Implementation of the

MONTEREY AGREEMENT

Statement of Principles by the State Water Contractors and the State of California Department of Water Resources for Potential Amendments to the State Water Supply Contracts

DRAFT PROGRAM ENVIRONMENTAL IMPACT REPORT

May 1995

Lead Agency

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TABLE OF CONTENTS

Section *Page*

EXECUTIVE SUMMARY ES-1

1. INTRODUCTION 1-1
   - 1.1 PURPOSE OF A PROGRAM EIR 1-1
   - 1.2 HISTORICAL BACKGROUND 1-2
   - 1.3 PARTICIPANTS IN THE STATE WATER PROJECT 1-2
   - 1.4 PURPOSE AND NEED 1-2
   - 1.5 PROVISIONS OF THE MONTEREY AGREEMENT 1-6
   - 1.6 ENVIRONMENTAL CONSEQUENCES CATEGORIES 1-8
   - 1.7 ENVIRONMENTAL CONSEQUENCES OF MONTEREY AGREEMENT PRINCIPLES 1-8
   - 1.8 CONCURRENT SWP ENTITLEMENT ACTIVITIES 1-8

2. PROGRAM DESCRIPTION 2-1
   - 2.1 MAJOR PROGRAM COMPONENTS OF MONTEREY AGREEMENT IMPLEMENTATION 2-1
   - 2.2 PROPOSED ACTION 2-12
   - 2.3 NO PROJECT ALTERNATIVE 2-15
   - 2.4 PROGRAM ALTERNATIVES 2-15

3. STATEWIDE ASSESSMENT 3-1
   - 3.1 GEOLOGY AND SOILS 3-2
   - 3.2 WATER RESOURCES 3-2
   - 3.3 AIR QUALITY 3-4
   - 3.4 BIOLOGICAL RESOURCES 3-4
   - 3.5 CULTURAL AND HISTORIC RESOURCES 3-4
   - 3.6 LAND USE 3-5
   - 3.7 RECREATION 3-21
   - 3.8 SOCIOECONOMICS 3-21
   - 3.9 HEALTH AND SAFETY 3-26

4. SITE-SPECIFIC ASSESSMENT 4-1
   - 4.1 GEOLOGY AND SOILS 4-1
   - 4.2 WATER RESOURCES 4-4

4.3 AIR QUALITY 4-36
4.4 BIOLOGICAL RESOURCES 4-38
4.5 CULTURAL AND HISTORIC RESOURCES 4-66
4.6 LAND USE 4-76
4.7 RECREATION 4-83
4.8 SOCIOECONOMICS 4-102
4.9 HUMAN HEALTH 4-103

5. POTENTIALLY SIGNIFICANT EFFECTS OF PROPOSED PROGRAM AND PROPOSED MITIGATION 5-1
5.1 BIOLOGICAL RESOURCES 5-1
5.2 CULTURAL RESOURCES 5-2

6. CUMULATIVE EFFECTS 6-1

7. REFERENCES AND PERSONS CONTACTED 7-1

8. EIR PREPARERS AND CONTRIBUTORS 8-1

APPENDIX A: MONTEREY AGREEMENT STATEMENT OF PRINCIPLES

APPENDIX B: MEMORANDUM OF UNDERSTANDING BETWEEN THE DEPARTMENT OF WATER RESOURCES OF THE STATE OF CALIFORNIA AND KERN COUNTY WATER AGENCY FOR DEVELOPING AND OPERATING THE KERN WATER BANK

C—094698

C-094698

FIGURES

Figure		*Page*
1.2-1	SWP Facilities	1-3
1.3-1	State Water Contractor Service Areas	1-4
2.1-1	Kern Fan Element Property	2-3
2.1-2	Location of Castaic Lake and Lake Perris	2-7
2.1-3	Castaic Lake and Associated Facilities	2-8
2.1-4	Castaic Lake -- Historic Monthly Storage, 1974-1994	2-9
2.1-5	Lake Perris and Associated Facilities	2-10
2.1-6	Lake Perris -- Historic Monthly Storage, 1974-1994	2-11
3.6-1	Average Annual Changes in Deliveries to Agricultural Contractors with and without 130,000 AF Entitlement Transfer	3-7
3.6-2	Net Change in Deliveries to Agriculture (3.0 Million AF SWP Demand) without 130,000 AF Entitlement Transfer	3-8
3.6-3	Net Change in Deliveries to Agriculture (3.0 Million AF SWP Demand) with 130,000 AF Entitlement Transfer	3-9
3.6-4	Net Change in Deliveries to Agriculture (4.12 Million AF SWP Demand) without 130,000 AF Entitlement Transfer	3-10
3.6-5	Net Change in Deliveries to Agriculture (4.12 Million AF SWP Demand) with 130,000 AF Entitlement Transfer	3-11
3.6-6	SWP Annual Deliveries to Districts (AF) 1986-1994	3-14
3.6-7	Field Crop in Districts Relinquishing Entitlement (1986-1993)	3-15
3.6-8	Tree Crop in Districts Relinquishing Entitlement (1986-1993)	3-16
3.6-9	Cropland Acreage vs. SWP Deliveries Belridge WSD, 1986-93	3-17
3.6-10	Cropland Acreage vs. SWP Deliveries Semitropic WSD - 1986-93	3-18
4.2-1	Castaic Lake -- Historic Monthly Storage, 1974-1994	4-5
4.2-2	Castaic Lake -- Monthly Variation in Historic Storage, 1974-1994	4-6
4.2-3	Castaic Lake -- Cumulative Frequency of Historic Storage (1974-1994)	4-7
4.2-4	Lake Perris -- Historic Monthly Storage, 1974-1994	4-9
4.2-5	Lake Perris -- Monthly Variation in Historic Storage, 1974-1994	4-10
4.2-6	Lake Perris -- Cumulative Frequency of Historic Storage (1974-1994)	4-11
4.2-7	Castaic Lake Storage -- Scenario A	4-13
4.2-8	Castaic Lake -- Cumulative Frequency of Storage, Scenario A	4-14
4.2-9	Lake Perris Storage -- Scenario A	4-16
4.2-10	Lake Perris -- Cumulative Frequency of Storage, Scenario A	4-17
4.2-11	Castaic Lake Storage -- Scenario B	4-20
4.2-12	Castaic Lake -- Cumulative Frequency of Storage, Scenario B	4-21
4.2-13	Lake Perris Storage -- Scenario B	4-22
4.2-14	Lake Perris -- Cumulative Frequency of Storage, Scenario B	4-23
4.2-15	Castaic Lake Storage -- Scenario C	4-25
4.2-16	Castaic Lake -- Cumulative Frequency of Storage, Scenario C	4-26
4.2-17	Lake Perris Storage -- Scenario C	4-27
4.2-18	Lake Perris -- Cumulative Frequency of Storage, Scenario C	4-28
4.4-1	Sensitive Plants -- Kern Fan Element Property	4-48

4.4-2 Sensitive Wildlife -- Kern Fan Element Property 4-49
4.6-1 Oil and Gas, Utility, and Conveyance Facilities in the Kern Fan Element Property 4-78
4.6-2 General Plan Land Use Designations in the Kern Fan Element 4-79
4.7-1 Castaic Lake State Recreation Area 4-84
4.7-2 Visitor Use at Castaic Lake and Lake Perris 4-86
4.7-3 Lake Perris State Recreation Area 4-88
4.7-4 Castaic Lake Surface Elevation, Scenarios A, B & C 4-90
4.7-5 Castaic Lake Cumulative Frequency of Surface Elevation, Scenarios A, B & C 4-91
4.7-6 Castaic Lake -- Average Monthly Surface Elevations Scenarios A, B & C 4-92
4.7-7 Lake Perris Surface Elevation, Scenarios A, B & C 4-97
4.7-8 Lake Perris Cumulative Frequency of Surface Elevations Scenarios A, B & C 4-98
4.7-9 Lake Perris -- Average Monthly Surface Elevations Scenarios A, B & C 4-99

C-094700

C-094700

TABLES

Table		*Page*
ES-1	Summary Table	ES-3
1.7-1	Cross Tabulation of Monterey Agreement Principles by Environmental Consequence Category	1-8
2.1-1	Proposed Quantity of Water Available for Withdrawal by SWP Contractors	2-12
2.2-1	Program Component Characteristics of Proposed Action Scenarios and No Project Alternative	2-13
3.6-2	SWP Agricultural Contractors and Member Units Relinquishing Entitlement (in acre-feet)	3-13
3.6-3	Potential Reductions of Cropland Associated with Retirement of 45,000 AF of Entitlement	3-19
3.6-4	Irrigated Cropland by Crop Type in Tulare Lake Hydrologic Region, 1990 (thousands of acres)	3-20
3.6-5	Reduction in SWP Water Deliveries to Agriculture and in Cropland by Field Crop Type (130,000 AF total reduction)	3-21
3.8-1	Full-Time and Part-Time Employment by Major Industry: 1990	3-24
3.8-2	Population Impacts of SWP Water Transferred from Agricultural to Urban Contractors for the State and Selected Hydrologic Regions	3-25
3.8-3	California Population by Hydrologic Region (thousands)	3-25
4.2-1	Castaic Lake: Average Monthly Surface Elevation and Storage	4-15
4.2-2	Lake Perris: Average Monthly Surface Elevation and Storage	4-18
4.2-3	Water Quality Measurements of Source Water from Castaic Lake and Lake Perris	4-33
4.2-4	Water Quality Measurements of Treated Water from Castaic Lake	4-34
4.4-1	Characteristic Wildlife Species of the Kern Fan Element Property	4-40
4.4-2	Sensitive Plants Potentially Occurring on the Kern Fan Element Property	4-43
4.4-3	Sensitive Wildlife Species Potentially Occurring on the Kern Fan Element Property	4-45
4.4-4	Sensitive Plant and Animal Species Potentially Occurring in the Castaic Lake Project Area	4-52
4.4-5	Characteristic Wildlife Species of the Habitats of the Lake Perris Project Area	4-55
4.4-6	Sensitive Plant Species Potentially Occurring in the Lake Perris Project Area	4-58
4.4-7	Sensitive Wildlife Species Potentially Occurring in the Lake Perris Project Area	4-59
4.5-1	Kern Fan Element Cultural Resources	4-71
4.5-2	Castaic Lake Cultural Resources	4-72
4.5-3	Lake Perris Cultural Resources	4-72
4.7-1	Visitor Use in Thousands at Castaic Lake and Lake Perris State Recreation Areas	4-85
4.7-2	Percentage of Time Castaic Lake and Lake Perris Would be at or Below Selected Water Levels Under Existing Conditions and Scenarios A, B, and C	4-93
4.7-3	Potential Recreation Effects at Castaic Lake State Recreation Area Due to Changes in Surface Water Level	4-94
4.7-4	Potential Recreation Effects at Lake Perris State Recreation Area Due to Changes in Surface Water Level	4-100

ACRONYMS

AF	acre-feet
BMWD	Berrend Mesa Water District
CalEPA	California Environmental Protection Agency
CCWA	Central Coast Water Authority
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CNPS	California Native Plant Society
DBP	disinfectant by-products
DRWD	Dudley Ridge Water District
DSRSD	Dublin San Ramon Services District
DWR	California Department of Water Resources
DWRSIM	DWR Project Operations Model
EIR	Environmental Impact Report
ESA	Endangered Species Act (Federal)
GPCD	gallons per capita daily
HCP	Habitat Conservation Plan
KCWA	Kern County Water Agency
KFE	Kern Fan Element
KWB	Kern Water Bank
MAF	million acre-feet
MCL	maximum contaminant level
M&I	Municipal and Industrial SWP Contractors
MOU	Memorandum of Understanding
MWD	Metropolitan Water District of Southern California
pphm	parts per hundred million
SBA	South Bay Aqueduct
SCAQMD	South Coast Air Quality Management District
SHPO	State Historic Preservation Office
SWP	State Water Project
SWRCB	State Water Resources Control Board
SWSD	Semitropic Water Storage District
SGVMWD	San Gabriel Valley Municipal Water District
TDS	total dissolved solids
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
WSD	Water Storage District

EXECUTIVE SUMMARY

The California Environmental Quality Act (CEQA) requires preparation of an environmental impact report (EIR) when a program such as implementation of the Monterey Agreement is believed to have a potential for significant impacts on the environment. The Central Coast Water Authority (CCWA) was designated by agreement among a majority of the State Water Project (SWP) Contractors and the Department of Water Resources (DWR) to act as the lead agency for CEQA compliance for the Monterey Agreement program EIR. The Monterey Agreement contains 14 principles, the implementation of some of which have the potential for ascertainable environmental consequences. This program EIR analyzes the Monterey Agreement implementation steps to the extent they are presently available.

PURPOSE AND NEED

Shortages of deliveries of water from the SWP have prompted SWP Contractors (both Agricultural Contractors and Municipal and Industrial [Urban] Contractors) to consider amendments to their water supply contracts with DWR. Some of the Contractors have considered litigation to resolve differences over water allocations. To avoid litigation, and to make the SWP operate more effectively for all Contractors, DWR and the Contractors have engaged in mediated negotiations toward a settlement of their disputes. The Monterey Agreement is the result of these negotiations.

PROPOSED ACTION AND ALTERNATIVES

The Monterey Agreement contains 14 principles, the implementation of some of which will have ascertainable and immediate environmental consequences. Some of these consequences, however, are difficult to quantify. Due to the uncertainty associated with the level of implementation of each of the program components, three program scenarios are defined. It is these scenarios (variants of the Proposed Action) and the No Project Alternative that are the subject of this EIR.

The five major program components of Monterey Agreement implementation, that when put into operation have the potential for current, tangible, and quantifiable environmental impacts, are as follows:

1. *Revisions to the methodology used to allocate water among Contractors.* Under the Monterey Agreement, water from existing SWP facilities is to be allocated based on entitlement; in years when SWP supplies are less than Contractor requests, water will be allocated in proportion to each Contractor's share of total Contractor entitlements to water, with no initial reduction in supplies to Agricultural Contractors; and existing categories of surplus, wet weather, and make-up water will be replaced by a single interruptible water category allocated on the basis of entitlement.

2. *Retirement of 45,000 acre-feet (AF) of agricultural entitlement.*

3. *Transfer by sale, between willing sellers and willing buyers, of 130,000 AF of entitlement from Agricultural Contractors to Urban Contractors.* This includes the potential for sales to non-Contractors as well as potential entitlement transfers among Urban Contractors.

4. *Changes in control of the Kern Fan Element (KFE) of the Kern Water Bank (KWB).* This change in control would be the sale or long term lease (with option to purchase) of the KFE and related assets by DWR to designated Agricultural Contractors. The KFE lands were acquired by DWR for the purpose of banking SWP water. The KWB

C—094703

C-094703

is defined as any opportunity to recharge SWP water in Kern County, the purpose of which is to store surplus water from the Sacramento-San Joaquin Delta during wet years for extraction during dry years to increase the SWP yield.

5. *Changes in the manner in which Castaic Lake and Lake Perris terminal reservoirs may be operated.* The Monterey Agreement provides that SWP Contractors who participate in repayment of the costs of Castaic and Perris Reservoirs will have an opportunity to directly utilize a portion of the respective capacities in order to optimize their water storage and supply operations to meet local Contractor needs and help ensure a firm water supply. To this end, these Contractors have proposed that approximately 50 percent of the active storage capacity of these reservoirs be available for withdrawal and use by these Contractors under a set of operational conditions.

These five major components form the basis for the analysis of environmental consequences in the three program scenarios. Also evaluated is the No Project Alternative, i.e., the Monterey Agreement is not implemented.

Alternatives that would accomplish many , but not all, of the objectives of the Monterey Agreement are also discussed. These include litigation among and between Contractors.

ENVIRONMENTAL CONSEQUENCES

A summary of potential environmental impacts associated with implementation of the Proposed Action when compared to status quo conditions, i.e., current conditions, is presented by resource area in Table ES-1.

C-094705

TABLE ES-1 PROPOSED ACTION ENVIRONMENTAL IMPACTS SUMMARY

Resource Area	Statewide Impacts	Site-Specific Impacts		
		Kern Fan Element	*Castaic Lake*	*Lake Perris*
Geology and Soils	Negligible	Negligible	Scenarios A and B: Beneficial, stabilization of lake banks	Negligible
Water Resources				
Surface water	Negligible	Negligible	Scenarios A and B: Higher than historic surface elevation and storage Scenario C: Prolonged drawdown	Scenarios A and B: Historic surface elevation and storage maintained Scenario C: Prolonged drawdown
Water quality	Negligible	Negligible	Scenarios A and B: Negligible Scenario C: Beneficial	Negligible
Groundwater	Negligible	Negligible	Negligible	Negligible
Air Quality	Negligible	Negligible	Negligible	Negligible
Biological Resources	Indeterminate	Potentially adverse Mitigable	Negligible	Negligible
Cultural Resources	Indeterminate	Potentially adverse Mitigable	Scenario A: Negligible Scenarios B and C: Potentially mitigable	Scenario A: Negligible Scenarios B and C: Potentially mitigable
Land Use	Adverse, not significant	Negligible	Negligible	Negligible
Recreation	Indeterminate	Negligible	Scenarios A and B: Beneficial Scenario C: Adverse, not significant	Scenarios A and B: Beneficial Scenario C: Adverse, not significant
Socioeconomics	Adverse, not significant	Negligible	Negligible	Negligible
Health and Safety	Indeterminate	Negligible	Negligible	Negligible

Source: SAIC 1995.

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C-094706

1. INTRODUCTION

The California Environmental Quality Act (CEQA) requires preparation of an environmental impact report (EIR) when a program such as implementation of the Monterey Agreement is believed to have a potential for significant impacts on the environment. An EIR is prepared to "identify the significant effects of a project [or program] on the environment, to identify alternatives to the project, and to indicate the manner in which such significant effects can be mitigated or avoided" (Public Resources Code section 2100, et seq., Title 14 California Administrative Code, section 15000, et seq.). An EIR serves as an informational document for decisionmakers and the general public regarding the environmental consequences of a proposed program.

The Central Coast Water Authority (CCWA) is the lead agency, designated by agreement among the Department of Water Resources (DWR) and a majority of the SWP Contractors, for CEQA compliance for implementation of the Monterey Agreement. The decision to prepare an EIR for the Monterey Agreement implementation was made following the completion of an Initial Study. A Notice of Preparation was published on February 7, 1995, and distributed to the California State Clearinghouse and other potentially interested parties.

1.1 PURPOSE OF A PROGRAM EIR

Several types of EIRs are defined under CEQA. Each is tailored to a different situation or intended use, e.g., Project EIR, Subsequent EIR, Addendum to an EIR, Staged EIR, and Program EIR. The most common type is the Project EIR that examines the environmental impacts of a specific development project.

The Monterey Agreement EIR is a Program EIR. The purpose of a Program EIR is to document a series of actions so related that they can be characterized as one project. The actions may be related in one or more of the following ways:

- by geographical proximity;
- as logical parts in a chain of contemplated actions;
- in connection with the issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program; or
- as individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects that can be mitigated in similar ways.

The proposal to implement the Monterey Agreement fulfills both the second and third criteria above, i.e., logical parts in a chain of contemplated actions, and a series of actions related to the issuance of rules, regulations, plans, and other general criteria to govern the conduct of a continuing program.

The Program EIR has a number of advantages. For example, a Program EIR may:

- provide an occasion for a more exhaustive consideration of effects and alternatives than would be practical in an EIR on an individual action;
- ensure consideration of cumulative actions that might be slighted in a case-by-case analysis;
- avoid duplicative reconsideration of basic policy considerations;
- allow the Lead Agency to consider broad policy alternatives and program-wide mitigation measures at an early time when

C—094707

C-094707

the agency has greater flexibility to deal with basic problems or cumulative impacts; and

- allow reduction in paperwork.

The Program EIR can be used with later activities. Subsequent activities in the program must be examined in the light of the Program EIR to determine whether an additional environmental document must be prepared. The Program EIR will be most helpful in dealing with subsequent activities if it deals with the effects of the program as specifically and comprehensively as possible. With a good and detailed analysis of the program, many subsequent activities could be found to be within the scope of the program described in the Program EIR, and no further environmental documentation would be required.

1.2 HISTORICAL BACKGROUND

The State Water Project (SWP) is a large water supply and distribution system authorized by an act of the California state legislature in 1959 and approved by the voters in 1960. The California Department of Water Resources (DWR) operates the facilities comprising the SWP. These facilities include dams, reservoirs, pumping plants, power plants, and canals and tunnels (see Figure 1.2-1). Primary facilities of the SWP include the following:

- Oroville Dam and Reservoir on the Feather River (a primary water supply source);
- San Luis Reservoir near Los Banos;
- Terminal reservoirs at Del Valle in the north and Castaic and Perris in the south;
- Banks Pumping Plant in the Sacramento-San Joaquin Delta near Tracy (a water diversion point);
- North Bay Aqueduct (the means of water transport to the northern San Francisco Bay Area);
- South Bay Aqueduct (the means of water transport to the southern San Francisco Bay Area); and
- California Aqueduct with its various branches and pipelines (the means of water transport to Central and Southern California).

In the early 1960s, DWR entered into a series of substantially similar water supply contracts with various urban and agricultural water suppliers, or Contractors. Each Contractor received a right to service for an annual quantity of water entitlement and capacity for delivery of that entitlement in return for payments intended to cover capital, operation, and maintenance costs.

1.3 PARTICIPANTS IN THE STATE WATER PROJECT

The SWP has 29 participating contractors (Contractors). They are listed and their respective service areas are illustrated in Figure 1.3-1.

Any or all of the Contractors may participate in the rights and obligations of any contract amendments approved consistent with the Monterey Agreement.

1.4 PURPOSE AND NEED

The Monterey Agreement is a statement of principles forming the foundation for agreements and amendments among Contractors and DWR that will settle their disputes over allocations of SWP water and certain operational aspects of the SWP.

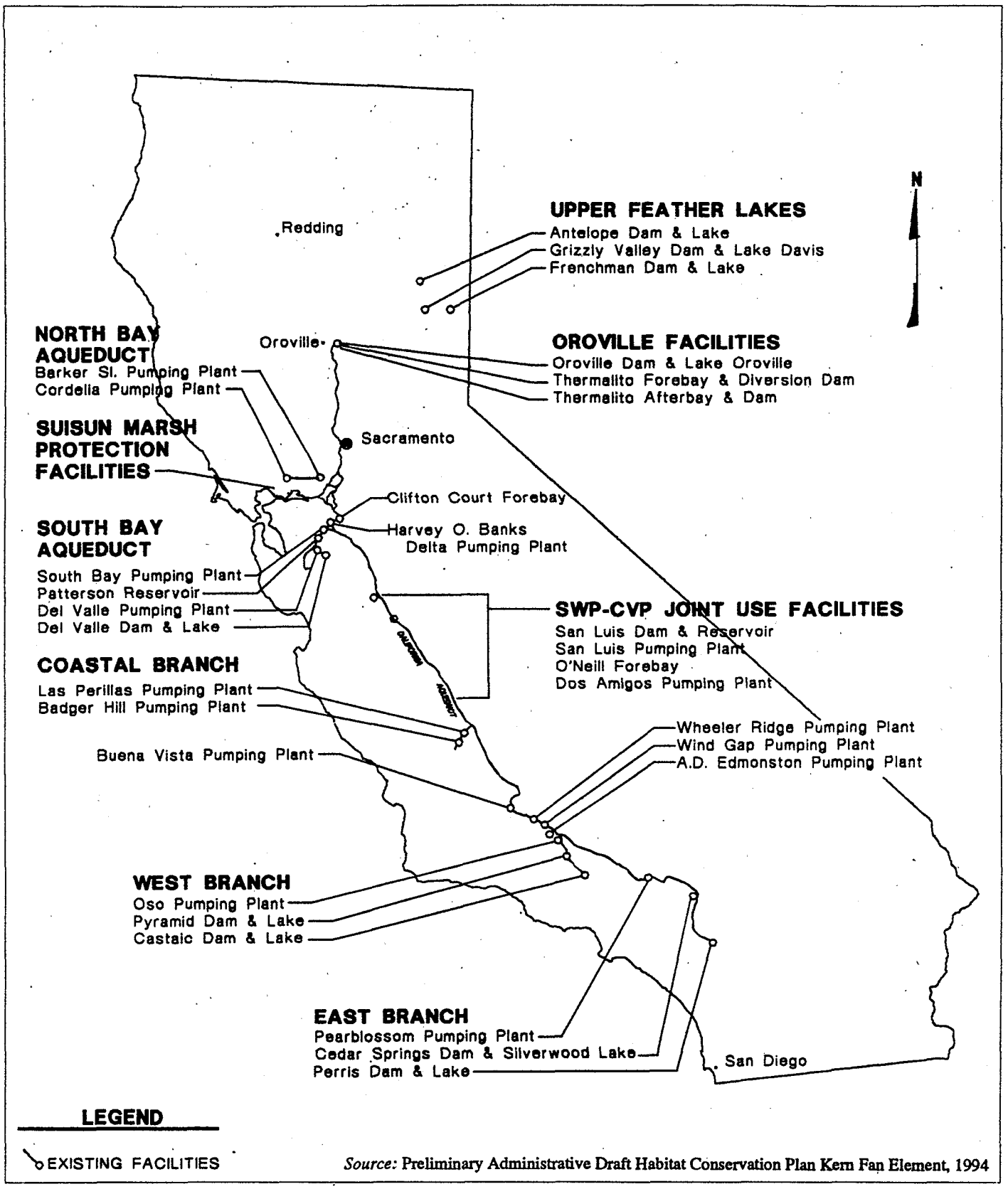
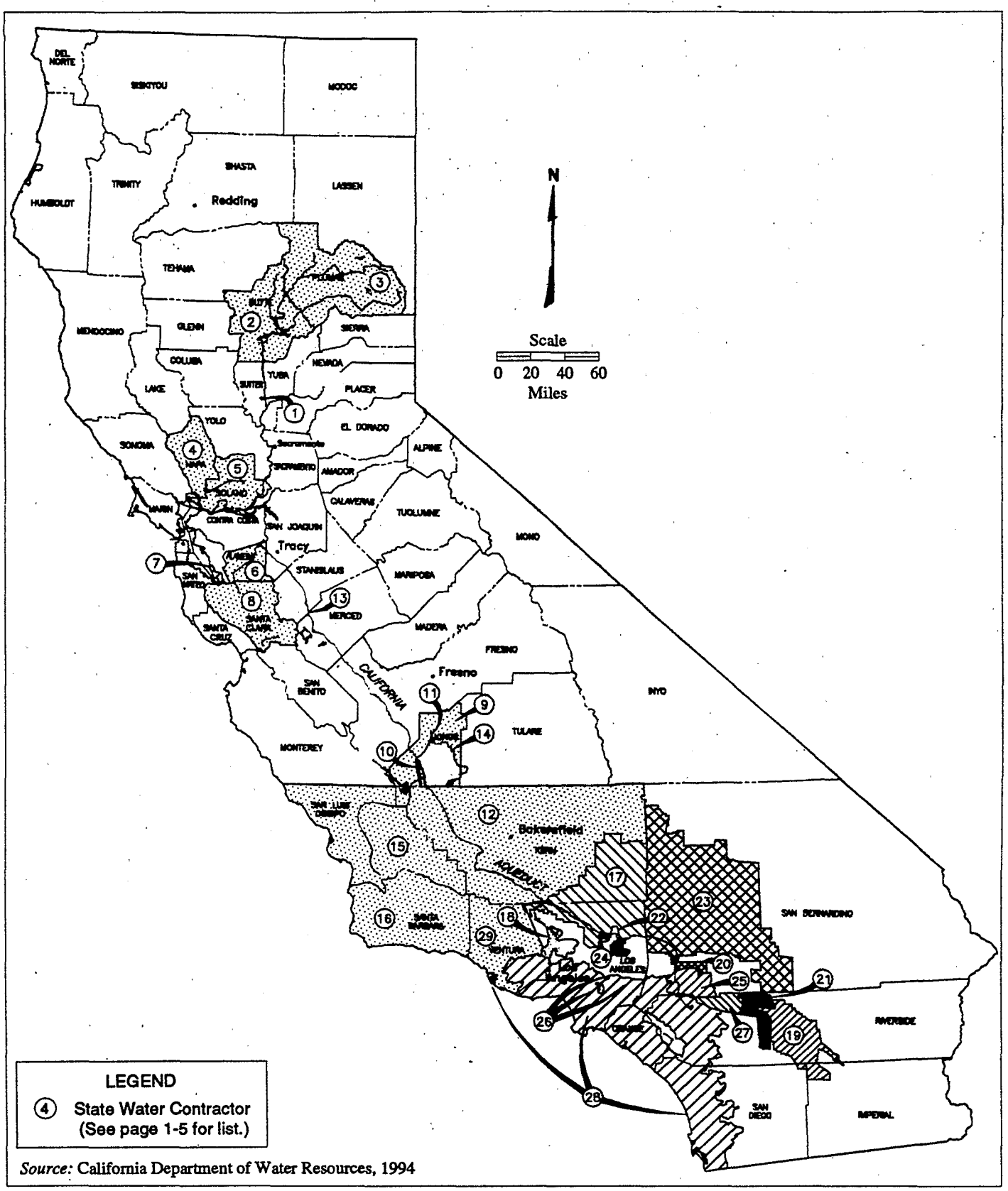


Figure 1.2-1. SWP Facilities.



Source: California Department of Water Resources, 1994

Figure 1.3-1. State water contractor service areas.

FIGURE 1.3-1. STATE WATER CONTRACTOR SERVICE AREAS

Upper Feather River Area

1. City of Yuba City
2. County of Butte
3. Plumas County Flood Control and Water Conservation District

North Bay Area

4. Napa County Flood Control and Water Conservation District
5. Solano County Water Agency

South Bay Area

6. Alameda County Flood Control and Water Conservation District, Zone 7
7. Alameda County Water District
8. Santa Clara Valley Water District

San Joaquin Valley Area

9. County of Kings
10. Dudley Ridge Water District
11. Empire West Side Irrigation District
12. Kern County Water Agency
13. Oak Flat Water District
14. Tulare Lake Basin Water Storage District

Central Coast Area

15. San Luis Obispo County Flood Control and Water Conservation District
16. Santa Barbara County Flood Control and Water Conservation District (Central Coast Water Authority)

Southern California Area

17. Antelope Valley - East Kern Water Agency
18. Castaic Lake Water Agency
19. Coachella Valley Water District
20. Crestline - Lake Arrowhead Water Agency
21. Desert Water Agency
22. Littlerock Creek Irrigation District
23. Mojave Water Agency
24. Palmdale Water District
25. San Bernardino Valley Municipal Water District
26. San Gabriel Valley Municipal Water District
27. San Gorgonio Pass Water Agency
28. The Metropolitan Water District of Southern California
29. Ventura County Flood Control District

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C-094711

SWP delivery shortfalls have prompted both agricultural and municipal and industrial (referred to as "Urban" or "M&I") SWP Contractors to scrutinize DWR procedures and to consider amendments to their water supply contracts with DWR. Some of the Contractors have considered litigation to resolve differences over water allocations. To avoid litigation, and to make the SWP operate more effectively and reliably for all Contractors, DWR and the Contractors engaged in mediated negotiations toward a settlement of their disputes.

1.5 PROVISIONS OF THE MONTEREY AGREEMENT

The Contractors' water contracts have been and will be amended from time to time to accommodate changing conditions. The Monterey Agreement is the most recent set of agreed principles forming a basis for further amendments by Contractors. The major conditions addressed by the Monterey Agreement include the following:

- allocation of SWP water;
- potential transfers of entitlements;
- greater reliability of water supply to all Contractors;
- integration of SWP terminal reservoirs into local water supply systems; and
- stabilization of water rates.

The Monterey Agreement Statement of Principles is intended to settle disputes over water allocations and certain operational aspects of the SWP. A copy of the Monterey Agreement is attached as Appendix A. Each of the 14 principles is briefly described below.

Principle 1 — Water Allocations. In the future, allocation of project water from existing facilities will be based on entitlements rather than the previously used methodology.

Principle 2 — Water Allocations. In years when total available SWP supplies are less than total Contractor requests for water, water will be allocated in proportion to each Contractor's share of total Contractor entitlements, thereby eliminating the initial supply reduction to Agricultural Contractors, which is currently applied with certain limitations. If a Contractor's allocation exceeds its annual request for water, the water in excess will be allocated to Contractors with unmet requests in proportion to their entitlement. This revised allocation methodology has two exceptions: (a) compliance with a valid court order or an order of the State Water Resources Control Board (SWRCB), and (b) a declaration of emergency by the Governor.

Principle 3 — Kern Water Bank. Property comprising the Kern Fan Element (KFE) of the Kern Water Bank (KWB) currently owned by DWR will be sold or leased (with an option to purchase) on a long-term basis to designated Agricultural Contractors. Any project water remaining in groundwater storage programs that use KFE facilities for extraction at the time of transfer of the property will be split equally between DWR and the transferee of the property. An annual entitlement of 45,000 acre-feet (AF) of agricultural water will be transferred to DWR and retired. Subject to the approval of designated Agricultural Contractors, Urban Contractors may be granted access to and use of the KFE property and related assets.

Principle 4 — Permanent Sales of Entitlement. Agricultural Contractors will make available for permanent transfer (on a willing buyer-willing seller basis) 130,000 AF of annual entitlements to Urban Contractors, or to non-Contractors after a right of first refusal by Urban Contractors. Transfers of

C—094712

C-094712

entitlements between other Contractors will also be allowed.

Principle 5 — Restructuring to Ensure Financial Integrity of the SWP. The SWP Contractors and DWR will develop a number of financial programs with SWP funds that will (1) establish a SWP operating reserve, (2) establish a program for water rate management, and (3) provide for revenue bond financing of specific planned future operation and maintenance facilities, if such facilities are constructed.

Principle 6 — Terminal Reservoirs — Points of Delivery. SWP Contractors who participate in repayment of the costs of Castaic and Perris reservoirs will have an opportunity to use the storage in those reservoirs. Subject to certain limitations, these Contractors will be provided the opportunity to directly utilize a portion of the respective storage capacities of these reservoirs in order to optimize the operation of both local and SWP facilities. The potential to work out a similar arrangement for Del Valle Reservoir was included in this Principle, but it has currently been decided not to pursue such arrangements.

Principle 7 — Interruptible Water Service Program. The three current categories of water remaining after entitlements and project operational commitments have been satisfied, i.e., surplus, wet weather, and 12(d) (shortage make-up provision) will be replaced by a single category of interruptible water service. This interruptible water will be allocated based on entitlement and delivered at the melded SWP power rate.

Principle 8 — Non-project Water Transport. Contractors shall have the right to transport non-Project water in SWP facilities at the melded SWP power rate.

Principle 9 — Water Storage Outside Service Area. A Contractor may elect to be either a "seller," as provided in Principle 10, or a "storer" of water in any one single year but cannot be both in the same year. This principle outlines guidelines pertinent to the storage of project water. Water stored by a Contractor outside its service area is reserved exclusively for use in the service area of the storer and cannot be sold. Within certain constraints, SWP water may be stored from year to year in SWP surface conservation storage facilities or in non-SWP surface storage facilities outside a Contractor's service area. There are no limits on groundwater storage of SWP water outside a Contractor's service area.

Principle 10 — Turn-back Water Pool Sales. This principle refers to Contractors who choose the "seller" track on an annual basis and outlines a set of priorities that must be followed in the annual sale of allocations of entitlement water. An annual turn-back pool of water is created and administered by DWR under which water allocated but not needed by a Contractor may be sold to interested Contractors and/or DWR at a percentage of the Delta Water Rate, or to non-contractors.

Principle 11 — Conforming Contract Amendments. SWP contracts will be amended as appropriate to conform to the Statement of Principles.

Principle 12 — Project Improvements. DWR reaffirms its obligation to make all reasonable efforts to complete the SWP.

Principle 13 — Integrated Package. Contractors must choose to participate in all the provisions of the Principles or none, i.e., the principles come as a package.

Principle 14 — No Precedent. If the parties do not enter into the amendments, they agree not to utilize the Statement of Principles document in any court proceedings relating to matters addressed in this agreement.

1.6 ENVIRONMENTAL CONSEQUENCES CATEGORIES

CEQA requires identification of potential environmental consequences of implementing the Monterey Agreement. At the outset it is helpful to categorize the principles in terms of their potential for generating environmental effects. Five categories of environmental impacts have been developed:

A. Potential for current, ascertainable environmental impacts;

B. No direct or indirect environmental impact ascertainable, but have potential for economic impact;

C. Potential for future environmental impacts, but not ascertainable at present;

D. No potential for environmental impacts, but ratify, clarify or restate present contract terms or state law; and

E. No potential for environmental impacts, but simply contain standard legal parlance.

1.7 ENVIRONMENTAL CONSEQUENCES OF MONTEREY AGREEMENT PRINCIPLES

The 14 principles of the Monterey Agreement are classified based on the five environmental consequences categories. The results are presented in Table 1.7-1. The primary focus of this EIR is on actions emanating from the full or partial implementation of the principles that fall within the first category of environmental consequences, i.e., those having the potential for current, ascertainable environmental impacts. These are principles 1, 2, 3, 4, 6, and 7, which address the following items: water allocations in general, water allocations when requests exceed supply, Kern Fan Element, permanent sale of entitlement, terminal reservoirs, and interruptible water service program.

Table 1.7-1
Cross Tabulation of Monterey Agreement Principles by Environmental Consequence Category

	Environmental Consequences Category				
Principle	*A*	*B*	*C*	*D*	*E*
1	Yes				
2	Yes				
3	Yes				
4	Yes				
5		Yes			
6	Yes				
7	Yes				
8				Yes	
9			Yes		
10		Yes			
11					Yes
12				Yes	
13					Yes
14					Yes

Source: SAIC, 1995.

1.8 CONCURRENT SWP ENTITLEMENT ACTIVITIES

Other concurrent SWP entitlement activities are summarized below. Final implementation of some of these activities, as currently proposed, is subject to final implementation of the Monterey Principles; others could proceed without implementation of the Monterey Agreement.

Santa Barbara County and San Luis Obispo County Flood Control and Water Conservation Districts

When the Santa Barbara County Flood Control and Water Conservation District (Santa Barbara County) and the San Luis Obispo Flood Control and Water Conservation District (San Luis Obispo County) initially contracted to receive SWP water, Santa Barbara obtained an entitlement for 57,700 AF, which it later

reduced to 45,486 AF, by amending its agreement with DWR. The amendment reserved to Santa Barbara County the option to reacquire the 12,214 AF entitlement by paying certain accrued costs or to have DWR sell or assign the capacity rights to some other project purpose. Since Santa Barbara County has determined that no local interests wish to pay the accrued costs and reacquire some or all of this entitlement, the County is in the process of attempting to dispose of its capacity rights, but no agreement has been reached. Santa Barbara County's Contractors have requested 45,486 AF of entitlement.

When San Luis Obispo County initially contracted for SWP water, it obtained an entitlement for 25,000 AF. Its contractors have requested a total of approximately 6,000-7,000 AF. As a result, San Luis Obispo is in the process of seeking a market or markets for the portion of its entitlement that has not been subscribed. Negotiations have been instituted for a potential transfer but the outcome is unknown.

Berrenda Mesa Water District - Dublin San Ramon Services District

Berrenda Mesa Water District (BMWD), located in the northwest corner of Kern County, plans to declare 75,000 AF of SWP agricultural water entitlement as available for transfer. BMWD negotiated and agreed, prior to the Monterey Agreement being executed, to an arrangement with the Dublin San Ramon Services District (DSRSD), which supplies water to northern Alameda County, whereby DSRSD will purchase up to 8,500 AF of the available water entitlement for transfer from BMWD. The transfer amount would be diverted from the California Aqueduct at the Banks Pumping Plant in lieu of BMWD taking delivery from the Coastal Branch of the California Aqueduct. The transferred water entitlement would be delivered to DSRSD utilizing the unobligated capacity of the South Bay Aqueduct (SBA) and the South Bay Pumping Plant. The unobligated SBA capacity could be purchased by DSRSD or Alameda County Flood Control and Water Conservation District (Zone 7), which in turn would be sold to DSRSD.

Semitropic Water Storage District - Metropolitan Water District of Southern California

Prior to the Monterey Agreement being executed, Semitropic Water Storage District (SWSD) and Metropolitan Water District of Southern California (MWD) entered into an agreement to develop a water banking and exchange program. A temporary storage program was implemented in 1993 when a portion (50,000 AF) of the 1992 carry-over water from the SWP due to MWD was stored in the groundwater basin underlying SWSD. Under the agreement, water could be stored by either direct spreading or in-lieu means. Returned water could either be pumped from the groundwater basin and delivered directly to the California Aqueduct or exchanged for an equal quantity of Kern County Water Agency (KCWA) SWP entitlement water which would otherwise be delivered to SWSD.

Based on the success of the temporary program, a long-term program was negotiated in December of 1994. When finally implemented, this agreement would allow MWD to store, at any time, up to 350,000 AF of SWP or other water supplies in the groundwater basin underlying SWSD. The capacity of the long-term storage program is one million AF. Since MWD did not contract for the full capacity offered by the program, SWSD has contacted DWR and other SWP Contractors to solicit their participation. The final EIR for this project was published in 1994.

Dudley Ridge Water District - San Gabriel Valley Municipal Water District

In 1994, prior to the Monterey Agreement, Dudley Ridge Water District (DRWD) and San Gabriel Valley Municipal Water District

(SGVMWD) developed a draft agreement for a 25-year water banking program. The objectives of the water banking program are to allow DRWD to increase the firmness of a portion of their SWP supply and to provide SGVMWD additional water and flexibility in meeting their water demands. Under the agreement, DRWD may store up to 20,000 AF in SGVMWD's groundwater storage account in the Main San Gabriel Basin. SGVMWD would retain 5 percent of the water delivered by DRWD. Upon request by DRWD, SGVMWD will have a portion of their SWP water delivered to DRWD (not to exceed the water in storage and subject to availability after SGVMWD's retention of up to 5,000 AF for power contract obligations).

C—094716

C-094716

2. PROGRAM DESCRIPTION

The Monterey Agreement contains 14 principles, the implementation of some of which have the potential for ascertainable environmental consequences. A copy of the complete text of the agreement is included as Appendix A.

Based on those principles that are identified as having the potential for current, ascertainable environmental impacts, five major program components have been formulated. These program components are defined as implementation activities that have the potential for current and tangible environmental impacts. Some of these impacts, however, are difficult to quantify. Due to the uncertainty associated with the level of implementation of each of the program components, three program scenarios are defined. It is these scenarios (variants of the Proposed Action), alternatives to the Proposed Action, and the No Project Alternative that are the subject of this EIR.

2.1 MAJOR PROGRAM COMPONENTS OF MONTEREY AGREEMENT IMPLEMENTATION

The major program components of the Monterey Agreement implementation are defined as those principles that, when put into operation, have the potential for current, tangible, and quantifiable environmental impacts. The program components are listed below and are addressed in greater detail in subsequent sections.

- Revisions to the methodology used to allocate water among Contractors, especially when supply is less than demand;
- Retirement of 45,000 acre-feet (AF) of agricultural entitlement;
- Changes in control of the Kern Fan Element (KFE);
- Transfer by sale of 130,000 AF of entitlement from Agricultural Contractors to Urban Contractors and non-Contractors and possible additional transfers among contractors; and
- Changes in the manner in which Castaic Lake and Lake Perris terminal reservoirs may be operated.

2.1.1 Principles 1, 2, and 7: Allocation Methodology

PRINCIPLE 1

Under the Monterey Agreement, water from existing SWP facilities is to be allocated based on entitlements rather than the methodology previously used. Previously, water was allocated on the basis of request, which results in the same allocation as when allocated on the basis of entitlement except during years of supply shortage.

PRINCIPLE 2

Under the Monterey Agreement, in years when total available SWP supplies are less than total Contractor requests for water, water will be allocated in proportion to each Contractor's share of total Contractor entitlements. If a Contractor's allocation exceeds its annual request for water, the water in excess will be allocated to Contractors with unmet requests in proportion to their entitlement. This revised allocation methodology has two exceptions: (a) to comply with a valid court order or an order of the State Water Resources Control Board (SWRCB), or (b) a declaration of emergency by the Governor.

C—094717

C-094717

Previously, when available supplies were less than requests, initial reductions were made in supplies to Agricultural Contractors by an amount up to 50 percent of their requests in any one year and up to a cumulative total of 100 percent in any 7 consecutive years. Any shortages remaining after these initial Agricultural reductions were shared among all Contractors in proportion to requests or entitlements.

PRINCIPLE 7

Under the Monterey Agreement, three current categories of water that are supplied only after requested entitlement deliveries have been made, i.e., surplus, wet weather, and Article 12(d) (or make-up) water, will be replaced with a single category of interruptible water service. Interruptible water, when available, will be allocated on the basis of entitlement.

Surplus water is water that is available in excess of scheduled entitlement deliveries and SWP operational storage entitlements. It has been made available in the past on either a scheduled or unscheduled basis. Significant deliveries of scheduled surplus were made in the 1970s through mid-1980s when Contractor demands were lower. In recent years, surplus water has been available only on an unscheduled, interruptible basis due to increasing Contractor demands, limited supplies because of drought, increased regulatory constraints on SWP operations, and lack of additional facilities.

Wet weather water is water made available to certain Contractors following years in which local conditions in their respective service area is so wet that their ability to take SWP entitlement is limited. Only six Contractors have such provisions.

Article 12(d) is a provision in the Contractors SWP Water Supply Agreements in which DWR agrees to deliver, in years following a shortage in supplies, water to make up that shortage. This water would be delivered in addition to entitlement.

2.1.2 Principle 3: Retirement of 45,000 AF of Agricultural Entitlement

Designated Agricultural Contractors will transfer 45,000 AF of agricultural water entitlement to DWR. DWR will retire the entitlement.

2.1.3 Principle 3: Kern Fan Element (KFE) of the Kern Water Bank (KWB)

The Monterey Agreement calls for the sale or long-term lease (with option to purchase) of the KFE property and related assets by DWR to designated Agricultural Contractors. Subject to the approval of these designated Agricultural Contractors, Urban Contractors may be provided access to and use of KFE property and related assets of the KWB for water storage.

The KWB is defined as any opportunity to recharge water in Kern County for SWP yield, the purpose of which is to store excess water during wet years for extraction during dry years. The proposed KWB program consists of eight separate projects, or elements. The KFE is one of these projects with seven other local elements proposed to be owned by various water districts in Kern County.

The KFE property consists of 20,546 acres of land located in Kern County southwest of Bakersfield, including the Rosedale-Rio Bravo property of about 600 acres (see Figure 2.1-1). DWR acquired this land for groundwater recharge, storage, and extraction purposes. Storage facilities were planned to be built in two stages. Planned storage capability of the first stage was to be about 350,000 AF. The second stage was expected to increase the storage capability to about 1 million AF. A number of documents pertinent to the KFE

C—094718

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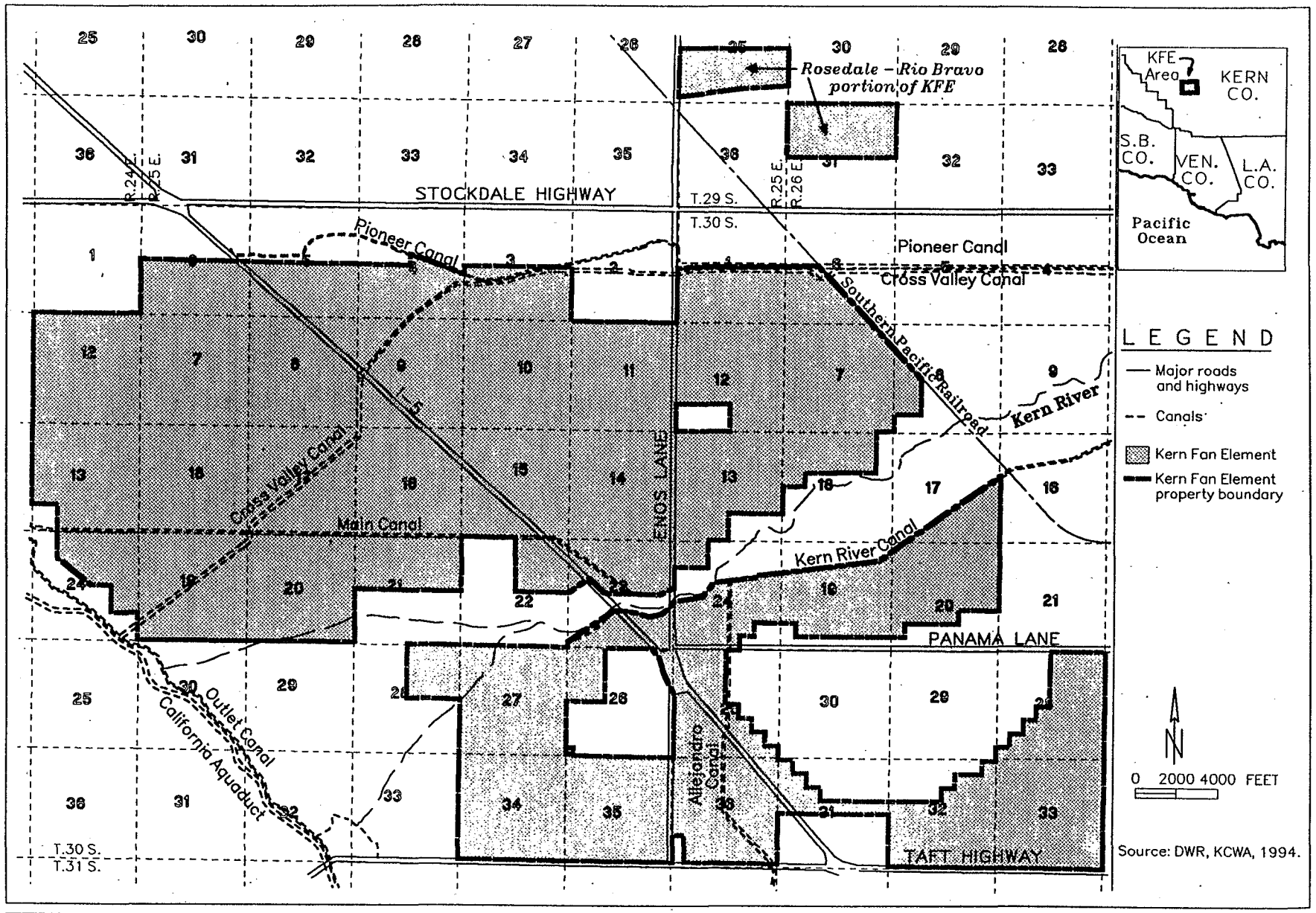

Figure 2.1-1

KERN FAN ELEMENT PROPERTY

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property have been circulated and are described immediately below.

KERN WATER BANK FINAL PROGRAM EIR (1986)

DWR published a Final Program EIR for the Kern Water Bank (DWR, 1986). This EIR evaluated the program-level impacts of the use of the groundwater basin west of Bakersfield, California, to recharge, store, and extract water. The EIR addressed the general effects of the program and the impacts associated with DWR's proposal to acquire approximately 46,000 acres necessary for the first element, the KFE. It did not address operation of the KWB.

