2, considering the main intent of the project. A project can have multiple ecosystem elements assigned to priority 2, but can only have a single priority 1 element.

Upon entry into the database, projects are also assigned to various topic areas. These topic areas derive from the Draft Stage 1 Implementation Plan, as well as implementation documents integrated into the early ERP Proposal Solicitation Packages (PSP's). Topic areas were used to guide the early PSP's, and they are currently used for reporting purposes in the Multi-Year Program Plan. A project may have more than one applicable topic area. Topic areas are also assigned a priority of 1 or 2. Again, a project can have multiple topic areas assigned to priority 2 but can only have a single priority 1 topic area. All projects must have at least one topic area.

Due to the complexities of assigning elements and topic areas to projects, developing the project summary tables required some interpretation. Projects assigned a priority 1 for a topic area or element were automatically included in the project summary table of each chapter. Projects assigned a priority 2 were only included in the table if they made an important contribution to that element or topic.



Ecological Management Regions



**California Department of Fish and Game
Ecosystem Restoration Program**

Figure 2. Map of Ecosystem Restoration Program Regions



Ecological Management Zones



**California Department of Fish and Game
Ecosystem Restoration Program**

Figure 3. Map of Ecosystem Restoration Program Ecological Management Zones

The following provides an outline of the ERP evaluation process for topic or Ecological Management Zones. Topics are arrayed as ecosystem processes, habitats, stressors, and multi-species conservation strategy species.

1. Introduction

- a. General description of topic or Ecological Management Zone/Area – Provides a description of the topic subject, or EMZ including historical and present information
- b. Applicable ERP Vision- Explains what the ERP expected to achieve based on what was known in 2000
- c. Stage 1 Expectations – Lists the restoration expectations for Stage 1 at the Topic or EMZ level
- d. Changes Attributable to ERP – This section explains which projects were evaluated and how they contributed to the ERP vision, how the project and/or visions require maturation or had misguided assumptions from the onset, lists lessons learned and new knowledge since 2000
- e. Project Summary Table – Lists the ERP Project Number, Project Description, Project End Date, Total Funding, and Project Status
- f. Other Programs Contributions to ERP Vision – Provides a brief description of other programs that have contributed to ERP visions
- g. Status of Topic or EMZ Today – Includes a broader discussion of projects and includes any new knowledge that may have become apparent on a bigger level
- h. Planned Projects for Implementation – Provides a discussion of planned projects that were not implemented but should now be implemented
- i. Impediments to Implementation – Discusses any past impediments that prevented implementation and/or any foreseen future impediments.
- j. References

The detailed discussions of EMZs/EMUs are presented in Appendix A. The information contained in the appendix is used to provide the Regional Overview sections. The Regional Overviews include the Bay and Delta systems, Sacramento River system, San Joaquin River system, and issues that extend beyond a single region and are program-wide in scope.

References

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