MEMORANDUM OF UNDERSTANDING (MOU) BETWEEN DWR AND KERN COUNTY WATER AGENCY (KCWA) (1987)

Following the completion of the Kern Water Bank Final Program EIR, DWR and KCWA entered into an MOU in March 1987 that established the principles for developing, operating, and managing the Kern Water Bank. A copy of the MOU is included as Appendix B. These principles included agreements on:

- KCWA's option to acquire or control the KFE;
- Operations and maintenance responsibilities for the KFE;
- Land use and groundwater overdraft correction (farming operations on lands within the KFE would be taken out of irrigation within 5 years);
- Use of the KFE lands and facilities for the recharge and extraction of non-SWP (local) water; and
- Legal and policy considerations.

FIRST STAGE KERN FAN ELEMENT DRAFT SUPPLEMENTAL EIR (1990)

DWR published a Draft Supplemental EIR for the First Stage Kern Fan Element in December 1990 (DWR, 1990). This draft supplemental EIR tiered off the DWR Program EIR of 1986 and evaluated the impacts of constructing and operating the first stage of the KFE. The first stage included 1,100 acres of ponds within the 20,000 acres of the KFE. Maximum groundwater storage capacity of the first stage was 350,000 AF. A final EIR was never published.

ADMINISTRATIVE DRAFT HABITAT CONSERVATION PLAN (HCP) (MAY 1994)

In 1994, DWR prepared a preliminary administrative draft version of the HCP for the Kern Fan Element HCP Steering Committee. The three major project proponents identified in the HCP are Atlantic Richfield Company (ACRO), DWR, and KCWA, who, in addition to California Department of Fish and Game (CDFG) and United States Fish and Wildlife Service (USFWS), comprise the members of the HCP Steering Committee. ARCO owns all mineral rights to the KFE property although production is mainly conducted by other companies operating under agreements with ARCO. The HCP addresses the terrestrial impacts of the proposed activities on the KFE property and sets forth a conservation strategy to mitigate adverse impacts to threatened and endangered species. The draft document was never finalized or distributed for public comment.

2.1.4 Principle 4: Permanent Sales of Entitlement

Three types of entitlement transfers are addressed in the agreement.

AGRICULTURAL TO URBAN ENTITLEMENT TRANSFERS

Agricultural Contractors will make available for permanent transfer to Urban Contractors (on a willing buyer-willing seller basis) 130,000 AF of annual entitlement. KCWA is obligated to make available to willing buyers any portion of this 130,000 AF entitlement not made available by other Agricultural Contractors. This responsibility on the part of KCWA applies until January 1, 2011. Any of these transfers must be approved by the appropriate Agricultural Contractor and DWR in an expeditious manner. KCWA shall be entitled to receive a percentage of the gross sales price for sales from within its service area. Member units of KCWA shall have 90 days to exercise a right of first refusal to purchase any entitlement being offered to Urban Contractors. Such sales to KCWA member units shall not diminish the 130,000-AF obligation of KCWA.

TRANSFERS TO NON-CONTRACTORS

Any permanent transfers of entitlement by Agricultural Contractors to parties who are not Urban Contractors (or to KCWA urban member units including KCWA's Improvement District No. 4) will be considered a part of the 130,000 AF addressed above, provided Urban Contractors have been allowed 90 days to exercise a right of first refusal to purchase any such entitlement.

OTHER WATER TRANSFERS

Any permanent sales of entitlement among Contractors must be expeditiously approved by DWR.

2.1.5 Principle 6: Terminal Reservoirs

Although this document includes an analysis of potential environmental impacts resulting from potential operational changes at Castaic Lake and Lake Perris as a result of implementation of the Monterey Agreement, reservoir operational changes have been held by the courts to be exempt from CEQA review. There are two legal bases for such an exemption. In *Leach v. San Diego* (1990) 220 Cal. App. 3d 389, 269 Cal. Rptr. 328, the court concluded that a change in operations at an existing reservoir is purely ministerial, not discretionary. CEQA does not apply to ministerial acts. The court in *Nacimiento Regional Water Management Advisory Com. v. Monterey County Water Resources Agency* (1993) 15 Cal. App. 4th 200, 19 Cal. Rptr. 2d 344 found that operational changes at an existing reservoir constituted a normal part of the operation of an on-going project approved prior to November 23, 1970. The court stated that the distinction between an activity that requires CEQA review and one that does not is "whether it expands or enlarges project facilities or merely monitors and adjusts the operation of existing facilities to meet fluctuating conditions." CEQA Guidelines section 15261(a) states that if the "project being carried out by a public agency was approved prior to November 23, 1970, the project shall be exempt from CEQA unless" (1) a substantial portion of the allocated public funds for the project have not been spent and the project feasibly could be changed; or (2) the public agency proposes to modify the project in a way that could have a new significant environmental impact. The court concerned itself with a physical change in the project facilities as contrasted with operational modifications using existing facilities.

The proposed operational changes for the terminal reservoirs meet these criteria. Although these changes fall within the CEQA exemption, they are analyzed in this document in the interests of full disclosure to the decision-makers and the public.

The two terminal reservoirs addressed in this EIR are Castaic Lake and Lake Perris. It has been determined that no changes in the

C—094721

C-094721

operation of Lake Del Valle will result from implementation of the Monterey Agreement.

CASTAIC DAM AND LAKE

The Castaic Dam and Lake facility is located about 45 miles northwest of Los Angeles and about 2 miles north of the community of Castaic (see Figure 2.1-2). Construction of Castaic Lake, which was completed in 1972, fulfills the following purposes: (a) provides emergency storage in the event of a shutdown of the California Aqueduct to the north, assuring water deliveries to the West Branch water users; (b) acts as regulatory storage for deliveries during normal operation; (c) provides a setting for recreational development by state and local agencies for the Southern California area; and (d) provides some flood control. Castaic Lake and associated facilities are illustrated in Figure 2.1-3.

Elderberry Forebay, located at the upper end and separated from the right arm of Castaic Lake, serves three purposes: (a) it provides 18,000 AF of live storage that can be utilized by Castaic Power plant during offpeak hours for pumpback into Pyramid Lake; (b) it provides submergence for the pump-generator when Castaic Lake is at its lower operating levels; and (c) it reduces daily and weekly fluctuations in Castaic Lake.

Castaic Lagoon, located immediately downstream of Castaic Dam, originally was a borrow area for the construction of Castaic Dam. It now serves two purposes: (a) it provides a recreation pool with a water surface at a constant elevation of 1,134 feet and (b) it functions as a recharge basin for the downstream groundwater basin.

Castaic Lake, which receives water from Pyramid Lake to the north via the Castaic pump-generation powerplant, is the final reservoir on the West Branch of the SWP. It provides a major source of water to the Castaic Lake Water Agency and to the western part of the service area of the Metropolitan Water District of Southern California (MWD).

Castaic Lake is cycled annually, generally peaking in end-of-month storage in March, with drawdown taking place through the following months until a low is reached usually in October. From this low point, the reservoir is filled to attain a high point again in March (see Figure 2.1-4). Periodically, such as occurred in 1977-78, 1985, and 1994-95, storage at Castaic Lake is drawn down significantly to perform required inspections and maintenance. These maintenance drawdowns will continue to be required in the future.

LAKE PERRIS AND PERRIS DAM

Lake Perris and Perris Dam are located in northwest Riverside County, approximately 13 miles southeast of the City of Riverside and about 65 miles east of Los Angeles (see Figure 2.1-2). Lake Perris is a multi-purpose facility with provisions for water supply, recreation, and fish and wildlife enhancement. Lake Perris and associated facilities are illustrated in Figure 2.1-5.

Lake Perris, the most southerly and last reservoir on the East Branch of the SWP, supplies water to the Metropolitan Water District of Southern California (MWD). Water is routed to the lake from Silverwood Lake via the San Bernardino Tunnel and Devil Canyon Powerplant.

Lake Perris is not cycled to the degree that Castaic Lake is, but the overall pattern of variation in storage over the course of the year is similar to Castaic Lake (see Figure 2.1-6), with end-of-month storage generally peaking in March and reaching a low point in September.

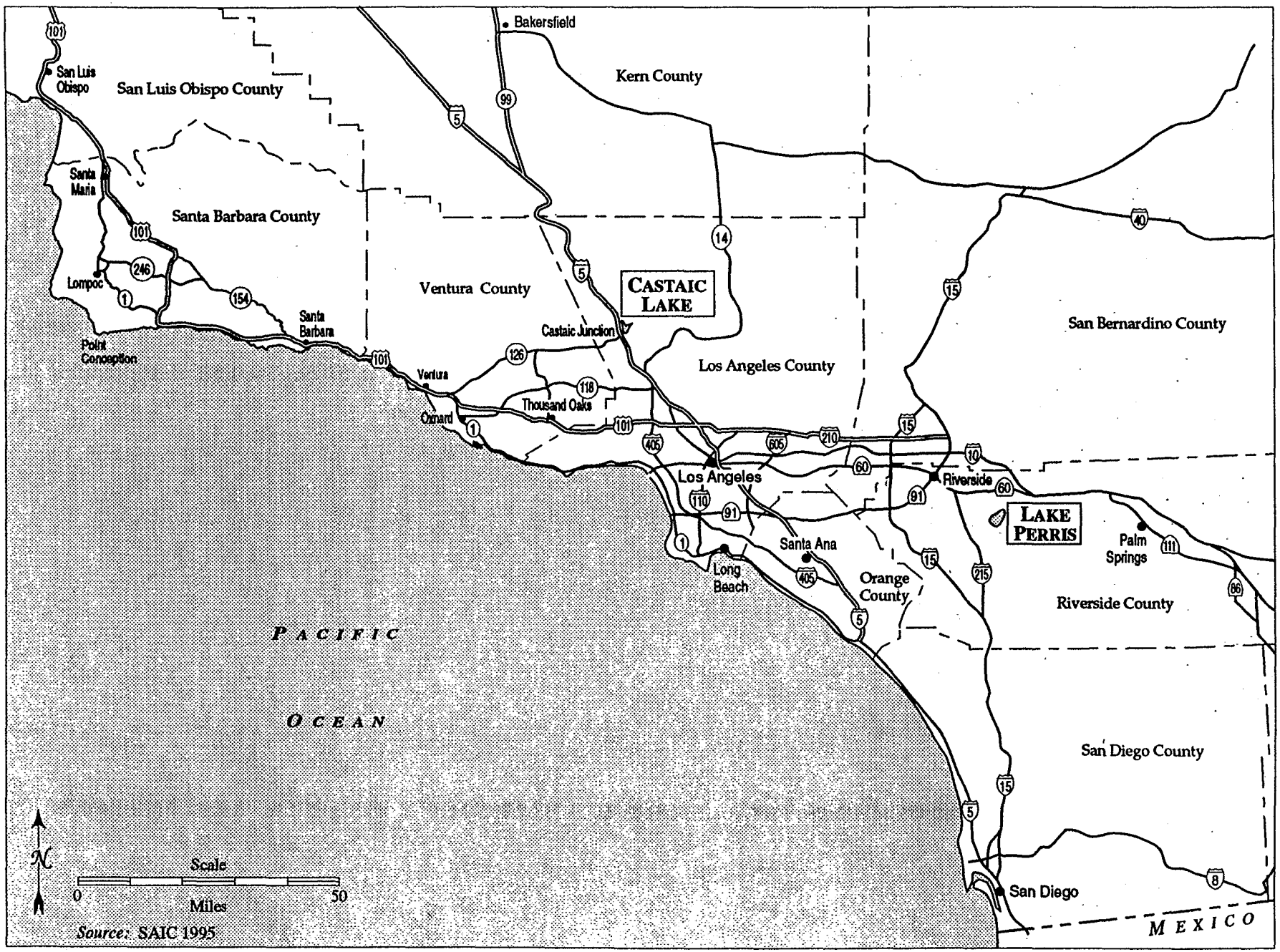

Figure 2.1-2. Location of Castaic Lake and Lake Perris.

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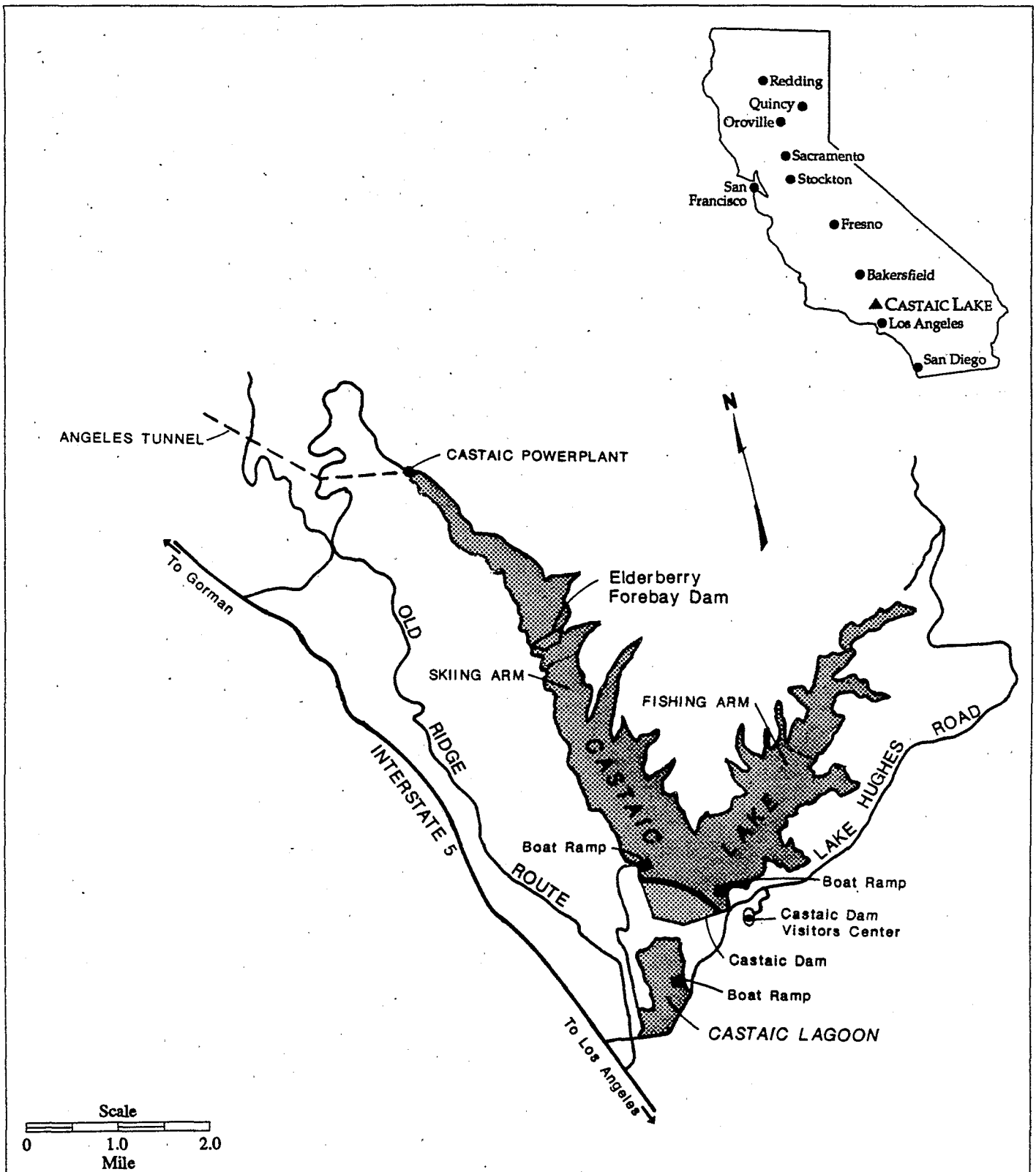

Source: Recreation Facilities of the State Water Project: An Inventory, 1989

Figure 2.1-3. Castaic Lake and Associated Facilities.

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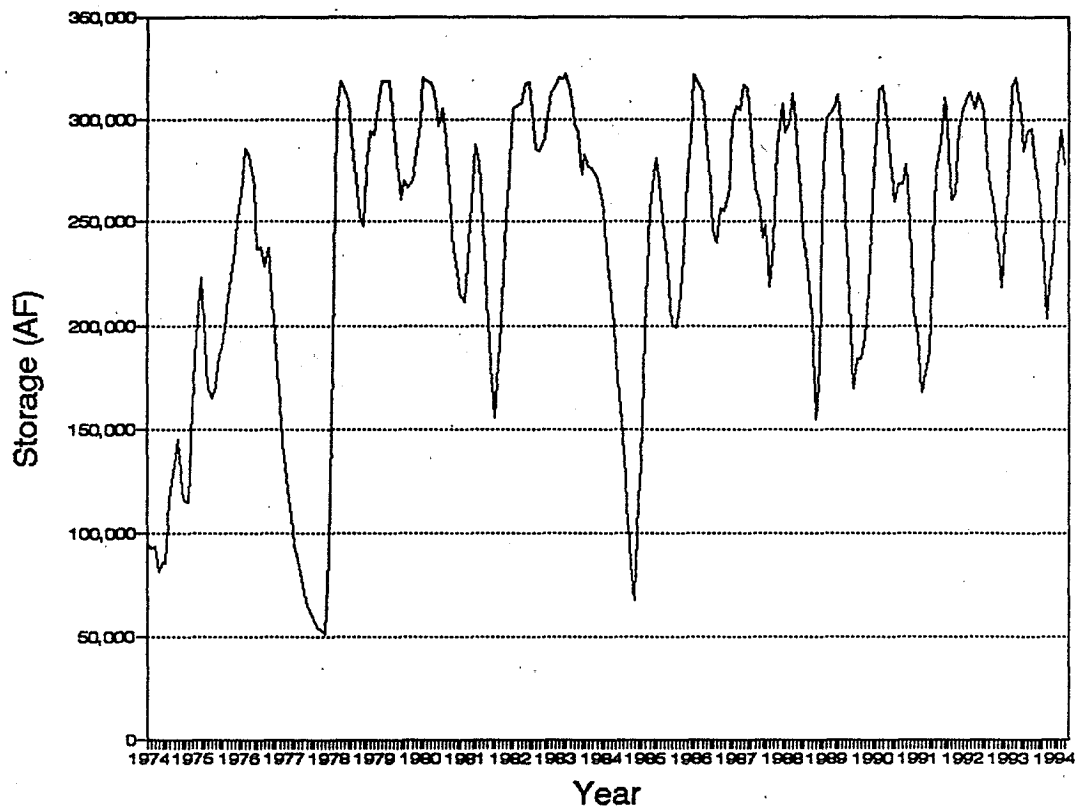
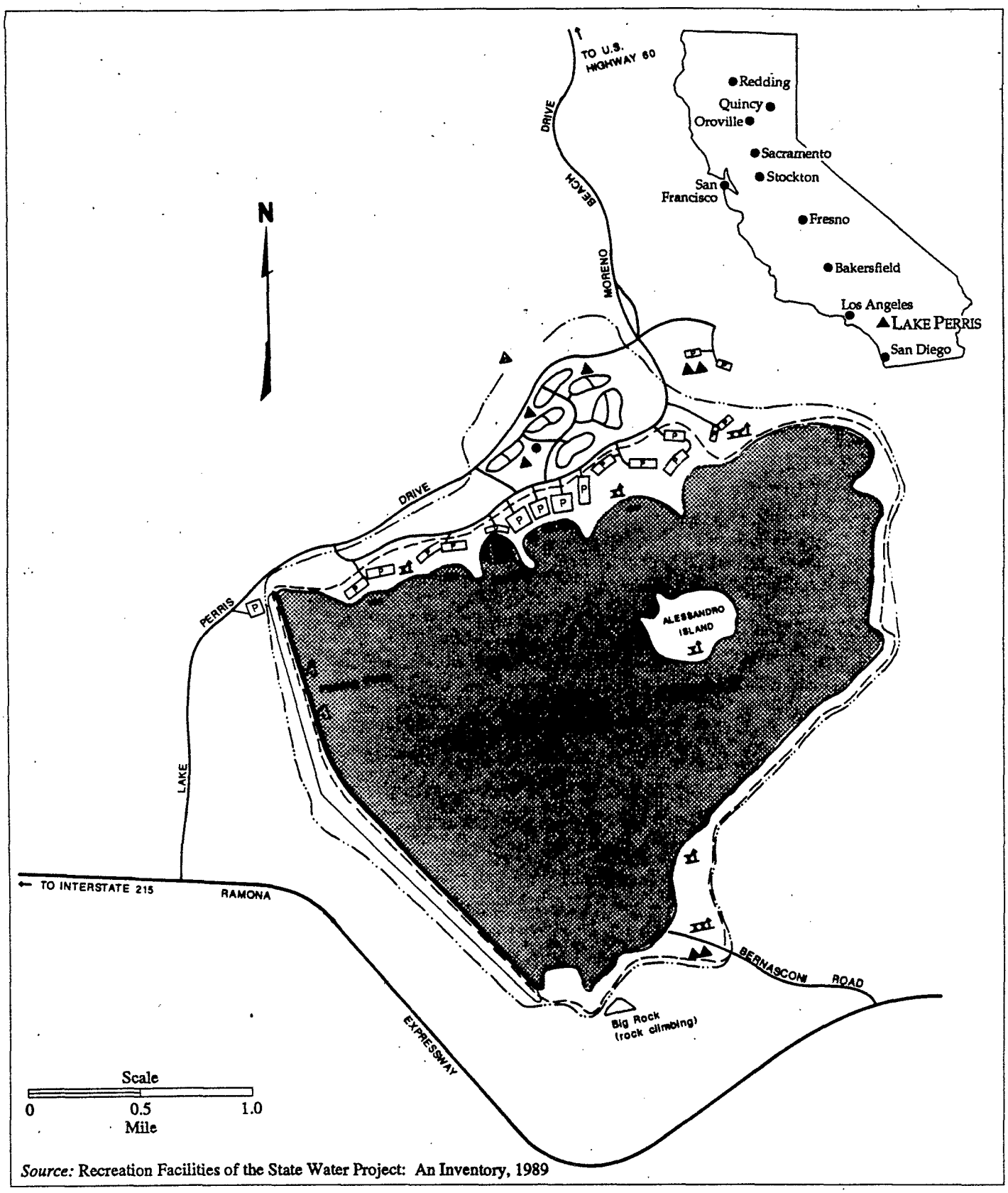


Source: MWD, 1994; SAIC, 1995

Figure 2.1-4. Castaic Lake - Historic Monthly Storage, 1974-1994



Source: Recreation Facilities of the State Water Project: An Inventory, 1989

Figure 2.1-5. Lake Perris and Associated Facilities.

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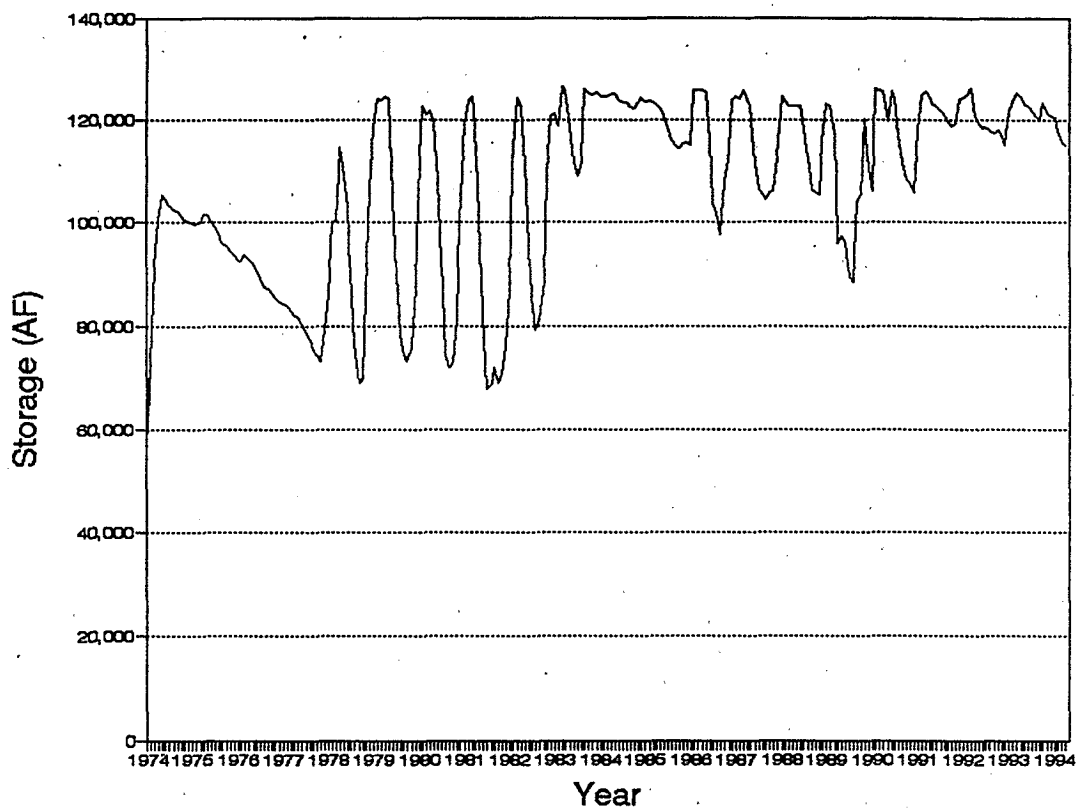


Source: MWD, 1994; SAIC, 1995

Figure 2.1-6. Lake Perris - Historic Monthly Storage, 1974-1994

C-094727

C-094727

FUTURE RESERVOIR OPERATING PROCEDURES

The Monterey Agreement provides that SWP Contractors who participate in repayment of the costs of Castaic and Perris Reservoirs will have an opportunity to directly utilize a portion of the respective capacities in order to optimize their water storage and supply operations and help ensure a firm water supply. To this end, these Contractors have proposed that approximately 50 percent of the active storage capacity of these reservoirs be available for withdrawal and use by these Contractors under a set of operational conditions. These conditions would include the following:

- Contractor-requested withdrawals would be a "loan" and would not be considered part of that Contractor's entitlement allocation in that year.
- The water loan would be paid back by that Contractor within 5 years.
- The water paid back could be SWP water, purchased or exchanged water, or some other water procured by the Contractor.

The Contractors who would potentially share in any withdrawal from the two reservoirs, and their respective shares, are presented in Table 2.1-1.

Proposed cycling patterns for each of the reservoirs under each of three scenarios of the Proposed Action are presented in section 4.2, Water Resources.

Table 2.1-1
Proposed Quantity of Water Available for Withdrawal by SWP Contractors

	CASTAIC LAKE		LAKE PERRIS	
Contractor	*Percentage Share*	*Available for Withdrawal (AF)*	*Share*	*Available for Withdrawal (AF)*
Metropolitan Water District of Southern California	0.962	153,940	1.000	65,000
Ventura County Flood Control District	0.009	1,377	0.000	0
Castaic Lake Water Agency	0.029	4,683	0.000	0
Total	1.000	160,000	1.000	65,000

Source: MWD, 1995.

2.2 PROPOSED ACTION

The Proposed Action is implementation of the Monterey Agreement. For the Proposed Action, three scenarios are presented. Each scenario represents a different level of implementation of the Monterey Agreement, as summarized below.

Summary characterizations of the three implementation scenarios of the Proposed Action and No Project Alternative for the KFE, in addition to existing conditions and those described in the Preliminary Administrative Draft Habitat Conservation Plan (HCP), are shown in Table 2.2-1.

C-094728

C-094728

C-094729

Table 2.2-1
PROGRAM COMPONENT CHARACTERISTICS OF PROPOSED ACTION SCENARIOS AND NO PROJECT ALTERNATIVE

Program Component	*Existing Conditions (Status Quo)*	*Preliminary Draft Habitat Conservation Plan (HCP)*	PROPOSED ACTION			*No Project Alternative*
			Scenario A	*Scenario B*	*Scenario C*	
Kern Fan Element (KFE) Land Use (acres)						
Recharge facilities [1]	578	6,778	3,258	5,258	7,758	Note 6
Irrigated farmland	288	0	0	0	0	Note 6
Native and disturbed vegetation [2]	2,690	7,540	2,000	4,500	7,100	Note 6
Previously irrigated/undesignated [3]	16,500	5,738	14,798	10,298	5,198	Note 6
Other [4]	490	490	490	490	490	Note 6
Ownership of KFE Land	DWR	DWR	Agricultural Contractors	Agricultural Contractors	Agricultural Contractors	DWR
SWP Water Allocation Method [5]	No change	Note 7	Change	Change	Change	No change
Retirement of 45,000 AF of Agricultural Contractor Entitlement	No	Note 7	Yes	Yes	Yes	No
Transfer of 130,000 AF of Entitlement from Agricultural to Urban Contractors and Non-Contractors	No	Note 7	No	65,000 AF	130,000 AF	No
Castaic Lake						
Annual cycling	No change	Note 7	Reduced	Reduced	Reduced	No change
Urban Contractor water loan	No	Note 7	No	Yes (1-2 yrs)	Yes (4-5 yrs)	No
Lake Perris						
Annual cycling	No change	Note 7	No change	No change	No change	No change
Urban Contractor water loan	No	Note 7	No	Yes (1-2 yrs)	Yes (4-5 yrs)	No

Notes: 1. Includes recharge ponds on Rosedale/Rio Bravo property.
2. Includes open areas and land maintained under dry farming for vegetation management.
3. These lands can be made available for additional water recharge and extraction facilities, recreational activities, for additional mitigation banking use, and irrigated agriculture. They include land currently utilized for oil and gas extraction activities.
4. Includes roads, canals, and oil and gas facilities on non-native and disturbed vegetation land.
5. No change implies continuation of the initial agricultural deficiency clause. Change implies a discontinuation of this clause and allocation based solely on entitlement.
6. A number of potential No Project Alternative futures are possible, including activities similar to those characterized by Scenarios A, B, and C of the Proposed Action.
7. The Habitat Conservation Plan applies to the KFE property only.

Source: SAIC, 1995.

C—094729

2.2.1 Scenario A

The Monterey Agreement is implemented, and the following actions occur:

- Changes in SWP water allocations occur. Allocations will be based solely on entitlements. In years when initial deficiencies occur, Urban Contractors will no longer have priority over Agricultural Contractors. Current surplus, wet weather, and make-up water categories will be replaced by an interruptible water category allocated based on entitlement.

- 45,000 AF of Agricultural Contractor entitlement is retired.

- KFE land of the KWB is transferred (by sale or lease with purchase option) from DWR to KCWA and Dudley Ridge Water District (DRWD) or other Agricultural Contractors. Of the 20,546 acres comprising the KFE (including the Rosedale-Rio Bravo property), 3,258 acres would be used for water recharge and extraction facilities. Approximately 2,000 acres would be maintained as native and disturbed vegetation. Of the remaining acreage, 14,798 acres would be classed as previously irrigated agricultural land/ undesignated use, and 490 acres would continue to be occupied by non-project roads, canals, and oil and gas facilities on non-native and disturbed vegetation land.

- The KFE is used for groundwater recharge, storage and recovery. The quantities of water recharged each year and the sequence of recharge and recovery activities will be determined at a later date.

- No transfer of entitlement occurs for the 130,000 AF, because no willing buyers and/or sellers are forthcoming.

- About 50 percent of the active storage capacity of Castaic and Perris reservoirs is available for withdrawal by the Contractors participating in repayment of those facilities. As a result, annual storage cycling at Castaic is reduced to about 30,000 AF, with no real change in annual cycling at Perris. The Contractors make no storage withdrawals for succeeding-year repayment.

2.2.2 Scenario B

The Monterey Agreement is implemented, and the following actions occur:

- Changes in SWP water allocations occur as stated in Scenario A.

- 45,000 AF of Agricultural Contractor entitlement is retired.

- KFE land of the KWB is transferred (by sale or lease with purchase option) from DWR to KCWA and DRWD or other Agricultural Contractors. Of the 20,546 acres comprising the KFE (including the Rosedale-Rio Bravo property), 5,258 acres would be used for water recharge and extraction facilities. Approximately 4,500 acres would be maintained as native and disturbed vegetation. Of the remaining acreage, 10,298 acres would be classed as previously irrigated agricultural land/ undesignated use, and 490 acres would continue to be occupied by non-project roads, canals, and oil and gas facilities on non-native and disturbed vegetation land.

- The KFE is used for groundwater recharge, storage and recovery. The quantities of water recharged each year and the sequence of recharge and recovery activities will be determined at a later date.

- A transfer of entitlement occurs for 50 percent of the 130,000 AF, because parties are willing to buy and/or sell only 50 percent of the total.

- Storage availability for Contractors from Castaic and Perris reservoirs is as stated in Scenario A. The Contractors make moderate storage withdrawals and refill those withdrawals within several years.

2.2.3 Scenario C

The Monterey Agreement is implemented, and the following actions occur:

- Changes in SWP water allocations occur as stated in Scenario A.
- 45,000 AF of Agricultural Contractor entitlement is retired.
- KFE land of the KWB is transferred (by sale or lease with purchase option) from DWR to KCWA and DRWD or other Agricultural Contractors. Of the 20,546 acres comprising the KFE (including the Rosedale-Rio Bravo property), 7,758 acres would be used for water recharge and extraction facilities. Approximately 7,100 acres would be maintained as native and disturbed vegetation. Of the remaining acreage, 5,198 acres would be classed as previously irrigated agricultural land/ undesignated use, and 490 acres would continue to be occupied by non-project roads, canals, and oil and gas facilities on non-native and disturbed vegetation land.
- The KFE is used for groundwater recharge, storage and recovery. The quantities of water recharged each year and the sequence of recharge and recovery activities will be determined at a later date.
- Transfer of entitlement occurs for 100 percent of the 130,000 AF.
- Storage availability for Contractors from Castaic and Perris reservoirs is as stated in Scenario A. The Contractors make a large storage withdrawal and take 5 years to refill that withdrawal.

2.3 NO PROJECT ALTERNATIVE

The Monterey Agreement is not implemented, and consequently:

- No changes in SWP water allocations occur. Initial reduction in supplies to Agricultural Contractors in deficit years, to the extent currently allowed by contract, continues. No changes are made to current categories and allocations of surplus, wet weather, and make-up water.
- 45,000 AF of Agricultural Contractors entitlement is not retired.
- KFE land is not transferred from DWR to designated Agricultural Contractors. DWR continues to develop the KFE lands in accordance with its plans as described in the 1990 Feasibility Report, DWR/KCWA MOU, Draft HCP, and DWR Bulletin 132-93, or KFE land continues in its current uses.
- No transfer of 130,000 AF of agricultural entitlement occurs.
- No changes occur in the operation of Castaic and Perris terminal reservoirs.

2.4 PROGRAM ALTERNATIVES

The Monterey Agreement has four major objectives: (1) increase the reliability of existing water supplies for both Urban and Agricultural Contractors, (2) stabilize the rate structure to improve the financial viability of the project for all Contractors, (3) increase water management flexibility (including but not limited to transfers) for all Contractors, and (4) complete the State Water Project. Because of the complexity of the Monterey Agreement and of the breadth of program goals, it is extremely difficult to identify program alternative projects capable of accomplishing all of the program goals. All of the alternatives to the program discussed

C—094731

C-094731

below meet some, but not all, of the program goals. No single alternative has been identified that meets all program goals.

2.4.1 Litigation

Under this alternative, one or more parties would sue the DWR and possibly other parties to obtain a court interpretation of their respective rights and obligations under the existing Water Supply Agreements for the SWP. No matter how strongly a party might consider its legal and factual position to be, the outcome of litigation is uncertain. This EIR attempts neither to assess the merits of the parties' positions nor to predict the result on any litigation described.

Certain of the Agricultural Contractors and Urban Contractors each have taken issue with DWR regarding past, current, and future methods of allocation determination. There has been dispute as to whether the Department is correct in applying an initial agricultural use deficiency. Under current circumstances, some contractors have argued that water should be allocated irrespective of type of use. There has also been controversy as to whether allocations should be on the basis of actual requests or entitlements to request water. When and if litigation commenced on such issues it is highly uncertain as to what other matters of contract administration would also be litigated. DWR's implementation has been to apply the initial agricultural use deficiency and, at different times, to allocate water both in accordance with requests (where less than entitlements) and entitlements. In litigation, the parties each could raise these and other legal issues.

2.4.2 Transfers of Entitlement and Sales of Water by Water Purveyors in the Northern Portions of the State to Purveyors in the Southern Portions of the State

This alternative would include individual transfers by unidentified holders of water entitlements, water rights, and water supplies who feel they have excess water to sell on a short-term or long-term basis (from the SWP, the Central Valley Project, and any other water resource or project) to unidentified Southern and Central California purveyors who wish to acquire that water. These transfers, depending upon how widespread they might be, perhaps could be an alternative project cumulatively that would meet the first and third objectives of the Project (increase the reliability of existing water supplies and increase water management flexibility) for some Contractors.

2.4.3 Increase Water Extractions from the Delta

This alternative assumes that either environmental constraints on SWP water extractions from the Delta would be reduced or eliminated, either as a result of legislative or judicial modification of current regulatory schemes, or as a result of changes in the perceived impacts on Delta species from the SWP, or changes in SWP operations/facilities that allow for increased extractions.

The amount of additional Delta diversions is limited by regulatory constraints. Based on current information, this alternative is unlikely to be available as a viable alternative within the timetable that the Program must be implemented. As concerned agencies, interest groups, and citizens continue to study the Delta and its sensitive species, some mechanism for increasing extractions is expected to be developed in the future. Depending upon the amount of increase, it is possible that this alternative could satisfy the first, second, and third project objectives

(increase the reliability of existing water supplies, stabilize the rate structure to improve the financial viability of the project, and increase water management flexibility for all Contractors), but this alternative is not presently feasible.

2.4.4 Construct More Water Projects

To increase the reliability of water supplies and increase water management flexibility (the first and third project objectives), the State of California and individual water Contractors could undertake immediately an aggressive program of new water projects (including both storage and transportation) as an alternative to the proposed program. Such a program would be costly and would have potential local, regional, and statewide environmental impacts of unknown magnitude. A program of new water projects must necessarily be constructed in the future to meet California's long-term water needs and to fulfill the Department's contractual obligations to the water Contractors to exercise all reasonable efforts to provide reliable agreed-to supplies. Financial and environmental constraints make it infeasible to implement such a program in as timely a manner as the Monterey Agreement can be implemented. Consequently, construc-tion of new water projects is not a presently feasible alternative to the program, although such efforts are not precluded by the program (in fact, Principle 12 reaffirms the existing contractual commitment to complete the SWP).

2.4.5 Provide Alternative Funding for the State Water Project or as a Partial Subsidy

Under this alternative, the State of California would provide additional capital for the SWP from some source other than the SWP Contractors and their rate payers. The source could be from the General Fund, from bonds, or from some other source (paid by the taxpayers statewide). This alternative would relieve the Contractors of some of the financial burdens that led to the project and, depending upon the amount of alternative funding or subsidy, potentially could satisfy the second project objective (stabilize the rate structure to improve the financial viability of the project for all Contractors). Because of ongoing revenue shortfalls and economic problems being experienced by the state, this alternative is not considered feasible.

C—094733

C-094733

C—094734

C-094734

3. STATEWIDE ASSESSMENT

This chapter describes, at the state and regional levels, the affected environment, potential environmental consequences associated with implementation of program alternatives, and proposed mitigation measures designed to offset potentially significant adverse impacts.

Of the five program components identified in Chapter 2, those potentially having identifiable impacts at the state and regional levels are the following:

- Revisions to the methodology used to allocate water (especially in years when supply is less than demand) among Contractors (Principles 1, 2, and 7);
- Retirement of 45,000 acre-feet (AF) of entitlement (Principle 3); and
- Transfer by sale of 130,000 AF of entitlement from Agricultural Contractors to Urban Contractors and non-SWP Contractors (Principle 4).

PRINCIPLES 1, 2, AND 7: REVISIONS TO THE METHODOLOGY USED TO ALLOCATE WATER

The SWP has delivered water to contractors in the amounts requested in all but a handful of years. Shortage years occurred in 1977, 1990, 1991, 1992 and 1994. Since the mid-1980s, the increase in Contractor requests, coupled with reduced project yield (resulting from increased environmental restrictions and other factors), have increased the frequency of SWP shortages. Changes in the method of allocating water become relevant only in years when demand exceeds available supply. During such years, following enactment of the principles contained in the Monterey Agreement, shortages will be shared proportionately by all contractors rather than be borne primarily by Agricultural Contractors as is the current practice.

Thus, during future deficit years Agricultural Contractors can anticipate larger deliveries of water and Urban Contractors can expect smaller quantities of water than would have been the case in the past. These changes bring about a decrease in the variability of supplies delivered to Agricultural Contractors while increasing slightly that for the Urban Contractors.

Added reliability of deliveries to Agricultural Contractors could increase the continuity of agricultural activities in these service areas. Added variability of water deliveries to Urban Contractors can, however, be offset by their acquisition of additional entitlement offered for sale by Agricultural Contractors as outlined below, and through other measures included in the program for increased water management flexibility.

PRINCIPLE 3: RETIREMENT OF 45,000 AF OF ENTITLEMENT

The Agricultural Contractors receiving the KFE property will transfer entitlement of 45,000 AF of water to DWR, who will then retire the entitlement. A more detailed analysis of impacts in districts relinquishing water entitlements is presented in Chapter 4.

PRINCIPLE 4: TRANSFER BY SALE OF 130,000 AF OF ENTITLEMENT

The transfer of 130,000 AF of water entitlement from Agricultural Contractors to Urban Contractors and non-SWP Contractors has the potential to affect activities and land use patterns in those jurisdictions both relinquishing and acquiring the entitlement. Effects in those areas relinquishing water entitlement are likely to be centered on agricultural practices while those in areas

C—094735

C-094735

acquiring water entitlement may relate to growth accommodation. The location of the eventual sellers and buyers of water entitlements is not known at this time.

3.1 GEOLOGY AND SOILS

Amendments to SWP contracts resulting from implementation of the Monterey Agreement are unlikely to affect statewide geological and soil resources. Potential site-specific earth resources, Monterey Agreement-related impacts, and potential mitigation measures are discussed in Chapter 4. Future, proposed projects resulting from implementation of the Monterey Agreement with regional or local consequences on earth resources will be evaluated by affected agencies in future CEQA documents in response to specific proposed projects, as is contemplated by the programmatic nature of the implementation process.

3.2 WATER RESOURCES

3.2.1 Surface Water

No significant environmental impacts on the Sacramento-San Joaquin Delta or other SWP water sources are anticipated as a result of implementation of the Monterey Agreement. No new water storage facilities are proposed. Potential modifications to the operating procedures at Castaic Lake and Lake Perris and anticipated upstream impacts are addressed in Chapter 4. Any upstream change in SWP operations to accommodate operational changes at these reservoirs would be governed and constrained by all the same standards, permits, and agreements that currently govern SWP operations, including existing SWP water rights for Delta diversions.

Retirement of 45,000 AF of water entitlement slightly decreases the demand for currently limited SWP supplies. This results in a slight increase in current supply reliability. It also decreases slightly the need for future water supply facilities by reducing the cumulative annual entitlement of all SWP water contractors from 4,230,000 AF to 4,185,000 AF.

Transfer of up to 130,000 AF from Agricultural Contractors to Urban Contractors would have little, if any, effect on the total water diverted out of the Delta, or the average Sacramento-San Joaquin drainage area runoff of approximately 30 MAF (DWR Bulletin 160-93). Rather, it would result simply in delivering water to one contractor instead of another. Such a reallocation would result in some water contractors receiving more water, and some less water, but with the cumulative total remaining the same. The pattern of diversion of such water is expected to remain unchanged, since the water delivery peaking limitations associated with the seller's water would continue as a requirement on the buyer for the transferred supplies. Increased deliveries to purchasing contractors would be accommodated through measures such as decreased reliance on groundwater, storage of additional supplies in existing storage facilities, and/or providing additional storage capacity through separate measures. Locations and the potential need for new facilities, if any, will be evaluated by the affected agencies in future CEQA documents.

Any other voluntary permanent transfers among Contractors, as well as water marketed among the water Contractors on an annual basis, as provided for in the annual water sales pool under Principle 10 of the Monterey Agreement, would likely have the same result. There is a potential, however, for increased Delta diversions if the SWP water contractors in the Feather River area sell water to contractors who receive water from Delta diversions. At present there are no indications that such sales are being contemplated. In any event, such transfers would need to be evaluated through a separate CEQA process.

The Agreement sets forth the possibility that permanent sales of entitlement from

C—094736

C-094736

Agricultural Contractors to non-SWP water users could occur (Principle 4), as well as temporary transfers to non-Contractors through the annual turn-back pool (Principle 10). Either of these possibilities would be subject to existing Delta regulatory constraints, and would require additional action by the SWRCB to deliver SWP water outside the service area designated in the SWP water rights permits. If such action were to occur, it would require a separate CEQA process, and likely an EIR. Further, such permanent transfers are subject to a right of first refusal by the Urban Contractors, and temporary transfers are subject to a right of first refusal by all other SWP Contractors and DWR. All of these constraints and limitations make it unlikely that entitlement will be transferred out of the SWP service area at a time when it does not yet have enough supplies currently to meet its long-term contractual commitments.

3.2.2 Groundwater

The agricultural districts selling up to 130,000 AF of SWP agricultural entitlement may be located outside useable groundwater basins or they may overlie useable groundwater. If the selling districts do not overlie groundwater, as is most likely the case, there will be little or no impact on groundwater resources. If the selling districts overlie useable groundwater, the sold entitlement water could be replaced with groundwater that could, in turn, aggravate ongoing overdraft in the southern San Joaquin Valley.

It is likely that districts not overlying groundwater will contribute most of the sales because these districts are under the greatest pressure exerted by high water costs. These high costs stem from the lack of other relatively inexpensive sources of water to blend with the relatively expensive SWP supply.

It is unlikely that groundwater would be pumped from the groundwater basin to non-overlying lands to replace the sold water since proposals to export water from overdrafted basins are normally challenged by overlying users.

Districts that overlie the groundwater basin may have rights to relatively inexpensive local supplies or groundwater that can be blended with the SWP entitlement water to reduce the overall unit cost of water. Overlying districts also recognize the need to maintain existing supplemental water sources to minimize groundwater overdraft. Thus, it is unlikely that such districts will elect to sell SWP entitlement.

Accordingly, it is probable that most, if not all, of the up to 130,000 AF of the agricultural entitlement water sold will be contributed by non-overlying districts and will not cause significant adverse impacts to groundwater resources.

Potential regional and local groundwater resources, Monterey Agreement-related impacts, and applicable mitigation measures are discussed in Chapter 4. Future, proposed projects resulting from implementation of the Monterey Agreement with regional or local consequences to groundwater resources will be evaluated by affected agencies in future CEQA documents in response to specific proposed projects.

3.2.3 Water Quality

Amendments to SWP contracts resulting from implementation of the Monterey Agreement are unlikely to impact statewide water quality. Potential regional and local water quality concerns, Monterey Agreement-related impacts, and applicable mitigation measures are discussed in Chapter 4. Future, proposed projects resulting from implementation of the Monterey Agreement with regional or local consequences to water quality will be evaluated by affected agencies in future CEQA documents in response to specific proposed projects.

3.3 AIR QUALITY

Amendments to SWP contracts resulting from implementation of the Monterey Agreement are unlikely to directly impact statewide air quality. As discussed in Section 3.8, Socioeconomics, full implementation could support increases in population by accommodating or inducing growth. The exact locations of these impacts are not identifiable or quantifiable since eventual buyers of entitlement are not yet identified. Future purchase agreements stemming from implementation of the Monterey Agreement and future site-specific projects resulting from the addition of SWP water to a growth-limited water district with regional or local consequences to air quality management will be evaluated by affected agencies in future CEQA documents.

Potential regional and local air resources, Monterey Agreement-related impacts that are currently addressable, and applicable mitigation measures are discussed in Chapter 4. Future, proposed projects resulting from implementation of the Monterey Agreement with regional or local consequences to air quality management that are not a result of growth accommodation will also be evaluated by affected agencies in future CEQA documents in response to specific proposed projects.

3.4 BIOLOGICAL RESOURCES

Amendments to SWP contracts resulting from implementation of the Monterey Agreement are unlikely to directly affect statewide vegetation, wildlife, or protected species or habitats. As discussed in Section 3.8, Socioeconomics, full implementation could support increases in population by accommodating or inducing growth. Such increases in population could require the conversion of biologically important lands to urban uses and this conversion could adversely impact vegetation, wildlife, or protected species or habitats. These impacts are currently not identifiable or quantifiable. Future site-specific projects resulting from the transfer of SWP water with regional or local consequences to biological resources management will be evaluated by affected agencies in future CEQA documents.

Potential regional and local vegetation, wildlife and protected species or habitats, Monterey Agreement-related impacts that are currently addressable, and applicable mitigation measures are discussed in Chapter 4. Future, proposed projects resulting from implementation of the Monterey Agreement with regional or local consequences to biological resources that are not a result of growth accommodation, will also be evaluated by affected agencies in future CEQA documents in response to specific proposed projects.

3.5 CULTURAL AND HISTORIC RESOURCES

Amendments to SWP contracts resulting from implementation of the Monterey Agreement could adversely impact statewide cultural resources. Potential impacts from growth accommodation are similar to those identified for biological resources in Section 3.4.

Under Scenario A of the Proposed Action, no transfer of entitlement from agricultural to urban uses would occur. Therefore, the potential for additional urban development throughout the state would not exist. No impacts on cultural resources would occur.

Under Scenario B, up to approximately 65,000 AF of entitlement would be transferred from Agricultural Contractors to Urban Contractors. Water exchanges could occur throughout the state, in distributions that are impossible to predict. This water could be used to potentially offset existing deficiencies in urban water agencies and districts, or could accommodate additional growth in areas

currently constrained by water shortages. Additional development could result in increased ground disturbances and increased impacts on cultural resources currently located in open space or agricultural areas. These impacts would be evaluated by local jurisdictions in future CEQA documents as specific development projects are proposed.

Under Scenario C, 130,000 AF of entitlement would be transferred from Agricultural Contractors to Urban Contractors. Like Scenario B, water exchanges could occur throughout the state in distributions that are impossible to predict. The potential for additional development could result in increased ground disturbances and impacts on cultural resources currently located in open space or agricultural areas. These impacts would be evaluated as discussed under Scenario B above.

Potential regional and local cultural resources, Monterey Agreement-related direct impacts, and applicable mitigation measures are discussed in Chapter 4.

3.6 LAND USE

3.6.1 Affected Environment

The result of implementation of Principles 1 and 2 concerning the method of water allocation among Contractors will be that the pattern of SWP deliveries to Contractors will change. With implementation of Principles 3 and 4 concerning the retirement of 45,000 AF and the transfer of 130,000 AF of entitlement from Agricultural Contractors to Urban Contractors, additional redistribution will occur.

Using readily available water supply/demand simulation models, it is possible to forecast SWP water deliveries to the aggregate of Agricultural and Urban Contractors over a wide range of potential hydrological conditions. The model results presented here represent three system demand levels: 3.0 MAF, 3.5 MAF and 4.12 MAF. Estimates of deliveries are made under existing conditions (pre-Monterey) and forecasts assuming adoption of the principles contained in the Monterey Agreement (post-Monterey).

The supply of water available for delivery through the SWP is derived from DWR's Project Operations Simulation Model (DWRSIM). DWRSIM is a computer model developed and used extensively by DWR. One of the model's main inputs is a time series of runoff based on historic hydrologic conditions for the years 1922 through 1991, inclusive (i.e., a 70-year series).

For a selected demand level placed on the SWP system, DWRSIM calculates the quantity of water that the SWP system is capable of delivering in each month of the 70 years of operation by the model. The model is iterative in the sense that where supply in any year exceeds demand, then water is stored to the extent possible and carried over to the next year. In years when demand exceeds supply, a shortfall occurs and the succeeding year's storage may begin at a lowered starting point compared with the previous year.

Under the previously used allocation methodology, SWP water was allocated based on Contractor requests and available water supply. In deficit years, Agricultural Contractors received an initial supply reduction of up to 50 percent in requests in any one year and up to a cumulative total of 100 percent in any 7 consecutive years. Any shortages remaining after this initial agricultural reduction were shared among all Contractors in proportion to requests. Under the provisions of the Monterey Agreement, shortages are allocated in deficit years on the basis of entitlement. In addition, 45,000 AF of entitlement currently held by Agricultural Contractors is retired.

C—094739

C-094739

The resulting net changes in pre- and post-Monterey Agreement average annual deliveries, in aggregate, to Agricultural and Urban Contractors under each of the three demand level scenarios are presented in Table 3.6-1. It should be noted that the post-Monterey quantities in Table 3.6-1 reflect changes related only to the changes in water allocations among Contractors (Principles 1 and 2) and to the retirement and/or transfer of up to 175,000 AF of agricultural entitlement (Principles 3 and 4). Also note that the quantities in Table 3.6-1 and Figure 3.6-1 represent averages. Changes in individual years are shown in Figures 3.6-2 through 3.6-5. Other water supply benefits to Contractors are not reflected in Table 3.6-1. These include Agricultural and Urban Contractor participation in the KWB (Principle 3) and increased flexibility for storage outside a Contractor's service area via groundwater banking programs and use of SWP storage reservoirs (Principle 9).

Table 3.6-1
Average Annual Deliveries to Agricultural and Urban Contractors Under Pre- and Post-Monterey Agreement Conditions

	System Demand Level (Million AF)		
	3.0	3.5	4.12
Deliveries to Agricultural Contractors			
Pre-Monterey Agreement	923,700	832,600	789,200
Post-Monterey Agreement (45,000 AF transfer)			
Without 130,000 AF transfer	925,900	882,500	876,000
With 130,000 AF transfer	818,500	785,800	780,300
Deliveries to Urban Contractors			
Pre-Monterey Agreement	1,662,400	1,963,900	2,207,600
Post-Monterey Agreement (45,000 AF transfer)			
Without 130,000 AF transfer	1,660,100	1,914,000	2,120,800
With 130,000 AF transfer	1,767,500	2,010,700	2,216,500
Shift in Deliveries from Urban to Agricultural Contractors			
Post-Monterey Agreement (45,000 AF transfer)			
Without 130,000 AF transfer	2,300	49,900	86,800
With 130,000 AF transfer	(105,100)	(46,800)	(8,900)

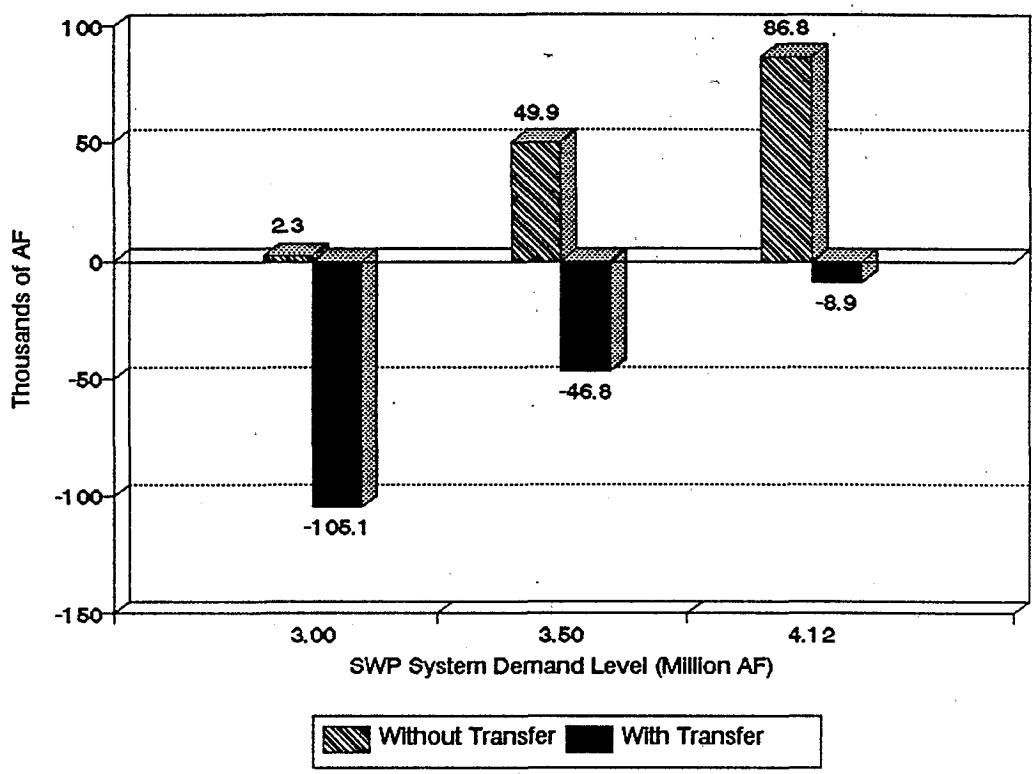
Source: MWD, 1995; SAIC, 1995.

The net changes are presented graphically in Figure 3.6-1. It is evident that under all demand level scenarios with implementation of Principles 1, 2, and 3 (i.e., without the transfer of 130,000 AF of entitlement from Agricultural Contractors to Urban Contractors), there is a net shift in deliveries to Agricultural Contractors ranging from 2,300 AF annually (at the 3.0 MAF demand level) to 86,800 AF annually (at the 4.12 MAF demand level). With the transfer of the 130,000 AF of entitlement, the net changes in allocations reverse with Urban Contractors becoming the beneficiaries.

As can be seen from Figure 3.6-2, under conditions of 3.0 MAF demand, the net shift in average annual deliveries from Urban Contractors to Agricultural Contractors is contributed by positive changes in 12 of the 70 years compared to negative changes in the remaining 58 years (most of which experience a net loss of 45,000 AF). Full operation of the KFE would be expected to significantly reduce this net loss.

C—094740

C-094740



Source: MWD, 1994; SAIC, 1995

Figure 3.6-1. Average Annual Changes in Deliveries to Agricultural Contractors With and Without 130,000 AF Entitlement Transfer

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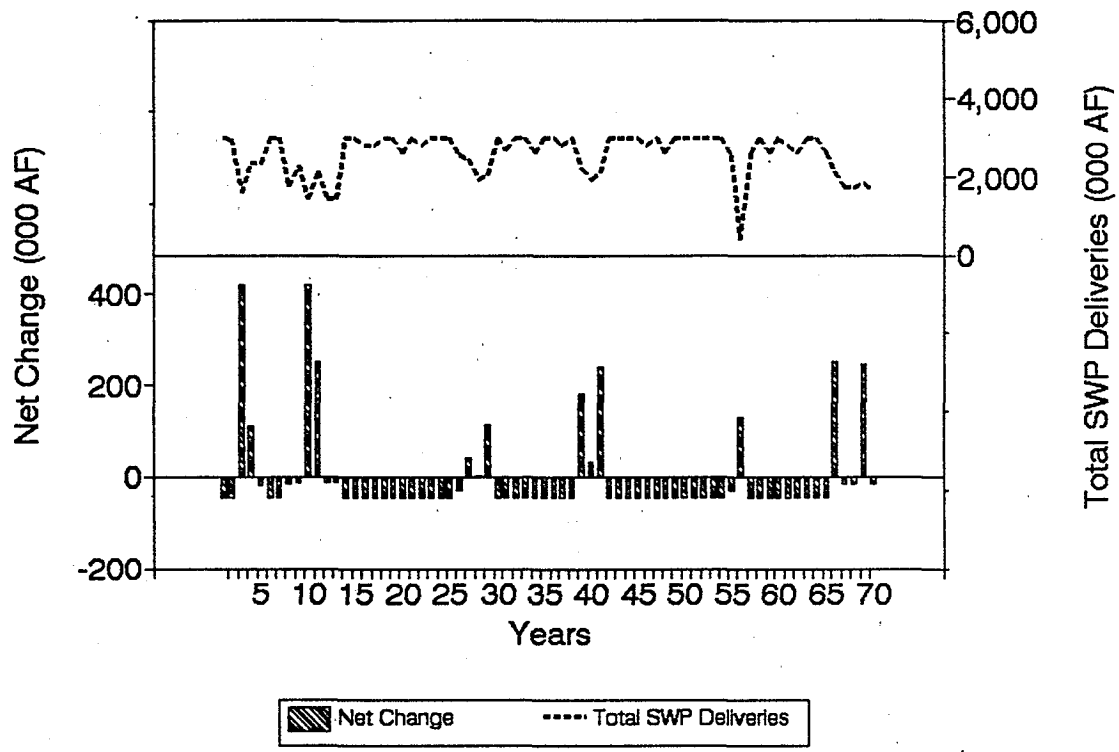
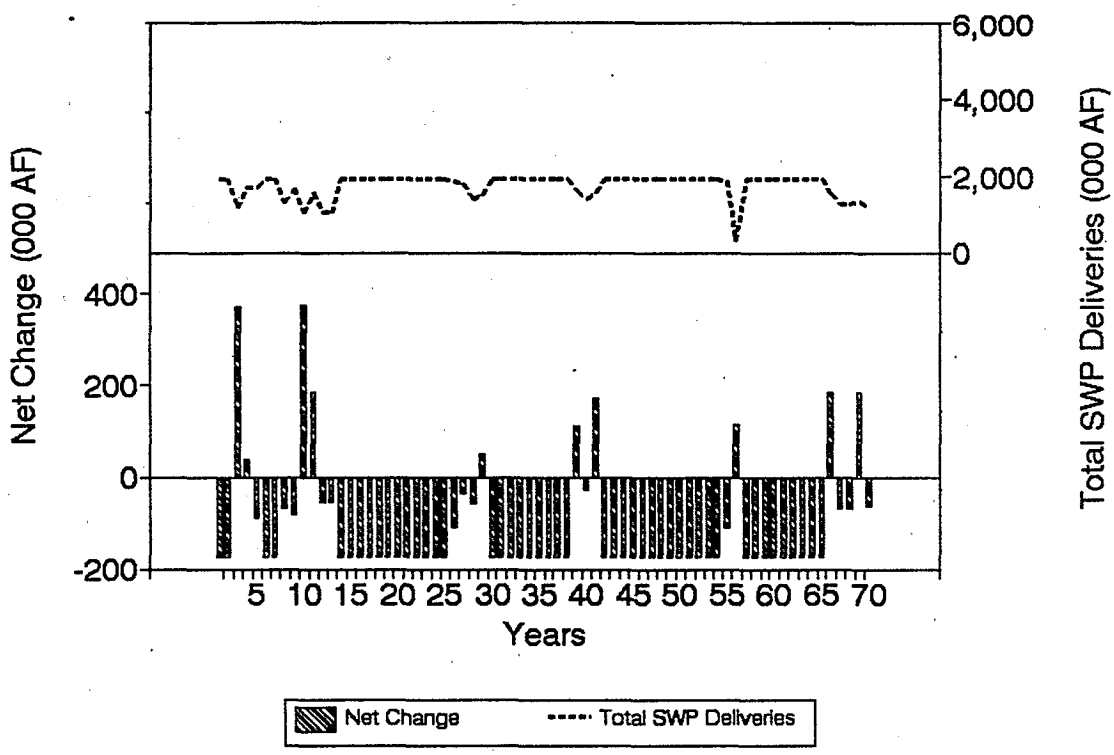


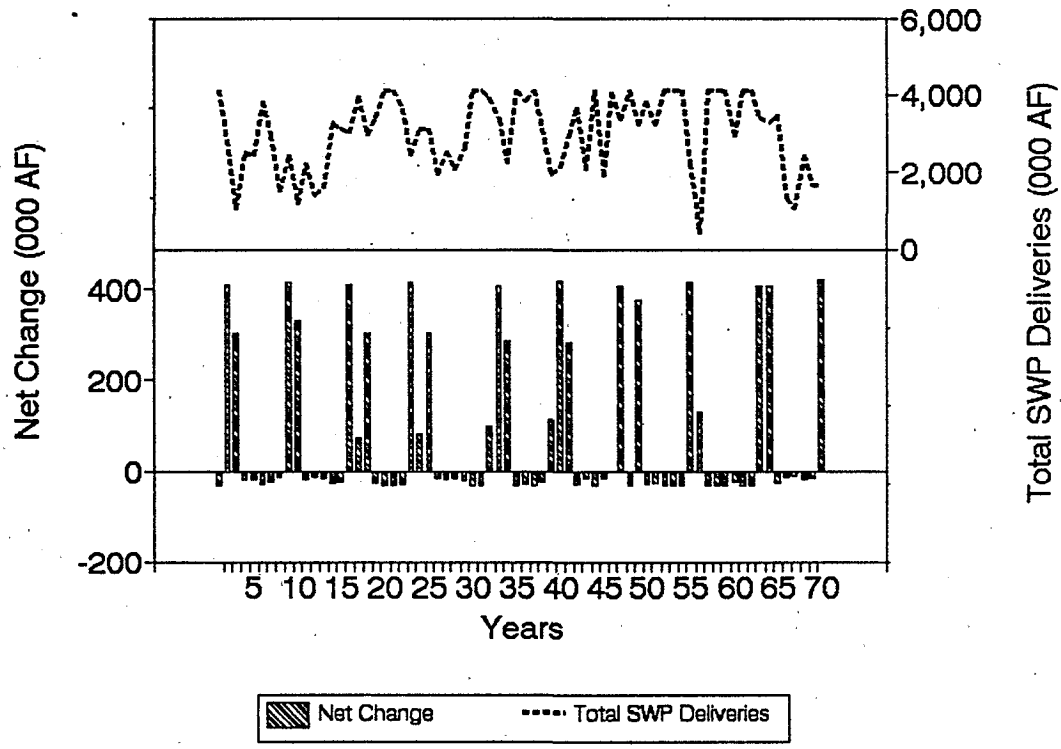
Source: MWD, 1994; SAIC, 1995

Figure 3.6-2. Net Change in Deliveries to Agriculture (3.0 Million AF SWP Demand) Without 130,000 AF Entitlement Transfer



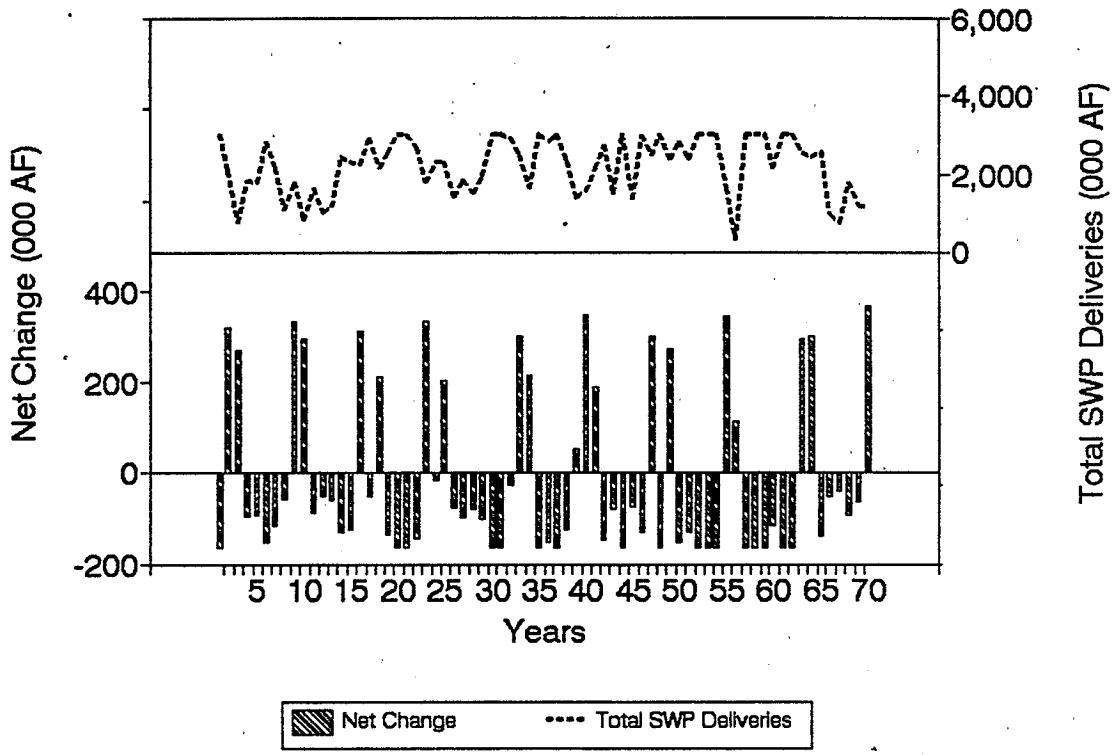
Source: MWD, 1994; SAIC, 1995

Figure 3.6-3. Net Change in Deliveries to Agriculture (3.0 Million AF SWP Demand) With 130,000 AF Entitlement Transfer



Source: MWD, 1994; SAIC, 1995

Figure 3.6-4. Net Change in Deliveries to Agriculture (4.12 Million AF SWP Demand) Without 130,000 AF Entitlement Transfer



Source: MWD, 1994; SAIC, 1995

Figure 3.6-5. Net Change in Deliveries to Agriculture (4.12 Million AF SWP Demand) With 130,000 AF Entitlement Transfer

The permanent transfer of 130,000 AF from Agricultural Contractors to Urban Contractors, analyzed without regard to Principle 1, results in a net shift in deliveries away from Agricultural Contractors in favor of Urban Contractors. This shift amounts to 105,100 AF annually, on average (at the 3.0 MAF demand level). As is evident from Figure 3.6-3, the 10 years in which net shifts to Agricultural Contractors occur have quantities similar to the previous case (without the 130,000 AF entitlement transfer). The remaining years, however, in which there is a net shift away from Agricultural Contractors, the quantity of that shift is often as great as 175,000 AF. Full operation of the KFE would be expected to significantly reduce this net loss through storage and recovery of SWP and local water supplies available to participating Agricultural Contractors.

Under conditions describing a system demand level of 4.12 MAF, shifts in annual deliveries in favor of Agricultural Contractors (averaging 86,800 AF annually) occur in 23 of the 70 years. In the remaining years when net shifts from Agricultural Contractors occur, the quantities are minor (see Figure 3.6-4). Under identical demand conditions, but with the transfer of 130,000 AF from Agricultural Contractors, there is a net shift to Urban Contractors (of 8,900 AF annually, on average) contributed by the net shift from Agricultural Contractors in 50 of the 70 years (see Figure 3.6-5).

Principle 3 of the Monterey Agreement stipulates that an annual entitlement of 45,000 AF will be transferred from Agricultural Contractors to DWR. DWR will, in turn, retire the entitlement.

Preliminary agreements have been negotiated between Agricultural Contractors and, in the case of Kern County Water Agency (KCWA), between the agency and its member units regarding the source of the 45,000 AF of agricultural entitlement that will be relinquished and transferred to DWR. Presently, it is estimated that the entire entitlement to be transferred will originate with five-member units of KCWA (Belridge Water Storage District, Improvement District Number 4, Lost Hills Water Storage District, Semitropic Water Storage District, and Wheeler Ridge-Maricopa Water Storage District) and Dudley Ridge Water District (DRWD). Estimated contributions made by each Contractor and their respective member units (in the case of KCWA) are presented in Table 3.6-2. Minor changes in the contributions shown may occur as contributors make adjustments in the future.

DRWD is an Agricultural Contractor with all SWP entitlement devoted to agricultural activities. A large majority (88.3 percent) of the entitlement of KCWA is also allocated to agriculture. DRWD and both Belridge Water Storage District (WSD) and Lost Hills WSD of KCWA are primarily dependent on the SWP for water since they have no access to groundwater or local surface waters. Wheeler Ridge-Maricopa WSD and Improvement District Number 4 have limited access to groundwater and Semitropic WSD is a groundwater district.

Table 3.6-2
SWP Agricultural Contractors and Member Units Relinquishing Entitlement
(in acre-feet)

SWP Contractor/Member Unit	*Total Agricultural Entitlement*	*Amount Relinquished*	*Percent of Agricultural Entitlement*
Dudley Ridge Water District	57,700	4,500	7.8
Kern County Water Agency			
Belridge	163,000	18,500	11.4
Improvement District 4 [1]	10,276	4,500	43.8
Lost Hills	140,400	4,000	2.9
Semitropic	158,000	2,250	1.4
Wheeler Ridge	252,924	11,250	4.5
TOTAL	782,300	45,000	5.8

Notes: 1. Improvement District 4, which is classed as a municipal and industrial district, is operated by KCWA and serves the greater Bakersfield urban area. In 1988 the district purchased 10,276 AF of agricultural entitlement from Wheeler Ridge. The 4,500 AF transferred is a part of this agricultural entitlement. All other member units referred to are solely agricultural districts.

Source: KCWA and DRWD, 1995

Annual SWP deliveries to each of the member districts of KCWA and DRWD for the years 1986 through 1994, inclusive, are illustrated in Figure 3.6-6. Deliveries remained relatively constant over the period 1986 through 1989, and in 1993 when the SWP was able to meet all Contractor requests for water. Deliveries were lower during the remaining drought years due to the imposition of 50 percent initial agricultural reductions in 1990 and 1991, and the sharing of additional shortages in 1991, 1992, and 1994.

Of total irrigated cropland under cultivation in the districts relinquishing entitlements, a large majority is devoted to field crops. Specific types of crops contributing to this majority are cotton, alfalfa, grains, and vegetables as illustrated in Figure 3.6-7. The remainder of the irrigated cropland is devoted to tree crops as illustrated in Figure 3.6-8. The most important tree crops, in terms of acreage, are almonds and other tree nuts, followed by grapes and vines followed by tree fruits.

Agricultural practices are affected by many factors that include climatic conditions, soils, market conditions (such as the costs of production, including labor, fertilizers, herbicides, irrigation water, etc., versus the potential revenues derived from the sale of crops), and availability/reliability of good quality irrigation water. Additionally, there can be multiple water sources, e.g., SWP, Central Valley Project, local surface water, and local groundwater.

Where SWP water is the sole source of water for cropland, e.g., in the Belridge WSD and Lost Hills WSD, there is a direct relationship between SWP deliveries and cropland acreage. In the Belridge WSD (see Figure 3.6-9), in years where deliveries are close to entitlement (1986-89, inclusive), an average of 3.23 AF of state water was applied per acre of cropland. In the case of Lost Hills WSD, the average application rate during the same time period was 2.83 AF.

In the case of Semitropic WSD, where groundwater resources are available to farmers, the relationship between availability of SWP water and cropland acreage is less clear (see Figure 3.6-10). In the Semitropic WSD, in years 1986-89, an average of 1.75 AF of SWP water were applied per acre of cropland. The reliance on non-SWP sources of water was evident in the extreme drought year

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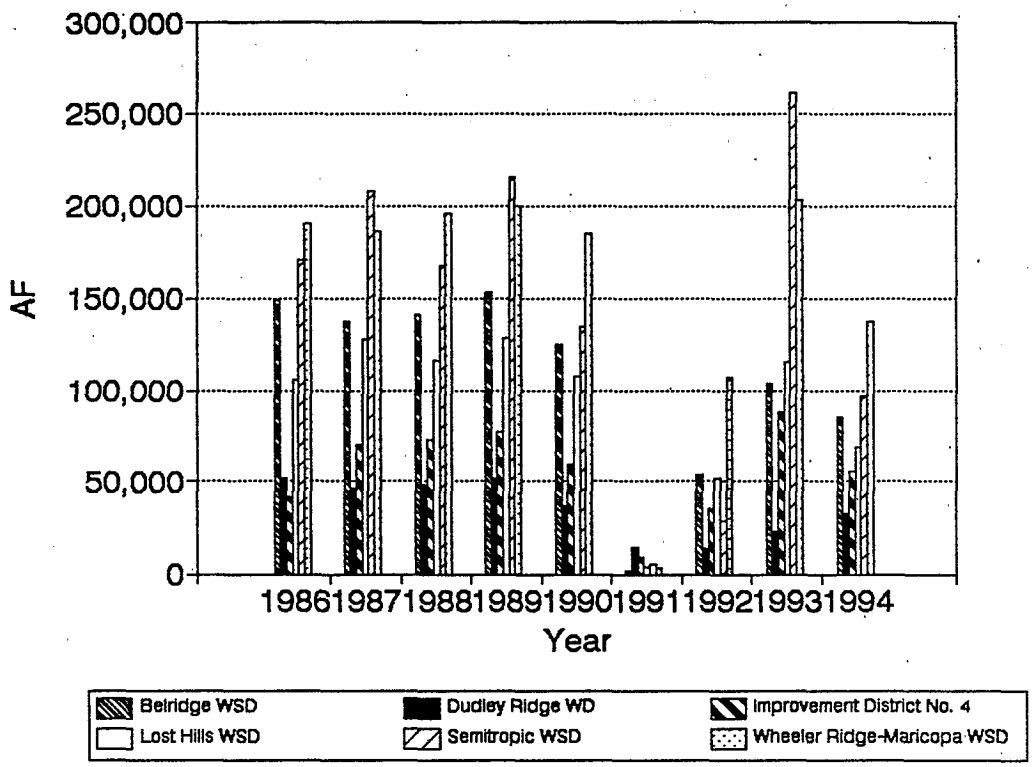
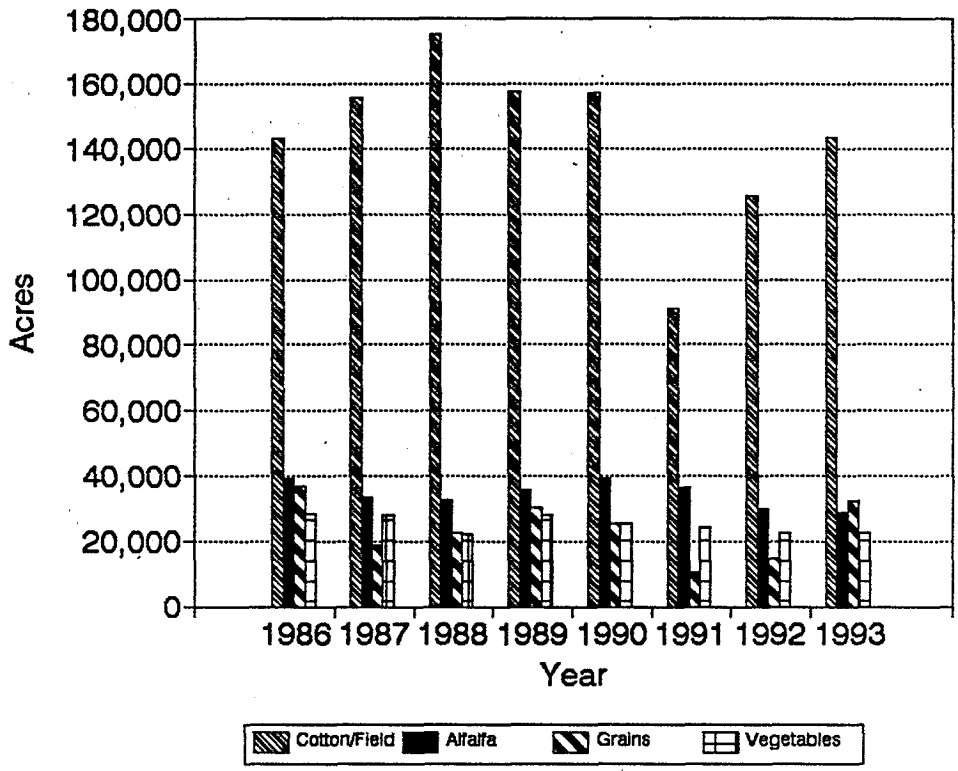


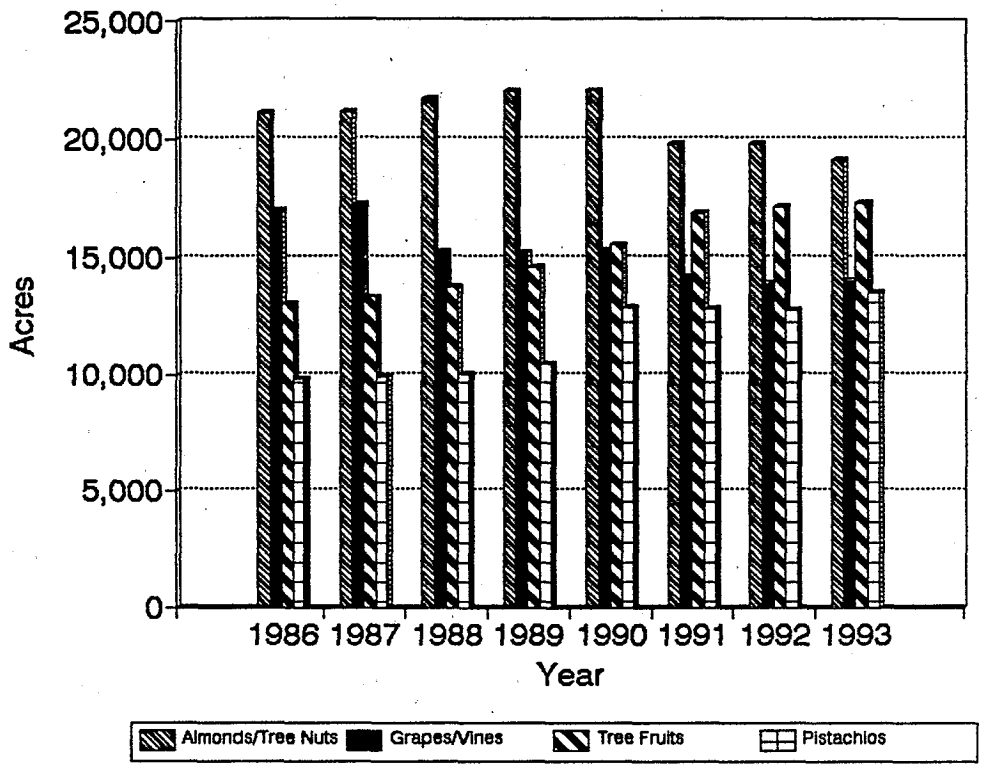
Source: KCWA and DRWD, 1995; SAIC, 1995

Figure 3.6-6. SWP Annual Deliveries to Districts, 1986-1994



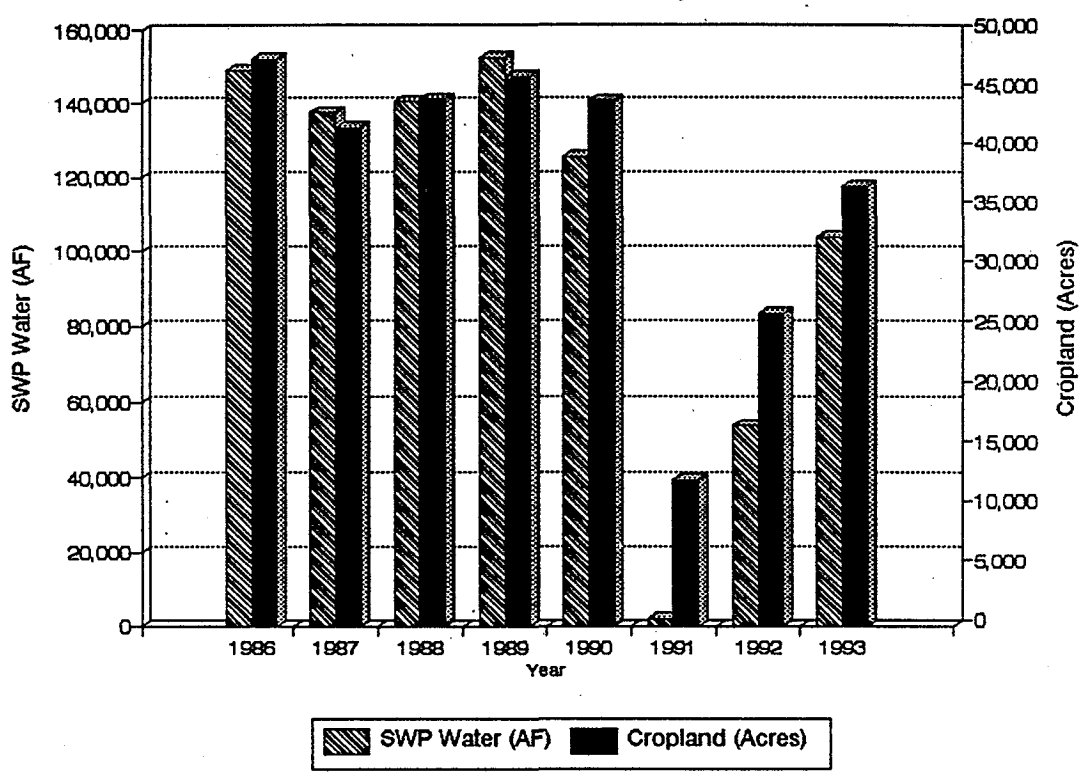
Source: KCWA and DRWD, 1995; SAIC, 1995

Figure 3.6-7. Field Crop Acreage in Districts Relinquishing Entitlement, 1986-1993



Source: KCWA and DRWD, 1995; SAIC, 1995

Figure 3.6-8. Tree Crop Acreage in Districts Relinquishing Entitlement, 1986-1993



Source: KCWA, 1995; SAIC, 1995

Figure 3.6-9. Cropland Acreage vs. SWP Deliveries - Belridge WSD, 1986-1993

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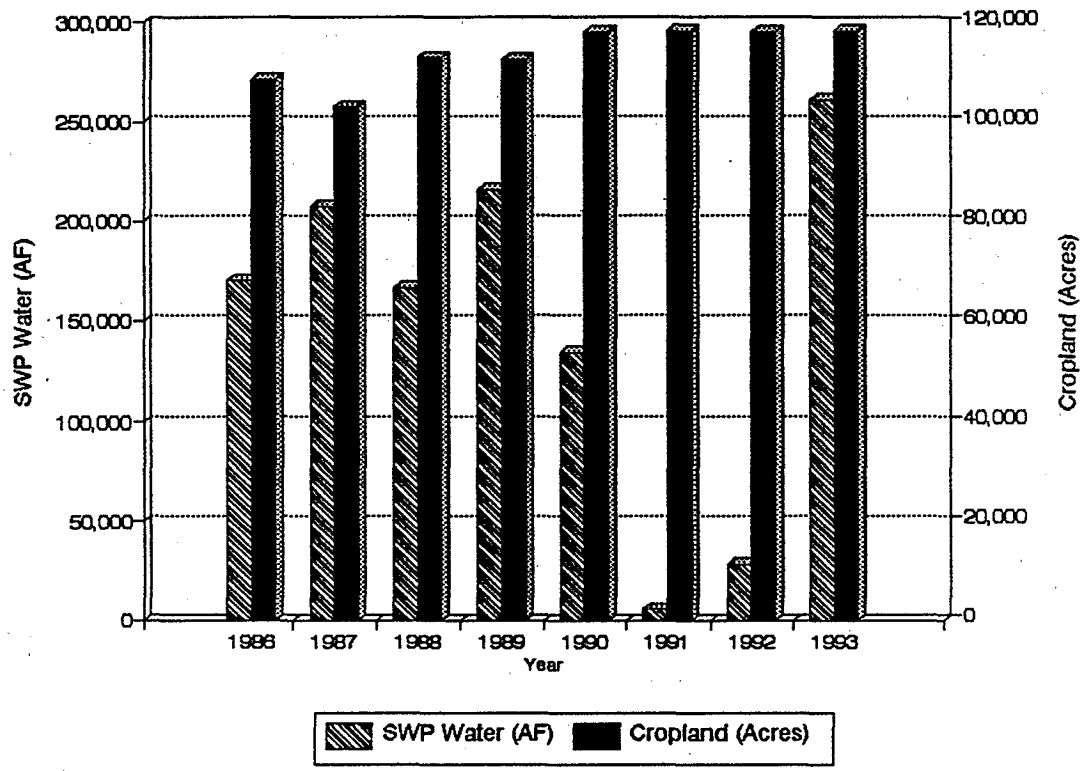

Source: KCWA, 1995; SAIC, 1995

Figure 3.6-10. Cropland Acreage vs. SWP Deliveries - Semitropic WSD, 1986-1993

of 1991 when, as the delivery of SWP water was reduced to zero, crop acreage did not decrease but increased slightly.

3.6.2 Environmental Consequences

Impacts addressed immediately below relate to those anticipated from the retirement of 45,000 AF of entitlement by known water districts and the transfer by sale of 130,000 AF from Agricultural Contractors. It is assumed in the latter case that Contractors are located in the Tulare Lake Hydrologic Region.

PROPOSED ACTION

Retirement of 45,000 AF of Agricultural Water Entitlement

With the exception of the Semitropic WSD, deliveries of SWP water are less than entitlement. These proportions calculated over the period 1986 through 1993 (excluding the extreme drought year of 1991) are as follows: Belridge WSD 75.7 percent, Dudley Ridge WSD 67.1 percent, Improvement District Number Four 73.2 percent, Lost Hills WSD 76.8 percent, Semitropic WSD assumed to be 100 percent (since deliveries to the district equal its entitlement), and Wheeler Ridge-Maricopa WSD 71.6 percent. The potential reduction in SWP water deliveries expressed as a percent of historic deliveries (1986-1993, excluding 1991) is applied to the quantity of irrigated cropland to project the amount of cropland that potentially will leave production. In the case of districts whose sole water source is the SWP, a one-to-one relationship between reduction in delivered water and cropland is assumed. In cases where limited alternative water sources are available, a two-to-one relationship is assumed. Finally, in cases where alternative water sources are readily available, a four-to-one relationship is assumed. Based on these assumptions, the quantity of cropland potentially removed from production in each of the districts because of the retirement of 45,000 AF of entitlement is as shown in Table 3.6-3.

Farmers may have a number of potential responses to a reduction in available irrigation water. The most extreme response would be the idling of cropland. Alternative approaches include changes in cropping patterns, changes to less water-intensive crops, and changes in irrigation techniques to conserve water. Average consumptive water use varies dramatically over the range of crops typically

Table 3.6-3
Potential Reductions of Cropland Associated with Retirement of 45,000 AF of Entitlement

SWP Contractor/Member Unit	*Percent Water Delivery Reduction*	*Proportion Factor*	*Cropland Reduction (acres)*
Dudley Ridge Water District	7.8	1:1	1,072
Kern County Water Agency			
Belridge	11.3	1:1	4,645
Improvement District 4	0.0[1]	NA	0[1]
Lost Hills	2.8	1:1	1,146
Semitropic	1.3	4:1	375
Wheeler Ridge	4.4	2:1	1,869
TOTAL	NA	NA	9,107

Notes: NA = Not Applicable.
1. Water is not used for agricultural purposes in ID4.
Source: SAIC, 1995.

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cultivated in the San Joaquin Valley. Additionally, water application rates for crops vary substantially depending on the irrigation technique used (where technique substitution is possible).

Assuming a worst-case scenario involving a reduction in cropland rather than other responses that might be made, 9,107 acres of cropland could be idled. This quantity comprises 3.1 percent of the total irrigated cropland in the multi-district region in 1993. A potential reduction of this size is not considered a significant impact.

This worst-case scenario may overstate the case and may exaggerate the potential cropland reductions for three reasons: (1) some of these lands have been marginally productive even when SWP has been available so they have not been irrigated for many years; (2) the cost of SWP water has rendered some or all of these lands uneconomical for farming, so they have been left fallow; and (3) some of the cropland that could be idled likely already has been idled because the urban priority for SWP water, when combined with recent drought conditions and system-wide deficits, has rendered agricultural water supplies to these lands unreliable and irrigation has been sporadic or abandoned.

Transfer by Sale of 130,000 AF of Agricultural Water Entitlement

It is anticipated that the majority of the 130,000 AF of entitlement to be transferred from Agricultural Contractors to Urban Contractors is likely to occur in the Tulare Lake Hydrologic Region. This region contains all but one of the SWP Agricultural Contractors of the San Joaquin Valley Area.

Of the total irrigated cropland acreage of just over 3.2 million acres for the region as a whole in 1990, the majority (61 percent) supports the cultivation of field crops (grain, cotton, sugar beet, corn, alfalfa, pasture, and tomatoes), with almost one third of the total irrigated cropland supporting cotton cultivation (see Table 3.6-4). Orchards and vineyards occupy an additional 23 percent of the cropland, with the remaining 16 percent in other crops.

Table 3.6-4
Irrigated Cropland by Crop Type in Tulare Lake Hydrologic Region, 1990 (thousands of acres)

Crop Type	*Acres*	*Percent of Total*
Grain	297	9
Cotton	1,029	32
Sugar beet	35	1
Corn	100	3
Alfalfa	345	11
Pasture	44	1
Tomatoes	107	3
Almonds/ pistachios	164	5
Citrus/ olives	181	6
Grapes	393	12
Other	517	16
TOTAL	**3,212**	**100**

Source: DWR, 1994b.

Under the assumption that all cropland reduction attributable to reduced water deliveries would occur in field crops, the potential reductions in cropland would be as shown in Table 3.6-5. Under such circumstances the greatest reduction in acreage would be in cotton (20,710 acres). The greatest impact could occur with respect to grain cultivation whereby almost 3.7 percent of the cropland in cultivation in 1990 would be withdrawn (see Table 3.6-5). The reduction of 41,640 acres represents a worst-case scenario, because land has already gone out of production in some districts. Such potential reductions in cropland are not considered significant impacts on the agriculture of the region.

Table 3.6-5 Reduction in SWP Water Deliveries to Agriculture and in Cropland by Field Crop Type (130,000 AF total reduction)			
	REDUCTION IN:		
Crop Type	*Water (000 AF)*	*Cropland (000 Acres)*	*Percent of 1990 Inventory*
Grain	19.73	10.96	3.69
Cotton	68.35	20.71	2.01
Sugar Beet	2.32	0.65	1.85
Corn	6.64	1.85	1.85
Alfalfa	22.92	4.77	1.38
Pasture	2.92	0.61	1.38
Tomatoes	7.11	2.09	1.95
TOTAL	**130.00**	**41.64**	**1.29**
Source: SAIC, 1995.			

This worst-case scenario may overstate the case and may exaggerate the potential cropland reductions for three reasons: (1) some or potentially all of the cropland that could be idled likely already has been because the urban priority for SWP water has rendered agricultural water supplies to these lands unreliable and irrigation has been sporadic or abandoned; (2) some of these lands have been marginally productive even when SWP has been available so they have not been irrigated for many years; and (3) the cost of SWP water has rendered some or all of these lands uneconomical for farming, so they have been left fallow.

NO PROJECT ALTERNATIVE

No changes in regional or statewide land use would be expected.

3.6.3 Mitigation Measures

In the absence of significant impacts, no mitigation measures are called for.

3.7 RECREATION

Amendments to SWP contracts resulting from implementation of the Monterey Agreement are unlikely to affect statewide recreation resources. Potential impacts from growth accommodation are similar to those identified for biological resources in Section 3.4.

Potential regional and local recreation resources and opportunities, Monterey Agreement-related direct impacts, and applicable mitigation measures are discussed in Chapter 4. Future, proposed projects resulting from implementation of the Monterey Agreement with regional or local consequences to recreation resources will be evaluated by affected agencies in future CEQA documents when potential environmental impacts are ascertainable.

3.8 SOCIOECONOMICS

Implementation of the Monterey Agreement will result in direct and secondary economic effects in those regions relinquishing and transferring (exporting) water and in the regions acquiring (importing) those entitlements (and ultimately deliveries). For

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example, in the exporting region, adjustments in agricultural practices may take place such as withdrawal of land from irrigated cropland use or change in cropping patterns. Such changes have implications for employment. In the importing region, the availability of additional water supplies may accommodate growth in economic activity and, thus, employment.

In addition to these direct effects, the program will create secondary economic effects. For example, to produce crops, a farmer typically purchases equipment and other supplies (such as seed, fertilizers, pesticides, etc.) as well as the services of managers and laborers. Once the crops have been harvested, the products must either be transported to processing firms or delivered to markets. Farm products may be processed by many firms before a final product is ready for delivery to markets. This indirect economic activity creates income earned by households that in turn is spent for personal consumption, thereby generating additional economic activity (induced effects). If the program results in a reduction in crop acres in the exporting region, then all (or portions) of these other linked activities may also be adversely affected.

In the water importing region, the effect will be just the opposite. For example, the availability of water supplies may accommodate an increase in a wide range of economic activities.

In addition to economic effects, the program may also affect community services. For example, a reduction in cropland may result in decreased employment in a region because of idled farmworkers and a potential net decline in general business activity (indirect effects). This could affect local governments as follows. First, there would be less income generated from sales taxes and other sources to fund local government programs. Second, local government expenses may increase to fund additional social services that need to be provided as a result of the decreased employment.

The direction (positive or negative) and magnitude of socioeconomic effects will vary depending on how much water is transferred and the ultimate destination of the water supplies.

Conditions involving the retirement of irrigated cropland would have the greatest potential for adverse effects on community services. This would have a great potential for creating unemployment among farm workers and related agricultural businesses in the community above that associated with changes in crop patterns.

One area of concern is how a reduction in cropland acreage could affect local property taxes. Most farmland is protected by the Williamson Act, which lowers property taxes for farmers agreeing to maintain agricultural productivity on their land. Under conditions where no crops will be grown in the foreseeable future, the assessment might be reduced to apply to dry farmed crops. If this were to occur, then county revenues would be reduced.

The option of withholding future irrigation from crops could also have some adverse community impacts as workers involved with harvesting and processing of farm product could be affected. The option of substituting lower water-use crops for higher water-use crops is not anticipated to have significant effects on community services, since crops will still be brought to market. However, there may be slight effects depending on the labor requirements for harvesting and processing of the new crop compared to the crop that would have been planted without the program.

In contrast to the exporting regions, socioeconomic effects will occur in the importing regions as a result of increased water entitlements and potential supply. The

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types of effects will be similar, with both direct and indirect economic effects on income and employment.

3.8.1 Economics

AFFECTED ENVIRONMENT

It is not expected that actions associated with implementation of the Monterey Agreement will create substantial new employment opportunities. In all likelihood, some SWP water will be allocated differently in the future than in the past. This could result in the accommodation of additional secondary employment (especially in urban areas) and a possible reduction in employment in agricultural areas where changes in agricultural practices may occur. However, this could be offset to some degree by the increased reliability of agricultural water supplies brought about by the elimination of the initial agricultural deficiency.

As can be seen from the information presented in Table 3.8-1, employment in agricultural activities (farming and agricultural services) in the area composed of Fresno, Kern, Kings, and Tulare counties (which approximates closely the Tulare Lake Hydrologic Region) is significantly higher than for the state as a whole. In the multi-county area 16.5 percent of total full- and part-time employment is in agricultural activities compared with just under 3.4 percent for the state.

ENVIRONMENTAL CONSEQUENCES

Assuming that any reduction in employment (in agriculture and agricultural services) is directly proportional to the land potentially retired from agriculture (as described in Section 3.6, Land Use), the decrease in employment would number less than 850 jobs in each of these two sectors, account for just over 1 percent of the current workforce in these two economic sectors and far below 1 percent of total regional employment. It is not possible to presently determine the specific locations of any such changes or the types of jobs lost, if any. Such a potential reduction in employ-ment is not considered significant.

3.8.2 Population

AFFECTED ENVIRONMENT

Water delivered through the SWP is, in most cases, only one of several sources of water available to Urban Contractors. These water sources vary in terms of price, quality, and reliability. It is not possible to predict how much of the additional water entitlement made available through implementation of the Monterey Agreement would be utilized in any particular year. SWP water could be taken in a particular year and used to replenish ground-water reserves and act as a back-up water source for water-short years. It could also be stored outside the service area for use at a later date. Under such circumstances, the increased water supply would not immediately accommodate additional population. It is questionable that the availability of water alone will induce population growth. In a situation where the availability of water appears to be the sole constraint on growth in an area (i.e., the necessary community infrastructure is in place, employment opportunities exist, developable land is plentiful and the community is conducive to growth), removal of that constraint could contribute to population growth. There are relatively few communities where such is the case.

The 1990 population levels and projected levels to the year 2020 for the San Francisco Bay Area and South Coast urban regions and the state are shown in Table 3.8-2.

Average water consumption in the South Coast hydrologic region is 211 gallons per capita daily (gpcd), ranging from 204 gpcd in metropolitan Los Angeles to 246 gpcd in Santa Ana. Average water consumption in the San Francisco Bay hydrologic region is 193 gpcd,

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Table 3.8-1
FULL-TIME AND PART-TIME EMPLOYMENT BY MAJOR INDUSTRY: 1990

Industry	*Fresno County*	*Kern County*	*Kings County*	*Tulare County*	*4-County Aggregate*	*Percent of Aggregate*	*California*	*4-Counties as Percent of State*
Farm	29,641	13,722	4,562	16,117	64,042	8.21	257,222	1.54
Agricultural Service, Forestry, Fisheries	26,927	17,203	1,838	18,718	64,686	8.29	309,100	1.85
Mining	915	14,962	104	146	16,127	2.07	52,431	0.31
Construction	18,857	16,129	1,339	6,538	42,863	5.49	869,747	5.21
Manufacturing	27,797	11,513	3,497	13,212	56,019	7.18	2,225,354	13.34
Transportation, Public Utilities	14,330	10,361	992	5,131	30,814	3.95	703,405	4.22
Wholesale Trade	16,759	9,250	859	5,495	32,363	4.15	832,228	4.99
Retail Trade	53,691	39,135	7,083	20,548	120,457	15.44	2,637,422	15.80
Finance, Insurance, Real Estate	24,193	14,079	1,533	7,777	47,582	6.10	1,481,459	8.88
Services	76,141	56,799	6,002	26,341	165,283	21.19	4,893,822	29.33
Federal Government, Civilian	10,634	12,520	1,397	1,311	25,862	3.32	362,575	2.17
Federal Government, Military	2,009	7,149	4,916	883	14,957	1.92	362,014	2.17
State and Local	40,813	31,415	6,979	19,813	99,020	12.69	1,701,033	10.19
TOTAL	**342,707**	**254,237**	**41,101**	**142,030**	**780,075**	**100.00**	**16,687,812**	**100.00**

Source: U.S. Department of Commerce, 1993; SAIC, 1995.

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Table 3.8-2 Population Impacts of SWP Water Transferred from Agricultural to Urban Contractors for the State and Selected Hydrologic Regions				
Hydrologic Region	*1990 Populations (000s)*	SWP Demand Level		
		3.0 MAF	*3.5 MAF*	*4.12 MAF*
Supportable persons	NA	468,746	208,728	39,694
San Francisco Bay Area	5,484	8.6%	3.8%	0.7%
South Coast	16,293	2.9%	1.3%	0.2%
State	30,000	1.6%	0.7%	0.1%
Source: DWR, 1994b; SAIC, 1995.				

ranging from 100 gpcd in San Mateo County to 230 gpcd in Contra Costa County. In some communities, a substantial portion of the consumed water is used by industry.

A statewide average of 200 gpcd is used to represent per capita water consumption. This equates to 73,000 gallons per year or 0.224 AF per person per year. Thus, one AF of water could support, on average, 4.46 persons.

ENVIRONMENTAL CONSEQUENCES

A range of potential environmental consequences are possible depending largely on the level of deliveries made by the SWP system. At an aggregate (i.e., system-wide) level of analysis of changes in deliveries attributable to implementation of the revised SWP water allocation methodology, and assuming the transfer of 130,000 AF from Agricultural Contractors to Urban Contractors, there will be a net shift in deliveries to Urban Contractors. These shifts will vary in magnitude depending on the total water deliveries made by the system. These anticipated changes in deliveries are shown in Table 3.6-1 of Chapter 3.0.

Proposed Action

Based on the statewide average per capita water consumption rate and the average net shift in water deliveries to Urban Contractors after transfer of the 130,000 AF of agricultural entitlement, the number of persons potentially supportable for each of three total SWP demand levels would be as shown in Table 3.8-3. The number of persons potentially supportable would be approximately 468,700 at a total SWP demand of 3.0 MAF (approximately equal to current demands), 208,700 at a 3.5 MAF demand level, and 39,700 at a 4.12 MAF demand level. The data in the table shows that as Contractors' demands for SWP water increase in the future, the number of persons supportable from the shift in water deliveries to Urban Contractors as a result of the Monterey Agreement decreases. Therefore, the potential population impacts indicated at the lower demand levels could

Table 3.8-3 California Population by Hydrologic Region (thousands)				
Hydrologic Region	Year			
	1990	*2000*	*2010*	*2020*
San Francisco Bay Area	5,484	6,215	6,611	6,944
South Coast	16,293	19,273	22,098	25,315
STATE TOTAL	**30,000**	**36,500**	**42,500**	**48,900**
Source: DWR, 1994b.				

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only occur on a temporary basis and would not be sustainable.

The estimated proportion that each of these populations comprise of the total population resident in each of the two major metropolitan regions of the state, and of the state as a whole, are also presented in Table 3.8-3. The number of persons capable of being supported by the shift in water deliveries to Urban Contractors represents 1.6 percent of the 1990 state population at the 3.0 MAF SWP demand level, 0.7 percent at the 3.5 MAF demand level, and 0.1 percent at the 4.12 MAF demand level. The percentages included in the table for the two metropolitan regions indicate the percentages that the population shown would represent if it occurred entirely within each region. These regional percentages are shown for illustrative and comparative purposes only. It is highly probable that the additional water would be delivered to multiple agencies located within both regions. Therefore, the statewide impacts are more indicative of potential impacts and are not considered significant.

No Project Alternative

Current conditions would continue into the future and no impacts on population are expected.

MITIGATION MEASURES

In the absence of significant adverse impacts in both economics and population, mitigation measures are not called for.

3.9 HEALTH AND SAFETY

Amendments to SWP contracts resulting from implementation of the Monterey Agreement are unlikely to affect statewide human health and safety. Potential Monterey Agreement-related impacts on regional and local human health and safety, and potential mitigation measures are discussed in Chapter 4. As actual projects are proposed as a result of the Monterey Agreement, which may have regional or local consequences on human health and safety, the potential environmental impacts will be ascertainable and will be evaluated by affected agencies consistent with CEQA.

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4. SITE-SPECIFIC ASSESSMENT

4.1 GEOLOGY AND SOILS

4.1.1 Affected Environment

KERN FAN ELEMENT

The KFE is located in the southern portion of the San Joaquin Valley, a large, deep, asymmetrical sedimentary basin. The San Joaquin Valley is bordered on the south and east by the crystalline igneous and metamorphic rocks exposed in the Sierra Nevada and the Tehachapi Mountains. These rocks also underlie the basin at depth. To the west, the basin is bordered mainly by consolidated marine sedimentary rocks exposed in the Coast Range. These rocks are also found overlying the basement rocks within the basin.

Overlying the marine sedimentary rocks in the basin is a thick series of continental rocks and semi-consolidated to unconsolidated sediments. These continental sediments, which form the primary groundwater basin, are several thousand feet thick in the project area. However, the usable portion of this sediment accumulation is limited to that portion above the base of fresh water. The portion of the groundwater basin above the base of fresh water is dominated by alluvial fan and lake deposits. Groundwater development is limited to the upper portion of the fresh water system.

The near-surface geology of the KFE area is dominated by the alluvial fan deposited by the Kern River. The fan alluvium consists of thick deposits of sand and gravel with extensive but discontinuous silt and clay beds (DWR 1986). The sand and gravel, which represents old stream channels, tend to occur in sinuous interconnecting stringers and sheets that can be found throughout the fan but become less prominent toward the edges. These sinuous, highly permeable deposits are imbedded with less permeable silt and clay deposits. The fine-grained material becomes more extensive toward the edges of the fan and, in places, may interlace with relatively massive clay beds deposited in lakes. Overall, the upper portions of the alluvial fan deposits form an unconfined to semiconfined aquifer system that can be expected to accept, store, and transmit large amounts of surface recharge.

As described in DWR 1986, soils within the KFE region range from highly permeable, coarse sandy soils to silty loam with very low permeability. Generally, most of the soils can be characterized as deep, well-drained sandy loam. These soils usually have moderate to rapid permeability with low water-holding capacity. A few pockets of clay loam soils can also be found. These soils have low permeability and are often associated with saline-alkali conditions.

Based on the United States Department of Agriculture's (USDA) land capability classification, all of the cropped, fallow, and idle lands fit into class I, IIs4, IIs5, IIs6, and IIIs6. These lands are suited to the crops being grown in the area. Much of the undeveloped land would also be in these classes if irrigated (DWR 1986).

While there are no active faults mapped in the project area, many faults within the valley are known to exist beneath the surface from studies associated with the extensive oil exploration of this area. These originated along the western margin of the valley due to the Cenozoic mountain building of the Coast Ranges. Active faults mapped in the area that have the potential to produce strong ground motion in the project area include the White Wolf fault, the Kern Front fault, and the San Andreas fault. These faults are located approximately 20 miles southeast, 14 miles northeast, and 20 miles southwest of the project area, respectively. Historically these

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C-094761

faults have produced significant earthquakes including magnitude 7.3 (1952) and magnitude 7.9 (1857) events on the White Wolf and San Andreas faults, respectively (Wesnousky 1986).

CASTAIC LAKE

Castaic Lake is formed in the Santa Clara River drainage of Los Angeles County, within the confluence of Castaic Creek and Elizabeth Lake Canyon Creek, immediately north of Castaic. This area is located in the Transverse Ranges physiographic province of California, a series of east-west trending mountain ranges that stretch directly across the dominant northwest trend of the other major structural and geomorphic features in the state. Castaic Lake itself is situated between the Sierra Pelona to the east, the Piru Mountains to the south, and the Pine and Topatopa Mountains to the west.

The geology within and in the immediate vicinity of the lake consists of stream channel alluvium and marine shales, mudstones, siltstones, and fine sandstones of the upper Miocene Castaic Formation. Deformation of the Castaic Formation is evidenced by visible folding in the well-developed bedding of the Castaic sediments in nearby deposits. Additionally, the irregular topography of the nearby hill slopes suggests considerable sliding, slumping, flow, and creep within these rocks (Sharp 1976). Overlying the Castaic Formation to the south is the nonmarine Saugus formation, which includes coarse sandstones and conglomerates of Pleistocene age.

Soils developed from these materials vary considerably from those occurring in and near stream channels to those on nearby mountainous slopes. Stream channel deposits consist of highly permeable deposits of sand, gravel, and cobbles. As mapped by the U.S. Forest Service (1987), soils developed on the nearby mountain-sides and ridges include clay loams, silty clay loams, and silty loams. These soils have a high erosion hazard with a moderately slow to moderately rapid permeability depending predominantly on clay content.

As with most of southern California, this area is seismically active. No known active faults that would pose a surface fault rupture hazard have been mapped within the vicinity of the lake. However, the lake area is located less than 15 miles from the San Andreas Fault, California's largest fault system, which represents the major tectonic expression of the boundary between the Pacific plate and the North American plate. This northwest-trending fault system has been the source of many large earthquakes in California. The most recent recorded event along the nearby segment of the San Andreas fault was the magnitude 7.9 earthquake in 1852 (Wesnousky 1986). There are numerous other mapped and unmapped faults in the region that have the potential to produce strong ground motion in this area.

LAKE PERRIS

Lake Perris is located in Riverside County, east of Interstate 15 in the Alessandro Valley. This area is part of the Peninsular Ranges physiographic province of California, which is characterized by steep, elongated ranges and valleys that trend northwestward. The lake is situated in a structural upland known as the Perris Plain, a highly eroded, faulted mass of crystalline rock that has been stream-cut into valleys deeply filled with ancient alluvial deposits. The Perris Plain was formed between the San Jacinto and Elsinore fault systems as a down-dropped fault block. Outcrops of the igneous materials that dominate the Peninsular Ranges province emerge from the deep alluvial fill, surrounding the lake to the north. These crystalline materials date from 65 to 130 million years old and are commonly referred to collectively as the Southern California Batholith.

The soils in this area are generally derived from unconsolidated granitic alluvium derived from local igneous parent material. In general, soils of the Perris Plain have been described as fine- to medium-grained valley soils that develop on shallow slopes, basins, old terraces, and alluvial fans. Soil classifications include loam and sandy loam textures. While most of these loamy soils have a relatively rapid permeability, some have a moderately high runoff due to an impervious clay layer found at a depth of 28 to 50 inches.

This is also an area of relatively high seismic activity. Numerous active faults in the area have the potential to produce primary seismic hazards including strong ground motion and potential surface fault rupture. Some of the major faults in the region include the Elsinore, San Jacinto, and San Andreas, located approximately 8, 15, and 20 miles from the Lake Perris area, respectively. The closest of these faults to the lake, the San Jacinto, is historically the most active fault zone in California. Five earthquakes of Richter magnitudes 6.2 or greater have had epicenters along this fault zone since 1890 (Wesnousky 1986). The more widely known fault, the San Andreas, is 20 miles distant and less active, but has the potential to produce earthquakes of Richter magnitude 8.0 along this segment of the fault.

4.1.2 Environmental Consequences

PROPOSED ACTION

Kern Fan Element

Development of the KFE under any of the potential development scenarios would not be expected to adversely impact geologic or soil resources. Impacts of the proposed action on these resources would be similar to those of the No Project Alternative.

Castaic Lake

Implementation of Scenario C at Castaic Lake could exacerbate erosion control problems along the banks and other nearby areas. Impacts of erosion would be greatest when the lake level is at a low level during the winter season. Maintenance of higher lake levels would minimize soil impacts by allowing the stabilization of lake banks with native or introduced vegetation.

Lake Perris

Implementation of any of the scenarios of the proposed action at Lake Perris would not be expected to adversely or beneficially affect local geologic or soil resources.

NO PROJECT ALTERNATIVE

Impacts to geologic or soil resources of the No Project Alternative would be similar to those of the Proposed Action.

If the KFE land is not developed for water conservation, no impacts on geologic resources would be expected and the soils would support native and non-native vegetation types.

Likewise, implementation of the No Project Alternative would be expected to result in no new impacts on geologic and soil resources at both Castaic Lake or Lake Perris.

4.1.3 Mitigation Measures

No mitigation measures are required.

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4.2 WATER RESOURCES

4.2.1 Surface Water

AFFECTED ENVIRONMENT

Kern Fan Element

Lands comprising the KFE are a natural component of Kern River drainage. The Kern River historically flowed through the area (in wet years) in braided, ephemeral channels before collecting in Buena Vista Lake. Surface waters in the area are from flood discharges on the Kern River or the various irrigation structures providing a source of water for agriculture.

Castaic Lake

The Castaic Dam and Lake facility, located in northwestern Los Angeles County at the confluence of Castaic Creek and Elizabeth Lake Canyon Creek, includes three components: Castaic Lake; Elderberry Forebay; and Castaic Lagoon (see Figure 2.1-3). Castaic Lake has a maximum operating storage capacity of 323,702 AF, and minimum operating storage (also dead pool storage) of 18,590 AF. (Dead pool storage refers to water below intakes that is unavailable for withdrawal.) The lake has a surface area of 2,235 acres at maximum operating elevation and 372 acres at minimum operating elevation. The length of shoreline at maximum operating elevation is 29 miles.

Elderberry Forebay has a maximum operating storage capacity of 33,004 AF, a normal maximum operating storage of 28,231 AF, a minimum operating storage of 19,041 AF, and dead pool storage of 811 AF. The water body has a surface area of 492 acres at maximum operating elevation and 379 acres at minimum operating elevation. The length of shoreline at spillway crest elevation is 7 miles.

Castaic Lagoon originally was a borrow area for the construction of Castaic Dam. It now serves as a recreation pool, with a water surface at a constant elevation of 1,134 feet, and a recharge basin for the downstream groundwater basin.

Castaic Lake, which receives water from Pyramid Lake to the north via the Castaic pump generation powerplant, is the final reservoir on the West Branch of the SWP. It provides a major source of water to the Castaic Lake Water Agency and to the western part of the service area of MWD.

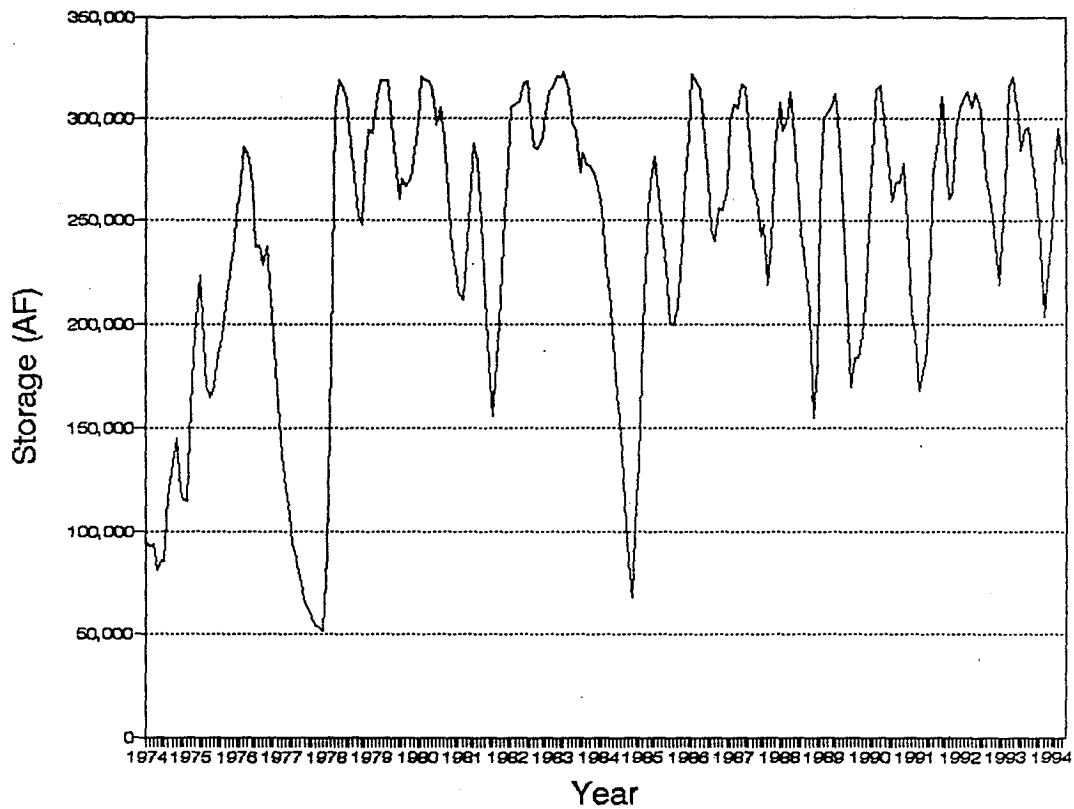
Historic monthly variation in the storage of Castaic Lake over the period 1974 through 1994 is illustrated in Figure 4.2-1. The reservoir is cycled annually, generally peaking in end-of-month storage in March, with drawdown taking place through the following months until a low is reached usually in October. From this low point, the reservoir is filled to attain a high point again in March.

In addition, storage at Castaic Lake is periodically drawn down to perform required inspections and maintenance. These maintenance drawdowns occurred in 1977-78, 1985, and 1994-95, and will continue to be required in the future.

The average monthly storage over the entire period 1974-1994 has varied between approximately 271,800 AF (in March, the high month) and 210,200 AF (in October, the low month) as illustrated in Figure 4.2-2. Historic storage frequencies are shown in Figure 4.2-3, which indicates that Castaic Lake has contained a storage of less than 100,000 AF about 8 percent of this 20-year period. About half the time, the storage was above 262,000 AF, and half the time it was below.

Lake Perris

Perris Dam and Lake Perris are located in northwest Riverside County, approximately 13 miles southeast of the city of Riverside and about 65 miles east of Los Angeles. Lake



Source: MWD, 1994; SAIC, 1995

Figure 4.2-1. Castaic Lake - Historic Monthly Storage, 1974-1994

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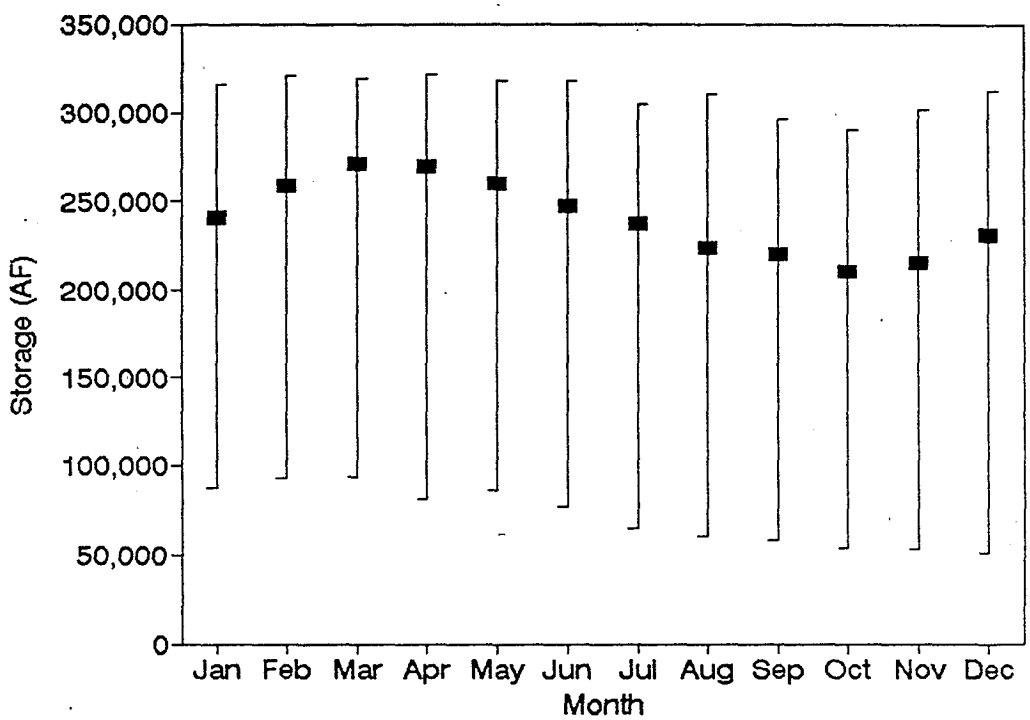
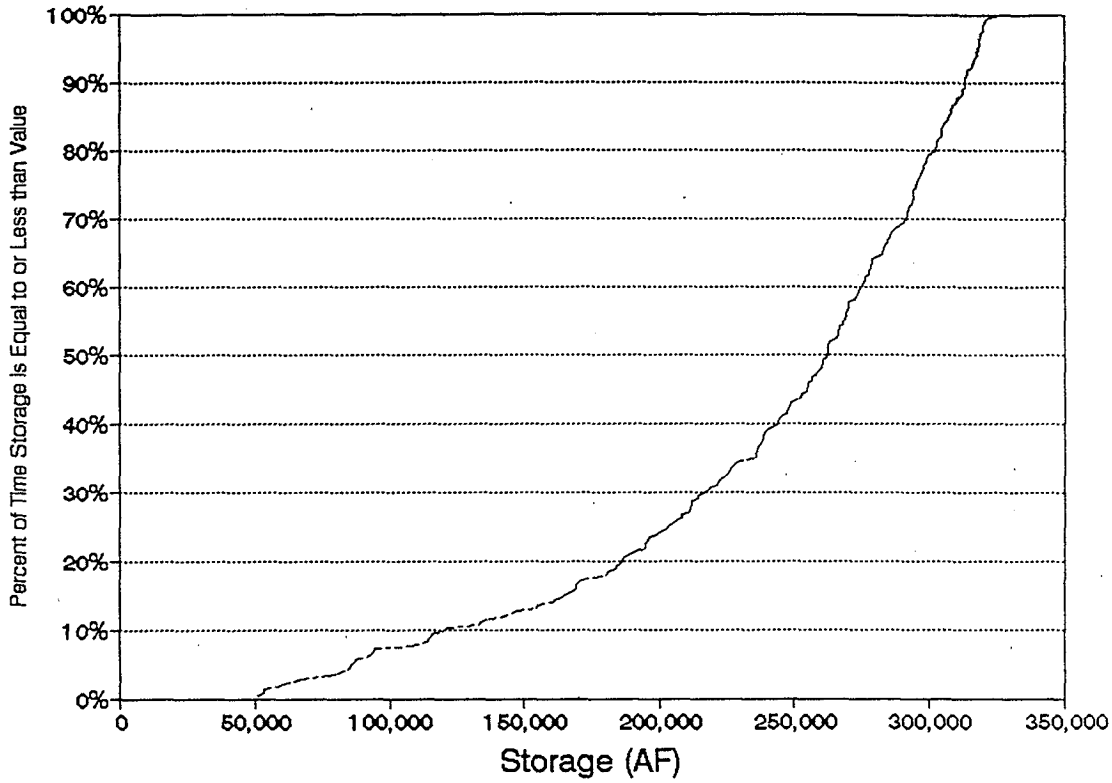


Horizontal ticks indicate maximum and minimum values.
Filled squares indicate average values.

Source: MWD, 1994; SAIC, 1995

Figure 4.2-2. Castaic Lake - Monthly Variation in Historic Storage, 1974-1994



Source: MWD, 1994; SAIC, 1995

Figure 4.2-3. Castaic Lake - Cumulative Frequency of Historic Storage, 1974-1994

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Perris is a multi-purpose facility with provisions for water supply, recreation, and fish and wildlife enhancement (see Figure 2.1-4).

Lake Perris has a maximum operating storage capacity of 126,841 AF, a minimum operating storage of 37,013 AF and dead pool storage of 4,100 AF. The lake has a surface area of 2,292 acres at maximum operating elevation and 1,540 acres at minimum operating elevation. The length of shoreline at spillway crest elevation is 10 miles.

Lake Perris, the most southerly and last reservoir on the East Branch of the SWP, supplies water to the MWD. Water is routed to the lake from Silverwood Lake via the San Bernardino Tunnel and Devil Canyon Powerplant.

Historic monthly variation in the storage of Lake Perris from 1974-1994 is illustrated in Figure 4.2-4. The reservoir is not cycled to the degree that Castaic Lake is, but the overall pattern of variation in storage over the course of the average year is similar to Castaic Lake (see Figure 4.2-5). End-of-month storage in March (the high month) has averaged 116,500 AF while that in September (the low month) has averaged about 98,700 AF. The frequency of occurrence of specific storage levels at Lake Perris is illustrated graphically in Figure 4.2-6. Lake Perris has contained a storage of less than 70,000 AF for 3 percent of this 20-year period. About half the time, the storage was above 113,000 AF, and half the time it was below.

ENVIRONMENTAL CONSEQUENCES

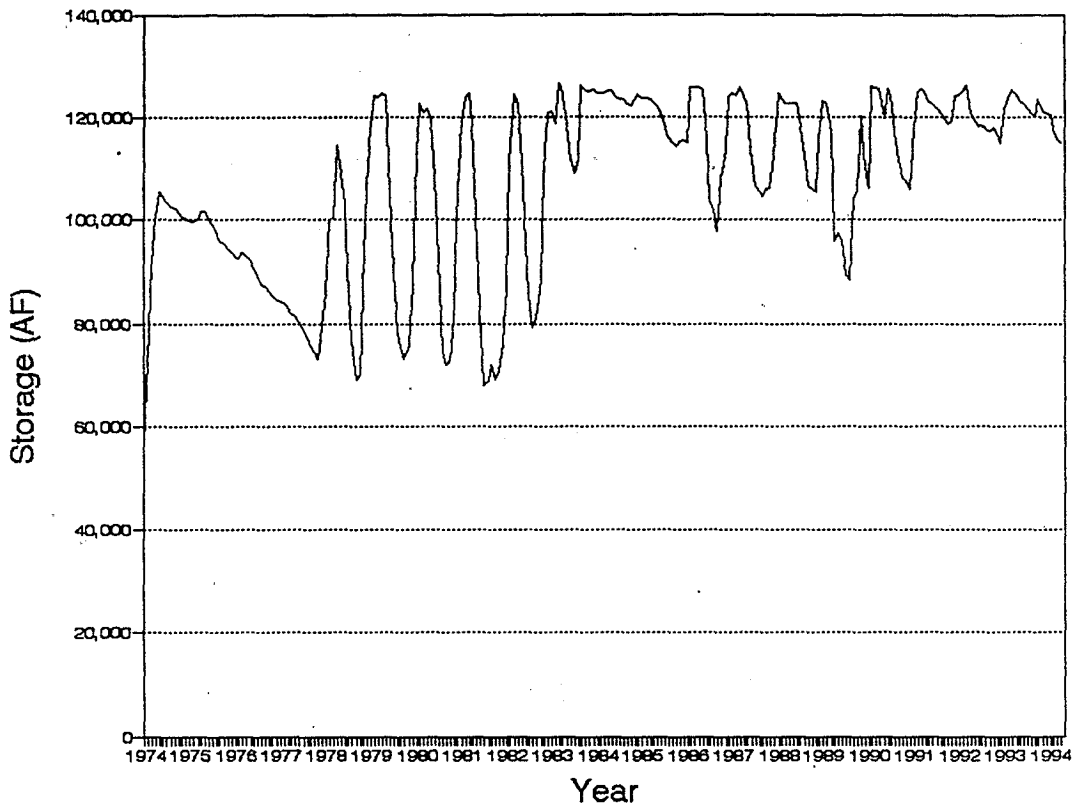
Proposed Action

Kern Fan Element. Since the surface waters in the Kern Fan area are ephemeral and the result of flooding, implementation of the Monterey Agreement through any of the potential development scenarios would not be expected to adversely impact surface waters. The development of surface water spreading basins could have associated beneficial impacts on biology resources such as providing migratory waterfowl and other wildlife with surface water resources that do not currently exist.

Terminal Reservoirs. The Monterey Agreement provides that SWP Contractors who participate in repayment of the costs of Castaic and Perris Reservoirs will have an opportunity to directly utilize a portion of the respective capacities in order to optimize their water storage and supply operations and help ensure a firm water supply. To this end, these Contractors have proposed that approximately 50 percent of the active storage capacity of these reservoirs be available for withdrawal and use by these Contractors under a set of operational conditions. These conditions would include the following:

- Contractor-requested withdrawals would be a "loan" and would not be considered part of that contractor's entitlement allocation in that year.
- The water loan would be paid back by that contractor within 5 years.
- The water paid back could be SWP water, purchased or exchanged water, or some other water procured by the contractor.

Three operating scenarios are presented below that cover the range of anticipated operations of Castaic and Perris Reservoirs with implementation of the Monterey Agreement. Under all operating scenarios, the annual storage cycling at Castaic Lake would be reduced to about 30,000 AF in order to keep enough water in storage to meet both emergency storage requirements and Contractor withdrawals. Annual cycling at Lake Perris would remain similar to the historic cycling that has occurred since 1984.



Source: MWD, 1994; SAIC, 1995

Figure 4.2-4. Lake Perris - Historic Monthly Storage, 1974-1994

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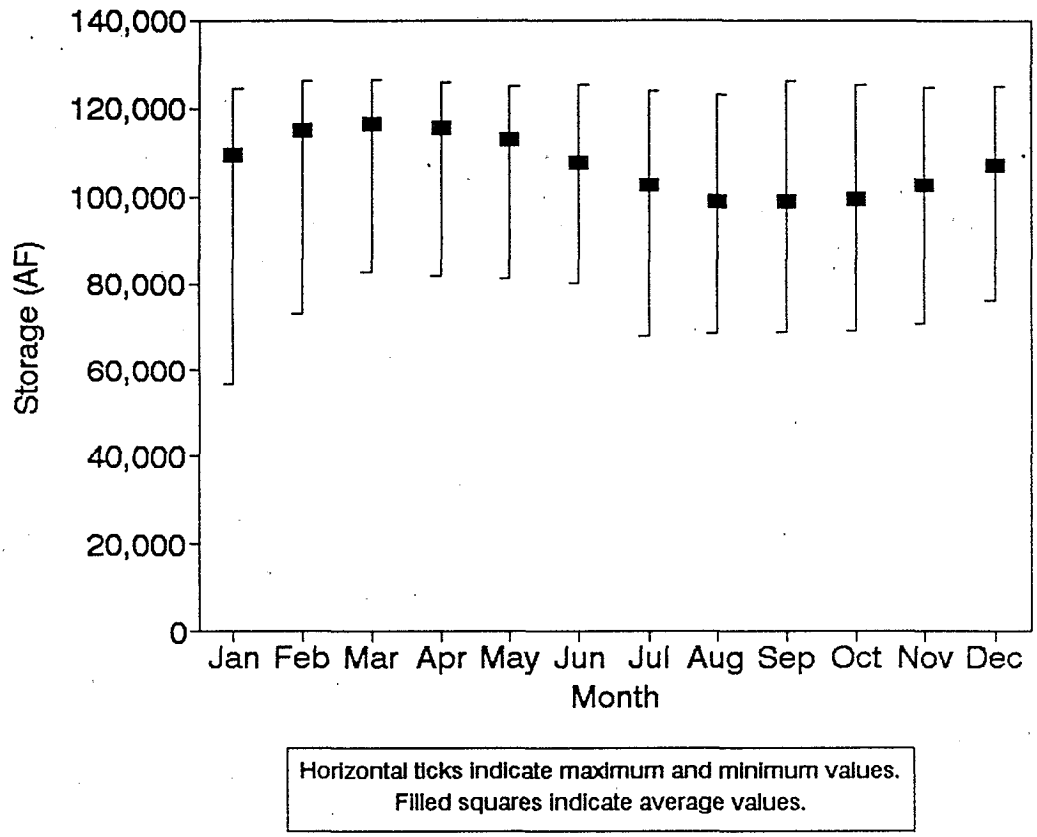
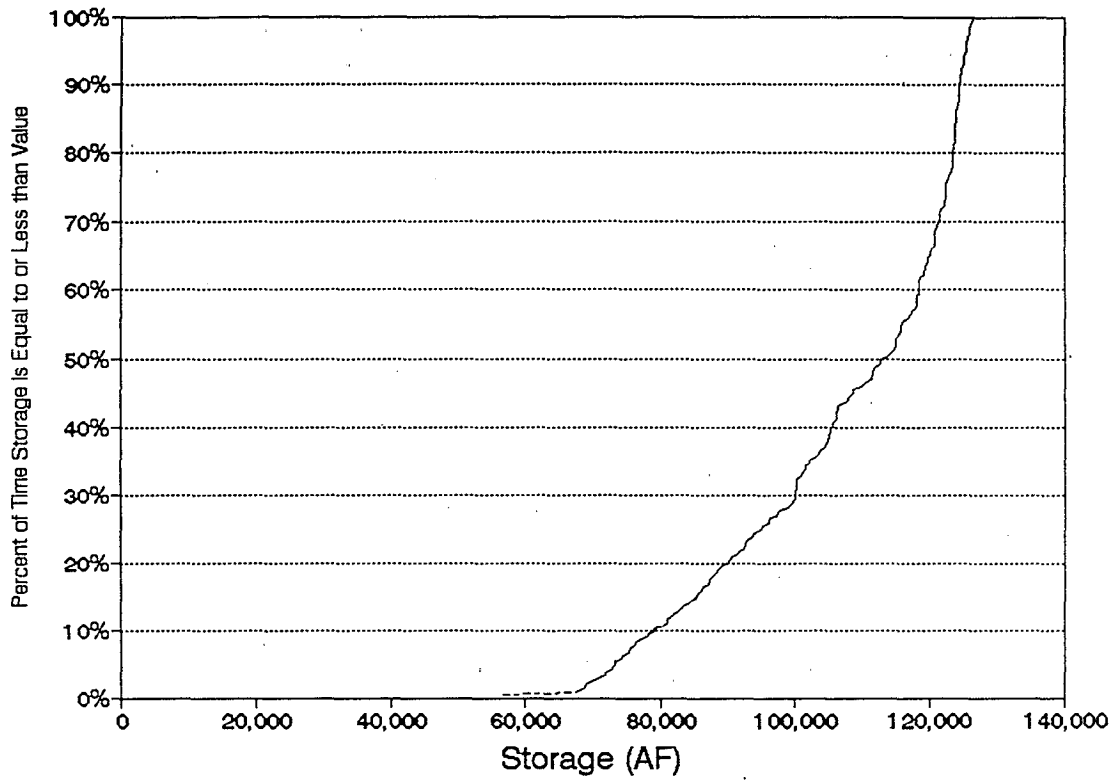


Source: MWD, 1994; SAIC, 1995

Figure 4.2-5. Lake Perris - Monthly Variation in Historic Storage, 1974-1994



Source: MWD, 1994; SAIC, 1995

Figure 4.2-6. Lake Perris - Cumulative Frequency of Historic Storage, 1974-1994

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Scenario A

Under Scenario A, the Contractors make no storage withdrawals for succeeding year repayment. Storage fluctuations would result primarily from the annual cycling described above, and in the case of Castaic Lake, from maintenance drawdowns.

Castaic Lake. Monthly variation in the storage of Castaic Lake over a hypothetical 16-year period (compared to a period of equal length ending in 1994) is illustrated in Figure 4.2-7. Under this operating scenario, it is anticipated that the reservoir would be cycled annually, peaking in end-of-month storage in March with drawdown taking place through the following months until a low is reached in September or October. From this low point, the reservoir would be filled to attain a high point again in March. The average monthly storage over the 16-year period would vary between approximately 308,400 AF (in March, the high month) and 276,300 AF (in September, the low month). Under this operating scenario, as shown in Figure 4.2-8, Castaic Lake would contain a storage of less than 100,000 AF about 2 percent of the 16-year period. About half the time, the storage would be above 300,000 AF, and half the time it would be below.

The average monthly surface elevation of the lake over the 16-year period would vary little between a high of 1,508 feet in March (the high month) and 1,493 feet in September (the low month).

The average monthly surface elevation and storage values under Scenario A and for the historic period 1974-1994 are shown in Table 4.2-1. In all months, surface elevation levels under Scenario A would exceed those of the past. In the case of storage, values under Scenario A would exceed those of the past by significant margins: between 12.8 percent (in April) and 33.4 percent (in October).

Lake Perris. Monthly variation in the storage of Lake Perris over a hypothetical 16-year period (compared to a period of equal length ending in 1994) is illustrated in Figure 4.2-9. It is anticipated that the reservoir would be cycled annually peaking in end-of-month storage in March with drawdown taking place through the following months until a low is reached in September. From this low point, the reservoir is filled to attain a high point again in March. The average monthly storage over the 16-year period would vary between approximately 123,810 AF (in March, the high month) and 111,070 AF (in September, the low month). Under this operating scenario, as shown in Figure 4.2-10, Lake Perris would not contain a storage of less than 70,000 AF during the 16-year period. About half the time, the storage would be above 118,000 AF, and half the time it would be below.

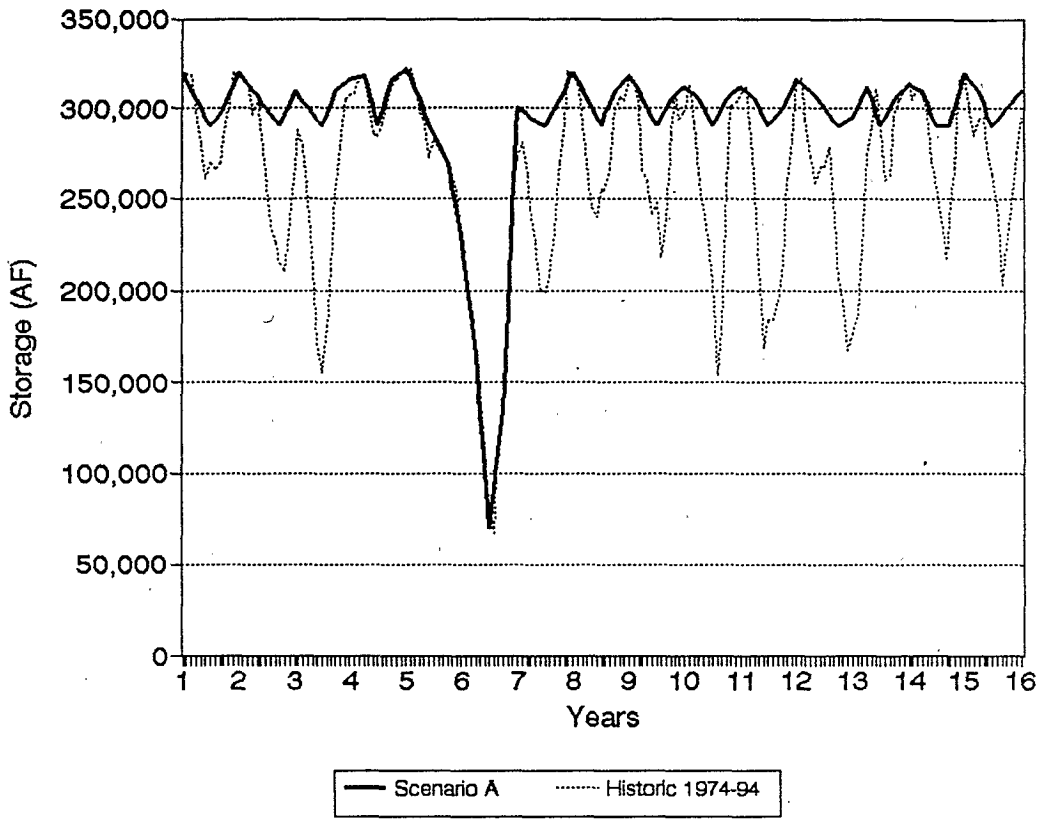
The average monthly surface elevation of the lake over the 16-year period would change very little between a high of 1,587 feet in March (the high month) and 1,581 feet in September (the low month).

The average monthly surface elevation and storage values under Scenario A and for the historic period 1974-1994 are shown in Table 4.2-2. In all months, surface elevation levels under Scenario A would exceed those of the past. In the case of storage, values under Scenario A would exceed those of the past by large margins: between 1.9 percent (in February) and 13.6 percent (in August).

Scenario B

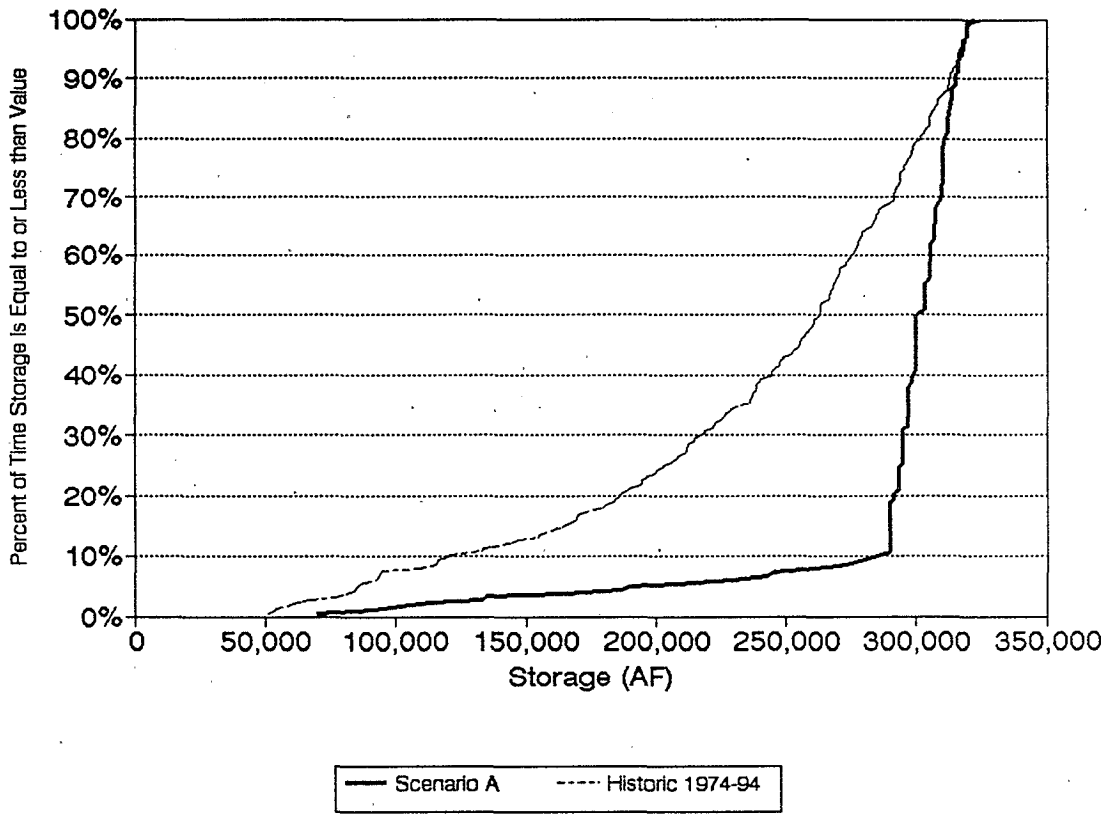
Under Scenario B, operations would be the same as Scenario A except that Contractors would make moderate storage withdrawals and would refill those withdrawals within several years.

Castaic Lake. Monthly variation in the storage of Castaic Lake over a hypothetical 16-year period (compared to a period of equal length



Source: MWD, 1994; SAIC, 1995

Figure 4.2-7. Castaic Lake - Storage, Scenario A



Source: MWD, 1994; SAIC, 1995

Figure 4.2-8. Castaic Lake - Cumulative Frequency of Storage, Scenario A

Table 4.2-1. Castaic Lake: Average Monthly Surface Elevation and Storage Volume

Average Monthly Elevations in Feet

Month	Historic 74-94	SCENARIOS A	Percent of Historic	B	Percent of Historic	C	Percent of Historic
Jan	1,475.0	1,501.8	101.8	1,485.4	100.7	1,471.7	99.8
Feb	1,483.9	1,504.7	101.4	1,489.7	100.4	1,476.3	99.5
Mar	1,490.5	1,508.0	101.2	1,495.2	100.3	1,482.9	99.5
Apr	1,489.6	1,506.3	101.1	1,492.1	100.2	1,479.3	99.3
May	1,484.7	1,504.6	101.3	1,490.0	100.4	1,477.5	99.5
Jun	1,478.0	1,502.9	101.7	1,487.8	100.7	1,475.7	99.8
Jul	1,473.0	1,499.5	101.8	1,483.7	100.7	1,471.0	99.9
Aug	1,465.7	1,496.2	102.1	1,479.4	100.9	1,466.2	100.0
Sep	1,463.4	1,492.8	102.0	1,475.1	100.8	1,461.4	99.9
Oct	1,457.9	1,494.8	102.5	1,477.1	101.3	1,463.3	100.4
Nov	1,460.9	1,496.8	102.5	1,479.1	101.2	1,465.2	100.3
Dec	1,469.5	1,498.8	102.0	1,481.1	100.8	1,467.1	99.8

Average Monthly Storage Volumes in Acre-Feet

Month	Historic 74-94	SCENARIOS A	Percent of Historic	B	Percent of Historic	C	Percent of Historic
Jan	241,431	295,044	122.2	261,600	108.4	235,267	97.4
Feb	258,678	301,356	116.5	270,133	104.4	243,800	94.2
Mar	271,836	308,438	113.5	281,250	103.5	256,563	94.4
Apr	269,983	304,667	112.8	275,000	101.9	249,556	92.4
May	260,217	301,000	115.7	270,667	104.0	246,111	94.6
Jun	247,151	297,333	120.3	266,333	107.8	242,667	98.2
Jul	237,650	290,333	122.2	258,111	108.6	233,889	98.4
Aug	224,202	283,333	126.4	249,889	111.5	225,111	100.4
Sep	219,973	276,333	125.6	241,667	109.9	216,333	98.3
Oct	210,192	280,467	133.4	245,467	116.8	219,800	104.6
Nov	215,450	284,600	132.1	249,267	115.7	223,267	103.6
Dec	231,163	288,733	124.9	253,067	109.5	226,733	98.1

Source: MWD, 1994.

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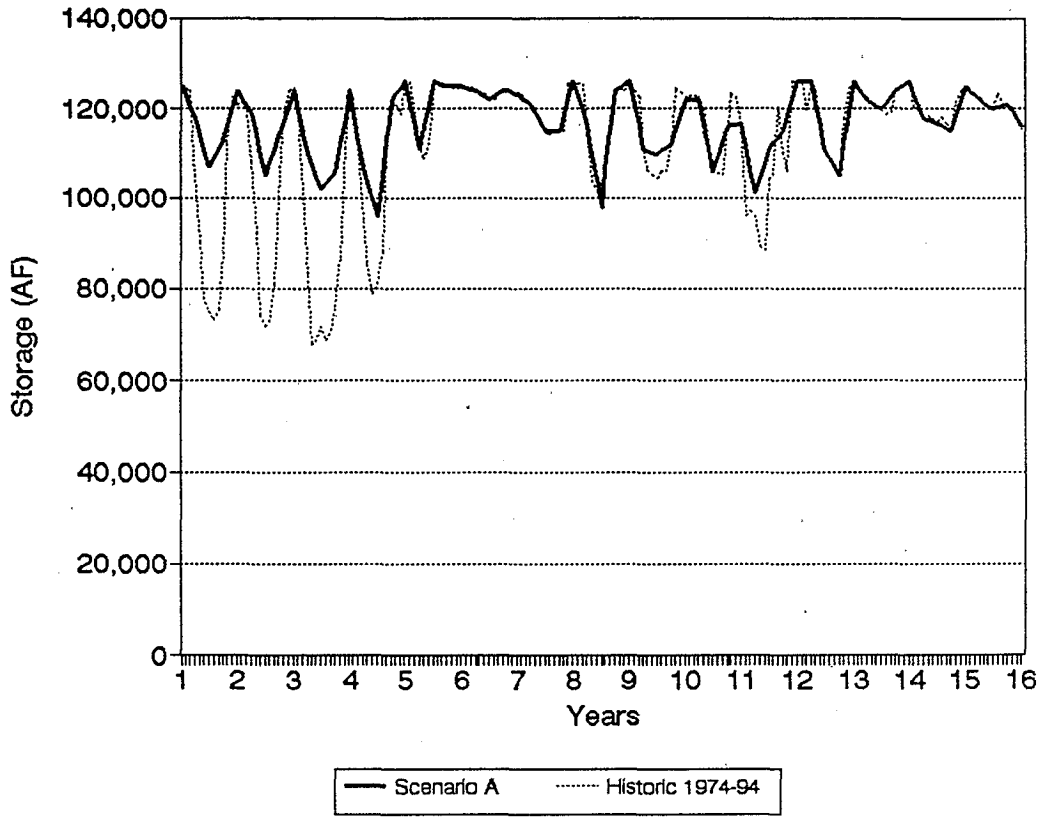
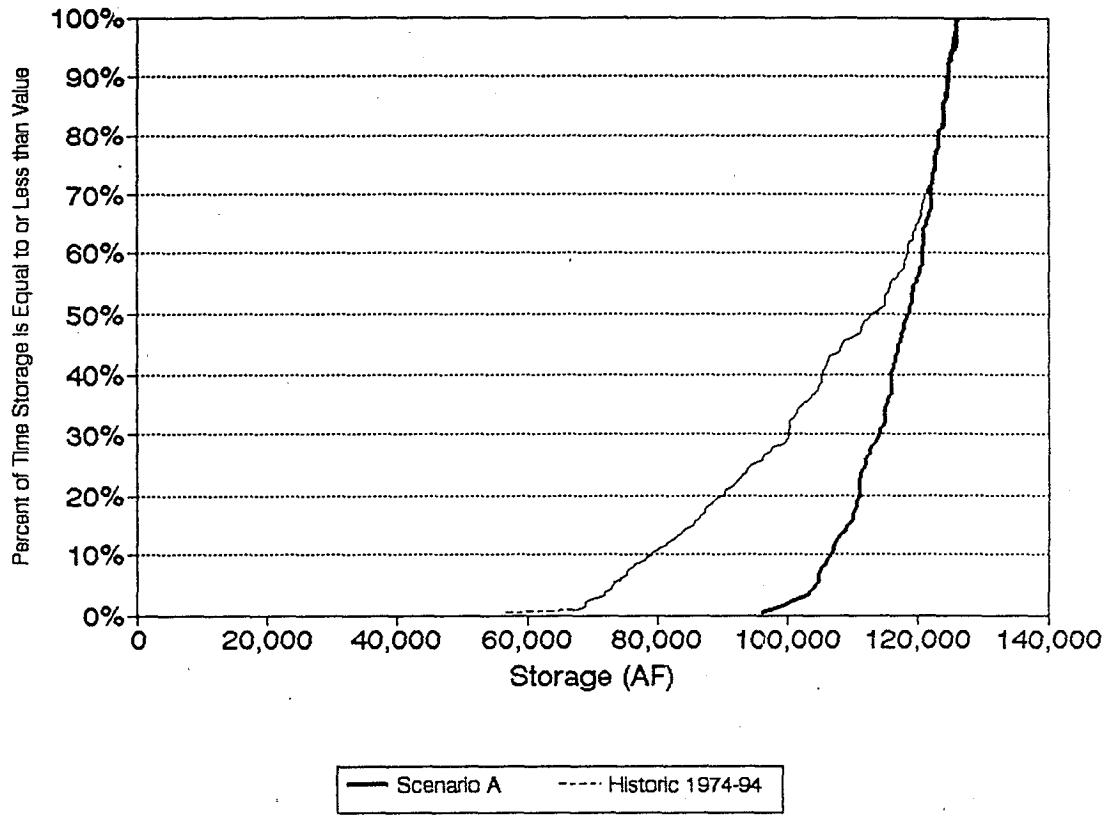


Source: MWD, 1994; SAIC, 1995

Figure 4.2-9. Lake Perris - Storage, Scenario A



Source: MWD, 1994; SAIC, 1995

Figure 4.2-10. Lake Perris - Cumulative Frequency of Storage, Scenario A

Table 4.2-2. Lake Perris: Average Monthly Surface Elevation and Storage Volume

Average Monthly Elevations in Feet

Month	Historic 74-94	SCENARIOS A	Percent of Historic	B	Percent of Historic	C	Percent of Historic
Jan	1,582.3	1,584.5	100.1	1,580.0	99.9	1,575.3	99.6
Feb	1,584.6	1,585.6	100.1	1,582.0	99.8	1,577.2	99.5
Mar	1,585.0	1,586.6	100.1	1,584.1	99.9	1,579.5	99.7
Apr	1,584.3	1,585.7	100.1	1,583.1	99.9	1,578.1	99.6
May	1,582.9	1,584.5	100.1	1,582.0	99.9	1,577.0	99.6
Jun	1,580.3	1,583.4	100.2	1,580.9	100.0	1,575.9	99.7
Jul	1,577.4	1,582.6	100.3	1,579.4	100.1	1,574.5	99.8
Aug	1,575.4	1,581.7	100.4	1,577.9	100.2	1,573.1	99.9
Sep	1,575.4	1,580.9	100.3	1,576.4	100.1	1,571.6	99.8
Oct	1,575.8	1,581.8	100.4	1,576.9	100.1	1,572.2	99.8
Nov	1,577.7	1,582.6	100.3	1,577.5	100.0	1,572.9	99.7
Dec	1,580.2	1,583.5	100.2	1,578.0	99.9	1,573.5	99.6

Average Monthly Storage Volumes in Acre-Feet

Month	Historic 74-94	SCENARIOS A	Percent of Historic	B	Percent of Historic	C	Percent of Historic
Jan	114,118	119,067	104.3	109,133	95.6	99,178	86.9
Feb	119,193	121,400	101.9	113,400	95.1	103,022	86.4
Mar	120,059	123,813	103.1	118,125	98.4	108,000	90.0
Apr	118,632	121,733	102.6	115,867	97.7	105,111	88.6
May	115,559	119,133	103.1	113,467	98.2	102,756	88.9
Jun	109,682	116,533	106.2	111,067	101.3	100,400	91.5
Jul	103,481	114,711	110.9	107,822	104.2	97,422	94.1
Aug	99,361	112,889	113.6	104,578	105.3	94,444	95.1
Sep	99,356	111,067	111.8	101,333	102.0	91,467	92.1
Oct	100,143	112,956	112.8	102,511	102.4	92,756	92.6
Nov	104,165	114,844	110.3	103,689	99.5	94,044	90.3
Dec	109,587	116,733	106.5	104,867	95.7	95,333	87.0

Source: MWD, 1994.

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ending in 1994) is illustrated in Figure 4.2-11. Under this scenario, it is anticipated that the reservoir would be cycled annually, peaking in end-of-month storage in March with drawdown taking place through the following months until a low is reached in September or October. From this low point, the reservoir is filled to attain a high point again in March. The average monthly storage over the 16-year period would vary between approximately 281,250 AF (in March, the high month) and 241,670 AF (in September, the low month). Under this operating scenario, as shown in Figure 4.2-12, Castaic Lake would contain a storage of less than 100,000 AF about 2 percent of the time during the 16-year period. About half the time, the storage would be above 280,000 AF, and half the time it would be below.

The average monthly surface elevation of the lake over the 16-year period would vary little between a high of 1,495 feet in March (the high month) and 1,475 feet in September (the low month).

The average monthly surface elevation and storage values under Scenario B and for the historic period 1974-1994 are shown in Table 4.2-1. In all months, surface elevation levels under Scenario B would exceed those of the past. In the case of storage, values under Scenario B would exceed those of the past by percentages ranging from 1.9 (in April) to 16.8 (in October).

Lake Perris. Monthly variation in the storage of Lake Perris over a hypothetical 16-year period (compared to a period of equal length ending in 1994) is illustrated in Figure 4.2-13. Under this operating scenario, it is anticipated that the reservoir would be cycled annually, peaking in end-of-month storage in March with drawdown taking place through the following months until a low is reached in September. From this low point, the reservoir is filled to attain a high point again in March. The average monthly storage over the 16-year period would vary between approximately 118,130 AF (in March, the high month) and 101,330 AF (in September, the low month). As shown in Figure 4.2-14, Lake Perris would contain a storage of less than 70,000 AF about 2 percent of the time during the 16-year period. About half the time, the storage would be above 111,000 AF, and half the time it would be below.

The average monthly surface elevation of the lake over the 16-year period would vary little between a high of 1,584 feet in March (the high month) and 1,576 feet in September (the low month).

The average monthly surface elevation and storage values under Scenario B and for the historic period 1974-1994 are shown in Table 4.2-2. In six of the months, surface elevation levels under Scenario B would exceed those of the past while in the remaining six months they would be below them. In the case of storage, values under Scenario B would exceed those of the past by as much as 5.3 percent (in August) and would be less than the historic experience by as much as 4.9 percent (in February).

Scenario C

Under Scenario C, operations would be the same as Scenarios A and B except that Contractors would make a large storage withdrawal and take 5 years to refill that withdrawal. It is anticipated that this situation would occur only under the most extreme circumstances, since Castaic Lake and Lake Perris provide a considerable portion of the emergency storage supplies available to Southern California. MWD would attempt to refill any such withdrawals as soon as possible in order to maintain adequate supplies in case of an earthquake or other emergency, or for use in years of extreme supply shortage.

Castaic Lake. Monthly variation in the storage of Castaic Lake over a hypothetical 16-year

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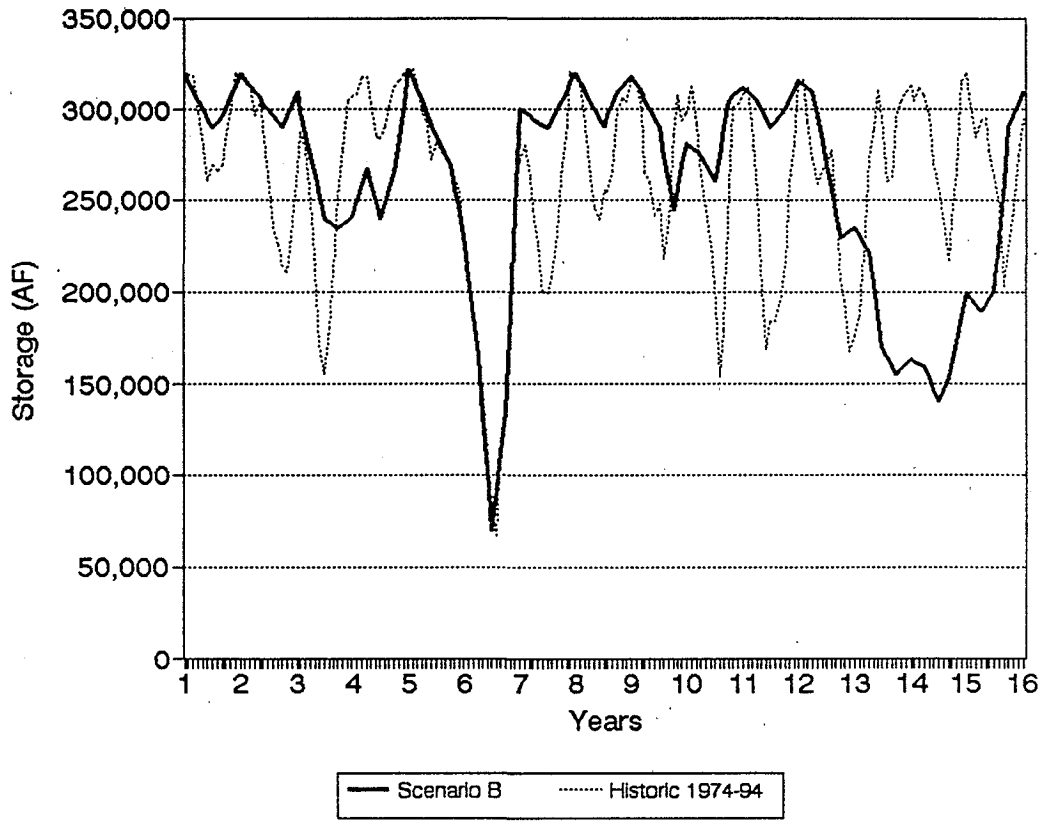

Source: MWD, 1994; SAIC, 1995

Figure 4.2-11. Castaic Lake - Storage, Scenario B

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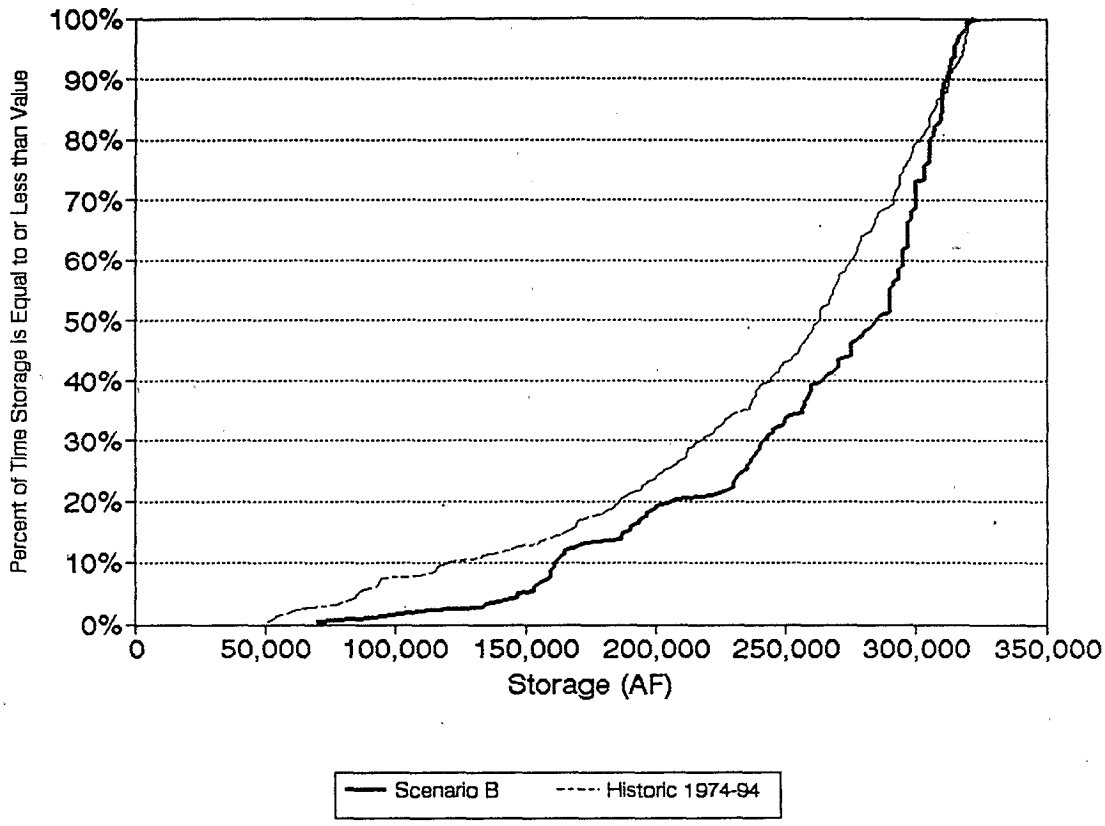
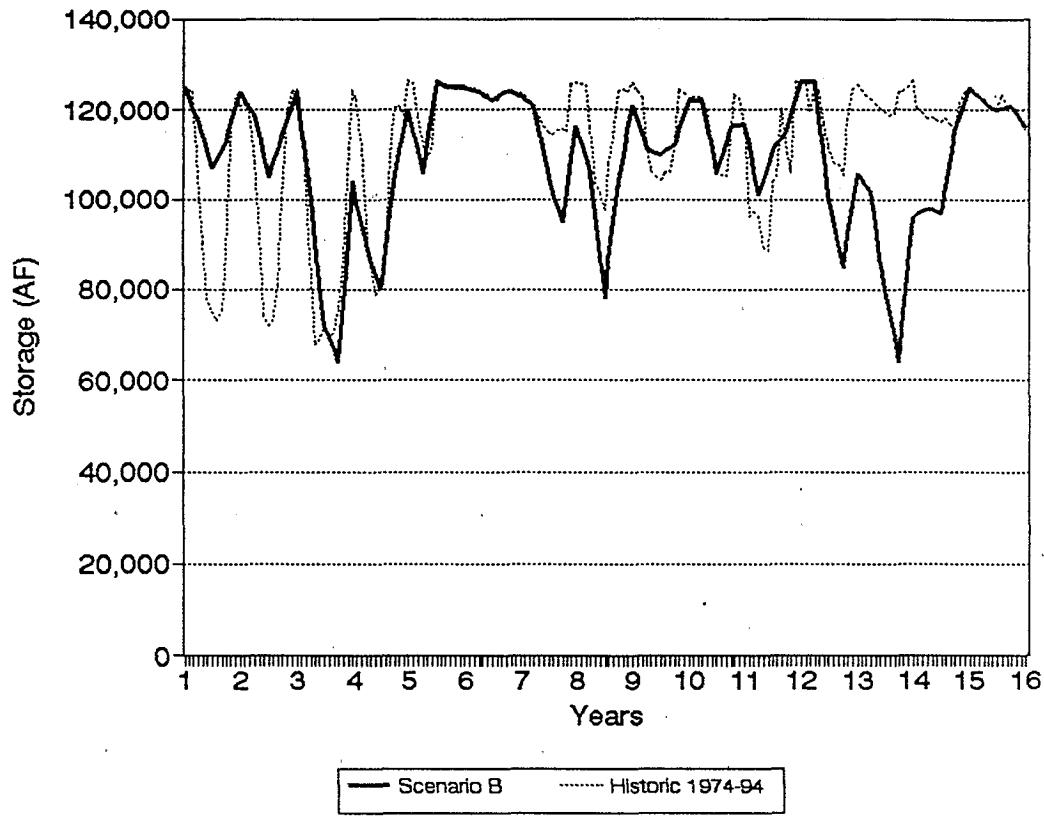


Source: MWD, 1994; SAIC, 1995

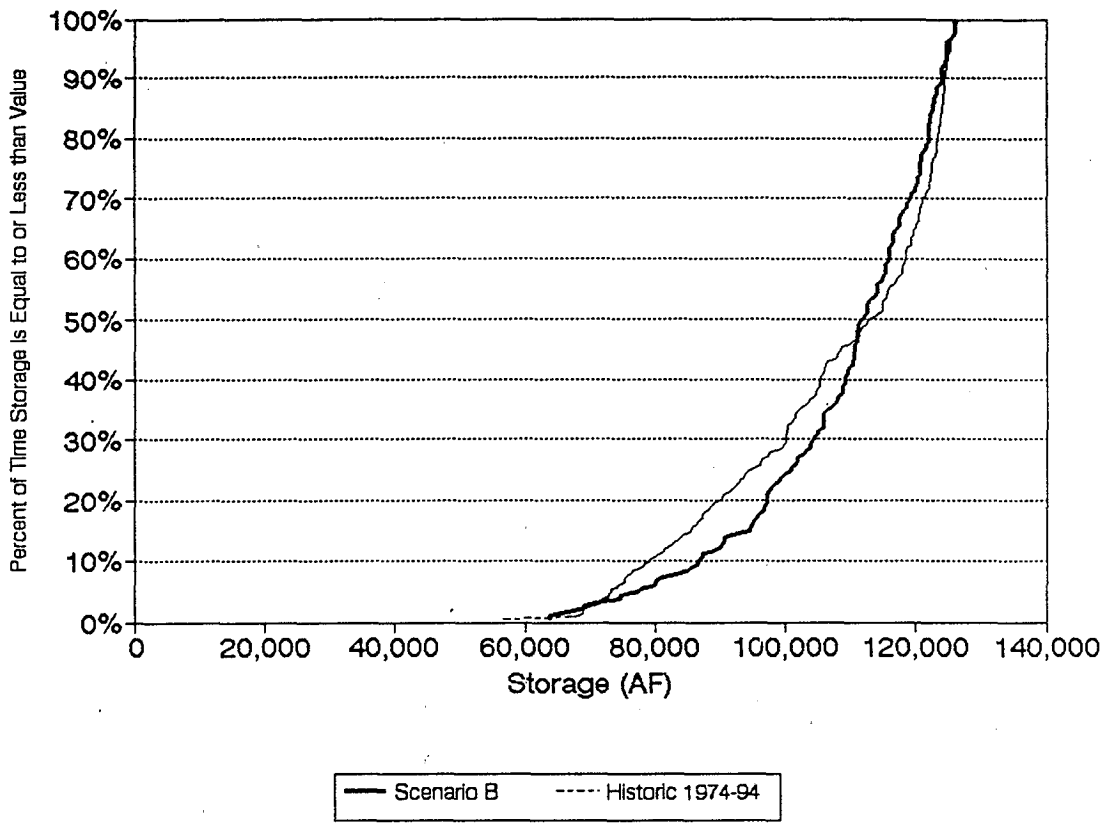
Figure 4.2-12. Castaic Lake - Cumulative Frequency of Storage, Scenario B



Source: MWD, 1994; SAIC, 1995

Figure 4.2-13. Lake Perris - Storage, Scenario B

C-094782



Source: MWD, 1994; SAIC, 1995

Figure 4.2-14. Lake Perris - Cumulative Frequency of Storage, Scenario B

period (compared to a period of equal length ending in 1994) is illustrated in Figure 4.2-15. Under this operating scenario, it is anticipated that the reservoir would be cycled annually, peaking in end-of-month storage in March with drawdown taking place through the following months until a low is reached in September or October. From this low point, the reservoir is filled to attain a high point again in March. The average monthly storage over the 16-year period would vary between approximately 256,560 AF (in March, the high month) and 216,330 AF (in September, the low month). As shown in Figure 4.2-16, Castaic Lake would contain a storage of less than 100,000 AF about 2 percent of the 16-year period. About half the time, the storage would be above 240,000 AF, and half the time it would be below.

The average monthly surface elevation of the lake over the 16-year period would vary little between a high of 1,483 feet in March (the high month) and 1,461 feet in September (the low month).

The average monthly surface elevation and storage values under Scenario C and for the historic period 1974-1994 are shown in Table 4.2-1. In all but three months, surface elevation levels under Scenario C would be less than those of the past. In the case of storage, values under Scenario C would exceed those of the past by as much as 4.6 percent (in October) and would be less than those of the past in nine of the months by up to 7.6 percent (in April).

Lake Perris. Monthly variation in the storage of Lake Perris over a hypothetical 16-year period (compared to a period of equal length ending in 1994) is illustrated in Figure 4.2-17. Under this scenario, it is anticipated that the reservoir would be cycled annually, peaking in end-of-month storage in March with drawdown taking place through the following months until a low is reached in September. From this low point, the reservoir is filled to attain a high point again in March. The average monthly storage over the 16-year period would vary between approximately 108,000 AF (in March, the high month) and 91,470 AF (in September, the low month). As shown in Figure 4.2-18, Lake Perris would contain a storage of less than 70,000 AF about 3 percent of the 16-year period. About half the time, the storage would be above 105,000 AF, and half the time it would be below.

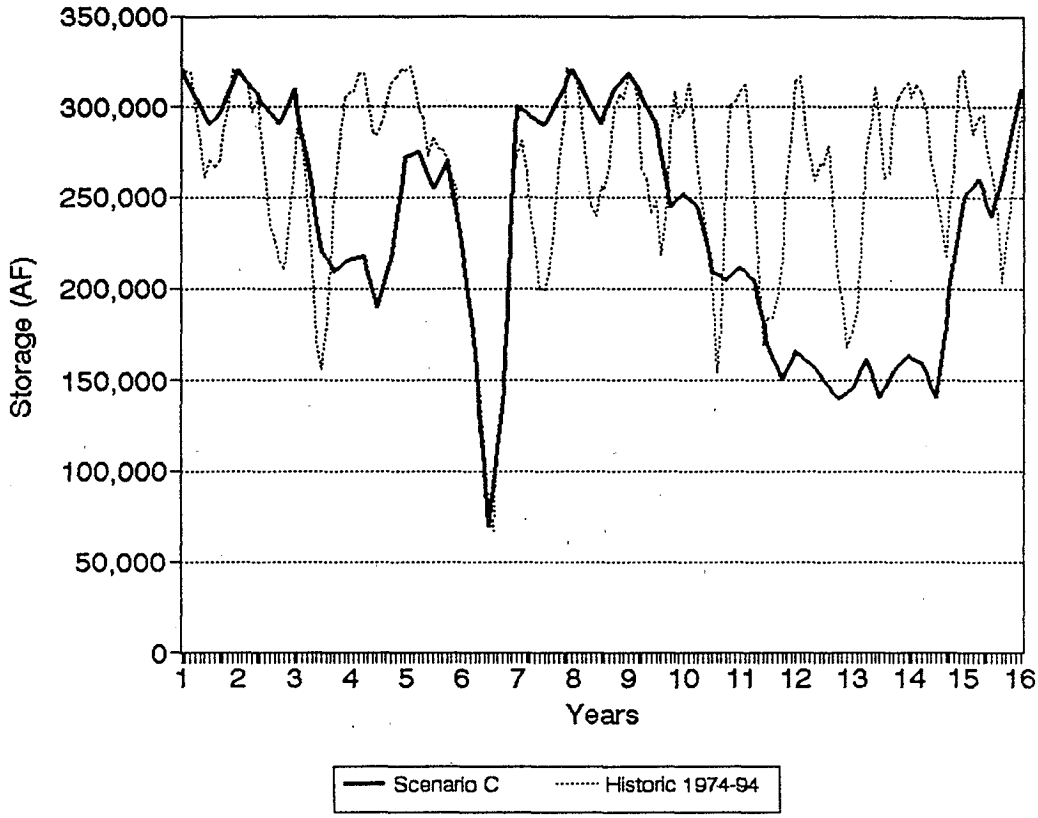
The average monthly surface elevation of the lake over the 16-year period would vary little between a high of 1,584 feet in March (the high month) and 1,576 feet in September (the low month).

The average monthly surface elevation and storage values under Scenario C and for the historic period 1974-1994 are shown in Table 4.2-2. In all months, surface elevation levels under Scenario C would be less than those of the past. In the case of storage, values under Scenario C would be below those of the past in all months by percentages ranging from 4.9 percent (in August) to as much as 13.6 (in February).

Upstream Consequences

Changes in the manner in which the terminal reservoirs could be operated provide the potential for operational changes upstream within SWP facilities. The potential for such changes are addressed immediately below.

Currently, storage at San Luis Reservoir and at transportation reservoirs is cycled annually with the degree of cycling varying by reservoir. Annual storage withdrawals from San Luis Reservoir are made during the summer and early fall to meet high demands when diversions from the Delta are most highly constrained. Annual storage withdrawals from transportation reservoirs are also made during the summer and early fall to meet Contractor requirements during high demand months.



Source: MWD, 1994; SAIC, 1995

Figure 4.2-15. Castaic Lake - Storage, Scenario C

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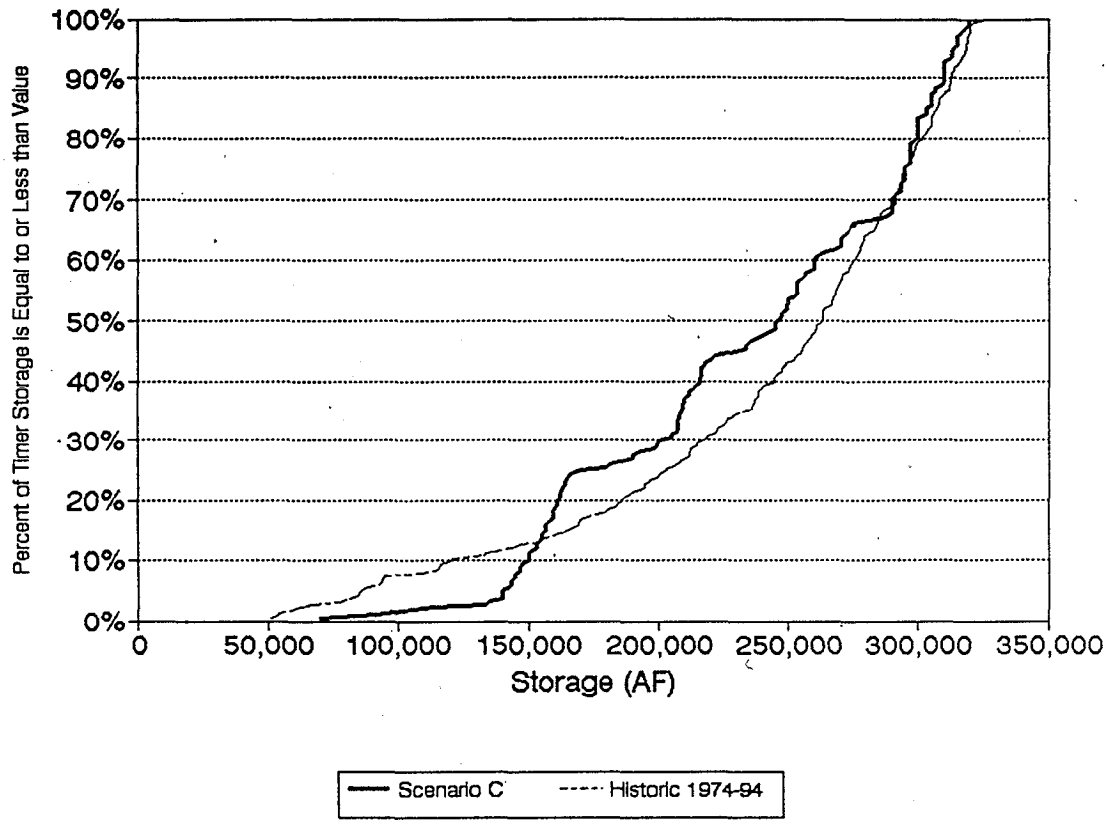
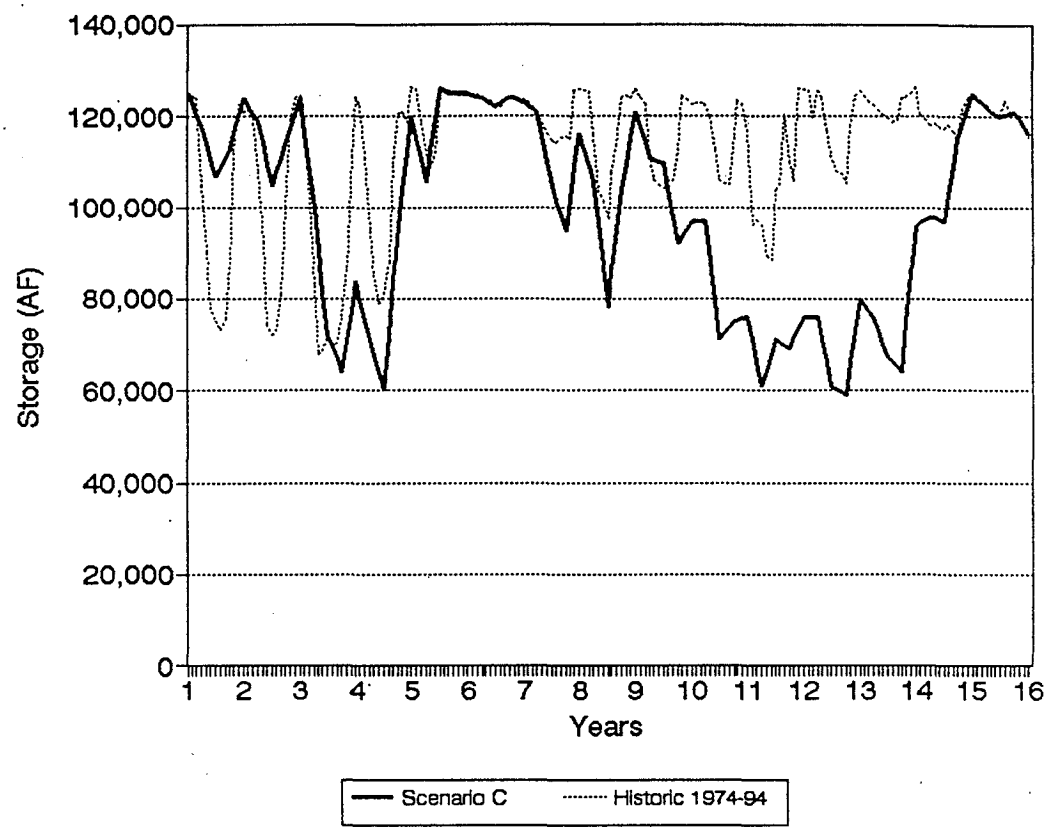


Source: MWD, 1994; SAIC, 1995

Figure 4.2-16. Castaic Lake - Cumulative Frequency of Storage, Scenario C



Source: MWD, 1994; SAIC, 1995

Figure 4.2-17. Lake Perris - Storage, Scenario C

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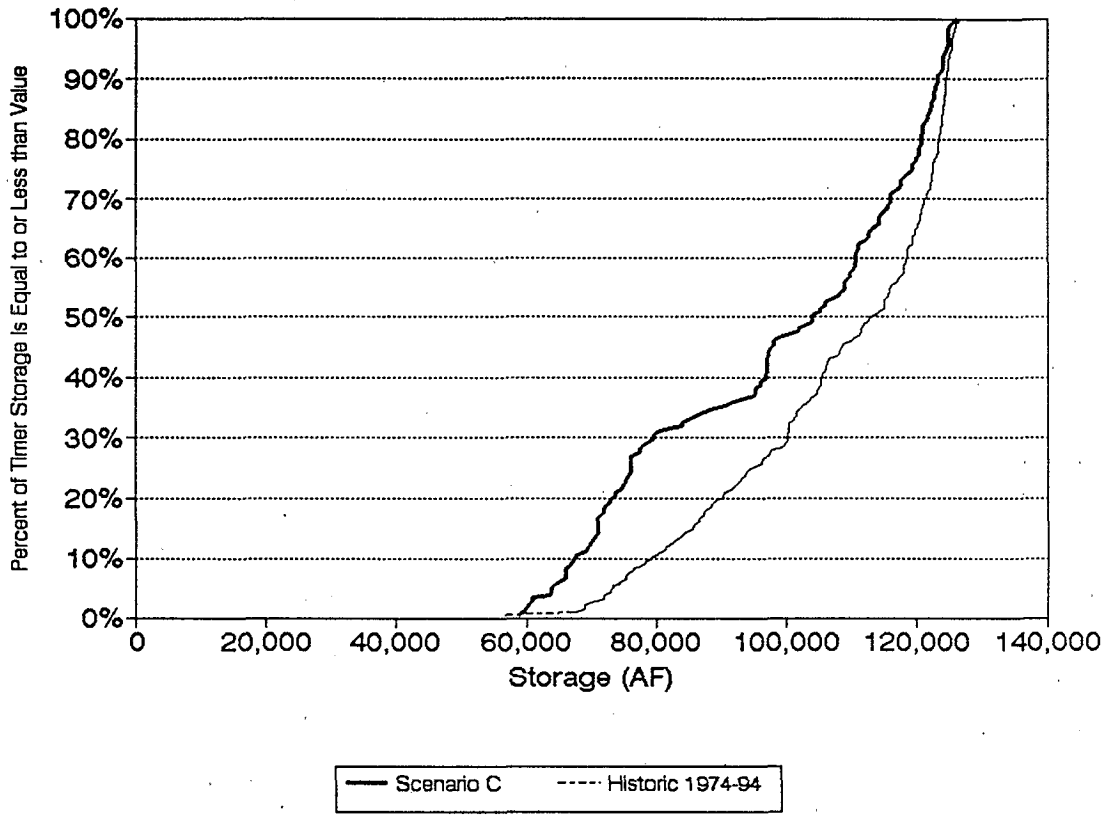

Source: MWD, 1994; SAIC, 1995

Figure 4.2-18. Lake Perris - Cumulative Frequency of Storage, Scenario C

Storage at San Luis Reservoir and the terminal reservoirs is refilled during winter and early spring months. The target is for storage at San Luis and the transportation reservoirs to be full each year by April 15.

With implementation of the Monterey Agreement, operations at the terminal reservoirs would be the same as current operations with the following exceptions.

- Annual cycling of storage at Castaic Lake to meet peaking requirements would be limited to approximately 30,000 AF. This limitation should not impair the ability to meet projected peaking demands. The West Branch of the California Aqueduct was originally designed to deliver a much greater proportion of MWD's SWP entitlement than is now anticipated. As a result, the need to withdraw stored water to provide summer peaking is proportionately less.

- Storage withdrawals at a Contractor's request can be made from Castaic Lake and Lake Perris without that storage being refilled that same year.

- A storage withdrawal by a Contractor must be repaid, i.e., the storage refilled, by that Contractor within 5 years following that withdrawal (storage refill can be from entitlement and interruptible water allocated to that Contractor, and/or from water purchased or exchanged by that Contractor).

- Any upstream change in DWR operations to accommodate operational changes at transportation reservoirs would be governed and constrained by all the same standards, permits, and agreements that would otherwise affect DWR operations.

The above operational changes are, strictly speaking, not program impacts since all of these changes in transportation reservoir operation could currently be made by DWR (absent implementation of the Monterey Agreement) at its discretion.

Potential impacts of the operational changes identified immediately above are described below.

Reduced Annual Storage Cycling at Castaic Lake

If deliveries to Contractors from Castaic Lake are to be maintained at a similar monthly peaking pattern as currently occurs, while at the same time reducing the degree of annual storage cycling at Castaic, additional water would need to be transported through the California Aqueduct during the summer and early fall months, when water would currently have been withdrawn from Castaic storage.

Upstream operational changes needed to accommodate this shift in a portion of conveyance to the West Branch in summer and early fall would vary depending on total SWP Contractor demands and the monthly pattern of those demands; SWP storage and supply availability; and whether operations in that year would, without the program, have already constrained operations in all of those summer and early fall months. Potential changes associated with this operational change include the following.

- **San Luis Reservoir:** There would be an incremental increase in reliance on storage from San Luis Reservoir. If SWP demands are high and/or storage at San Luis Reservoir as of April 15 is low, such that the reservoir would already have been drawn down to minimum storage levels, and to the extent that Oroville storage and Delta operations could not accommodate additional withdrawals, this could result in a slight decrease in allocation to all SWP contractors. If SWP demands are lower and/or storage at the reservoir as of April 15 is high such that San Luis Reservoir storage is available to meet that increased

C—094789

C-094789

demand, there would be no impact except a slightly increased drawdown at San Luis Reservoir.

- **Oroville Reservoir:** To the extent that storage conditions at San Luis Reservoir cannot accommodate the additional withdrawal, and to the extent that Lake Oroville storage and Delta operations would allow, Lake Oroville releases could be shifted from other months to these summer and early fall months, or could be increased in these months without change to other month releases. The impact of these changes would be a slight increase in instream flow downstream of Oroville Dam in the Feather and Sacramento Rivers and of inflow to the Delta, during whichever of these summer and early fall months flexibility in Delta operations might be available to accommodate these changes. In general, this flexibility would be available only in September and October.

- **Delta Operations:** To the extent that storage conditions at San Luis Reservoir cannot accommodate the additional withdrawal, and to the extent that Lake Oroville storage and Delta operations would allow, an increase in Lake Oroville releases would result in increased inflow to the Delta and an increased diversion from the Delta in those same months. As noted above, flexibility in Delta operations to accommodate such changes would generally be available only in September and October.

- **Entitlement Transfer of 130,000 AF:** A mitigating factor to the potential changes in San Luis Reservoir operations described above would result from another component of the program, specifically the entitlement purchase of up to 130,000 AF and its corresponding conversion from agricultural to urban use. This change in use would result in a reduced summer demand since urban demands typically peak in the summer at a relatively lower rate than agricultural demands. This would result in a reduced need for withdrawal from San Luis Reservoir to meet summer peaking demands and would help to offset an increased reliance on San Luis Reservoir storage due to changes in transportation reservoir operations.

Year with Storage Withdrawal

No changes in upstream operations would be required since the water would already be in storage in Castaic Lake and Lake Perris.

Year with Storage Refill

Storage refill could be from SWP entitlement and interruptible water allocated to that contractor, and/or water purchased or exchanged by that contractor.

Refill from these sources, depending on the year in which the refill occurs, could have the following impacts.

- In a year in which all SWP demands are not being met but in which the entitlement being used for refill would otherwise have been turned back for reallocation among other contractors, an impact on SWP supply to some contractors could occur. This impact would be only to those contractors whose requests in that year had not yet been satisfied, and the impact among them would total an amount up to the quantity of refill. In this situation there would be no change in Delta diversions.

- In a year in which not all SWP demands are being met but in which the contractor would otherwise have chosen to store this water in another location, there would be no impact on SWP supply to other contractors or to Delta diversions.

- In years in which all SWP demands are met, there would be no impact on SWP supply to other contractors. In this situation, Delta diversions would probably increase, but this would occur only in wetter years, which are the best conditions for diversion.

- Refill with interruptible water would have minimal impact. Interruptible water is, by definition, available on a short-term, interruptible basis when all scheduled demands are being met, SWP project storage is full, and additional water is available for diversion from the Delta. These conditions typically occur only during wet years or during large storm events. While refilling previously withdrawn storage with interruptible water would result in an increased diversion from the Delta, this would only occur during these wet periods, which are the best conditions for diversion. Allocations of interruptible water to other SWP contractors under most circumstances would not be effected.

- Refill with purchased water would generally have minimal impact. Water purchases for this purpose would typically be made in normal or wetter years when inexpensive water would more likely be available. If the purchase were made from a source south of the Delta, there would be no increase in Delta diversions. If the source were north of or in the Delta, Delta diversions would increase but only in those months in which the water could be transferred through the Delta within environmental and operational constraints. Allocated deliveries to other SWP contractors would not be effected.

- Refill with exchange water (e.g., an exchange among Contractors storing water at Castaic Lake) would have no effect on upstream SWP operations or on allocated deliveries to other SWP contractors.

4.2.2 Groundwater

AFFECTED ENVIRONMENT

Kern Fan Element

Groundwater within the Kern Fan region occurs in the alluvial fan materials of the Kern River. These materials provide confined, unconfined and semi-confined conditions (DWR, 1992). Groundwater pumping has produced a decline in water levels. Current groundwater levels in the KFE range from about 60 feet to 180 feet below ground level.

Terminal Reservoirs

Implementation of the Monterey Agreement would not be expected to affect groundwater resources in the regions of Castaic Lake or Lake Perris.

ENVIRONMENTAL CONSEQUENCES

Proposed Action

Kern Fan Element. Implementation of the Monterey Agreement with respect to the action of transferring ownership of the KFE from DWR to Agricultural Contractors is not expected to result in significant changes to the groundwater basin. The various levels of implementation would result in a range of operations that would periodically recharge the basin and periodically withdraw most, but not all, of the previously stored waters. While providing temporary increases in groundwater levels when recharge occurs, long-term operations would only recover previously stored water in a manner intended to minimize or prevent adverse effects. Generally, operations are intended to be conducted so that groundwater basin levels are no worse than those conditions that would have occurred absent the KFE project. A similar groundwater banking program was analyzed in DWR's 1986 Program EIR on the KFE and found to result in generally positive groundwater impacts. Thus, groundwater

C—094791

C-094791

effects under the Proposed Action could also occur under the No Project Alternative if DWR proceeded with development of their planned groundwater banking program.

Castaic Lake. Implementation of the Monterey Agreement would not be expected to impact the groundwater regime near Castaic Lake.

Lake Perris. Implementation of the Monterey Agreement would not be expected to impact the groundwater regime near Lake Perris.

No Project Alternative

Under the No Project Alternative, prevailing conditions are expected to continue. No adverse impacts are anticipated.

MITIGATION MEASURES

No mitigation measures are required.

4.2.3 Water Quality

AFFECTED ENVIRONMENT

Water quality concerns potentially involve three issues: water quality in Castaic Lake and Lake Perris with regard to recreational activities, water quality in the lakes as a source of drinking water, and water quality of the treated water for public consumption.

Castaic Lake and Lake Perris are designed to store SWP water. However, because of a number of factors, the quality of the water in the two reservoirs varies from month to month and from year to year. Factors include the following: the natural variability of the water entering the reservoirs which results from changing conditions in the Bay/Delta region; the operational parameters of the reservoirs (e.g., the rates and quantities of inflow, outflow and storage) which affect the chemical and biological constituents (for instance, limited outflow will result in a build-up of total dissolved solids as evaporation occurs; conversely, a high reservoir turnover will result in concentrations of dissolved solids being closer to that of the influent water); the size and shape of the reservoirs that affect the physical conditions, e.g., temperature and dissolved oxygen, which, in turn affect the type and rate of biological activity; the number of visitors who participate in the recreational activities at the reservoirs and the types of these activities (e.g., swimming, boating) affect the water quality; the nature of the sediments that have built up over the years can result in different chemical and biological activity; the concentrations and populations of various species of algae and other microorganisms which affect the taste and odor of the waters over time; and different characteristics of runoff into the reservoirs, which may influence the chemical and biological characteristics of the reservoirs.

Recreation. Water quality at Castaic Lake with its recreational activities of fishing and boating is excellent. Swimming is prohibited. At Lake Perris, in addition to fishing and boating, swimming is usually permitted. However, there have been periods at Lake Perris when swimming has been prohibited because of high coliform counts and the potential impacts on public safety.

Raw Water Source. The waters from Castaic Lake and Lake Perris are regularly tested with regard to suitability as a source water for treatment plants that provide drinking water. Testing results of the raw water are shown in Table 4.2-3.

Treated Water. The treated water of MWD meets all of Department of Health Services's primary standards and the EPA's maximum contaminant levels (MCLs) for drinking water (MWD Annual Report 1993). Testing results for treated waters from Castaic Lake (Jensen Plant) are shown in Table 4.2-4.

C-094793

Table 4.2-3
WATER QUALITY MEASUREMENTS OF SOURCE WATER FROM CASTAIC LAKE AND LAKE PERRIS

		Castaic Lake							Lake Perris						
	Measurement	*86/87*	*87/88*	*88/89*	*89/90*	*90/91*	*91/92*	*92/93*	*86/87*	*87/88*	*88/89*	*89/90*	*90/91*	*91/92*	*92/93*
Silica	mg/L	12.4	13.9	18.7	15.4	15.9	15.7	16.1	6.8	5.8	7.1	4.9	2.3	2.2	1.9
Calcium	mg/L	28	28	30	26	25	32	38	14	16	18	20	23	25	26
Magnesium	mg/L	14.0	14.5	15.0	16.5	16	17.5	18.5	11.0	12.5	14.5	15.5	16.5	18	18.5
Sodium	mg/L	49	54	64	74	71	78	76	40	47	58	66	72	81	86
Potassium	mg/L	3.0	3.1	4.0	3.8	3.7	3.8	3.7	3.2	3.4	3.7	3.9	4.1	4.4	4.6
Carbonate	mg/L	0	0	1	0	0	0	0	0	1	2	3	1	1	2
Bicarbonate	mg/L	100	102	122	101	98	107	117	80	89	96	101	114	122	124
Sulfate	mg/L	61	58	55	51	50	75	105	35	35	39	39	42	46	52
Chloride	mg/L	61	71	83	110	107	108	91	50	60	82	94	107	118	124
Nitrate	mg/L	1.80	2.40	1.55	2.5	2.4	2.2	2.3	0.35	0.05	0.15	0.45	0.25	0.15	0.15
Fluoride	mg/L	0.19	0.16	0.30	0.12	0.14	0.19	0.27	0.15	0.15	0.13	0.12	0.13	0.14	0.16
Boron	mg/L	0.24	0.18	0.38	0.21	0.27	0.25	0.32	0.16	0.16	0.19	0.16	0.3	0.24	0.22
Total Dissolved Solids	mg/L	281	297	334	351	339	386	410	201	225	273	298	323	358	377
Total Hardness as $CaCO_3$	mg/L	127	130	136	133	127	152	172	80	90	105	114	124	136	143
Total Alkalinity as $CaCO_3$	mg/L	82	84	101	83	80	88	95	66	74	81	88	93	103	105
Free Carbon Dioxide	mg/L	2.2	2.8	2.3	2.4	2.7	3.2	3.4	1.4	0.9	0.8	0.6	1.1	1	1
H+ Concentration	pH	7.93	7.84	8.02	7.89	7.81	7.8	7.78	8.08	8.32	8.43	8.62	8.34	8.36	8.36
Specific Conductance	micro-mho/cm	503	532	591	636	623	703	726	374	423	510	560	618	687	730
Turbidity	NTU	0.86	0.96	1.30	0.93	0.85	1.2	1.3	0.81	0.61	0.63	0.54	0.52	0.69	0.57
Temperature	Degrees C	15.0	15.0	14.0	15	18	16	15.5	18.0	19.0	19.0	19	19	19	20
Bromide	mg/L					0.32	0.33	0.29					0.36	0.37	0.4
Percent State Project Water			100%	71%	100%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: MWD, 1995.

C—094793

Table 4.2-4
WATER QUALITY MEASUREMENTS OF TREATED WATER FROM CASTAIC LAKE

		JENSEN PLANT EFFLUENT						
	Measurement	*86/87*	*87/88*	*88/89*	*89/90*	*90/91*	*91/92*	*92/93*
Silica	mg/L	12.2	13.7	18.4	15.3	15.8	15.5	15.9
Calcium	mg/L	28	28	30	26	24	32	38
Magnesium	mg/L	14.0	14.5	14.5	16.5	16	17.5	18.5
Sodium	mg/L	50	56	67	76	74	81	78
Potassium	mg/L	3.0	3.1	4.0	3.7	3.7	3.8	3.6
Carbonate	mg/L	1	2	4	2	3	0	1
Bicarbonate	mg/L	100	102	120	102	98	113	120
Sulfate	mg/L	61	59	57	52	50	76	105
Chloride	mg/L	63	73	85	111	108	108	94
Nitrate	mg/L	1.85	2.40	1.55	2.45	2.4	2.32	2.35
Fluoride	mg/L	0.19	0.16	0.27	0.11	0.11	0.17	0.25
Boron	mg/L	0.24	0.18	0.37	0.21	0.26	0.26	0.31
Total Dissolved Solids	mg/L	285	303	340	355	346	392	417
Total Hardness as $CaCO_3$	mg/L	128	129	135	132	126	151	172
Total Alkalinity as $CaCO_3$	mg/L	85	87	105	87	85	93	100
Free Carbon Dioxide	mg/L	0.9	0.8	0.9	0.8	0.7	1.3	1.3
H+ Concentration	pH	8.32	8.34	8.36	8.36	8.4	8.18	8.18
Specific Conductance	micro-mho/cm	509	543	603	645	633	712	739
Color Units	CU				3	3	3	3
Effluent Turbidity	NTU				0.11	0.11	0.1	0.08
Turbidity	NTU	0.12	0.10	0.11	0.11	0.11	0.1	0.08
Temperature	Degrees C	15.0	15.0	14.0	15	18	16	15.5
Bromide	mg/L							
Total Trihalomethanes	micrograms/L					73	76	68
Percent State Project Water			100	71	100	99	100	100

Note: The source of water for the Jensen Plant is Castaic Lake.
Source: MWD, 1995.

Total Dissolved Solids (TDS). The average TDS value in 1993 for SWP water measured at the Joseph Jensen Filtration Plant influent was 410 mg/l. This is the highest TDS level since MWD has measured TDS. The elevated TDS level is caused by increased salinity from seawater intrusion into the Bay/Delta and by past drought conditions (MWD Annual Report 1993).

Mineral, Physical and Trace Constituents. In October 1992 and April 1993, source waters and plant effluents were analyzed and all primary and secondary standards for metals and inorganic constituents were complied with (MWD Annual Report 1993).

Trace Organics. In 1993, no pesticide and herbicide chemicals, volatile organic compounds or semi-volatile organic compounds were detected in state project water samples. Methylene-blue active substance (MBAS) concentrations were less than 0.05 mg/l (MCL 0.5 mg/l) (MWD Annual Report 1993).

Trihalomethanes and other Disinfectant By-Products (DBPs). It is anticipated that a more stringent D/DBP Rule will require all systems to comply with MCLs of 80 microgram/liter for total tri-halomethanes (TTHMs) and 60 micrograms per liter for five haloacetic acid HAA species (HAA5) (MWD Annual Report 1993).

A study to evaluate the impact of bromide and Total Organic Carbon (TOC) in the Bay/Delta on DBP formation in ozonated or chlorinated water was completed. Refined THM predictive equations were developed and used to evaluate MWD's ability to meet the current TTHM rule of 0.10 mg/L, as well as future (lower) levels (MWD Annual Report 1993).

Taste and Odor. For the second year, in 1993, high concentrations of 2-methylisoborneol (MIB), which is associated with taste and odor problems, were found in the East Branch of the California Aqueduct (summer of 1992 until the spring of 1993). The California Department of Water Resources treated the water with copper sulfate. This taste and odor problem marked a departure from historical water quality trends in this branch (MWD Annual Report 1993).

Coliforms. The bacteriological quality of MWD's treated water remains excellent. In 1993, the monthly percentages of samples testing positive ranged from 0 to 0.54, and only one sample tested positive for E. coli, well below the Total Coliform Rule (TCR) requirements. (TCR requires that no more than five percent of the distribution samples be positive for coliform and that no two consecutive samples test positive for total coliforms, if one of the two has also tested positive for fecal coliforms or E. coli.) (MWD Annual Report 1993).

Pathogens. Tests were performed in 1991-92 for pathogens in source and finished waters for protozoans *Giardia* and *Cryptosporidium*, enteric viruses and the Legionnella bacterium. Source and finished water levels for *Giardia* were 0.05 and <1 cysts/100 liters, respectively. Source and finished water levels for *Cryptosporidium* were 0.2 and 0.01 oocysts/100 liters, respectively. Source and finished water *Giardia* and *Cryptosporidium* levels in MWD's system are considerably lower than that reported in other parts of the United States (MWD Annual Report 1993).

ENVIRONMENTAL CONSEQUENCES

Over the more than 20 years that the reservoirs have operated, there has been a wide range in storage volumes and corresponding surface elevations. It is not expected that the variation in the water quality of the reservoirs will be significantly altered by the implementation of the Proposed Action scenarios alone. There is sufficient flexibility in the operational parameters to make adjustments in order to improve quality, if required.

Water quality with regard to recreational activities will not change as a result of the Proposed Action.

In recent years, Lake Perris has had taste and odor problems that have generally restricted the use of Lake Perris to primarily emergency water supply. With appropriate timing, increased use of Lake Perris and increased cycling of the surface elevation of the reservoir may improve the water quality slightly with regard to TDS. For this reason, from a water quality perspective, Scenarios B and C with their larger changes in elevation and throughput may be marginally better than Scenario A.

Castaic Lake has also had taste and odor problems during certain periods. As with Lake Perris, only minor changes in water quality are expected with the Proposed Action. For the same reasons given above, Scenarios B and C may be slightly preferable to Scenario A.

NO PROJECT ALTERNATIVE

Under the No Project Alternative, prevailing conditions are expected to continue. No adverse impacts are anticipated.

MITIGATION MEASURES

No mitigation measures are required.

4.3 AIR QUALITY

4.3.1 Affected Environment

KERN FAN ELEMENT

The climate of the project area is Mediterranean, with dry, hot summers and moist, cool winters. The average monthly temperatures range in Bakersfield from 48 degrees Fahrenheit (F°) in January to 84 F° in July. Summers are generally cloud-free while radiation fogs are frequent in the winter. The average annual precipitation is approximately 6 inches. In contrast, the annual evaporation is approximately 65 inches.

Air quality in the Bakersfield area (where KFE is located) is unhealthful. The region has been designated as non-attainment of the state and federal air quality standards for ozone and particulate matter less than 10 microns in diameter. The San Joaquin Valley Unified Air Pollution Control District has regulatory responsibility for the control of air emissions and maintenance of air quality (Cal-EPA 1994).

CASTAIC LAKE

The climate of the project area is Mediterranean, with dry, hot summers and moist, cool winters. Summers are generally cloud-free while radiation fogs are frequent in the winter.

Air quality in the Santa Clara River drainage area of Los Angeles County (of which Castaic Lake is a part) is unhealthful. As part of the greater Los Angeles basin, the region has been designated as non-attainment of the state and federal air quality standards for ozone, carbon monoxide and nitrogen dioxide and particulate matter less than 10 microns in diameter. The expected peak ozone concentration at the nearest ambient air monitoring site (Santa Clarita) is 22.9 parts per hundred million (pphm). The South Coast Air Quality Management District has prepared a management plan to control air emissions and maintain air quality (Cal-EPA 1994).

LAKE PERRIS

The climate of the project area is Mediterranean, with dry, hot summers and moist, cool winters. Summers are generally cloud-free. Occasional storms are associated with frontal passages of Pacific storms in the winter.

Air quality in the Riverside area (of which Lake Perris is a part) is unhealthful. The

C—094796

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region (the greater Los Angeles basin) has been designated as non-attainment of the state and federal air quality standards for ozone, nitrogen dioxide and particulate matter less than 10 microns in diameter. The region is also designated in non-attainment of the federal carbon monoxide standard. The expected peak ozone concentration at Lake Perris is 19.8 pphm. The South Coast Air Quality Management District has prepared a management plan to control air emissions and maintain air quality (Cal-EPA 1994).

4.3.2 Environmental Consequences

PROPOSED ACTION

Kern Fan Element

Although unlikely, in all cases new spreading basins could add a small increment of water vapor to the naturally occurring fog. Additional fog, if any, would be expected to be within the long-term historic levels and would not be considered a significant impact on air quality. In any event, this would be difficult if not impossible to measure.

Combustive emissions from heavy equipment would result from the construction of spreading basins in the KFE. These emissions would be non-recurring and would be approximately equal to the emissions normally associated with agricultural activities on similar sized parcels over a similar period. Ground disturbance would also produce particulate matter, which would be suspended during active soil disturbance and could be resuspended during periods of high wind. The temporary construction activities would occur once (except for occasional operational and maintenance grading) as contrasted with on-going agricultural grading (which would be long term). Over the long-term, the presence of recharge activities would tend to reduce dust levels.

Combustive and fugitive emissions would be largest under Scenario C and smallest under Scenario A. Detailed, quantitative analysis of these emissions is not possible at this time since project-specific plans are not developed. Once the feasibility analysis and other plans for water spreading and groundwater recharge activities are sufficiently mature to allow efficient analysis, future CEQA analyses will be initiated and quantitative emissions analysis will be developed.

Castaic Lake

Implementation of the Monterey Agree-ment under all scenarios would not be expected to result in changes to the local or regional air quality.

Lake Perris

Implementation of the Monterey Agree-ment under all scenarios would not be expected to result in changes to the local or regional air quality.

NO PROJECT ALTERNATIVE

Kern Fan Element

Since the spreading basins could be developed by DWR, or other agencies, if the Monterey Agreement was not implemented, air quality impacts described above could occur under the No Project Alternative.

Castaic Lake

Continued operation of Castaic Lake would not be expected to adversely affect local or regional air quality.

Lake Perris

Continued operation of Lake Perris would not be expected to adversely affect local or regional air quality.

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4.3.3 Mitigation Measures

KERN FAN ELEMENT

No specific mitigation measures are currently required. Particulate matter released from disturbed areas could be reduced by spraying these areas with water. Frequently disturbed areas (dirt roads) could be treated with a dust palliative or hard surfacing to reduce long-term particulate emissions.

Use of heavy construction equipment could be optimized to reduce the potential for the production of ozone-forming emissions.

Project-specific emission control or reduction measures would be evaluated, as appropriate, during any future project-specific CEQA review.

CASTAIC LAKE

No mitigations are required.

LAKE PERRIS

No mitigations are required.

4.4 BIOLOGICAL RESOURCES

4.4.1 Affected Environment

KERN FAN ELEMENT

As a highly productive agricultural area, most of the southern San Joaquin Valley has been converted from its natural state to agriculture. This conversion of large areas of native habitat has greatly reduced populations of specific plant and wildlife species in the valley. Gradually over the years following the purchase of the land by DWR many of the KFE property agricultural fields have been fallowed, allowing recolonization by selected San Joaquin Valley sensitive species such as the San Joaquin kit fox, Tipton kangaroo rat, and blunt-nosed leopard lizard.

Biological surveys were conducted on the KFE property by California Department of Fish and Game (CDFG) biologists under contract to DWR from June 1990 to June 1991. The Administrative Draft version of the Habitat Conservation Plan (Jean Hopkins and Associates 1994) provides an account of survey methodology, habitat description, and species accounts obtained from these surveys. This information, supplemented by additional biological information provided in the *First Stage Kern Fan Element Draft Supplemental EIR* (DWR 1990) and a recent field visit, is summarized in the following description. The documents are incorporated by reference into this EIR for general information purposes only.

Vegetation

Most of the vegetation on the KFE property has been extensively modified by prior agricultural development. The property currently supports non-native grassland dominated by introduced annual grasses and native and introduced annual forbs (wildflowers). Characteristic species of this plant community include red brome (*Bromus rubens*), soft chess (*Bromus mollis*), ripgut brome (*Bromus diandrus*), foxtail (*Hordeum leporinum*), wild oats (*Avena* spp.), Italian ryegrass (*Lolium multiflorum*), filaree (*Erodium* spp.), bur-clover (*Medicago polymorpha*), fiddleneck (*Amsinkia* sp.), and lupine (*Lupinus* sp.). Very few perennial species are present in this habitat type.

Five additional natural plant communities have been identified on the property and cover a total of about 1,500 acres. These communities include valley saltbush scrub, valley sacaton grassland, mulefat scrub, great valley mesquite scrub, and great valley cottonwood riparian forest. These habitats are sparsely distributed on the property with the riparian communities occurring mainly along the Kern River. Valley saltbush scrub occurs on non-alkaline, sandy soils in the southwestern San Joaquin Valley.

Characteristic plant species include valley saltbush (*Atriplex polycarpa*), spiny saltbush (*Atriplex spinifera*), pale-leaf golden bush (*Isocoma acradenia*), birds-eye gilia (*Gilia tricolor*), red brome, goldfields (*Lasthenia* spp.), and several species in the goosefoot family (*Chenopodiaceae*). Within the KFE property, valley saltbush scrub occurs in small patches in areas of oil development and along the north side of the Kern River in association with mesquite scrub.

Valley sacaton grassland is a native grassland community dominated by the bunchgrass alkali sacaton (*Sporobolus airoides*). Sites supporting this community are usually poorly drained and have alkaline soils. Often these areas are flooded during winter and spring rains. This habitat is very rare within the project area and was only found during the CDFG surveys in a small patch in the western portion of the site.

Mulefat scrub and great valley cottonwood riparian forest are the plant communities that occur along the river channel and floodplain of the Kern River. Mulefat scrub is a successional riparian community that is maintained by periodic flooding. Characteristic species include mulefat (*Baccharis salicifolia*), stinging nettle (*Urtica holosericea*), and willow (*Salix* spp.). In the absence of frequent flooding, most stands of mulefat scrub are replaced by willow scrub or cottonwood riparian forest. Historically, great valley cottonwood riparian forest was the dominant plant community along the Kern River channel and floodplain. Dominant trees in this community include Fremont cottonwood (*Populus fremontii*), and valley willow (*Salix gooddingii*). Within the KFE property, the hydrology of the Kern River has been drastically altered by agricultural water development and flood control so that the riparian community has been reduced to scattered, degraded remnant stands. The largest area supporting this habitat occurs in the northeast portion of the site within the existing City of Bakersfield Recharge Area.

Great valley mesquite scrub is an open shrub community that is characterized by mesquite (*Proposis glandulosa*). Within the project area, this community is very similar to valley saltbush scrub and non-native grassland but with the addition of mesquite. The density of mesquite shrubs on the property is very low. The southern parcel of the Rosedale-Rio Bravo property supports active irrigated cropland and does not support habitat for sensitive species.

Wildlife

The wildlife surveys conducted by CDFG focused on identifying the presence and distribution of sensitive species on the property. In the process of conducting surveys for the federally and state listed as endangered blunt-nosed leopard lizard, Tipton kangaroo rat, and San Joaquin kit fox, common species were also recorded when they were observed and a comprehensive list was compiled (Table 4.4-1). The reptile surveys identified seven common reptile species in addition to the blunt-nosed leopard lizard.

Mammals were inventoried by trapping, conducting night spotlighting surveys, setting up scent stations and track pads, and walking transects to record wildlife sign. The spotlighting surveys revealed 12 species of mammals, including 14 sightings of San Joaquin kit foxes and one sighting of an American badger (California species of special concern). Scent stations and track pads recorded tracks of kit foxes, coyotes, badgers, striped skunks, rabbits, rodents, and birds. Of the 428 scent stations placed on the KFE property, 135 registered San Joaquin kit fox activity. Small mammal live trapping was conducted to sample the rodent population on the property. Four species of rodents were identified including the Tipton kangaroo rat (22 captures).

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Table 4.4-1
CHARACTERISTIC WILDLIFE SPECIES OF THE KERN FAN ELEMENT PROPERTY
(page 1 of 2)

Reptiles and Amphibians	
Gilbert's skink	*Eumeces gilberti*
Side-blotched lizard	*Uta stansburiana*
Western fence lizard	*Sceloporus occidentalis*
Coast horned lizard	*Phrynosoma coronatum*
Western whiptail lizard	*Cnemidophorus tigris*
Blunt-nosed leopard lizard	*Croraphytus wislizenii silus*
Pacific gopher snake	*Pituphis melanoleucus satenifer*
Common kingsnake	*Lampropeltis getulus*
Birds	
Pied-billed grebe	*Podilymbus podicops*
Western grebe	*Aechmophorus occidentalis*
Great blue heron	*Ardea herodias*
Great egret	*Casmerodius albus*
Snowy egret	*Egretta thula*
Green-backed heron	*Butorides striatus*
Cinnamon teal	*Anas cyanoptera*
Turkey vulture	*Carthartes aura*
Black-shouldered kite	*Elanus caeruleus*
Northern harrier	*Circus cyaneus*
Red-shouldered hawk	*Buteo lineatus*
Swainson's hawk	*Buteo swainsoni*
Red-tailed hawk	*Buteo jamaicensis*
Rough-legged hawk	*Buteo lagopus*
American kestrel	*Falco sparverius*
Ring-necked pheasant	*Phasianus colchicus*
California quail	*Callipepla californica*
American coot	*Fulica americana*
Killdeer	*Charadrius vociferus*
Black-necked stilt	*Himantopus mexicanus*
Long-billed curlew	*Numerinus americanus*
Western sandpiper	*Calidris mauri*
California gull	*Larus californicus*
Mourning dove	*Zenaida macroura*
Common barn owl	*Tyto alba*
Greater roadrunner	*Geococcyx californianus*
Great horned owl	*Bubo virginianus*
Burrowing owl	*Athene cunicularia*
Anna's hummingbird	*Calypte anna*
Northern flicker	*Colaptes auratus*
Black phoebe	*Sayornis nigricans*
Cassin's kingbird	*Tyrannus vociferans*
Western kingbird	*Tyrannus verticalis*

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Table 4.4-1
CHARACTERISTIC WILDLIFE SPECIES OF THE KERN FAN ELEMENT PROPERTY
(page 2 of 2)

Cliff swallow	*Hirundo pyrrhonota*
Common raven	*Corvus corax*
American robin	*Turdus migratorius*
Northern mockingbird	*Mimus polyglottos*
California thrasher	*Toxostoma redivivum*
Loggerhead shrike	*Lanius ludovicianus*
Yellow-rumped warbler	*Dendroica coronata*
White-crowned sparrow	*Zonotrichia leucophrys*
Red-winged blackbird	*Agelaius phoeniceus*
Western meadowlark	*Sturnella neglecta*
Northern oriole	*Icterus galbula*
House finch	*Carpodacus mexicanus*
American goldfinch	*Cardeulis tristis*
House sparrow	*Passer domesticus*
Mammals	
Virginia opposum	*Didelphis virginiana*
Desert cottontail	*Syvilagus audubonii*
Black-tailed jackrabbit	*Lepus californicus*
San Joaquin antelope squirrel	*Ammospermophillus nelsoni*
California ground squirrel	*Spermophilus beecheyi*
Heerman's kangaroo rat	*Dipodomys heermanni*
Tipton's kangaroo rat	*Dipodomys nitratoides*
Deer mouse	*Peromyscus maniculatus*
Black rat	*Rattus rattus*
Coyote	*Canis latrans*
San Joaquin kit fox	*Vulpes macrotis mutica*
Raccoon	*Procyon lotor*
Badger	*Taxidea taxus*
Striped skunk	*Mephitis mephitis*
Bobcat	*Lynx rufus*

Source: DWR, 1990.

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Bird surveys resulted in identifying 48 species of birds including four sensitive species (burrowing owl, Swainson's hawk, white-tailed kite, and northern harrier). Most of the species were observed in association with the wetland and riparian habitats along the Kern River.

Protected Species and Habitat

Special status species considered in this section include those formally listed or proposed by federal or state governments as endangered, threatened, or rare, and those under review as candidates for listing as threatened or endangered. These species have varying degrees of legal protection under both federal and California Endangered Species Acts (ESA and CESA), and recognition under California Environmental Quality Act (CEQA). The U.S. Fish and Wildlife Service (USFWS) and CDFG share responsibility for management and protection of sensitive biological resources. Under separate state and federal legislation, each agency conducts a detailed review of any project that could affect a special status plant or animal species. If a listed species may be affected, the lead agency must initiate a formal consultation with the USFWS and/or CDFG, as applicable, under federal or state law.

There is a large number of special status species of plants and animals that either occur or may occur on the KFE property. A comprehensive list of these species and their habitats and distribution within the project area is provided in tables 4.4-2 and 4.4-3, respectively. A brief description of state and/or federally listed as threatened or endangered species that are expected to be impacted by this project is provided here. Of the sensitive plant species known from the project area, only the Hoover's eriastrum (*Eriastrum hooveri*) and San Joaquin woolly threads (*Lembertia congdonii*), which are federally listed as endangered, have been identified on the property during the CDFG 1990-1991 surveys. Both of these species are small annual forbs that are found in valley grassland habitats where annual grass cover is relatively sparse. The Hoover's eriastrum was observed on approximately 620 acres and the San Joaquin woolly threads was found on approximately 160 acres. See Figure 4.4-1 for the distribution of these species on the KFE property.

Federally listed and/or state listed wildlife species that were identified on the property include blunt-nosed leopard lizard (federally and state listed as endangered), Tipton kangaroo rat (federally and state listed as endangered), San Joaquin kit fox (federally listed as endangered and state listed as threatened), and San Joaquin antelope squirrel (federal candidate 1 for listing and state listed as threatened). Figure 4.4-2 shows the distribution of these species on the project site as recorded from the CDFG surveys of 1991-1992. It should be noted that, since these surveys, additional agricultural land on the property was turned fallow. It is expected that the ranges of these sensitive wildlife species have expanded into these new habitat areas since the last surveys.

Blunt-nosed leopard lizards were historically distributed throughout the San Joaquin Valley and adjacent foothills and plains, but the conversion of native habitats to agriculture has greatly reduced their range. They prefer open habitats and wash systems with relatively level topography (O'Farrell et al. 1981). The lizards are active during the day usually between the months of April and October. They winter underground in rodent burrows. Within the KFE project area, the CDFG surveys identified blunt-nosed leopard lizards on approximately 720 acres.

The Tipton kangaroo rat is a subspecies of the San Joaquin kangaroo rat. The historic range of the Tipton kangaroo rat extended over the Tulare Lake Basin south to the northern edge of Bakersfield. Preferred habitat includes alkaline sink community and saltbush

Table 4.4-2
SENSITIVE PLANTS POTENTIALLY OCCURRING ON THE KERN FAN ELEMENT PROPERTY
(page 1 of 2)

Species	*Status Fed/State/CNPS*	*Habitat*	*Distribution in the Project Region*
Atriplex tularensis Bakersfield saltbush	C1/E/1B	Alkali sink scrub with high groundwater table for moisture in the summer months. Flowers: June-October	Six known historic occurrences in the Tulare Plai, south of Bakersfield. None observed in the project area.
Caulanthus californicus California jewelflower	E/E/1B	Non-alkaline to slightly alkaline sandy loam soils of relatively undisturbed grassland communities. Flowers February-May	Historically found in Fresno, Kings, Kern, Santa Barbara, San Luis Obispo, and Tulare counties. None observed within the project area.
Cordylanthus mollis ssp. *hispidus* Hispid bird's beak	E/E/1B	Alkali meadows of the Central Valley Flowers: June-September	Only known occurrence in Kern County is at the Kern Lake Preserve. None observed in the project area.
Eremalche parryi ssp. *kernensis* Kern mallow	E/--/1B	Dry open clay flats between 600 and 900 feet above mean sea level in saltbush scrub vegetation. Flowers: March-April	Found in the southwestern portion of the lower San Joaquin Valley referred to as the Belridge Plain. None observed in the project area.
Eriastrum hooveri Hoover's eriastrum	T/--/1B	Valley grassland with scattered saltbush, usually in areas where annual grass cover is sparse. Flowers: April-May	Known to occur from Fresno County to Kern County. Could potentially occur in the project area.
Lembertia congdonii San Joaquin wooly threads	E/--/1B	Valley grassland with silty sand or sandy loam soils at elevations ranging from 400 to 1,200 feet. Flowers: February-March	Could potentially occur in the project area.
Opuntia basilaris var. *treleasei* Bakersfield cactus	E/E/1B	Arid grasslands on low hills adjacent to valley flatlands, on mesas, and along dry river and stream beds. Flowers: May	Endemic to Kern County, mainly south and southeast of Bakersfield below the 1,000 foot elevation. None observed in the project area.
Atriplex cordulata Heart-leaved saltbush	C2/--/1B	Chenopod scrub and alkali playas. Flowers: May-October	None observed in the project area.
Atriplex depressa Valley brittlescale	C2/--/1B	Alkali playas. Flowers: May-October	

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Table 4.4-2
SENSITIVE PLANTS POTENTIALLY OCCURRING ON THE KERN FAN ELEMENT PROPERTY
(page 2 of 2)

Species	*Status Fed/State/CNPS*	*Habitat*	*Distribution in the Project Region*
Atriplex miniscula Lesser saltscale	C2/--/1B	Akali playas. Flowers: May-October	Known from fewer than five extant occurrences. None observed in the project area.
Atriplex vallicola Lost Hills saltbush	C2/--/1B	Alkali sink scrub vegetation on fringes of bare areas with high alkaline soils. Flowers: June-August	Not expected to occur in the project area.
Cirsium crassicaule Slough thistle	C2/--/1B	Low lying, seasonally to permanently wet habitats on the valley floor. Flowers: June-July	Sloughs and canals in various locations; San Joaquin and Kern counties. Could potentially occur in suitable habitat in the project area.
Delphinium recurvatum Recurved larkspur	C2/--/1B	Shrubby or grassland habitats with sub-alkaline soils. Flowers: March-May	Western Central Valley from Contra Costa to Kern counties. Could potentially occur in the project area.
Layia leucopappa Comanche Point layia	C2/--/1B	Chenopod scrub and grasslands on whitish clay soils. Flowers: May-April	Endemic to Kern County. Not expected to occur in the project area.

Notes: Federal Status (determined by U.S. Fish and Wildlife Service):

E - In danger of extinction throughout all or a significant portion of its range.

T - Listed as threatened by USFWS.

C1 - USFWS has sufficient biological information to support a proposal to list as endangered or threatened.

C2 - Information indicates that proposing to list these species is possibly appropriate, though more data on vulnerability and threat is necessary.

State Status:

E - Listed as endangered by the State of California.

CSC - California Department of Fish and Game "Species of Special Concern".

CNPS List 1B - California Native Plant Society List 1B (plants considered rare or endangered in California, eligible for state listing)

CNPS List 4 ; plants of limited distribution (a watch list)

Source: Jean Hopkins and Associates, 1994; Skinner and Pavlic, 1994.

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Table 4.4-3

SENSITIVE WILDLIFE SPECIES POTENTIALLY OCCURRING ON THE KERN FAN ELEMENT PROPERTY

(page 1 of 3)

Species	*Status Fed/State*	*Habitat*	*Distribution in the Project Region**
State and Federally Listed as Threatened or Endangered			
Invertebrates			
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T/CSC	Elderberry trees and bushes; feeds on leaves and flowers.	None observed and suitable habitat not present in project area.
Reptiles			
Blunt-nosed leopard lizard *Gambelia silus*	E/E	Occurs on sparsely vegetated planes, lower canyon slopes, or valley floors and in washes.	Historically distributed over the San Joaquin Valley and adjacent lower foothills. Could potentially occur in the project area.
Birds			
Swainson's hawk *Buteo swainsonii*	--/T	Nests mostly within riparian areas of the Central Valley. Forages in open fields and pastures.	None observed within the project area.
Mammals			
Giant kangaroo rat *Dipodomys ingens*	E/E	Sparsely vegetated grasslands characterized by good drainage, fine sandy loam soils, and a slope of less than 10 percent.	Originally occurred throughout the San Joaquin Valley; now found only in small, scattered colonies. Not seen during surveys in the project area.
Tipton kangaroo rat *Dipodomys nitratoides nitratoides*	E/E	Alkali sink and saltbush scrub communities.	Historically occurred over the Tulare Lake Basin portion of the San Joaquin Valley. Existing habitats are comprised of small, widely scattered parcels separated by extensive agricultural fields. May occur on fallow agricultural land within the project area.
San Joaquin kit fox *Vulpes macrotis mutica*	E/E	Occurs in a variety of natural habitats in the central valley with fairly loose soils where it can excavate burrows.	Historically distributed over a large portion of central California. Suitable habitat occurs within the project area.

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Table 4.4-3

SENSITIVE WILDLIFE SPECIES POTENTIALLY OCCURRING ON THE KERN FAN ELEMENT PROPERTY

(page 2 of 3)

Species	*Status Fed/State*	*Habitat*	*Distribution in the Project Region**
San Joaquin antelope squirrel *Ammospermophilus nelsoni*	C1/T	Occurs in a variety of habitats with loamy soils and widely to moderately spaced shrubs.	Occurs in the Tulare Lake Basin and adjacent valleys to the west. Known to occur within the project area.
Other Sensitive Species			
Amphibians			
Western spadefoot toad *Scaphiopus hammondi hammondi*	—/CSC	Breeds in pools, slow streams, reservoirs, or irrigation ditches.	Has been observed in undisturbed areas within the project area.
Reptiles			
Southwestern pond turtle *Clemmys marmorata pallida*	C2/CSC	Streams, rivers, ponds, lakes, and marshes.	Has been observed along the north side of the Kern River within the project area.
Birds			
Tricolored blackbird *Agelaius tricolor*	C2/CSC	Requires dense marsh vegetation for breeding; mostly associated with large marshes but may be found in small patches of marsh vegetation along canals and irrigation reservoirs.	Nesting birds not observed within the project area.
Ferruginous hawk *Buteo regalis*	C2/CSC	Inhabits open areas like plains or prairies; rest mostly in trees or cliffs.	Occurs in California only as a winter visitor. Foraging birds may occur within the project area. None observed during surveys.
Western snowy plover *Charadrius alexandrinus nivosus*	T/CSC	Breeding habitat consists of barren to sparsely vegetated shores of saline and alkaline lakes and agricultural evaporation ponds.	Occurs near Bakersfield in suitable habitat. None observed within the project area.
Mountain plover *Charadrius montanus*	C2/CSC	Favors arid, sparsely vegetated grasslands, alkali flats, sprouting grain fields, grazed pastures, fallow agricultural land, and freshly plowed fields.	Occurs in appropriate habitat in the Tulare Valley. Not expected to occur within the project area.
Loggerhead shrike *Lanius ludovicianus*	--/CSC	Open areas such as savannas and deserts where bushes, small trees, and other perch sites are available.	Resident over much of California. None observed within the project area.

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Table 4.4-3

SENSITIVE WILDLIFE SPECIES POTENTIALLY OCCURRING ON THE KERN FAN ELEMENT PROPERTY

(page 3 of 3)

Species	*Status Fed/State*	*Habitat*	*Distribution in the Project Region**
Mammals			
Greater western mastiff bat *Eumops perotis californicus*	C2/CSC	Open arid areas with high cliffs. Roosts in rock crevices.	Central California to central Mexico. No historical record and none observed within the project area.
Townsend's western big-eared bat *Plecotis townsendii townsendii*	C2/CSC	Occurs in a variety of habitat types including coastal conifer and broad-leaved forests; oak and conifer woodlands; arid grasslands and deserts; and high-elevation forests and meadows. Most common in mesic sites. Roosts in limestone caves, lava tubes, mine tunnels, buildings, and other man-made structures.	Occurs throughout California. No historical record and none observed within the project area.
Buena Vista Lake shrew *Sorex ornatus relictus*	C1/CSC	Dense vegetation along streams and sloughs and around margins of tule marshes.	Occurs in the Tulare Lake Basin, although habitat has been greatly reduced. Not expected to occur within the project area.
American badger *Taxidea taxus*	---/CSC	Open grassland habitats.	Restricted to isolated and remote tracts of native grassland and shrubland habitats in lower San Joaquin Valley. Known to occur within the project area.

Notes: * Distribution in the project region based on June 1990-June 1991 surveys of the Kern Fan Element conducted by the California Department of Fish and Game.

Federal Status (determined by U.S. Fish and Wildlife Service):

E - In danger of extinction throughout all or a significant portion of its range.
T - Listed as threatened by USFWS.
C1 - USFWS has sufficient biological information to support a proposal to list as endangered or threatened.
C2 - Information indicates that proposing to list these species is possibly appropriate, though more data on vulnerability and threat is necessary.

State Status:

E - Listed as endangered by the State of California.
T - Listed as threatened by the State of California.
CSC - California Department of Fish and Game "Species of Special Concern."

Source: Jean Hopkins and Associates, Inc., 1994.

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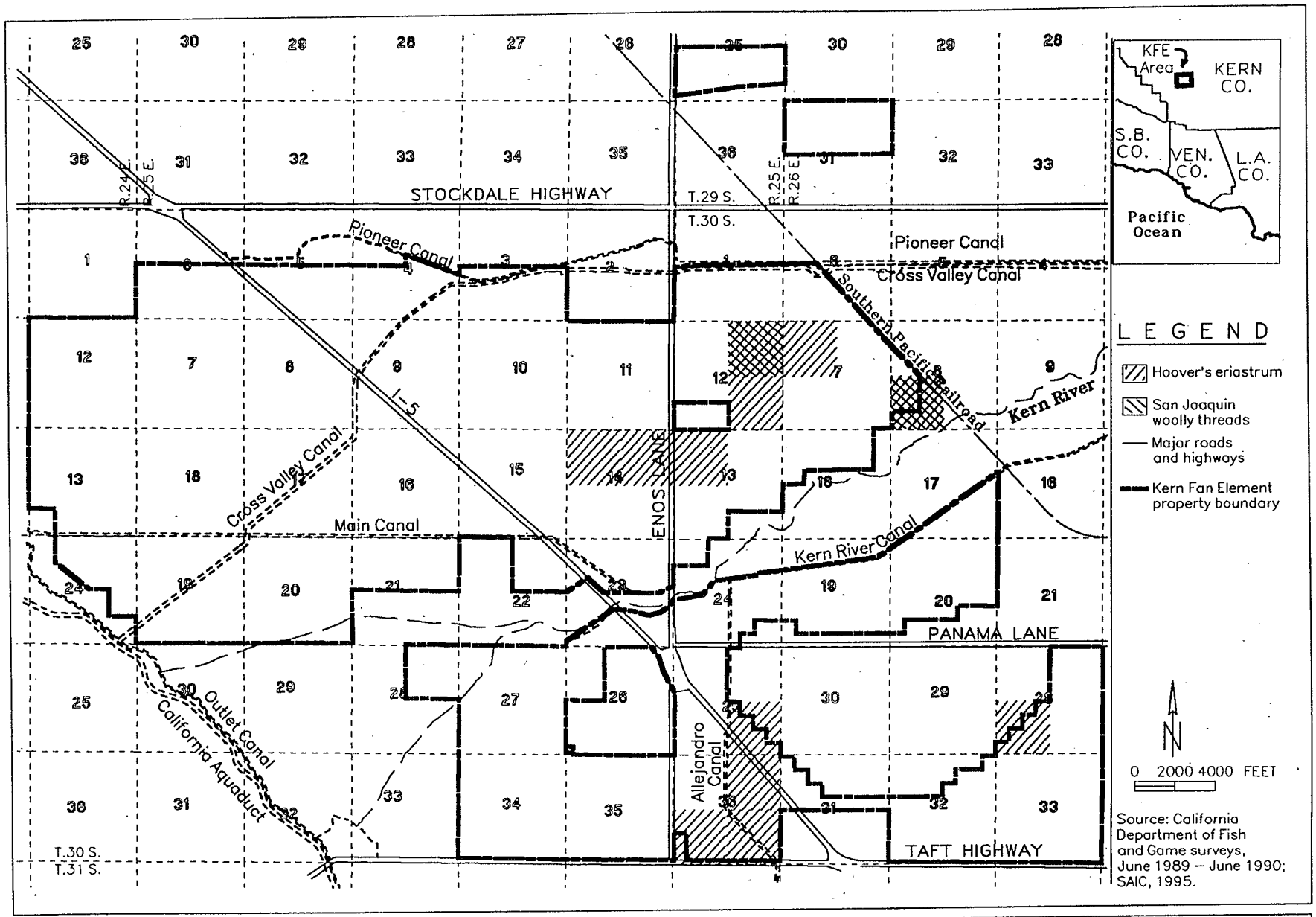

Figure 4.4-1

SENSITIVE PLANTS - KERN FAN ELEMENT PROPERTY

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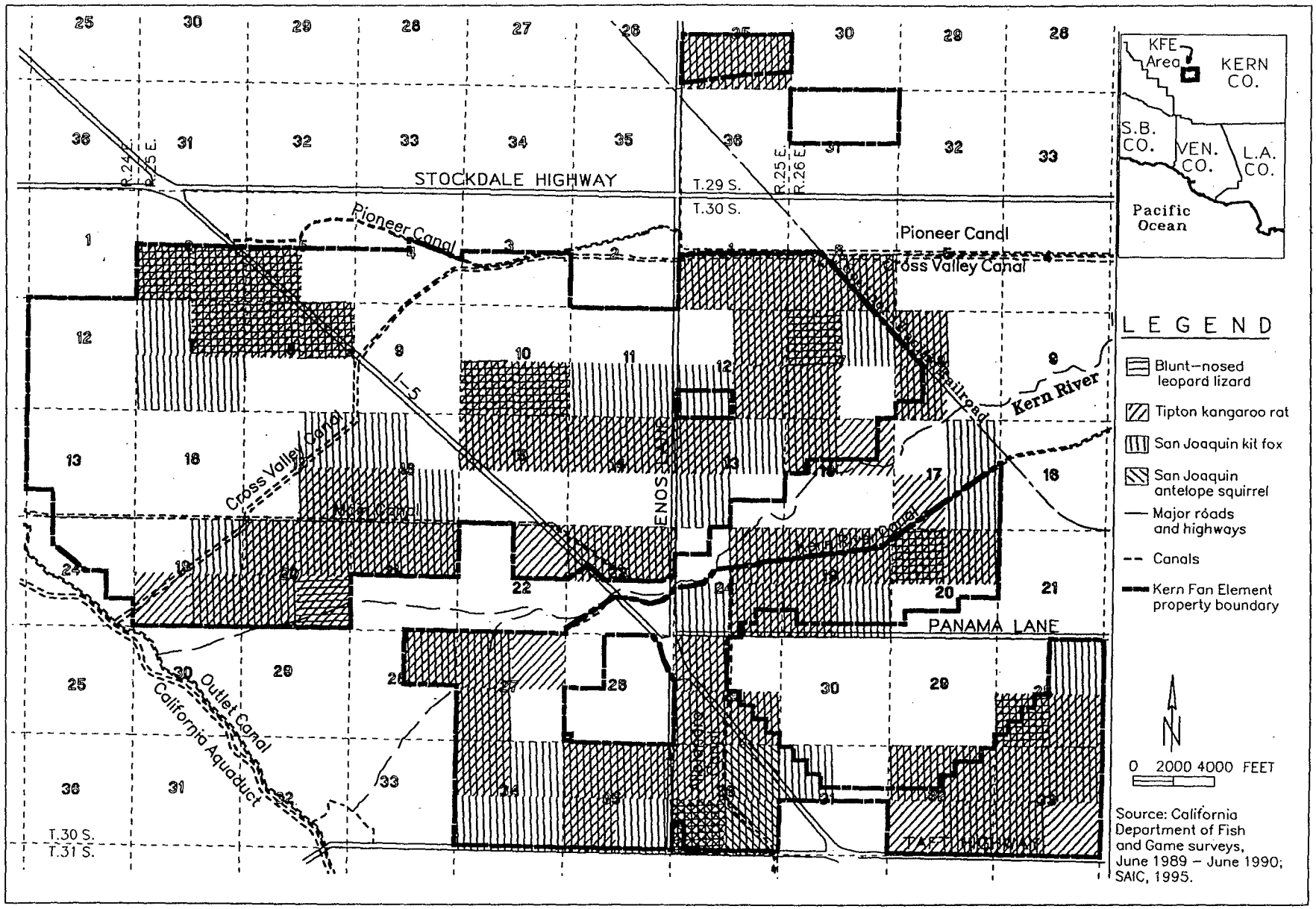

Figure 4.4-2

SENSITIVE WILDLIFE - KERN FAN ELEMENT PROPERTY

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shrublands. The kangaroo rats usually excavate their burrows on slightly elevated ground to reduce vulnerability to seasonal flooding. Tipton kangaroo rat burrows often are found on road berms, canal embankments, railroad beds, and the bases of shrubs and fences where windblown sand accumulates (Jean Hopkins & Associates 1994). During the CDFG surveys, Tipton kangaroo rats were observed on approximately 6,800 acres of land, much of which was fallow agricultural land that Tipton kangaroo rats recolonized.

The San Joaquin kit fox was historically distributed over a large portion of central California roughly from southeastern Contra Costa County to the southern San Joaquin Valley. Habitat conversion has been the primary cause of the population decline. The kit fox occurs in most natural habitats in the central valley with fairly loose soils where it can excavate burrows. The burrows of other animals such as California ground squirrels often are enlarged and used. Within the KFE, San Joaquin kit foxes may occur anywhere on the property. The CDFG surveys identified kit foxes on approximately 9,030 acres.

The San Joaquin antelope squirrel historically ranged along the western side of the San Joaquin Valley from southern Merced County south to Kern County, in addition to the Carrizo and Elkhorn plains and Cuyama Valley. Currently this species appears to be restricted to the western part of the San Joaquin Valley with significant populations still present only in the Elk Hills of western Kern County and on portions of the Carrizo and Elkhorn plains. San Joaquin antelope squirrels occur in a variety of habitats with loamy soils and widely to moderately spaced shrubs. They dig their burrows in friable soils in upland areas that are unlikely to flood. CDFG biologists identified them inhabiting approximately 460 acres of the KFE during the 1990-1991 surveys.

The northern parcel of the Rosedale-Rio Bravo property contains fallowed irrigated cropland that was last cropped in 1989 at the time of its purchase by DWR. This parcel has been surveyed and evidence of active burrows of both San Joaquin kit fox and Tipton kangaroo rat was found.

CASTAIC LAKE

Castaic Lake is a terminal water storage facility for the SWP located at the confluence of Castaic Creek and Elizabeth Lake Canyon Creek. Construction of the dam was completed in 1972 to provide for emergency storage of water, act as a regulatory storage facility during normal SWP operation, and provide for recreational activity (e.g., fishing and boating). The following discussion on biological resources will focus on habitats and species that are directly associated with the lake because these are the areas that would potentially be affected by implementation of this project.

Vegetation

Within Castaic Lake State Recreation Area, vegetation consists of dry upland scrub and chaparral communities on the steep slopes above the water and minimal shoreline and aquatic vegetation associated with the lake. Pine plantations have been established on some of the flatter topped hills around the lake. The steep banks along almost the entire perimeter of the lake and the fluctuating water levels prevent the establishment of shoreline vegetation. Only a few scattered willows and mulefat exist along the high water line in areas with more gradually sloping banks in both the east and west arms of the lake. The CDFG planted additional willows in scattered areas around the lake in 1990 to help create fish spawning habitat, but the plants were submerged when water levels rose and all the transplants died (Coash 1995).

The banks of Castaic Lagoon, which is located immediately below Castaic Dam, are less steep than the banks of the lake and the water levels of the lagoon are kept constant. This allows for the establishment of vegetation. The banks of the lagoon are vegetated by planted and maintained grasses, shrubs, and trees. The most common trees are planted pines and eucalyptus.

Wildlife

Wildlife associated with the Castaic Lake Recreation Area include both terrestrial and aquatic species. The arid hills around the lake support species adapted to the hot, dry conditions in southern California. Common wildlife include western fence lizard, side-blotched lizard, San Diego horned lizard, western rattlesnake, gopher snake, black-tailed jackrabbit, deer mouse, mule deer, coyote, and bobcat. Most of these species have little interaction with the immediate lake habitat. Species more directly associated with the lake include osprey, bald eagle, waterfowl, and fish. Osprey and bald eagles occasionally winter at the lake. They feed on the abundant fish population and perch on the steep rocky cliffs and trees above the water. Many species of migratory waterfowl such as ruddy duck, northern shoveler, northern pintail, and cinnamon teal stop over at the lake during the winter.

Castaic is an important recreational fishing lake that is known for its trophy-sized largemouth bass. Florida strain largemouth bass were stocked in the lake in the 1970s and have been successfully reproducing since (Sinnen and Curl 1992). The lake has trophy bass status with the CDFG and, therefore, receives specific management plans aimed at preserving and enhancing the Castaic bass fishery. Other warmwater game species occurring in the lake include striped bass, bluegill, crappie, and channel and white catfish. In addition, hatchery raised rainbow trout are stocked in the lake annually. Threadfin shad is the primary forage fish in the lake.

Protected Species and Habitats

Protected species include plants or animals that are listed, proposed, or under review (candidate) for listing under federal or state endangered species acts as well as species recognized as rare or of special concern by the California Native Plant Society (CNPS) or CDFG. Table 4.4-4 provides a comprehensive list of sensitive species known or expected to occur in the Castaic Lake Recreation Area and includes their habitat and distribution in the project area. The only known sensitive species that may be affected by implementation of this project are the bald eagle and osprey. Both of these birds may visit the lake during the winter to prey on fish. However, numbers are expected to be low due to the lack of perch sites and human presence. Wintering bald eagles have occasionally been observed at the lake and osprey are observed fairly frequently.

LAKE PERRIS

Lake Perris is a terminal water storage facility for the SWP, which provides for emergency storage of water, acts as a regulatory storage facility during normal SWP operation, and provides for recreational activity (e.g., fishing, boating, and swimming). The reservoir was built in a shallow canyon between the Bernasconi Hills and the Russell Mountains in northwestern Riverside County, and construction was completed in 1974. The maximum surface area of the lake is 2,318 acres and the maximum depth is 110 feet. A riprap-lined dam extends across the canyon and forms the western shore of the lake. The north shore is maintained for recreational uses and includes such facilities as swimming beaches, boat launch ramps, parking lots, and a marina. Willow riparian forest lines the northeastern and eastern perimeter of the lake. Alessandro Island in the northeast section of the lake supports coastal sage scrub vegetation

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Table 4.4-4

SENSITIVE PLANT AND ANIMAL SPECIES POTENTIALLY OCCURRING IN THE CASTAIC LAKE PROJECT AREA

(page 1 of 2)

Species	*Status Fed/State/CNPS*	*Habitat*	*Distribution in the Project Region*
Plants			
Nevin's barberry *Berberis (= Mahonia) nevinii*	C1/CE/1B	Chaparral, coastal scrub, cismontane woodland, riparian woodland; on shady or gravelly soils. Flower: March-April	May occur in appropriate upland habitat around Castaic Lake.
San Gabriel bedstraw *Galium grende*	C2/---/1B	Chaparral, cismontane woodlands, upland and lower montane forests. Flowers: June-July	May occur in appropriate upland habitat around the lake.
Wildlife			
California condor *Gymnogyps californianus*	FE/CE	Formerly inhabited the southern Coast Range from Monterey County to Los Angeles County. Nests on cliffs and forages on carrion. All known condors were taken from the wild in the 1980s. A release program is ongoing.	Several condors were released in the Sespe Wilderness in Ventura County in the early 1990s. A couple of condors frequented Castaic Lake and one was killed near the lake from electrocution on power lines. Recently attempts have been made to restrict released birds to Lion Canyon in Santa Barbara County.
Bald eagle *Haliaeetas leucocephalus*	FE/CE	Occurs along coasts, rivers, and large lakes. In Southern California, bald eagles are usually found wintering at lakes with ample fish populations and appropriate perch sites.	Possible winter visitor to Castaic Lake from November to March.
Osprey *Pandion haliatus*	—/CSC	Occurs along rivers, lakes, and coasts. Feeds solely on fish.	Expected to occur at Castaic Lake.
Golden eagle *Aquila chrysaetos*	—/CSC	Nests in rugged mountain areas, on cliffs, and occasionally in trees. Forages widely in a variety of habitats.	Expected to occasionally forage over the project area.

C-094812

C-094812

Table 4.4-4

SENSITIVE PLANT AND ANIMAL SPECIES POTENTIALLY OCCURRING IN THE CASTAIC LAKE PROJECT AREA

(page 2 of 2)

Species	*Status Fed/State/CNPS*	*Habitat*	*Distribution in the Project Region*
San Diego horned lizard *Phrynosoma coronatum blainvillii*	C2/CSC	Associated with sandy or gravelly substrates in a variety of habitats including coastal sage scrub and chaparral.	Expected to occur in the upland habitats around Castaic Lake.
Coastal western whiptail *Cnemidophorus tigris multiscutatus*	C2/CSC	Frequents arid/semiarid habitats with open areas for running, such as open chaparral, coastal sage scrub, riparian scrub, and grassland.	Expected to occur in habitats around Castaic Lake.
San Diego black-tailed jackrabbit *Lepus californicus bennettii*	C2/CSC	Perfers open scrub habitats such as coastal sage scrub, chaparral, and riparian scrub.	Occurs in upland habitats around the lake.
San Diego desert woodrat *Neotoma lepida intermedia*	C2/CSC	Inhabits rock outcrops in coastal sage scrub and chaparral habitats.	Expected to occur in suitable habitat around the lake.
Southern California rufous-crowned sparrow *Aimophila ruficeps ruficeps*	C2/CSC	Rocky chaparral, coastal sage scrub.	Potentially could occur in the coastal sage scrub habitat around the lake.
Bell's sage sparrow *Amphispiza belli belli*	C2/CSC	Chaparral, especially chamise.	Unlikely to occur in the upland habitats around the lake.

Notes: Federal Status (determined by U.S. Fish and Wildlife Service):
- E - In danger of extinction throughout all or a significant portion of its range.
- T - Listed as threatened by USFWS.
- C1 - USFWS has sufficient biological information to support a proposal to list as endangered or threatened.
- C2 - Information indicates that proposing to list these species is possibly appropriate, though more data on vulnerability and threat is necessary.

State Status:
- E - Listed as endangered by the State of California.
- T - Listed as threatened by the State of California.
- CSC - California Department of Fish and Game "Species of Special Concern."
- CNPS List 1B - California Native Plant Society List 1B (plants considered rare or endangered in California, eligible for state listing).

Source: Skinner and Pavlik, 1994.

C-094813

C—094813

and some planted trees. The hills around the lake are characterized by numerous rocky outcrops and predominantly support Riversidean coastal sage scrub vegetation. The following discussion on biological resources focuses on habitats and species that are directly associated with the lake because these are the areas that would potentially be affected by implementation of this project.

Vegetation

Within the Lake Perris Recreational Area, Riversidean coastal sage scrub occurs on the south-facing slopes of the Russell Mountains and on the steep, poorly drained soils of the Bernasconi Hills. This plant community has been identified by the CDFG as a rare natural community and is characterized by California sagebrush (*Artemisia californica*), brittlebush (*Encelia farinosa*), wild buckwheat (*Eriogonum fasciculatum*), foxtail chess (*Bromus rubens*), black sage (*Salvia mellifera*), and white sage (*S. apiana*). The dominant species of the Russell Mountains scrub community is brittlebush while the dominant species of the Bernasconi Hills is California sagebrush. Along the southern-most portion of the lake, the coastal sage scrub vegetation persists basically to the shoreline. Chaparral occurs in the shadier canyons of the Bernasconi Hills and is dominated by chamise (*Adenostoma fasciculatum*). Northeast of the lake, between the Russell Mountains and the Bernasconi Hills, is a grassland community that predominantly supports weedy annuals such as shortpod mustard (*Hirchfeldia incana*), wild oats (*Avena* sp.), barley (*Hordeum* sp.), Mediterranean grass (*Schismus barbatus*), and Russian thistle (*Salsola tragus*).

Along the shoreline, vegetation ranges from barren to dense riparian forest. The two-mile long Perris dam that forms the western shore is completely void of vegetation. The north side of the lake is well maintained for recreational purposes and supports minimal vegetation along the shoreline. Landscaping trees such as pepper trees, planted pines, eucalyptus, sycamore, and liquid amber have been planted near the shoreline amongst the parking lots and recreational facilities. The topography along the northeastern and eastern shoreline is more gradual then the rest of the lake and supports abundant willow growth that extends about 20 feet on both sides of the shoreline. Willow (*Salix* sp.) is the dominant species with an understory of mulefat (*Baccharis salicifolia*), and stinging nettles (*Urtica holosericea*). In most areas the willow stands are too dense to allow much understory development. The riparian habitat becomes sparse toward the southern end of the lake where the shoreline is steep and rocky.

Wildlife

Wildlife occurring within the Lake Perris Recreational Area includes species associated with the upland habitats around the lake, the shoreline riparian habitat, and the aquatic habitat in the lake. The arid rocky hills that form a horseshoe around Lake Perris support an assemblage of wildlife adapted to the dry, hot conditions of inland southern California. Lizards and snakes are plentiful and include several sensitive species such as orange-throated whiptail, San Diego horned lizard, and rosy boa. Mammals and birds are also quite numerous although the conditions restrict many species that require permanent water, more vegetative cover, and cooler temperatures. Characteristic wildlife species of the habitats around the lake are listed in Table 4.4-5.

The riparian zone along the eastern shore provides a contrasting habitat to the surrounding upland terrain. The dense shady trees provide shelter, food, and perch sites for a number of bird species, many of which are migrants through the area. Birds such as black-chinned hummingbird, Wilson's warbler, yellow warbler, warbling vireo, Pacific-slope flycatcher, and Hutton's vireo

Table 4.4-5

CHARACTERISTIC WILDLIFE SPECIES OF THE HABITATS OF THE LAKE PERRIS PROJECT AREA

(page 1 of 2)

Aquatic Habitat	
Fish	
Rainbow trout	*Salmo gairdnerii*
Channel catfish	*Ictalurus punctatus*
Alabama spotted bass	*Micropterus punctulatus*
Green sunfish	*Lepomis cyanellus*
Southeastern bluegill	*Lepomis macrochirus*
Large-mouth bass	*Micropterus salmonoides*
Threadfin shad	*Dorosoma petenense*
Mississippi silverside	*Menidia audens*
Brown bullhead	*Ictalurus nebulosis*
Sculpin	*Cottus* sp.
Golden shiner	*Notemigonus chrysoleucas*
Birds	
Western grebe	*Aechmophorus occidentalis*
Eared grebe	*Podiceps caspicus*
Double-crested cormorant	*Phalacrocorax auritus*
Canada goose	*Branta canadensis*
Mallard	*Anas platyrhynchos*
Pintail	*Anas acuta*
American wigeon	*Mareca americana*
Northern shoveler	*Spatula clypeata*
Cinnamon teal	*Anas cyanoptera*
Green-winged teal	*Anas carolinensis*
Ring-necked duck	*Aythya collaris*
Bufflehead	*Bucephala albeola*
Ruddy duck	*Oxygura jamaicensis*
Lesser scaup	*Aythya affinis*
Common merganser	*Mergus merganser*
American coot	*Fulica americana*
Shoreline/Riparian Habitat	
Birds	
Cooper's hawk	*Accipiter cooperii*
Bald eagle	*Haliaeetus leucocephalus*
Osprey	*Pandion haliaetus*
Black-necked stilt	*Himantopus mexicanus*
Killdeer	*Charadrius vociferus*
Black phoebe	*Sayornis nigricans*
Ruby-crowned kinglet	*Regulus calendula*
Lesser goldfinch	*Spinus psaltria*
Lawrence's goldfinch	*Spinus lawrencei*
Rufous-sided towhee	*Pipilo erythrophthalmus*
Song sparrow	*Melospiza melodia*
Yellow warbler	*Dendroica petechia*
Wilson's warbler	*Wilsonia pusilla*
Mammals	
Raccoon	*Procyon lotor*

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Table 4.4-5

CHARACTERISTIC WILDLIFE SPECIES OF THE HABITATS OF THE LAKE PERRIS PROJECT AREA

(page 2 of 2)

Upland Habitat	
Reptiles	
Western fence lizard	*Sceloporus occidentales*
San Diego horned lizard	*Phrynosoma coronatum blainvillii*
Side-blotched lizard	*Uta stansburiana*
Orange-throated whiptail	*Cnemidophorus hyperythrus*
Western whiptail	*Cnemidophorus tigris*
Gopher snake	*Pituophis melanoleucus*
Red diamond rattlesnake	*Crotalus ruber*
Birds	
Turkey vulture	*Cathartes aura*
White-tailed kite	*Elanus leucurus*
Northern harrier	*Circus cyaneus*
Red-tailed hawk	*Buteo jamaicensis*
Golden eagle	*Aguila chrysaetos*
American kestrel	*Falco sparverius*
California quail	*Lophortyx californicus*
Mourning dove	*Zenaidura macroura*
Greater roadrunner	*Geococcyx californianus*
Burrowing owl	*Speotyto cunicularia*
Barn owl	*Tyto alba*
Anna's hummingbird	*Calypte anna*
American crow	*Corvus brachyrhynchos*
Canyon wren	*Catherpes mexicanus*
Mockingbird	*Mimus polyglottos*
California thrasher	*Toxostoma redivivum*
Blue-gray gnatcatcher	*Polioptila caerulea*
Loggerhead shrike	*Lanius ludovicianus*
Western meadowlark	*Sturnella neglecta*
Brewer's blackbird	*Euphagus cyanocephalus*
House finch	*Carpodacus mexicanus*
California towhee	*Pipilo fuscus*
Savannah sparrow	*Passerculus sandwichensis*
Vesper sparrow	*Pooecetes gramineus*
White-crowned sparrow	*Zonotrichia leucophrys*
Mammals	
Long-tailed weasel	*Mustela frenata*
Striped skunk	*Mephitis mephitis*
American badger	*Taxidea taxus*
Coyote	*Canis latrans*
Mountain lion	*Felis concolor*
Bobcat	*Lynx rufus*
Beechey ground squirrel	*Citellus beecheyi*
Pacific kangaroo rat	*Dipodomys agilis*
San Diego pocket mouse	*Chaetodipus fallax*
Dusky-footed woodrat	*Neotoma fuscipes*
California meadow vole	*Microtus californicus*
Stephens' kangaroo rat	*Dipodomys stephensi*
Black-tailed jackrabbit	*Lepus californicus*
Brush rabbit	*Sylvilagus bachmani*
Mule deer	*Odocoileus hemionus*

Source: Personal communication, G. Hund, 1995.

C—094816

C-094816

move into the area in spring and nest in the willow thicket. Resident birds include belted kingfisher, common yellowthroat, song sparrow, and purple finch. Several species of aquatic birds such as ruddy duck, cinnamon teal, eared grebe, gadwall, and American coot build nests in the emergent vegetation in the shallow water. Osprey and wintering bald eagles perch on the taller trees where they have a view of the lake.

The development of the reservoir created a large open water habitat that previously did not exist in this arid region of southern California. Lake Perris now supports large numbers of waterfowl, fish, and aquatic invertebrates that naturally would not occur in the region. Wintering waterfowl including a variety of species such as American wigeons, green-winged teal, northern shovelers, Canada geese, and snow geese feed on the lake's aquatic vegetation while western grebes, eared grebes, and common mergansers feed on the ample fish and invertebrate population.

Fishing is an important part of the recreational activities offered at Lake Perris. The CDFG periodically develops a fisheries management plan for the lake based on an assessment of populations of the sport fish within the lake. Alabama spotted bass, large-mouth bass, and southeastern bluegill are sport fish that have relatively self-sustaining populations although the spotted bass fishery has greatly declined and has basically been overtaken by large-mouth bass. The spotted bass were introduced to the lake because they spawn in deeper water than the large-mouth bass. In a working reservoir with fluctuating water levels it was believed that the spotted bass would have a higher survival rate because the eggs would less likely be exposed during water drawdowns. Channel catfish and rainbow trout are warm water sport fish that are annually stocked in the lake. Other fish species that were either introduced illegally into the lake or came through the California Aqueduct include green sunfish, threadfin shad, carp, Mississippi silverside, brown bullhead, sculpin, and golden shiner.

Protected Species and Habitat

Special status species considered in this section include those formally listed or proposed by the federal or state governments as endangered, threatened, or rare, and those under review as candidates for listing as threatened or endangered. A number of special status species may occur within the Lake Perris Recreation Area, but most of them are associated with the upland habitats surrounding the lake and would not be affected by implementation of the proposed project. A comprehensive list of sensitive plants and animals that may occur in the project region and their location is presented in tables 4.4-6 and 4.4-7, respectively. Sensitive species that may be affected by this project include species associated with the riparian/ shoreline and aquatic habitats.

The riparian habitat along the eastern shore has never been thoroughly surveyed for the presence of several sensitive birds that are associated with this declining habitat in southern California. These species include the least Bell's vireo, yellow-breasted chat, yellow warbler, and Cooper's hawk. The least Bell's vireo is a state and federally listed endangered species that has become extremely rare in southern California due in part to widespread loss and degradation of riparian habitats and to brood parasitism by the brown-headed cowbird. Preferred nesting and foraging habitat for this species tends to be associated with streams that have dense willow-dominated habitats with lush understory vegetation. Least Bell's vireos are migratory, arriving in the project region in mid-April and departing by late August after nesting and raising their young. They have not been observed at Lake Perris.

C—094817

C-094817

Table 4.4-6

SENSITIVE PLANT SPECIES POTENTIALLY OCCURRING IN THE LAKE PERRIS PROJECT AREA

Species	STATUS *Fed / State / CNPS*	*Description/ Habitat*	*Distribution in the Project Area*
Plants			
Brodiaea filifolia Thread-leaved brodiaea	C1/E/1b	Perennial herb (bulbiferous) Coastal sage scrub, cismontane woodland, grass-lands, vernal pools Flowers: March to June	Could potentially occur in the project area.
Atriplex coronata var. *notatior* San Jacinto Valley crownscale	C1/--/1B	Annual herb Playas, vernal pools; alkaline soils Flowers: April to August	Known from one extended but frag-mented population in the San Jacinto Valley. Suitable habitat does not occur in the project area.
Hemizonia pungens ssp. *laevis* Smooth tarplant	C2/--/1B	Annual herb Grassland, playas; alkaline soils Flowers: April to September	Believed extirpated from many historical localities; not expected to occur in the project area.
Navarretia fossalis Spreading navarretia	C2/--/1B	Annual herb Chenopod scrub, marshes, vernal pools Flowers: April to June	Suitable habitat does not occur within the project area.
Trichocoronis wrightii var. *wrightii* Wright's trichocoronis	--/--/2	Annual herb Meadows, marshes, riparian forests, vernal pools; mostly alkaline areas Flowers: May to September	Believed extirpated from many known localities; not expected to occur in the project area.
Hordeum intercedens Vernal barley	--/--/3	Annual herb Grasslands, vernal pools; saline flats and depressions, dry saline streambeds Flowers: March to June	More information needed; suitable habitat does not occur within the project area.
Caulanthus simulanus Payson's jewelflower	--/--/4	Chaparral, coastal sage scrub; open, dry areas in sandy, granitic soil Flowers: March to June	Could potentially occur in the project area.

Notes: Federal Status (determined by U.S. Fish and Wildlife Service):
C1 - USFWS has sufficient biological information to support a proposal to list as endangered or threatened.
C2 - Information indicates that proposing to list these species is possibly appropriate, though more data on vulnerability and threat is necessary.
State Status:
E - Listed as endangered by the State of California.
CNPS List 1B - California Native Plant Society List 1B (plants considered rare or endangered in California, eligible for state listing)
CNPS List 4 ; plants of limited distribution (a watch list)

Source: Skinner and Pavlic, 1994.

C-094818
C-094818

Table 4.4-7
SENSITIVE WILDLIFE SPECIES POTENTIALLY OCCURRING IN THE LAKE PERRIS PROJECT AREA
(page 1 of 3)

Species	*Status Fed/State*	*Habitat*	*Distribution in the Project Region*
State and Federally Listed as Threatened or Endangered			
Birds			
Bald eagle *Haliaeetus leucocephalus*	FE/CE	Occurs along coasts, rivers, and large lakes. In Southern California, bald eagles are usually found wintering at lakes with ample fish populations and appropriate perch site.	Occasional winter visitor to Lake Perris.
California gnatcatcher *Polioptila californica*	FT/CSC	Occurs in coastal sage scrub habitat in Southern California. Population has declined due to habitat conversion.	Occurs in the Riversidean coastal sage scrub habitat within the Lake Perris Recreation Area.
Least Bell's vireo *Vireo bellii pusillus*	FE/CE	Dense riparian willow thickets.	Unlikely visitor to the willow thicket along the eastern shore.
Mammals			
Stephen's kangaroo rat *Dipodomys stephensi*	FE/CT	Found in grassland habitat with patchy openings in the San Jacinto Valley.	Known from the grassland and coastal sage scrub habitats on the north and east sides of the lake.
Candidate Species			
Reptiles			
Southwestern pond turtle *Clemmys marmorata pallida*	C2/CSC	Occurs in rivers, streams, lakes, and ponds that have a dense growth of aquatic vegetation and protected basking sites.	Recorded from the San Jacinto River. No records from Lake Perris. Potential habitat exists along the eastern shore.
San Diego horned lizard *Phrynosoma coronatum blainvillii*	C2/CSC	Associated with sandy or gravelly substrates in a variety of habitats including coastal sage scrub and chaparral.	Occurs in the open sage scrub habitat around Lake Perris.
Rosy boa *Lichanura trivirgata*	C2/—	Occurs in rocky soils vegetated with coastal sage scrub/chaparral or desert scrub habitats.	Expected to occur in the hills around Lake Perris.
Orange-throated whiptail *Cnemidopharus hyperythrus*	C2/CSC	Inhabits sandy areas with rocks and patches of brush.	Known from hills around the lake.

C-094819

C-094819

Table 4.4-7
SENSITIVE WILDLIFE SPECIES POTENTIALLY OCCURRING IN THE LAKE PERRIS PROJECT AREA
(page 2 of 3)

Species	*Status Fed/State*	*Habitat*	*Distribution in the Project Region*
Mammals			
San Diego black-tailed jackrabbit *Lepus californicus bennettii*	C2/CSC	Prefers open scrub habitats such as coastal sage scrub, chaparral, and riparian scrub.	Common in the upland habitats around the lake.
San Diego desert woodrat *Neotoma lepida intermedia*	C2/CSC	Inhabits rock outcrops in coastal sage scrub and chaparral habitats.	Occurs in suitable upland habitat around the lake.
Other Sensitive Species			
Reptiles			
Western spadefoot toad *Scaphipus hammondii*	---/CSC	Frequents washes, floodplains, and alluvial fans in the lowlands but also ranges into the foothills and mountains. Prefers areas with open vegetation and sandy or gravelly soils.	Not known from the project area. Potentially could occur in any habitat.
Birds			
Cooper's hawk (nesting) *Accipiter cooperii*	---/CSC	Nests in oak woodland and riparian woodland habitats, generally near water.	Potential nesting habitat exists in the willow woodland along the eastern shore of Lake Perris.
Osprey *Pandion heliaetus*	---/CSC	Occurs along rivers, lakes, and coasts. Feeds solely on fish.	Known to occur at Lake Perris. Breeding at the lake in recent years has not been confirmed.
Golden eagle *Aquila chrysaetos*	---/CSC	Nests in rugged mountain areas, on cliffs, and occasionally in trees. Forages widely in a variety of habitats.	Expected to occasionally forage over the project area.
Yellow warbler (nesting) *Dendroica petechia brewsteri*	---/CSC	Inhabits riparian woodlands.	Expected to occur in the willow woodland along the eastern shore.
Yellow-breasted chat (nesting) *Icteria virens*	---/CSC	Dense willow riparian thickets, usually along streams.	Unlikely to occur in the project area.
Burrowing owl *Athene cunicularia*	---/CSC	Nests in burrows; forages in open fields, grasslands, and agricultural fields.	Known from grassland and roadside habitat around the lake.

C—094820

C-094820

Table 4.4-7
SENSITIVE WILDLIFE SPECIES POTENTIALLY OCCURRING IN THE LAKE PERRIS PROJECT AREA
(page 3 of 3)

Species	*Status Fed/State*	*Habitat*	*Distribution in the Project Region*
Mammals			
American badger *Taxidea taxus*	---/CSC	Frequents a variety of habitats including grassland and coastal sage scrub that have friable soils with an abundance of burrowing small mammals.	Expected as an uncommon resident in the hills around the lake.

Notes: Federal Status (determined by U.S. Fish and Wildlife Service):
E - In danger of extinction throughout all or a significant portion of its range.
T - Listed as threatened by the USFWS.
C1 - USFWS has sufficient biological information to support a proposal to list as endangered or threatened.
C2 - Information indicates that proposing to list these species is possibly appropriate, though more data on vulnerability and threat is necessary.
State Status:
E - Listed as endangered by the State of California.
T - Listed as threatened by the State of California.
CSC - California Department of Fish and Game "Species of Special Concern."

Source: Personal communication, G. Hund, 1995.

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The yellow-breasted chat, yellow warbler, and Cooper's hawk are CDFG Species of Special Concern and have not been recorded at the lake but are likely to occur in the willow forest along the eastern shore.

The only observed sensitive species associated with the aquatic habitats of Lake Perris are bald eagles (federal and state listed as endangered) and osprey (California species of special concern). The southwestern pond turtle (federal candidate for listing, and California species of special concern) has been recorded from the San Jacinto River south of Lake Perris but no records exist from the lake although appropriate habitat exists along the eastern shore (personal communication, Hund 1995). Wintering bald eagles (probably no more than three individuals per year) are occasionally observed at the lake. Historically, bald eagles were a more common visitor and permanent resident in coastal areas of southern California. During the past century, habitat loss, egg collecting, shooting, and pesticide accumulation have contributed to the population decline in the continental United States. The only mainland location in southern California where bald eagles have nested recently is Lake Cachuma in Santa Barbara County. Potential nesting habitat exists at Lake Perris and, as bald eagle populations in California are on the rise, they could begin to nest at the lake in the future. Osprey are fairly common at the lake and have historically nested there. It has not been confirmed whether or not they are currently nesting at the lake.

4.4.2 Environmental Consequences

PROPOSED ACTION

Kern Fan Element

Because the location and density of spreading basins on the Kern Fan Element property is uncertain and because recent surveys for sensitive wildlife species have not been conducted, it is assumed, for the purpose of impact assessment, that all proposed development on KFE lands would occur on lands occupied by sensitive species including Tipton kangaroo rat, blunt-nosed leopard lizard, San Joaquin antelope squirrel, and San Joaquin kit fox. The majority of the KFE land (16,500 acres) was irrigated agricultural land prior to its acquisition by DWR in 1989. Since that time virtually all agricultural activities have been suspended and the land has been fallowed. Although fallow agricultural land does not have much topographical relief and usually supports a preponderance of weedy vegetation with minimal perennial species, it still provides some habitat for these protected wildlife species.

Each of the development scenarios allocates a specific acreage to be set aside as native and disturbed vegetation. This amount represents partial mitigation for disturbance of land to be used for water spreading and extraction facilities. In addition to the land to be set aside as native and disturbed vegetation, the adverse impacts of each development scenario on the sensitive species that occur on the property shall be reduced by implementation of mitigation measures described in Section 4.4.3. These measures include guidelines for management of the lands designated as native and disturbed vegetation so that they are best managed for endangered species habitat and guidelines for design of the spreading basins so that they best provide wildlife habitat functions. The mitigation measures are required for all of the following scenarios.

Scenario A. Under Scenario A, 3,258 acres of the KFE would be used for water recharge and extraction activities and 2,000 acres would be maintained as native and disturbed vegetation. Of all the proposed scenarios, this one would convert the least amount of land into recharge basins, and therefore, at least in the short term, would have the least adverse effects on the threatened and endangered species that occur on the property. However, less land would be

designated as "native and disturbed habitat" and more land would be classified as undesignated. This land could be used in the future for a number of activities including additional water recharge and extraction facilities, recreation activities, mitigation banking, and irrigated agriculture.

Although creation of the basins would disturb sensitive species habitat, it would also create periodic freshwater and potential wetland habitat that could support numerous species including migratory waterfowl and shorebirds.

Scenario B. Under Scenario B, 5,285 acres of the KFE would be used for water recharge and extraction facilities and 4,500 acres would be maintained as native and disturbed vegetation. Compared to Scenario A, more KFE lands which may be inhabited by protected species would be developed into spreading basins. More lands would also be set aside as native and disturbed vegetation and could not be used for future developments.

Scenario C. Under Scenario C, 7,758 acres of the KFE would be used for water recharge and extraction facilities and 7,100 acres would be maintained as native and disturbed vegetation. Of all the proposed scenarios, this one would convert the most land into recharge basins, and therefore, would have the most adverse effects on the threatened and endangered species that occur on the property. However, more land would be designated as "native and disturbed habitat" which means that it would be set aside for habitat management and would not be used for future development activities. Less land would be classified as "undesignated," land that could be developed in the future.

Although creation of the basins would disturb a greater area of sensitive species habitat, it would also create a larger area of periodic freshwater and potential wetland habitat that could support numerous species including migratory waterfowl and shorebirds.

Castaic Lake

Scenario A. Castaic Lake would, on average, be maintained at a higher level than historic conditions under Scenario A. See Figure 4.7-4 for comparisons of elevation among the different scenarios. The lake level would continue to fluctuate seasonally similar to the historic conditions but the average water level would be higher during all seasons. No adverse impacts to biological resources are expected under implementation of this scenario. The Castaic Lake fishery would not be expected to be affected by an overall higher water level.

Scenario B. Under Scenario B, minimal changes would occur in levels and fluctuations of lake water as compared to the historic conditions. Lake levels would fluctuate on a seasonal and annual basis but changes would not be out of the range of current and past variations. No adverse impacts to biological resources are expected under implementation of this scenario.

Scenario C. Under Scenario C moderate changes would occur in levels of lake water as compared to the historic conditions. The lake level, on average, would be lower than historic conditions but it would not fluctuate on a seasonal or annual basis more than historic conditions. The reduction of the lake level would not adversely affect upland vegetation or terrestrial wildlife. There is minimal shoreline vegetation that would likely be killed by the lower water level. It is difficult to anticipate the long-term affects on the lake fishery but it is anticipated that the change would not be drastic enough to greatly reduce populations or alter species compositions within the lake.

Lake Perris

Scenario A. Under Scenario A, the lake would, on average, be maintained at a higher level than historic conditions. See Figure 4.7-4 for comparisons of elevation amongst the different scenarios. The level would continue to fluctuate seasonally similar to the historic conditions but the average water level would be higher during all seasons.

Much of the shoreline riparian vegetation would become inundated under this scenario. The trees in the deeper water would likely drown but trees along the upper shore would be expected to survive. In the long-term, the riparian zone would likely narrow under this scenario. Upland vegetation and wildlife would not be affected by the changes in lake level. Animals associated with the riparian habitat would likely be affected depending on the amount of change that occurs in the habitat. A more narrow riparian zone would support a different assemblage of birds than currently utilize the habitat. Many of the warblers (e.g., Wilson's warbler, yellow warbler) that prefer large dense willow thickets may decrease in numbers. Because the lake level would increase and rates and levels of seasonal fluctuations would not change, the fishery in the lake would not be expected to be adversely affected.

No adverse impacts to sensitive species would be expected under implementation of Scenario A.

Scenario B. Under Scenario B, minimal changes would occur in levels and fluctuations of lake water as compared to the historic conditions. See Section 4.2 for a detailed description of this scenario. Lake levels would fluctuate on a seasonal and annual basis but changes would not be out of the range of current and past variations.

Impacts to vegetation would be similar to those caused by current and past fluctuations of water levels. The riparian vegetation along the eastern shore has historically expanded and withdrawn in association with periods of high and low water. The well-established, deep-rooted trees survive the current fluctuating water levels while the younger trees sometimes are drowned or desiccated. These conditions would be expected to continue under Scenario B.

Impacts to wildlife would be similar to historic conditions. Upland wildlife would not be affected by the changes in lake level. Riparian and aquatic species would be affected similar to historic conditions. No major changes in fish composition or numbers would be anticipated.

No adverse impacts to sensitive species would be expected under implementation of Scenario B.

Scenario C. Under Scenario C moderate changes would occur in levels of lake water as compared to the historic conditions. See Section 4.2 for a detailed description of this scenario. The amount of water in the lake, on average, would be less than historic conditions but lake levels would not fluctuate on a seasonal and annual basis more than the existing condition.

The shoreline riparian vegetation would likely be impacted but it is difficult to anticipate the level of the impact. Some of the existing trees would not likely survive the prolonged drawdown of the lake level. However, trees would be expected to quickly establish along the new shoreline and in the shallows. Animals associated with the riparian habitat would likely be affected depending on the amount of change that occurs in the habitat. A more narrow riparian zone or a zone made up of only young trees would support a different assemblage of birds than currently utilize the habitat. Many of the warblers (e.g., Wilson's warbler, yellow warbler) that prefer large dense willow thickets may temporarily

decrease in numbers until the new growth of willows becomes mature enough to provide habitat for them. In the long term, the willow zone would be expected to be as wide or wider than the historic conditions.

The Lake Perris fishery would likely be affected under Scenario C but it is difficult to anticipate the extent of the impact. Several of the fish species lay their eggs and feed in the submerged tangle of willow roots and stems. If water levels are decreased below the line of willows, this fish habitat would temporarily disappear until new vegetation growth occurred. The riprap that lines the dam and some exposed areas along the north shore provides spawning habitat for some of the fish species including bass. It is unlikely that this habitat would become exposed during the spring spawn.

No adverse impacts to sensitive species would be expected under implementation of Scenario C.

4.4.3 Mitigation Measures

The following general mitigation measures are suggested for the construction of spreading basins and new facilities on the KFE. Because this is a Program EIR, it is recognized that some or all of these measures may be inapplicable to the facilities when they are designed and constructed. It is equally possible that when the precise location and design of these facilities later is determined and analyzed under CEQA, new mitigation measures will be found to be more appropriate than the ones listed below. Specific project(s) for recharge facilities on the KFE will require compliance with CEQA and other applicable regulations including state and federal Endangered Species Acts. It is for these reasons that the following mitigation measures are suggestions only and may be replaced with specific mitigation measures following consultation with governmental wildlife agencies incorporated into an approved Habitat Conservation Plan.

1. Prior to construction of spreading basins and new facilities, surveys of the proposed impacted area for sensitive species will be conducted as may be required. To the extent feasible, locate, design, and construct facilities in a manner that avoids significant adverse impacts to sensitive species. To the extent avoidance is infeasible, mitigate impacts with other mitigation measures.

2. Where on-site mitigation is infeasible, off-site mitigation should be considered, selecting lands that will provide suitable habitat for the impacted species.

3. Design spreading (ponding) and extraction facilities and appurtenances to provide, to the extent feasible and without interfering with the project objectives, in a manner that provides habitat both when inundated and when dry. For example, design berms to conform to the natural setting and revegetate with native plants (where the plants are likely to succeed and will not be outcompeted by exotics already existing in the vicinity). In this way, the loss of habitat can be minimized. The native and other vegetation will provide habitat and a food source for the Tipton kangaroo rat as well as for rabbits, ground squirrels, lizards, insects and the like, comprising a food source for the San Joaquin kit fox and the blunt-nosed leopard lizard. Tipton kangaroo rats, if they use these areas at all, would likely use the upper portions of the berms for burrows rather than the basin areas where repeated flooding will occur, thus minimizing potential conflicts between rats and the recharge operations. The presence of sensitive species in ponding-recharging basins should not be a basis for precluding use and maintenance of the basins.

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The same mitigation measures (or reasonable substitutes for them as discussed above) would be equally applicable if DWR were to continue to own the KFE and were to implement any recharge activities within it. As with the Monterey Agreement implementation program, it is not presently possible to predict either what DWR's activities would be or what potentially significant environmental impacts, if any, would result.

NO PROJECT ALTERNATIVE

Under the No Project Alternative, prevailing conditions are expected to continue. No adverse impacts are anticipated.

Development of the KFE lands for water spreading by DWR and local agencies is a possible outcome of selection of the No Project Alternative. Development of such facilities would be constrained by the same physical features (e.g., soils permeability) and regulatory issues (e.g., protected species) that are expected to constrain development under the Proposed Action.

4.5 CULTURAL AND HISTORIC RESOURCES

4.5.1 Affected Environment

Cultural resources are defined as prehistoric and historic sites, structures, and districts, or any other physical evidence associated with human activity considered important to a culture, a subculture, or a community for scientific, traditional, religious, or any other reason. For analysis purposes, cultural resources may be categorized into three groups: archaeological resources, historic resources, and contemporary Native American resources.

Archaeological resources are places where human activity has measurably altered the earth or left deposits of physical remains. Archaeological resources may be either prehistoric (before the introduction of writing in a particular area) or historic (after the introduction of writing). The majority of such places in this region are associated with either Native American or Euro-American occupation of the area. The most frequently encountered prehistoric and early historic Native American archaeological sites are village settlements with residential areas and sometimes cemeteries; temporary camps where food and raw materials were collected; smaller, briefly occupied sites where tools were manufactured or repaired; and special-use areas like caves, rock shelters, and sites of rock art. Historic archaeological resources are remnants of structures or features such as roads that can be associated with written documentation. Historic archaeological sites may include foundations or features such as privies, corrals, and trash dumps.

Historic resources are standing structures of historic or aesthetic significance. Architectural sites dating from the Spanish Period (1529-1822) through the beginning of the Depression (1929-1930) are generally considered for protection if they are determined to be historically or architecturally significant. Post-depression sites may also be considered for protection if they could gain significance in the future. Historic resources are often associated with archaeological deposits of the same age.

Contemporary Native American resources, also called ethnic resources, can include archaeological resources, areas where ritual ceremonies are practiced, rock art, and the prominent topographical areas, features, habitats, plants, animals, and minerals that contemporary Native Americans value and consider essential for the persistence of their traditional values.

The regions of influence that would experience direct effects from implementation of the Monterey Agreement are the Kern Fan Element (KFE), Castaic Lake, and Lake Perris.

Direct impacts on cultural resources may occur on KFE land from berming associated with spreading basins and at the terminal reservoirs from level fluctuations. Indirect impacts may occur by increasing public access to presently inundated archaeological resources or by disturbing the visual setting of a site where such a setting is an essential part of the significance of the site. The latter type of locations would include any cultural resource sites possessing a high degree of visual integrity, such as traditional Native American religious sites in pristine environmental settings or historic architectural sites in intact historical settings, where the integrity of setting would be compromised by changes in land use (e.g., berming for spreading basin construction in the KFE).

In addition to archaeological site data, contemporary Native Americans who have genealogical and political ties to the project region of influence were consulted. Native Americans were interviewed regarding the types of resources considered important in the project area, potential impacts of concern, appropriate mitigation measures, and other, more general issues of concern.

REGIONAL SETTING

Prehistory

Archaeologists have developed numerous prehistoric cultural sequences for the California interior and coastal areas within Kern, Riverside, and Los Angeles counties. These chronologies differ in various details and vary by several hundred years, depending on the source, but they are generally similar and reflect parallel trends in cultural evolution along the California coast and interior. The prehistoric chronology of the region of influence can be divided into four major periods: Paleo-Indian, Early, Middle, and Late. These are briefly described below. The time periods are listed in years before present (B.P.)

Paleo-Indian (ca. 11,000 to 7,500 B.P.). Archaeologists consider that humans entered the New World during the latter part of the Wisconsin glaciation, no earlier than 40,000 years B.P. and perhaps as recently as 25,000 to 20,000 B.P. Although dated material is as old as 23,600 B.P., associated with the Los Angeles Man skeleton (Moratto 1984), the earliest undisputed evidence of human occupation ranges from 10,000 to 8,000 B.P.

Small bands of Paleo-Indian hunter-gatherers throughout North America focused on hunting Pleistocene megafauna, but gathering plants and hunting smaller animals were undoubtedly important as well. Many archaeologists believe that environmental shifts near the end of the Pleistocene reduced the availability of large game. In response, the subsistence strategies shifted away from big-game hunting to the increased exploitation of wild plants and small game. Along the southern California coast, subsistence focused on locally available resources, such as mollusks, waterfowl, fish, and sea mammals, as well as terrestrial game and plants. Within the southern San Joaquin Valley, numerous pluvial lakes provided marsh and grassland environments. The Western Pluvial Lakes Tradition has been associated with an early lifestyle that exploited these habitats (Moratto 1984). Populations were dependent on hunting mammals, waterfowl, and gathering vegetable products. An important site related to this period is located on the southwestern edge of Buena Vista Lake, dating from 8,000 B.P., located approximately 6 miles southwest of the KFE.

Archaeologists consider that most sites dating to this period within the project area are deeply buried under alluvium (Moratto 1984). For example, up to 10 meters (30+ feet) of sediment have accumulated in the lower reaches of the San Joaquin River drainages. Many important archaeological finds from this period have been deeply buried in this way.

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Early Period (ca. 7,500 to 3,000 B.P.). Post-Pleistocene changes in climate and environment are reflected in the local archaeological record by approximately 7500 B.P., the beginning of the Early Period. The most diagnostic feature of this period is the millingstone, used for grinding acorns, small seeds, and other plant foods. Most reconstructions of Early Period subsistence patterns stress the dependence on terrestrial foods (Wallace 1955; Harrison and Harrison 1966; True 1980; King 1990), including deer and rodents in addition to plant foods. Climatic changes of warming and drying were responsible for populations moving from the mountains to the coast (Kowta 1969).

Middle Period (ca. 3,000 to 1,000 B.P.). This period was characterized by cooler, moister conditions during which the Mojave Desert area was more extensively used (Kowta 1969). Artifacts found in sites in the Transverse Ranges indicate a mixture of Early Period millingstone equipment with technologies of the Pinto Basin complex in the Mojave Desert. A variety of projectile point types suggests a reliance on hunting, while the presence of pestles among the manos and metates indicates acorn collection and preparation. The Middle Period was also a time of expanding trade between the Channel Islands, the coast, and interior valleys, judging from the increased amount of exotic items on archaeological sites. The Middle Period was also a time of larger and more permanent settlements (King 1990).

Late Period (ca. 1,000 to 150 B.P.). The Late Period culture is probably directly ancestral to the ethnohistoric Emigdiano, Castac, Chumash, Tataviam, and Gabrieliño/Tongva cultures, and began around A.D. 1150. All scholars who have postulated chronologies for the region recognize the distinctiveness of the Late Period (King 1990; Wallace 1955; Harrison and Harrison 1966). This period is associated with an efflorescence of material culture; an elaboration of social, economic, and political organization; an expansion of trade networks; an aggregation of the coastal population into larger villages; and intensification of marine resource exploitation. Much of what archaeologists understand about the Late Period comes from analogies with the ethnohistoric aboriginal cultures in the region. The Late Period was a time of population increase throughout the region (Glassow 1991). There appear to be affiliations between cultures living in the southern San Joaquin Valley and the southern California Coast, indicating widespread trading and diffusion of ideas (Moratto 1984).

A slightly different chronology of cultural change is evident in the Lake Perris area. Until 500 B.P., gathering of small seeds processed in deep basin milling stones, supplemented by hunting, was practiced (O'Connell et al. 1974). Later, a shift to acorn processing in bedrock mortars occurred, with a broader pattern of resource exploitation. This may have been caused by increased populations migrating to the area due to increasing climatic dryness and reduction in Salton Sea freshwater contents (O'Connell et al. 1974).

Ethnohistory

Ethnohistoric resources include ethnographically documented Native American historic village sites, cemeteries, ceremonial sites, watercraft construction and launch locations, mineral quarries, and sites of subsistence and other activities. Ethnohistoric groups living in the project area included the Southern Valley Yokuts (KFE), Emigdiano, or Castac Chumash (Castaic Lake), and the Cahuilla (Lake Perris) (Wallace 1978; Bean 1978, Grant 1978). These groups were devastated by the establishment of the missions and subsequent influx of white settlers culminating with the annexation of California to the United States.

Although the Spanish first explored the region in the 16th century, the protohistoric

aboriginal cultures were not severely interrupted until the arrival of the Spanish expedition led by Gaspar de Portola in 1769. Shortly thereafter, these cultures changed dramatically with the establishment of the missions, where Native Americans were trained in many aspects of European culture and were also exposed to European diseases. By 1900 the aboriginal populations were small and dispersed.

Yokuts. Lakes, marshes and sloughs once covered more than 5,000 km^2 in the San Joaquin Valley alone, including Buena Vista Lake (Moratto 1984). Valley bottomlands exposed to winter storm flooding and Sierra snowpack runoff produced vegetation including coarse grasses, tules, and cattails. These flora resources were used by Indians as sources of food, fiber, and building material. Central Valley waterways provided habitats for river mussels and many fish species.

The late prehistoric Yokuts claimed nearly all of the San Joaquin Valley as well and the lower Sierra Nevada foothills south of the Fresno River. Three divisions of Yokuts, Northern Valley, Southern Valley and Foothill, were composed of about 60 "tribelets," each with between 350 to over 1,000 members (Wallace 1978). The Southern Valley Yokuts lived in the southern end of the San Joaquin Valley, from the lower Kings River to the Tehachapi Mountains. These peoples adapted to the lake-slough-marsh environment of the region. The tribelet occupying the channels and tule-lined sloughs of the delta within the KFE project site area were the Chuxoxi (Wallace 1978). Their villages were occupied nearly year-round due to the extensive food resources available, and were placed on high ground near watercourses to maximize the ability to fish, hunt waterfowl, and collect shellfish, roots, and seeds. Land mammals and birds provided only a minor contribution to their diet. Within the Chuxoxi territory, houses were circular or oval single-family dwellings of tule mats over pole frames.

Unlike many Native Californians, the Southern Valley Yokuts way of life was not substantially affected by Spanish exploration. Several expeditions in the early 19th century were unsuccessful in bringing the Native Americans under Franciscan missionary influence (Wallace 1978). An epidemic thought to be unusually severe malaria broke out in 1833, which killed approximately 75 percent of Southern Valley Yokuts. Annexation of California and the resulting waves of settlers overwhelmed the remaining passive Native American populations. Lands were turned over to the American government in return for reservations and payments in goods, but the treaty was never ratified. Southern Valley Yokuts ultimately settled at the Tule River Reservation 16 km (10 miles) east of Porterville, and at the Santa Rosa Reservation near Lemoore (Wallace 1978).

Castac Chumash. The Chumash occupied a large, ecologically diverse region stretching from San Luis Obispo to Malibu Canyon on the coast, east as far as the San Joaquin Valley, and west to the Channel Islands (Grant 1978). Within this large territory, the historic Chumash were divided into seven groups. Each group occupied a different territory, had its own adaptation, and played a different role in the overall economic system. The Chumash territory contained a variety of resource zones that differed widely in type, availability, and abundance of natural resources. Each environmental zone would have required local hunter-gatherers to devise different strategies for obtaining food.

The Chumash economic system was complex, involved widespread formalized trading networks, and was closely tied to kinship, political, and religious systems (Blackburn 1974). Shell bead currency was used throughout southern California, and it appears that the Chumash were the primary makers of this standardized money (Blackburn 1975).

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The Castac Chumash lived in what is now the southwest corner of Kern County. Very little is known about their way of life due to the lack of archaeological data. Populations are thought to have been low, in the hundreds. Many ethnohistoric villages have been identified in the project vicinity, among them *Castac*, on the north shore of Castaic Lake (Grant 1978). The Castac Chumash lived along Pastoria Creek (Grant 1978) and appeared to share many traits with their coastal Chumash neighbors, though many specialized coastal artifacts would not have been used. Trading between the areas is evident, by the presence of shellfish in site debris. Vegetable processing and seed grinding were important supplements to hunting.

Cahuilla. The Cahuilla occupied a diverse geographical area reaching from the summit of the San Bernardino Mountains in the north to Borrego Springs and the Chocolate Mountains in the south, a portion of the Colorado Desert west of Orocopia Mountain to the east, and San Jacinto Plain near Riverside and the eastern slopes of Palomar Mountain to the west (Bean 1978). The area is crossed by mountain ranges, passes, canyons, deserts and valleys including the Lake Perris site. Cahuilla villages were located in alluvial fans and canyons close to water sources and associated food resources. These locations also provided shelter from strong prevailing winds (Bean 1978).

Village structures housing between 150 to 300 persons included above-ground brush shelters and dome-shaped or rectangular houses up to 15-20 feet long. Ceremonial houses, sweathouses, and granaries were also built in the settlements. Cahuilla populations traveled for gathering, hunting, trading with neighboring tribes, and ritual activities. During the acorn-collecting season, most individuals would leave villages for up to several weeks to gather in oak woodland areas (Bean 1978). Hunting and gathering were supplemented by marginal agricultural practices, and included growing corn, beans, squashes, and melons.

The Cahuilla were assimilated into the Spanish Mission system, with tribal members baptized at San Gabriel, San Luis Rey, and San Diego missions. Spanish work settlements, *assistencias*, were established in 1819 near the Cahuilla territory, resulting in additional Spanish influences including participation in cattle raising, wage labor, religion, and western clothing. A smallpox epidemic in 1863 killed a large proportion of the population. Los Coyotes, Morongo, and Agua Caliente Indian Reservations were established in 1877. By 1974, most of the enrolled Cahuilla population existed on these reservations (Bean 1978).

History

The earliest European settlement in southern California focused on the establishment of missions, pueblos, and presidios in the period from 1769 to 1821. In the Rancho period from 1822 to 1847, Mexico achieved its independence from Spain and there was a reduced interest in Alta California. The mission system was abandoned and the lands were granted to Mexican loyalists and some Anglos. This was a period of extensive cattle ranching and limited dry farming over much of southern California. The Anglo-Mexican period lasted from 1848 to 1875. The influence of the United States affected the disintegration of the Mexican control over California. Discovery of gold in 1842, with later finds in northern California in 1848, fueled immigration that had begun in 1841. After success in the Mexican War of 1846-1847, the state was admitted to the Union in 1850 (Chartkoff and Chartkoff 1984).

From 1876 to 1912, there was increased Americanization as a result of increased ties of southern California to the rest of the United States due to the expanding railroad system. In the period from 1913 to 1945 there was

increased regional development, in part related to the bringing of water to southern California from the Owens Valley in 1913. There was increased diversity in industries, especially petroleum, entertainment, aircraft, automobile, and agriculture.

PROJECT AREA CULTURAL RESOURCES

Existing archaeological and historical site data were accessed from three searches of records archived at Information Centers of the California Archaeological Inventory (M. Duncan 1995; U. Doan 1995; A. Baldwin 1995). A total of 26 archaeological sites are recorded within the three project area boundaries. They are summarized below.

Kern Fan Element

Only three systematic archaeological surveys have occurred in the 20,546-acre KFE project site area. Less than 10 percent of the area has been evaluated by archaeologists. These and one artifact isolate investigations have identified nine archaeological sites and one artifact isolate listed in Table 4.5-1. This site density is considered high (approximately 1 site per 200 acres).

Based on the relatively high density of sites identified within areas surveyed within the project site and vicinity, the potential for identifying sites in uninvestigated areas is considered high.

No historic resources are recorded in the KFE area.

Table 4.5-1
Kern Fan Element Cultural Resources*

Site	*Description*	*Condition*
CA-KER-667	Small temporary village with shell, millingstones	Cultivation disturbance
CA-KER-2076	Low density stone tool flake scatter	Bisected by SH119
CA-KER-2279	Mound with stone tool artifacts, shellfish, bone	Cultivation disturbance
CA-KER-2280	Mound with stone tools, shell-fish	Cultivation disturbance
CA-KER-2281	Mound with stone tools, shell-fish	Cultivation disturbance
CA-KER-2282	Low density stone tool flake scatter, groundstone, bone	Cultivation disturbance
CA-KER-3073/3089	Medium density stone tool flake and groundstone scatter	Cultivation and road disturbance
CA-KER-3280	Large village with stone tool flake scatter, groundstone, shellfish, and bone	Cultivation disturbance
CA-IF-KER-679	Isolated granitic stone bowl	Disking may have moved artifact from CA-KER-3073/3089

Note: * No historic resources have been recorded.
Source: Baldwin, 1995.

Castaic Lake

Creation of Castaic Lake (2,235 acres) inundated prehistoric resources and sites on the lake's edge. Four systematic investigations (surveys or excavations) have been performed in the area. These were located on the south and west sides of the lake, representing less than 1 percent of the project area. No comprehensive survey was done prior to reservoir construction. Therefore, no estimates of project area site density are

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possible. Sites are located on the lake margin and on submerged knolls. Sites in the area are listed in Table 4.5-2.

Given the number of sites recorded and population densities noted ethno-graphically along waterways such as Castaic Creek, there is the potential for additional unknown archaeological sites to exist within the project site.

No historical sites are located within the Castaic Lake area. A 1903 map shows a developed road along Castaic Creek and partially up Elizabeth Lake Canyon that serviced several buildings. No historic structures were recorded in this area prior to inundation by the lake (Duncan 1995).

Lake Perris

Creation of Lake Perris (2,292 acres) has also inundated cultural resources. One survey for cultural resources was done within Lake Perris that covered approximately 20 percent of the total project site area prior to reservoir construction. It identified the prehistoric site described in Table 4.5-3. This represents a site density of one site per 450 acres.

Based on the number of watercourses draining the Bernasconi Hills to the south and Mt. Russell to the north, it is possible that other unknown prehistoric sites exist adjacent to these prehistoric riparian areas within the project site.

Table 4.5-2
Castaic Lake Cultural Resources*

Site	*Description*	*Condition*
CA-LAN-323	Village site with bedrock mortars	Cultivated prior to inundation
CA-LAN-324	Village with cemetery	Bulldozed before inundation
CA-LAN-325	Rock shelter	Heavily looted
CA-LAN-326	Stone tool scatter	Crossed by highway prior to inundation
CA-LAN-327	Temporary camp	Cultivated prior to inundation
CA-LAN-1221	Sandstone rock shelter	Lake flooding, boating access, and illicit artifact collection
CA-LAN-1222	Sandstone rock shelter	Lake flooding, boating access, and illicit artifact collection

Note: * No historic resources have been recorded.
Source: Duncan, 1995.

Table 4.5-3
Lake Perris Cultural Resources*

Site	*Description*	*Condition*
CA-RIV-487	Bedrock mortar and groundstone	Good prior to inundation

Note: * No historic resources have been recorded.
Source: Doan, 1995.

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Historic roads dating as early as 1901 also existed within the Lake Perris area. General Land Office plat maps dating from 1854 and 1855 do not indicate any structures or features within the area. No other historic sites are recorded (Doan 1995).

Contemporary Native American Groups

Descendants of Native Americans who may have occupied the project area were consulted to determine in what ways the project would affect ethnic resources and their heritage values. Yokut, Chumash, and Cahuilla representatives and individuals listed by the State Native American Heritage Commission in Kern and Los Angeles counties were contacted.

Contemporary Native Americans relate that their ancestors occupied the KFE, Castaic Lake, and Perris Lake project areas. No ceremonial areas were within the KFE, but villages were located in the vicinity of Castaic Lake and Lake Perris (personal communications R. Gomez, C. Cook, K. Saubel 1995).

4.5.2 Environmental Consequences

Any project proposed under this program must comply with CEQA, Appendix K, Cultural Resources. Compliance requires (1) identification of any cultural resource; (2) avoidance of all resources to the maximum degree feasible through project redesign; (3) if not feasible to avoid, significance assessment pursuant to specific criteria; and (4) mitigation through data recovery if the resource is significant. California Senate Bill 297 (1982) addresses the disposition of Native American human burials in archaeological sites. The code protects such remains from disturbance, vandalism, and inadvertent destruction; establishes procedures to be implemented if Native American skeletal remains are discovered during construction of a project; and establishes the Native American Heritage Commission to resolve disputes regarding disposition of such remains. It is incorporated in CEQA Appendix K, Archaeological Resources.

According to Appendix K, an important or significant resource is one that is associated with an event or person or recognized significance in California or American history or of recognized scientific importance in prehistory; can provide information that is of demonstrable public interest and useful in addressing scientifically con-sequential and reasonable archaeological research questions, has a special or particular quality such as oldest, best example, largest, or last surviving example of its kind; is at least 100 years old and possesses substantial stratigraphic integrity; or involves important research questions that historical research has shown can be answered only with archaeological methods.

The significance of a prehistoric site or property to the Native American community is determined through consultation with tribal representatives. CEQA Appendix G (j) provides the basis for a significant effect determination depending upon the outcome of this investigation.

A project affects a cultural resource when it alters the property's characteristics that qualify it as important in terms of CEQA Appendix G, and K criteria include those that diminish the integrity, research potential, or alteration of its character or setting. Adverse but not significant impacts include those that do not diminish the resource's significance, such as removal of a small, badly disturbed portion of an archaeological site. Beneficial impacts include those that would enhance the preservation of the cultural resource currently being affected by natural or human factors. These impacts are either direct (e.g., ground disturbances disturbing site integrity) or indirect (e.g., increased public access to sites resulting in greater potential for illegal artifact collection).

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PROPOSED ACTION

Scenario A

Under this scenario, 3,258 acres of the KFE property would be used for water recharge and extraction facilities and 14,798 acres would be previously irrigated and undesignated. These functions would require constructing an unknown number of earthen berms for containing stored water. Depending upon the location of the berms, the earth work could result in ground disturbances of cutting and filling that would directly affect recorded archaeological sites considered significant under CEQA Appendix K criteria. This would be a significant impact on cultural resources. Since most of the KFE has not been surveyed by archaeologists for the presence of archaeological sites, potential berming areas could impact unrecorded cultural resources. However, it is noted that up to 16,500 acres of the KFE property has been disturbed by farming operations and much of the land is in the historic Kern River flood plain. Archaeological sites are normally found on undisturbed high ground, not on disturbed low ground where berming has occurred and where recharge areas will be located.

Other areas would for roads, canals, and oil and gas facilities (490 acres). These activities would not result in additional impacts on cultural resources.

Minimal changes would occur in the operation of Castaic and Perris terminal reservoirs. Variations in reservoir levels would not be substantially affected, so potential effects of erosion from fluctuating water levels and associated wave action would be less than significant. Exposure of presently submerged prehistoric resources would not be substantially increased, so no noticeable increase in illicit artifact collection by lake boaters would occur. Impacts on prehistoric resources within Castaic and Perris terminal reservoirs would be less than significant.

Local Native Americans value all archaeological resources as part of their contemporary heritage, whether the site is a large village or a temporary food processing location. Burial sites are considered the most sensitive of resources, but all remains are considered unique elements of their past and are essential components illustrating their ancestors' relationship to the environment.

Native Americans with ancestral and political ties to the territory in the project vicinity contacted during this investigation expressed concern over archaeological sites and ceremonial areas (personal communications, C. Cook, R. Gomez, K. Saubel 1995). All archaeological sites are considered central to their heritage values. Ground disturbances, increased erosion, and illicit artifact collection are all considered significant impacts.

Scenario B

Under this scenario, approximately 5,250 acres of the KFE would be used for water recharge and extraction facilities, and approximately 10,298 acres would be previously irrigated and undesignated. Like Scenario A, these functions could require constructing an unknown number of earthen berms for containing stored water.

Other areas would include existing roads, canals, and oil and gas facilities (490 acres). These activities would not result in additional impacts on cultural resources.

Moderate changes would occur in the operation of Castaic and Perris terminal reservoirs. The moderate variation in reservoir levels could increase erosion of archaeological site soils. Waves at the reservoir water surface continuously erode the submerged landform. As the level of the wave zone moves up and down in elevation with increasing reservoir withdrawals and additions, a greater area of currently submerged archaeological site could be eroded (personal communication M.

Sampson 1995; U.S. Army Waterways Experiment Station 1990). This increased erosion of known and unrecorded prehistoric archaeological sites is potentially significant. Moderate reservoir fluctuations would also potentially expose presently submerged archaeological site surfaces. This exposure could result in increased access to sites by recreational boaters and illicit artifact collection. This is considered a potentially significant indirect impact.

Fluctuating reservoir levels would not result in substantial erosion of historical roads within Castaic Lake and Lake Perris. Impacts on historical resources would be less than significant.

Impacts on ethnic resources would be similar to Scenario A.

Scenario C

Under this scenario, 7,758 acres of the KFE would be used for water recharge extraction facilities and 7,100 acres for previously irrigated and undesignated and other allowable uses. Like Scenario A and B, these functions could require constructing an unknown number of earthen berms for containing stored water.

Other areas would existing roads, canals, and oil and gas facilities (490 acres). These activities would not result in additional impacts on cultural resources.

Substantial changes would occur in the operation of Castaic and Perris terminal reservoirs. Up to 50 percent of reservoir conservation storage capacity would be withdrawn from the lakes and held at that level for up to 4 years. This substantial variation in reservoir levels could increase erosion of archaeological site soils as discussed in Scenario B. Increased erosion of known and unrecorded prehistoric archaeological sites is potentially significant. Substantial reservoir fluctuations would also potentially expose presently submerged archaeological site surfaces. This exposure could result in increased access to sites by recreational boaters and illicit artifact collection. This is considered a potentially significant indirect impact.

Fluctuating reservoir levels would not result in substantial erosion of historical roads within the Castaic Lake and Lake Perris. Impacts on historical resources would be less than significant.

Impacts on ethnic resources would be similar to scenarios A and B.

NO PROJECT ALTERNATIVE

Under the No Project Alternative, no ground disturbances in the KFE area would occur and no adverse impacts are anticipated. No change in Castaic Lake and Lake Perris reservoir operations would occur, so no increased erosion or illicit artifact collection would result. Impacts on cultural resources would be insignificant.

4.5.3 Mitigation Measures

To reduce potentially significant impacts on known and unrecorded archaeological sites, the following measures are required:

1. All proposed areas of ground disturbances including filling and grading on lands not previously disturbed in the KFE area shall be surveyed by an archaeologist qualified under State Historic Preservation Office (SHPO) guidelines. Native American representatives also desire to be included in the survey. If archaeological materials are identified, they shall be recorded consistent with SHPO guidelines. Project plans shall be designed to the maximum extent feasible to avoid resources, establishing an 80-foot buffer between the resource and disturbance activities. The archaeological site boundary shall be

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fenced during construction to ensure that no construction equipment accidentally encroaches within the resource.

2. If cultural resources cannot be avoided by redesign, a significance assessment excavation shall be performed consistent with SHPO guidelines. If the site is determined to be significant pursuant to CEQA Appendix K criteria, a mitigation data recovery program shall be performed consistent with SHPO guidelines. All recovered artifacts shall be curated in a SHPO-qualified facility within the KFE project area.

3. If Proposed Action Scenario C is implemented for the terminal reservoirs, the following should be required:

   Subsequent to maximum drawdown of the reservoir conservation storage capacity, previously uninvestigated areas within Castaic Lake and Perris Lake shall be systematically surveyed by a qualified archaeologist consistent with SHPO guidelines. All cultural resources identified as part of this investigation and all previously recorded sites shall be stabilized and protected from wave action. The sites shall be covered with protective covering such as a filter fabric (Thorne 1988). Placement of the covering shall be supervised by an archaeologist and a Native American monitor. An erosion control treatment plan and monitoring program shall be prepared by engineers and reviewed and approved by a qualified archaeologist and Native Americans to ensure that cultural resources are not disturbed during anchoring of the hard-cover protection.

Implementation of these measures would reduce potential impacts on cultural resources to less than significant levels. Native Americans consulted agree that preservation of archaeological sites through identification and protection with non-intrusive covering material would reduce impacts on ethnic resources to less than significant levels.

4.6 LAND USE

4.6.1 Affected Environment

KERN FAN ELEMENT

On-Site Lands. The KFE contains 20,546 acres of land, all of which is owned by the State of California. Subsurface mineral rights are owned by ARCO Western Energy. The predominant zoning on the KFE property is the A—Exclusive Agriculture zone, which allows a 20-acre minimum lot size. There are also small amounts of land zoned A1—Limited Agriculture (minimum 2 1/2 acre lot size), and C-2P—Commercial Highway in the vicinity of I-5 interchanges. KFE lands are divided into two large parcels separated by the Kern River and lands owned by the City of Bakersfield, Buena Vista Water Storage District, and West Kern River Water District.

Table 2.2-1 identifies existing land use by land use category for the KFE. The predominant use, comprising 16,500 acres, is previously irrigated agricultural land or undesignated areas. Most of this area consists of fallow fields. It also includes several hundred acres of land currently used for oil and gas extraction activities. Prior to DWR terminating agricultural leases on the KFE property, about half of the land was used for field crops and one-fourth was either used for pasture or left fallow. The major field crops were cotton and alfalfa. Other crops included cereal grains, sugar beets, sudan grass, and carrots. Approximately 288 acres of irrigated farmland currently remain on the KFE property.

The Rosedale-Rio Bravo property is comprised of two separate parcels. The northern parcel contains fallowed irrigated cropland that was last cropped in 1989 at the time of its purchase

by DWR. The southern parcel supports active irrigated cropland.

Parts of five producing oil fields are contained in the KFE, including portions of the North Coles Levee, Ten Section, Canal, Strand, and Canfield Ranch Oil Fields (see Figure 4.6-1). ARCO owns all mineral rights. Production is mainly conducted by other companies operating under agreements with ARCO. There are approximately 64 oil wells and three tank farms in the five oilfields in the KFE area. Crude oil transport pipelines and high-pressure natural gas lines cross the KFE property in several locations.

Native and disturbed vegetation constitutes the next largest land use category, with 2,690 acres. This land use is primarily located on lands previously containing oil and gas production facilities and lands adjacent to the Kern River.

Recharge facilities comprise 578 acres. Of this acreage, about 320 acres is located near Stockdale Highway, and 258 acres is located on the Rosedale property. Any recharge on this acreage was done prior to purchase of the property by DWR. DWR has purchased previously stored local water in the Kern County groundwater basin since 1987, and has stored water through in-lieu means, i.e., where surface water is delivered to water users and used in-lieu of groundwater that would otherwise have been pumped and used.

The "other" land use category comprises 490 acres and primarily includes roads and canals.

Interstate 5, a four-lane divided highway, traverses the property from northwest to southeast. State Route 119, the Taft Highway, parallels the southern boundary. Enos Lane, State Route 43, runs north-south through the property, while Panama Lane extends east from I-5. Numerous unimproved roads provide access to the oil wells and follow the canals in the area in many cases. The Southern Pacific rail line forms part of the northeast boundary of the property. The Kern River Canal, Cross Valley Canal, Alejandro Canal, Main Canal, and Pioneer Canal cross portions of the property (see Figure 4.6-2).

Three 500-kV transmission lines cross the property, two owned by Southern California Edison and one owned by Pacific Gas and Electric. The utilities have right-of-way easements allowing access to the towers for periodic maintenance and repair. Local electric and telephone transmission lines are located throughout the property. These lines are mostly overhead, but some are underground.

Off-Site Lands. Land uses in the general vicinity of the KFE property have historically included agriculture and oil and gas development. Lands in the vicinity of the KFE include a 2,800-acre recharge area located along the Kern River and owned by the City of Bakersfield. It has recharge ponds and extraction facilities and provides riparian habitat and recreation. Recreation activities include bird watching, hiking, horseback riding, and picnicking (DWR 1990). The Buena Vista Water Storage District and West Kern River Water District jointly own 1,000 acres of land along the Kern River in this area. The Tule Elk State Reserve and the federally-owned Elk Hills Naval Petroleum Reserve are located west of the KFE property. The California Aqueduct is located to the southwest, just outside of the KFE property.

Local Plans and Policies. The State of California is exempt from local land use regulations, plans, and policies. However, to the extent feasible, it is state policy to consider local plans and policies in the development of state facilities. In addition, any lands transferred to county or private ownership in the future would be subject to local land use controls. Local water agencies are also exempt from county and city land use regulations, plans,

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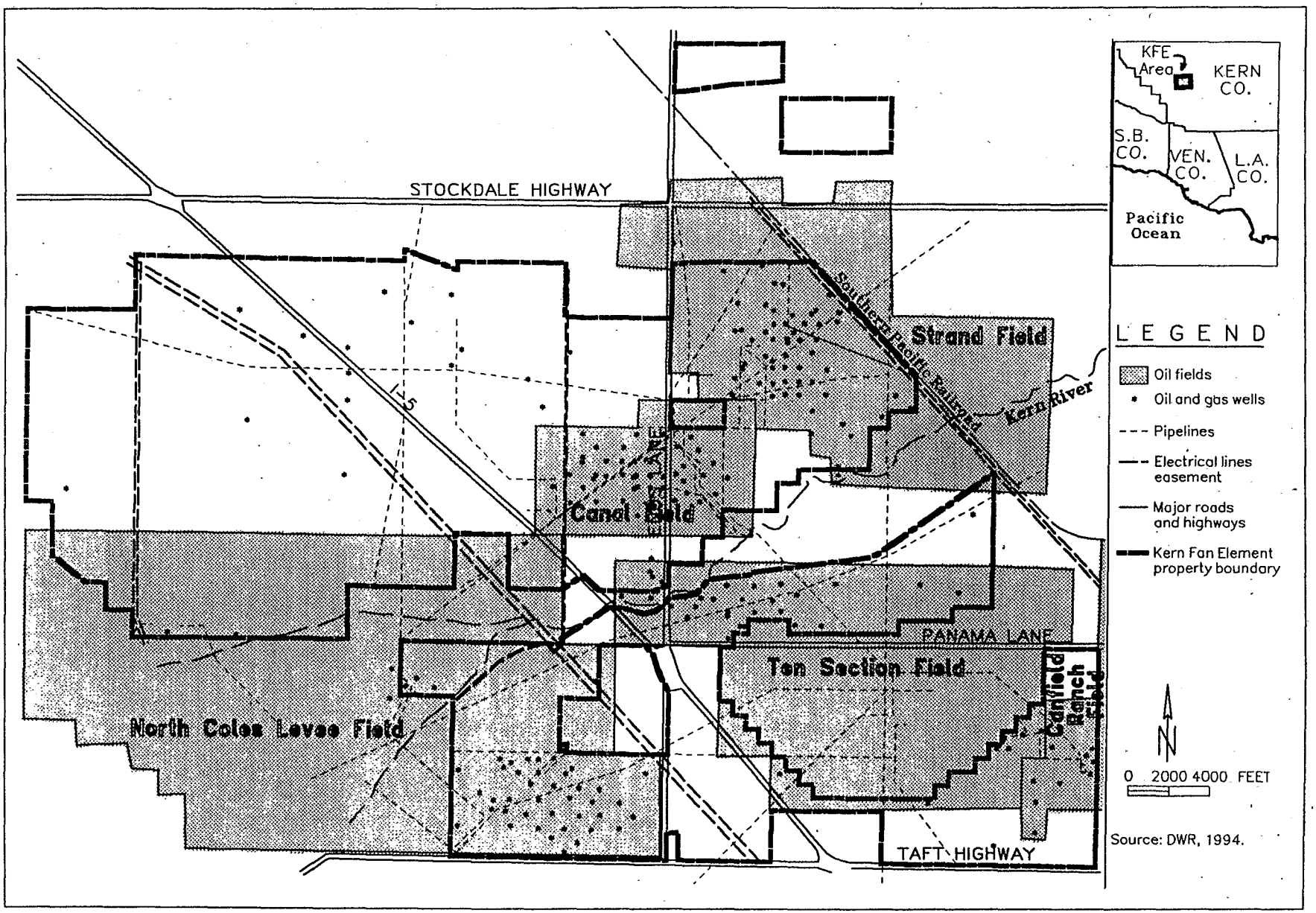

Figure 4.6-1

OIL AND GAS, UTILITY, AND CONVEYANCE FACILITIES IN THE KERN FAN ELEMENT PROPERTY

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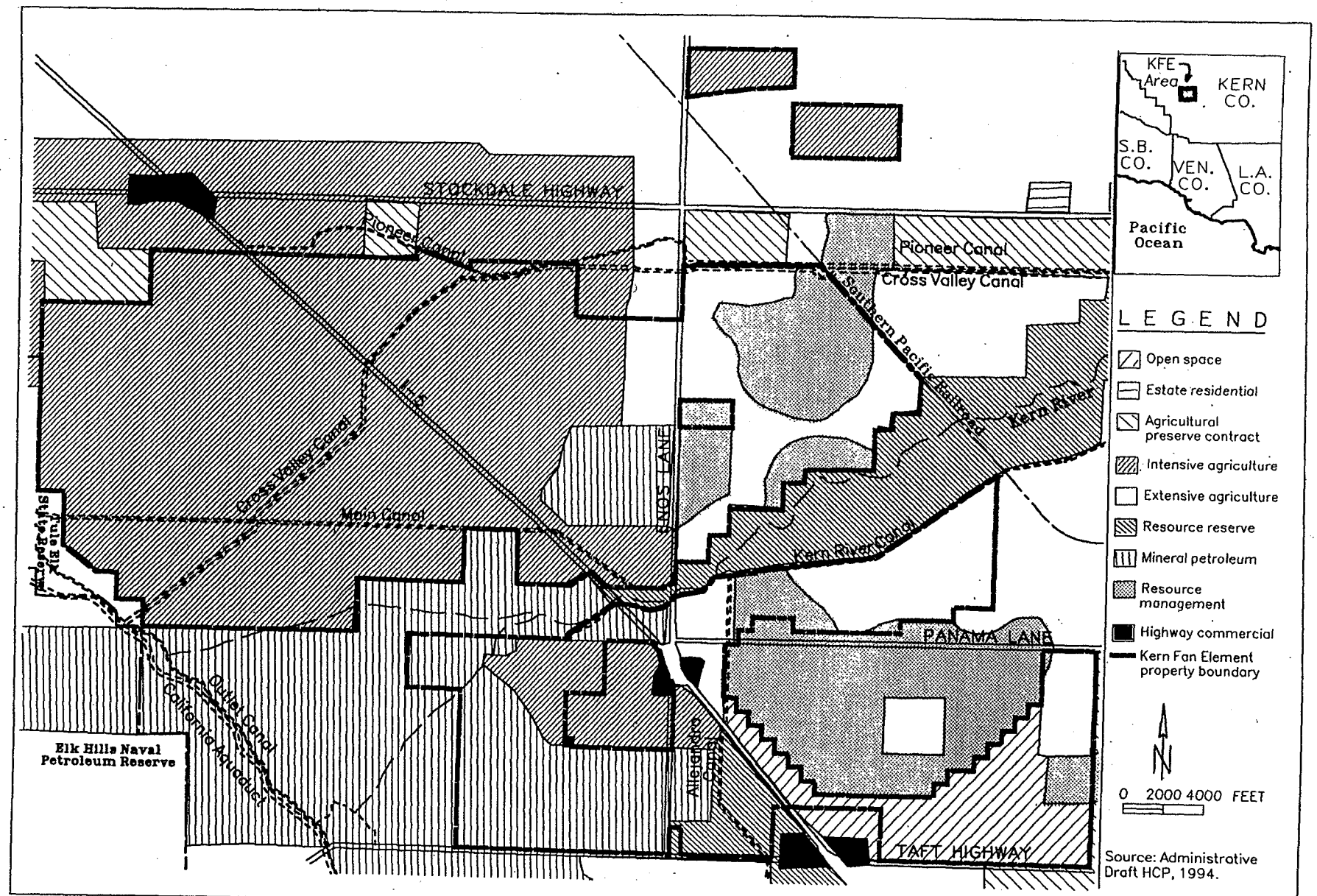

Figure 4.6-2

GENERAL PLAN LAND USE DESIGNATIONS IN THE KERN FAN ELEMENT AND ADJACENT PROPERTIES

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and policies. Adopted local plans and policies in the KFE area are addressed below.

The *Kern County General Plan* is the primary plan controlling land use within the immediate vicinity of the KFE area. The *Land Use, Open Space, and Conservation Element* (1990) includes maps that designate land uses in the unincorporated parts of the county. The 1990 land use designations have not been updated to reflect state ownership of the KFE property. Assuming continued ownership by the state, the land use designations would ultimately be redesignated as "nonjurisdictional" on the county land use map. Nonjurisdictional lands include incorporated cities, state lands, and large federal holdings, and are not under the direct planning jurisdiction of Kern County (JHA, Inc. 1994).

The predominant county land use designations on the KFE property are Intensive Agriculture, Resource Reserve, Extensive Agriculture, Mineral Petroleum, and Resource Management (see Figure 4.6-2), which all fall within the Resource category. Other land use designations include Highway Commercial (at three I-5 interchanges) and Open Space. Watershed recharge areas are identified within the "resource management" designation, which is defined as follows: primarily open space lands containing important resource values such as wildlife habitat, scenic values, or watershed recharge areas.

A portion of the KFE property is contained in the Rural Southwest and Northwest planning areas of the *Metropolitan Bakersfield 2010 General Plan*. Rural southwest lands are described as primarily agricultural and are identified as including DWR's groundwater recharge project. Rural Northwest lands are described as predominantly agricultural with scattered rural residential land uses. *The Kern River Plan Element* (KRPE) of the General Plan controls land use within the Kern River corridor. The KRPE provides for recreational opportunities and habitat preservation/ enhancement as well as the continuation of groundwater recharge activities, channel maintenance, and flood control activities. The plan identifies a new office/retail/residential mixed use center approximately 1 to 2 miles east of the KFE.

CASTAIC LAKE

Castaic Lake is part of the Castaic Lake State Recreation Area. Land use related to Castaic Lake is addressed under Recreation, Section 4.7.

LAKE PERRIS

Lake Perris is part of the Lake Perris State Recreation Area. Land use related to Lake Perris is addressed under Recreation, Section 4.7.

4.6.2 Environmental Consequences

PROPOSED ACTION

Kern Fan Element

In the sections below, Scenarios A, B, and C are first compared to existing land use conditions at the KFE, and then to conditions that would exist if the *Preliminary Administrative Draft Habitat Conservation Plan* (Draft HCP) (JHA 1994) for the KFE were adopted and implemented.

Scenario A. For all three scenarios, if provisions of the Monterey Agreement were implemented, lands in the KFE that are currently owned by DWR would be transferred to SWP Agricultural Contractors. Approximately 300 remaining acres of irrigated farmland would be eliminated under all scenarios. Lands in the "other uses" category (490 acres) would remain the same in all scenarios. The three scenarios differ in the amount of land devoted to three land use categories: recharge facilities, native and disturbed vegetation, and previously irrigated agricultural land/undesignated lands.

Under Scenario A, existing KFE lands categorized as recharge facilities would increase from 578 acres to 3,258 acres, an addition of 2,680 acres (see Table 2.2-1). Native and disturbed vegetation would decrease from 2,690 to 2,000 acres, a decrease of 690 acres. Previously irrigated agricultural land/undesignated land uses would decrease from 16,500 acres to 14,798 acres, a reduction of 1,702 acres.

Some water recharge, extraction, and conveyance uses already exist on KFE property and in nearby areas. Recharge facilities would generally be considered compatible with agriculture and would be allowed in the A—Exclusive Agriculture zone, which is the predominant zoning designation in the area. Depending upon the specific location of proposed uses and the existing General Plan land use designation for the area, an amendment to the General Plan map may be required to change the designation to Resource Management, which identifies water recharge uses. Review of proposed development plans by Kern County would be required prior to implementation of any of the scenarios. Similarly, coordination with USFWS and CDFG would be required to ensure compliance with statutes and regulations protecting threatened and endangered species located on the KFE property, and completion of a habitat conservation plan may be required.

Most agricultural leases on the KFE property have been terminated in recent years. Less than 2 percent of the KFE property currently comprises irrigated agricultural land. Irrigated agriculture is one of several possible uses in undesignated portions of the KFE property, along with recharge and recreation uses. Lands in active oil and gas production may continue to exist on portions of the KFE property, and may be unavailable for recharge facilities or habitat management.

The Draft HCP proposes more recharge facilities and more land in habitat management than proposed under Scenario A. Scenario A would reduce the amount of land in recharge facilities from 6,778 acres in the Draft HCP to 3,258 acres and reduce lands categorized as native and disturbed vegetation from 7,540 acres to 2,000 acres. The undesignated category would increase from 5,738 in the Draft HCP to 14,798 acres in Scenario A.

Overall, proposed uses under Scenario A generally appear to be compatible with existing uses and zoning in the area. A change in the General Plan land use map designation to Resource Management may be required for portions of the property. Conversion of 288 acres of irrigated farmland would occur, but other irrigated agriculture may be developed in undesignated areas. Loss of 5,540 acres of native and disturbed vegetation would occur. Lands used for recharge facilities would increase by 2,680 acres. Potential impacts to land use would not be significant.

Scenario B. Under Scenario B, existing lands categorized as recharge facilities would increase from 578 acres to 5,258 acres (see Table 2.2-1). Native and disturbed vegetation would be increased from 2,690 to 4,500 acres. Previously irrigated agricultural land/ undesignated land uses would be decreased from 16,500 acres to 10,298 acres.

The Draft HCP proposes more recharge facilities and more land in habitat management than Scenario B. Scenario B would reduce the amount of land in recharge facilities from 6,778 acres in the Draft HCP to 5,258 acres and reduce lands categorized as native and disturbed vegetation from 7,540 acres to 4,500 acres. The undesignated category would increase from 5,738 acres in the Draft HCP to 10,298 acres under Scenario B.

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Overall, proposed uses under Scenario B generally appear to be compatible with existing uses and zoning in the area. A change in the General Plan land use map designation to Resource Management may be required for portions of the property. Conversion of 288 acres of irrigated farmland would occur, but other irrigated agriculture may be developed in undesignated areas. Loss of 3,040 acres of native and disturbed vegetation would occur. Lands used for recharge facilities would increase by 4,680 acres. Potential impacts to land use would not be significant.

Scenario C. Under Scenario C, existing KFE lands categorized as recharge facilities would increase from 578 acres to 7,758 acres, an addition of 7,180 acres (see Table 2.2-1). Native and disturbed vegetation would increase from 2,690 to 7,100 acres, an addition of 4,410 acres. Previously irrigated agricultural land/undesignated land uses would decrease from 16,500 acres to 5,198 acres, a reduction of 6,202 acres.

The Draft HCP proposes less recharge facilities and more land in habitat management than Scenario C. However, land use allocations in this scenario are closest to the Draft HCP allocations of the three proposed scenarios. Scenario C would increase the amount of land in recharge facilities from 6,778 acres in the Draft HCP to 7,758, an increase of 980 acres. It would reduce lands categorized as native and disturbed vegetation from 7,540 acres to 7,100 acres, a reduction of 440 acres. The undesignated category would decrease from 5,738 acres in the Draft HCP to 5,198 acres under Scenario C.

Overall, proposed uses under Scenario C generally appear to be compatible with existing uses and zoning in the area. A change in the General Plan land use map designation to Resource Management may be required for portions of the property. Conversion of 288 acres of irrigated farmland would occur, but other irrigated agriculture may be developed in undesignated areas. Lands in native and disturbed vegetation would increase by 4,410 acres. Lands used for recharge facilities would increase by 7,180 acres. Potential impacts to land use would not be significant.

Castaic Lake

Impacts are addressed under Recreation, Section 4.7.

Lake Perris

Impacts are addressed under Recreation, Section 4.7.

NO PROJECT ALTERNATIVE

If the project were not implemented, it is assumed that DWR would continue to own the KFE property and that DWR and local agencies would develop recharge and conveyance facilities in the area. Plans for such facilities are described in the *First Stage Kern Fan Element Feasibility Report and Draft Supplemental EIR* (December 1990). Based on the findings of the EIR, a *Preliminary Administrative Draft Habitat Conservation Plan* was prepared. The plan presents a conservation strategy for avoiding and minimizing the potential loss of threatened and endangered species or their habitat. Because this plan only reached the Administrative Draft stage and no final decision was made to implement the plan, it is referenced in this EIR for information only.

For the purpose of this analysis, uses without the project are assumed to be those identified in the Draft HCP. The Draft HCP proposes 7,540 acres of native and disturbed vegetation and 6,778 acres of DWR and local recharge and conveyance facilities. It also proposes 5,738 acres of previously irrigated agricultural or undesignated lands. These lands can be made available for additional water recharge and extraction facilities, recreational activities, and additional mitigation banking use, and include land currently used for oil and gas extraction.

Other uses include 490 acres of roads, canals, and oil and gas facilities on non-native and disturbed vegetation land.

Since no significant land use impacts are anticipated from the three proposed Scenarios, the No Project Alternative would not prevent significant impacts from otherwise occurring under these scenarios.

4.6.3 Mitigation Measures

No significant impacts on land use would be caused by implementation of the Proposed Action and no mitigation measures are proposed.

4.7 RECREATION

4.7.1 Affected Environment

KERN FAN ELEMENT

Existing land uses in the 20,546-acre KFE include previously irrigated agricultural lands; native and disturbed vegetation; water recharge facilities; irrigated farmland and other uses including roads, canals, utilities, and active and abandoned oil and gas facilities. Recreation uses in the vicinity primarily occur off site, although informal activities such as bird watching and picnicking occur. Recreation activities in the City of Bakersfield's 2,800-acre recharge area along the Kern River consist of bird watching, hiking, horseback riding, and picnicking. In addition, the California Aqueduct and numerous canals in and around the KFE are popular fishing spots. The Buena Vista Aquatic Recreation Area, south of the site, is operated by the Kern County Parks and Recreation Department. It contains 86-acre Lake Evans and 873-acre Lake Webb, primarily devoted to boating and fishing, separate swimming lagoons, and picnicking and camping facilities. The 975-acre Tule Elk State Reserve, located northwest of Tubman, is operated and maintained by the California Department of Parks and Recreation and offers viewing of elk, picnicking, presentations, and tours.

CASTAIC LAKE STATE RECREATION AREA

Castaic Lake is located about 45 miles northwest of Los Angeles and 2 miles north of the community of Castaic (see Figure 4.7-1). The nearest major roads are Interstate 5 and Lake Hughes Road. Castaic Lake State Recreation Area, which is operated by the Los Angeles County Department of Parks and Recreation, offers fishing, boating, water skiing, sailing, jet skiing, wind surfing, float tubing, and recreational vehicle and tent camping. A concessionaire operates a boat rental facility.

Elderberry Forebay Dam, owned and operated by Los Angeles Department of Water and Power, is located 3 1/2 miles upstream of Castaic Dam on Castaic Creek. Elderberry Forebay provides regulatory storage for the Castaic Powerplant. It provides no recreation.

Castaic Lagoon, located downstream of the Castaic Dam, provides an additional 197 acres of surface water and 3 miles of shoreline for recreation use. It also functions as a recharge basin for the downstream water basin. The lagoon has its own annual water budget, and water levels remain fairly stable. Picnic facilities are most heavily concentrated in the development around Castaic Lagoon. Boating and fishing are also permitted at the lagoon.

At maximum operating elevation, Castaic Lake has a surface area of 2,235 acres, a maximum depth of 330 feet, and 29 miles of shoreline. The lake and dam were completed in 1972. The west arm (ski arm) of the V-shaped lake is the water-skiing and fast boating area. The east arm (fishing arm) is for fishing, sailing, and slow boating. A jet ski area is located

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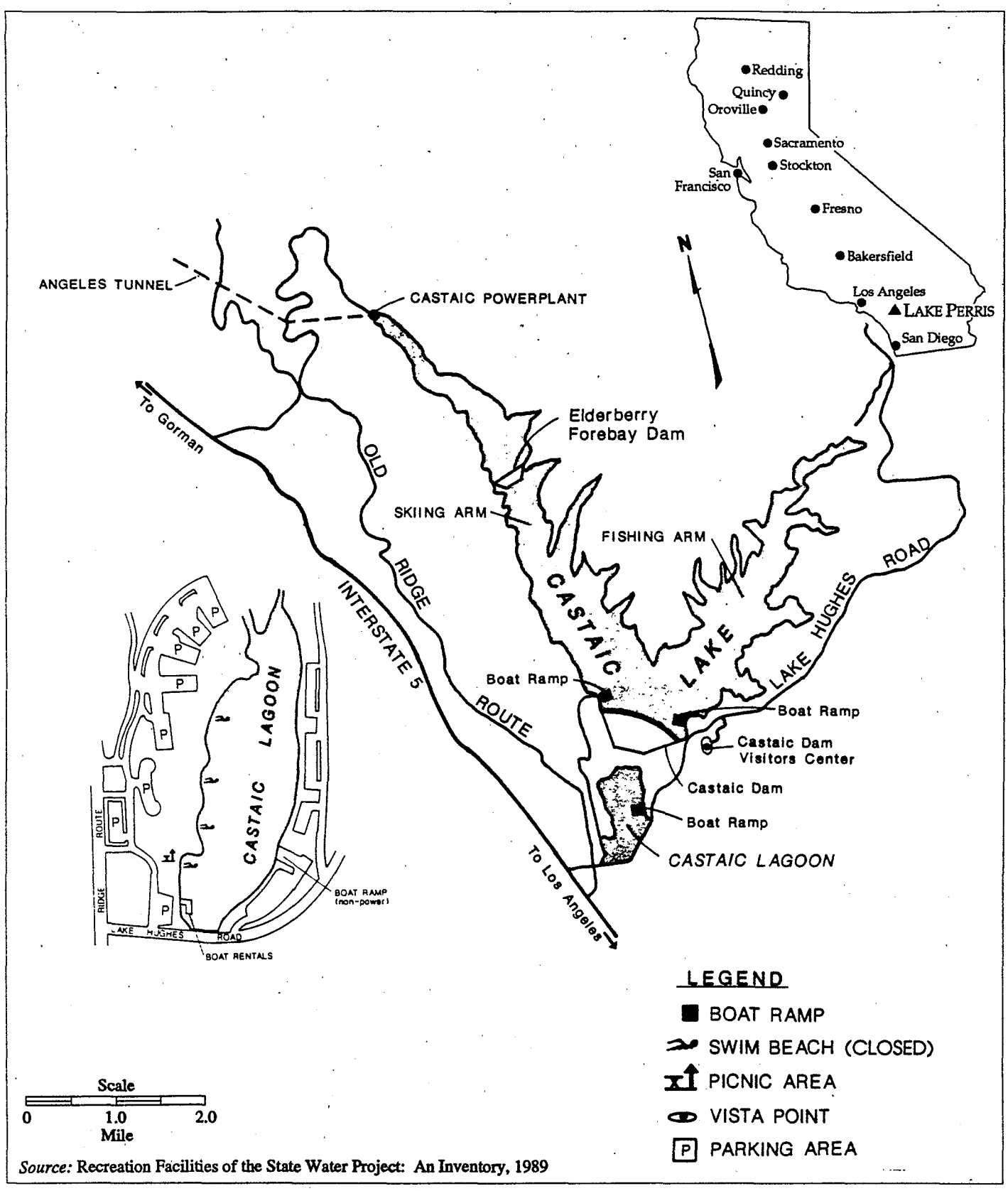

Source: Recreation Facilities of the State Water Project: An Inventory, 1989

Figure 4.7-1. Castaic Lake State Recreation Area.

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adjacent to the dam. There are two boat ramps on the lake, one at the east end of the dam, one at the west end of the dam, and one at the lagoon. The lake boating capacity is 500 vessels. Over the years, the shoreline areas around Castaic Lake, which are quite steep, have eroded in a number of locations, and landslides have occurred. This is in part due to water level fluctuations and geological conditions. At times, these conditions limit access to certain areas of the lake, and are a continual operational and safety concern.

The park contains 36 recreational vehicle campsites of which up to 10 sites are rented out for tent camping. A system of mountain bike and hiking trails has been developed on the west side of the park.

Swimming is not allowed in Castaic Lake. Swimming was permitted in Castaic Lagoon until 1992, when high coliform levels forced closure of the swimming areas. Funding has not been available to provide the additional treatment facilities needed to ensure public health and allow the swimming area to reopen.

Fishing at Castaic Lake includes large- and small-mouth bass, rainbow trout, catfish, and crappie. Fishing is allowed from sunrise to sunset on the main lake. The Department of Fish and Game regularly stocks the lake with trout. In fiscal year 1993-1994, approximately 170,000 fishermen used the recreation area, with the heaviest visitation in July (about 29,000 fishermen) and the lightest in January (about 4,700 fishermen). No hunting is allowed within the Castaic Lake State Recreation Area.

Table 4.7-1 and Figure 4.7-2 show historic annual visitor use at Castaic Lake State Recreation Area. Figures include both the main lake and the lagoon. Visitor use was 499,000 in 1993-94. It has been decreasing since the peak use year in 1989-90, when visitation was 1.4 million. Park officials indicate that the beach closure at the lagoon in 1992 played a significant role in reducing visitation levels at both the lagoon and main lake. Fee increases may also have played a role. Park officials have sought to increase visitation through increased promotion of special events such as bass tournaments, jet ski races, and regattas.

The highest attendance typically occurs in the spring and summer months. July has traditionally been the peak attendance month, with approximately 150,000 visitor use days. December has been the lowest attendance month with about 10,000 visitor use days.

Revenues generated by Castaic Lake State Recreation Area were approximately $1.0 million for fiscal year 1993-94. Revenue figures for the two prior years are not available, but prior to those years revenues

Table 4.7-1
Visitor Use in Thousands at Castaic Lake and Lake Perris State Recreation Areas

Year [1]	*Castaic Lake*	*Lake Perris*
1972-73	232	Not applicable
1973-74	358	Not applicable
1974-75	1,056	713
1975-76	1,013	788
1976-77	964	880
1977-78	833	782
1978-79	1,084	1,462
1979-80	985	1,044
1980-81	1,054	1,186
1981-82	1,267	1,467
1982-83	972	1,714
1983-84	875	1,623
1984-85	846	2,065
1985-86	903	1,970
1986-87	1,098	1,770
1987-88	1,270	1,545
1988-89	1,356	1,560
1989-90	1,422	1,343
1990-91	1,233	1,442
1991-92	1,084	1,235
1992-93	771	1,396
1993-94	499	1,437

Note: 1. Data reflect fiscal years from July through June of the following year.
Source: DWR, 1989; Higly, 1995.

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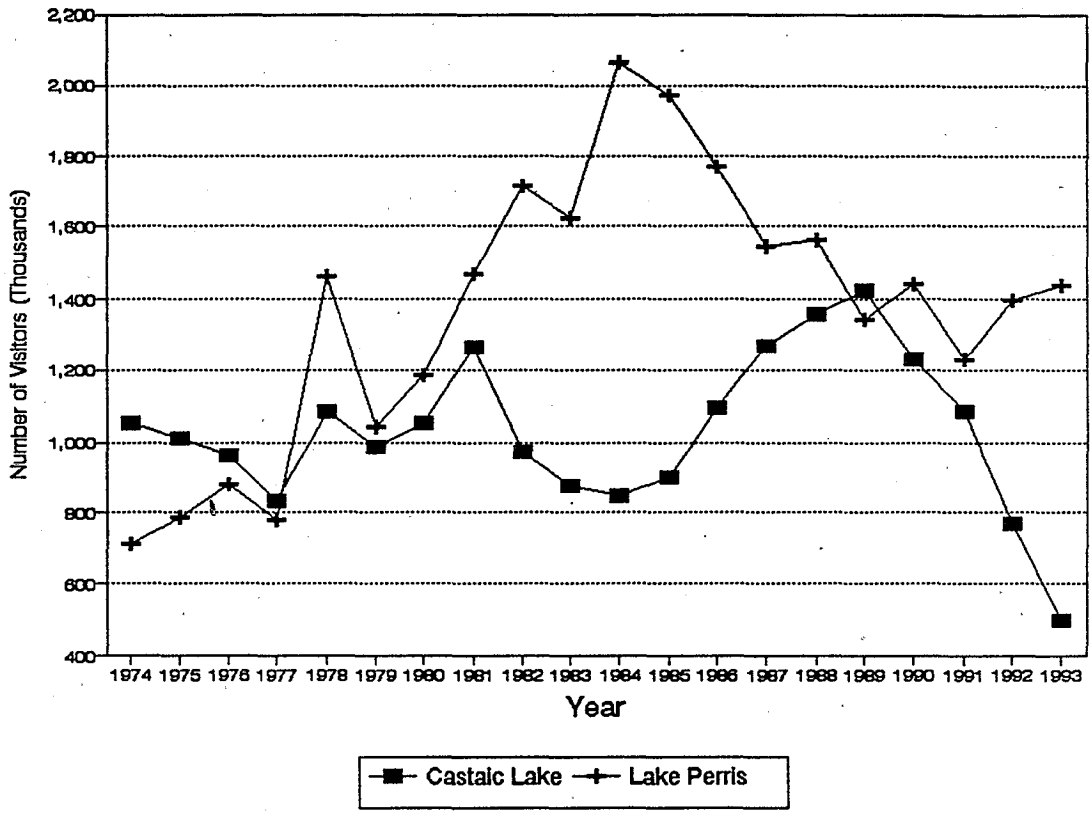

Source: DWR, 1989; Higly, 1995; SAIC, 1995

Figure 4.7-2. Visitor Use at Castaic Lake and Lake Perris

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were approximately $1.1 million in 1989-90 and 1990-91, $900,000 in 1988-89, $880,000 in 1987-88, and $600,000 in 1986-87.

LAKE PERRIS STATE RECREATION AREA

Operated by the California Department of Parks and Recreation, Lake Perris State Recreation Area offers camping, picnicking, horseback riding, sail and power boating, water-skiing, jet skiing, wind surfing, fishing, swimming, hiking, bicycling, hunting for upland game, and rock climbing. A concessionaire operates a marina and waterslide. Located about 13 miles southeast of the city of Riverside, the nearest major roads are the Ramona Expressway, Interstate 215, and U.S. Highway 60 (see Figure 4.7-3).

Lake Perris has a surface area of 2,318 acres, a maximum depth of 110 feet, and 10 miles of shoreline. Lake Perris and the Perris Dam were developed in 1974 as part of the State Water Project. Most of the developed areas such as parking areas, campgrounds, a marina, and boat launches are located on the north side of the lake. Access to the park is provided by Lake Perris Drive and Via Del Lago Road.

The park contains 431 family campsites, including 167 sites for tent campers and 264 paved sites for recreational vehicles. In addition, nine group campground areas each accommodate from 25 up to 80 or 100 people, and there is a primitive horsecamp. Hiking, bicycling, and horse trails have been developed around the lake. Rock climbing occurs at the south end of the dam at Big Rock.

Three boat launching ramps are located on the north side of the lake. The marina contains 306 boat slips and offers dry storage, a gas dock, coffee shop, marina store, boat repair, and boat and personal watercraft rental. Sailboats and windsurfers launch in the sail cove area, where no power boats are allowed. A personal watercraft launching ramp is proposed for construction in the 1996-97 fiscal year. Allesandro Island is a day use, boat-in only area with picnic tables and grills.

Swimming is allowed only in the Moreno and Perris Beach areas. Safe swim areas are marked with buoys. In 1986, swimming areas were closed due to high coliform counts. A public education program, including increased signage, was implemented and the swimming areas were reopened.

Fishing at Lake Perris includes large-mouth bass, Alabama spotted bass, rainbow trout, channel catfish, and Florida bluegill. The lake also has a large population of crayfish. There are two fishing piers at the west end of the lake. Anglers also fish along the dam, from boats, and from the shore. The Department of Fish and Game stocks trout and Alabama spotted bass at Lake Perris.

At the east end of Lake Perris, the Department of Fish and Game, in cooperation with the Department of Parks and Recreation, operates hunting areas for upland game including rabbits, jackrabbits, quail, dove, ducks, and geese. A portion of the east end of the lake is used by boaters for duck hunting.

Table 4.7-1 and Figure 4.7-2 show annual visitor use at Lake Perris State Recreation Area. Visitor use was 1,437,000 in 1993-94. Park officials indicate that the beach closures in 1986 and subsequent media coverage have played a significant role in reducing visitation levels even several seasons after the beaches were reopened. Fee increases in 1989 and 1991 may also have affected visitation.

Annual attendance generally increased through 1984-85, peaking in that year with 2.1 million visitation days. Since then, it has decreased and stabilized at approximately 1.4 million visitation days in each of the last 5 years.

Attendance is highest in the spring and summer, usually peaking in July, and is lower

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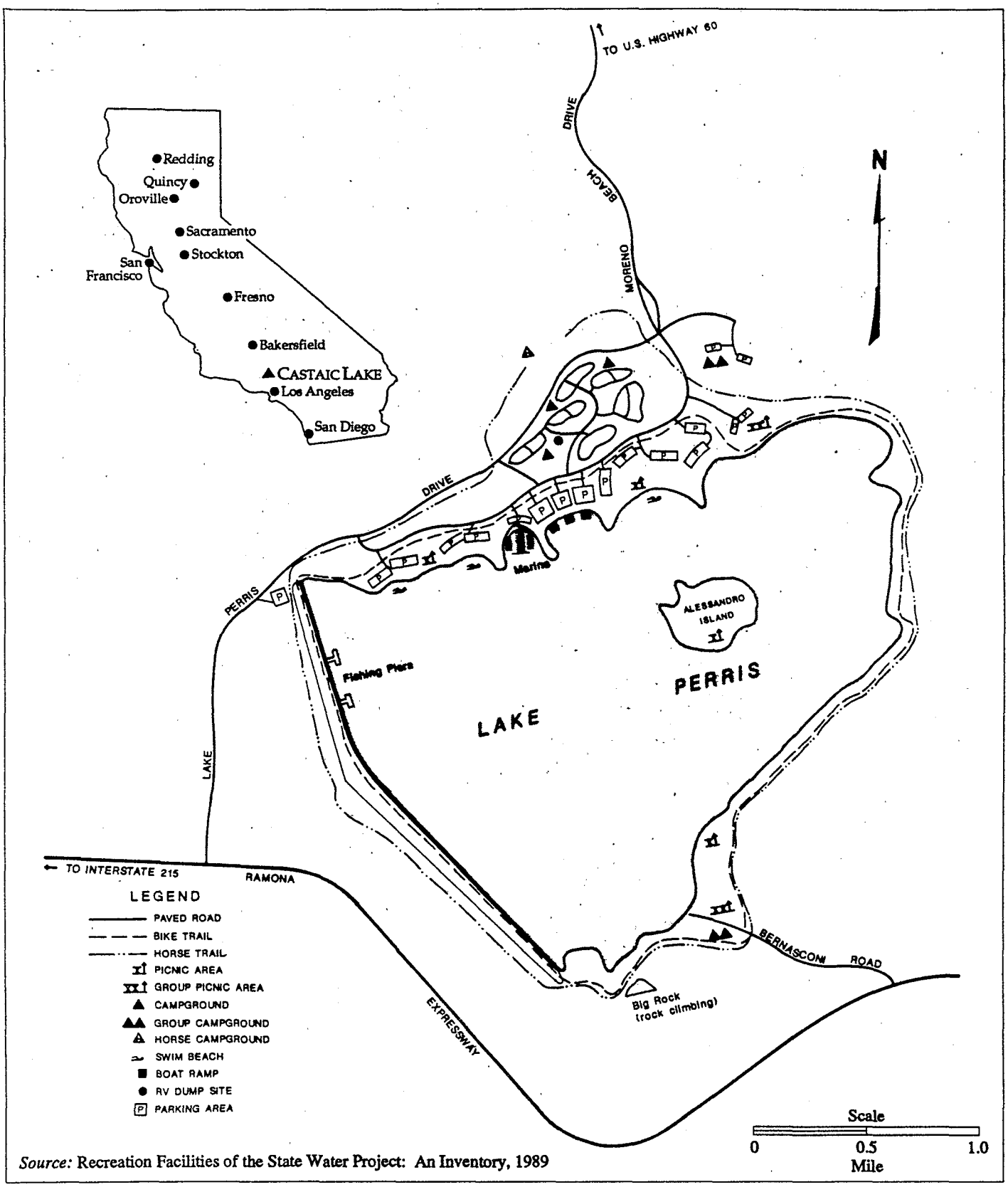

Source: Recreation Facilities of the State Water Project: An Inventory, 1989

Figure 4.7-3. Lake Perris State Recreation Area.

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in fall and winter. Average attendance in July has been about 250,000 visitation days, while average attendance in January, the lowest attendance month, is approximately 40,000. Attendance in July has been as high as 328,000 and as low as 164,000.

The lake normally operates at or near boating capacity (500 vessels) nearly every weekend and holidays during the period from May through October, and often beyond. During this period, boaters are frequently turned away and their entry delayed for several hours. Visitation is generally limited by the vehicle capacity of the facilities. With changes in boat use from vehicles with boat trailers, to more use of sailboards, kayaks, and personal watercraft that do not require larger parking spaces, the park still attempts to enforce the 500 boat limit.

Revenues generated by Lake Perris State Recreation Area for fiscal year 1993-94 were approximately $2.4 million. Revenues in the months of July, August and the following June, comprised approximately 47 percent of the annual total. Annual revenues in the three prior years were between $2.2 million and $2.5 million.

4.7.2 Environmental Consequences

PROPOSED ACTION

Kern Fan Element

No designated recreation areas currently exist on the KFE property. Under the three proposed scenarios, recreation use is indicated as one of several possible uses on previously irrigated agricultural and undesignated lands, but no amounts or locations are indicated. Impacts to recreation in the KFE would be negligible under the three proposed scenarios.

Castaic Lake State Recreation Area

Scenario A. If Scenario A were implemented, water levels at Castaic Lake would typically vary a minimum amount each year, about 15 feet, and the reservoir would be refilled annually. Figure 4.7-4 shows proposed monthly water level elevations over a 16-year period for Scenario A, compared to historic water levels. Water levels for Scenario A at typical high storage would be about 1,514 feet elevation and at low storage about 1,499 feet elevation. In this and each of the other scenarios, a major drawdown to approximately 1,360 feet elevation would occur every 8 to 10 years for maintenance and inspection of facilities.

Projected water levels would be at or below 1,500 feet elevation only 20 percent of the time under Scenario A (see Figure 4.7-5), compared to 70 percent of the time historically, a beneficial impact on year-round recreation.

Average water levels in June through August, the peak recreation months, would be between 1,497 and 1,503 feet elevation under Scenario A (see Figure 4.7-6). Average water levels in these months have been between 1,466 feet and 1,478 feet elevation in the past. This would have a beneficial effect on peak season recreation.

Table 4.7-2 compares water levels under existing conditions to water levels under the three proposed scenarios. Water levels at Castaic Lake would be at or below 1,495 feet elevation 9 percent of the time under Scenario A, compared to 65 percent of the time under existing operations. Water levels would be at or below 1,460 feet elevation 6 percent of the time under Scenario A compared to 30 percent under existing operations, and at 1,435 feet elevation 4 percent of the time, compared to 17 percent in the past.

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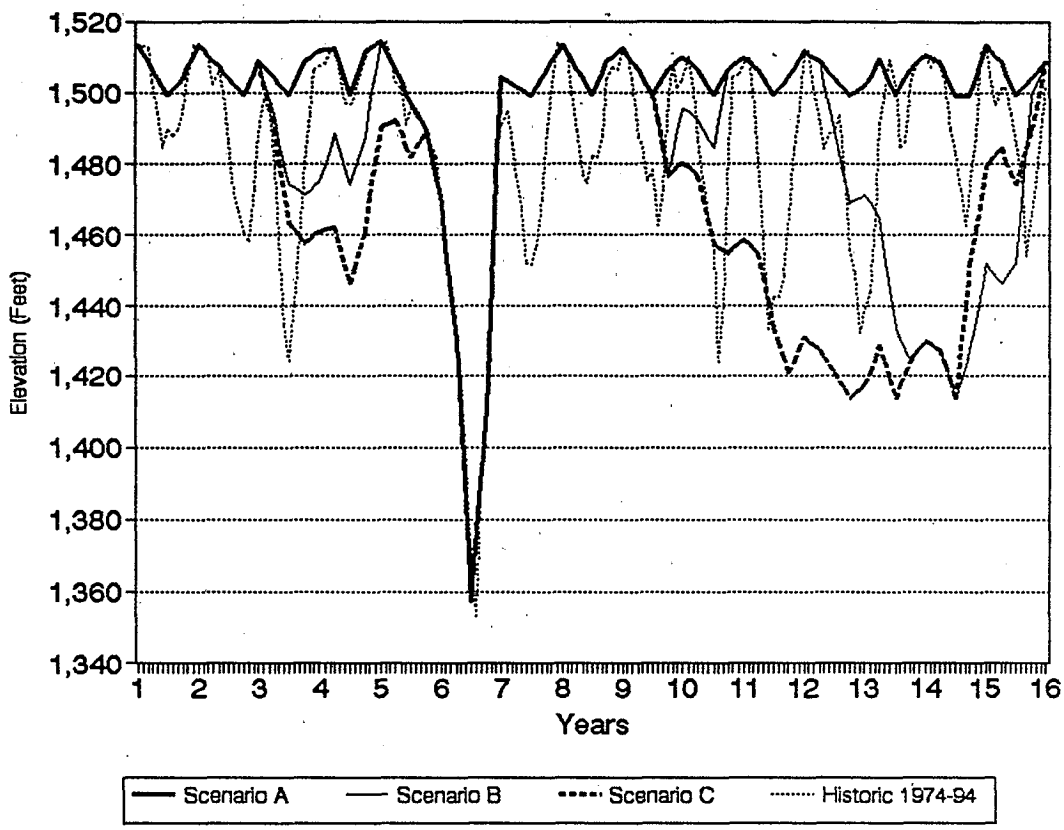
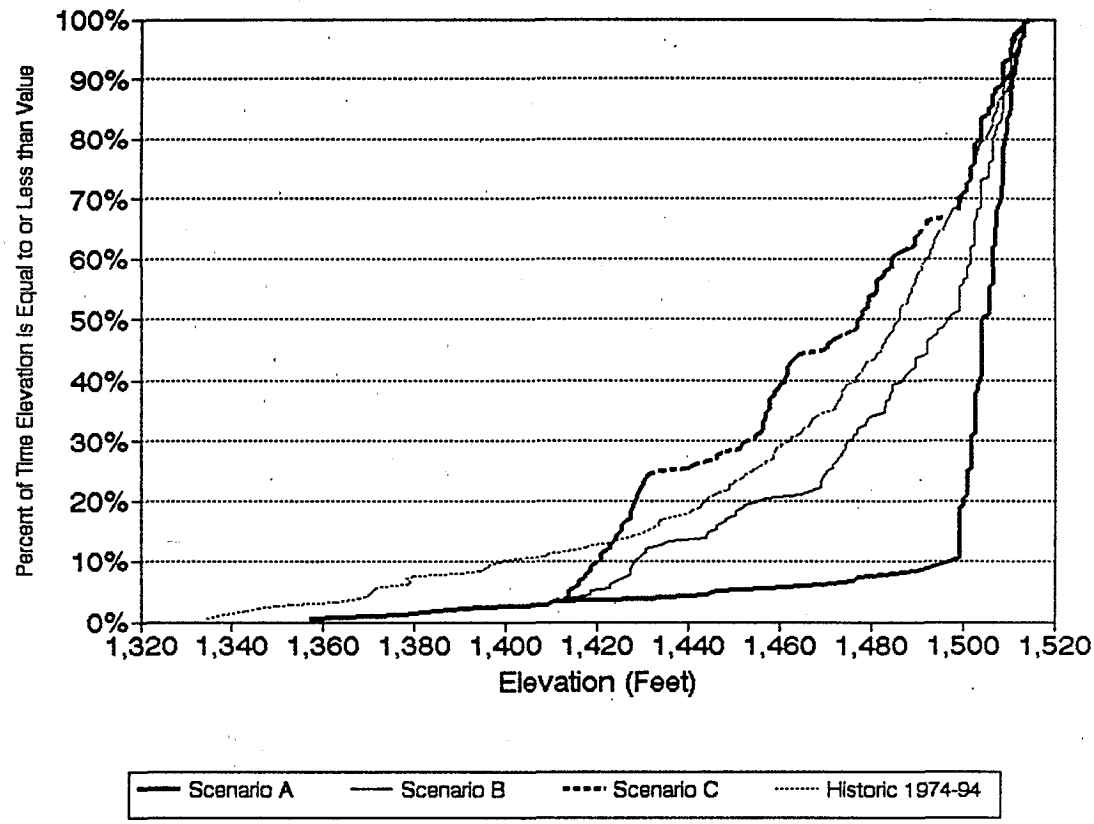


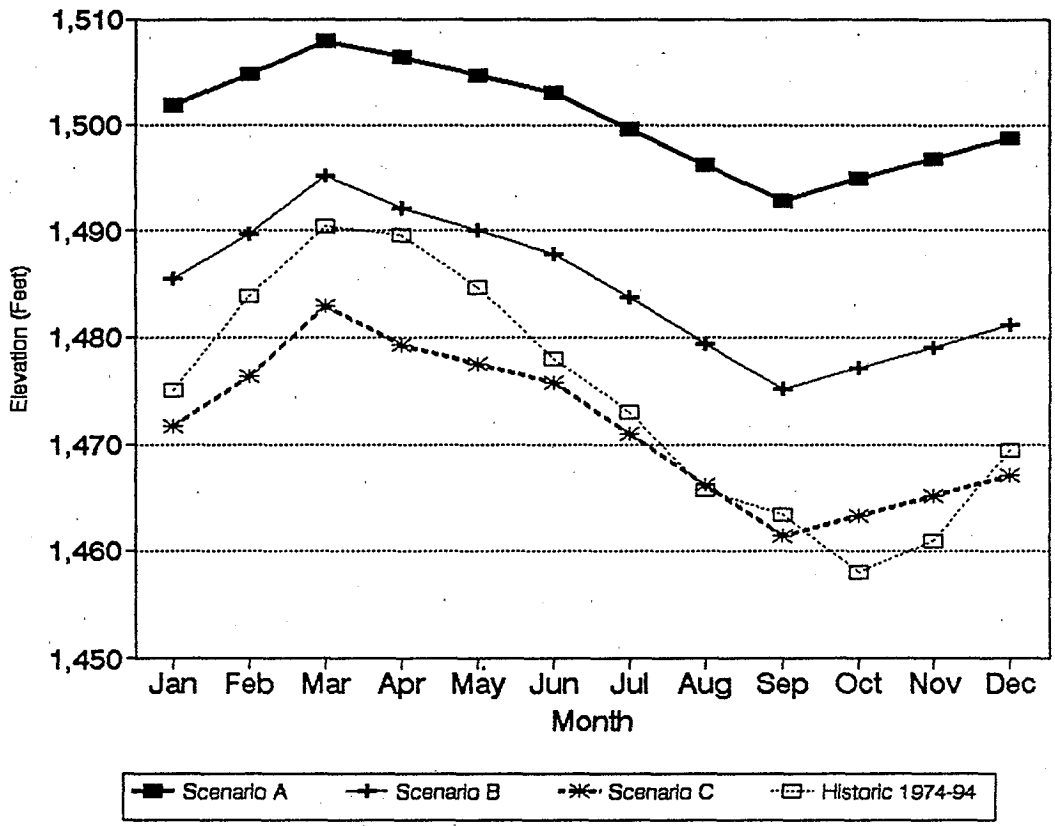
Source: MWD, 1994; SAIC, 1995

Figure 4.7-4. Castaic Lake - Surface Elevation, Scenarios A, B & C



Source: MWD, 1994; SAIC, 1995

Figure 4.7-5. Castaic Lake - Cumulative Frequency of Surface Elevations, Scenarios A, B & C



Source: MWD, 1994; SAIC, 1995

Figure 4.7-6. Castaic Lake - Average Monthly Surface Elevations, Scenarios A, B & C

Table 4.7-2
Percentage of Time Castaic Lake and Lake Perris Would be at or Below Selected Water Levels Under Existing Conditions and Scenarios A, B, and C

Average Water Level (elevation in feet)	Percentage of Time Lake Surface Would be at or Below Selected Water Levels			
	Existing Conditions	*Scenario A*	*Scenario B*	*Scenario C*
Castaic Lake				
1,495	65	9	49	66
1,460	30	6	21	39
1,435	17	4	13	25
Lake Perris				
1,574	27	0 [1]	19	43
1,565	9	0	6	29
1,560	2	0	2	12

Note: 1. Water levels at Lake Perris would remain above 1,574 feet elevation over 99 percent of the time under Scenario A.

Source: MWD, 1994; SAIC, 1995.

Table 4.7-3 shows the potential physical effects of a range of drawdown levels at Castaic Lake. None of the potential effects identified in the table would occur under Scenario A in non-maintenance years since water levels would be above 1,495 feet elevation. The types of effects listed in the table would potentially occur during the periodic maintenance and repair draw-down to 1,360 feet. However, since periodic maintenance is required under any operating scenario including the existing one, it is not considered an adverse effect of the proposed action when compared to existing conditions.

Overall, Scenario A would be beneficial to recreation since average water levels would be higher than in the past, and drawdowns would be reduced, avoiding some of the potential physical effects and use conflicts that could occur with lower lake levels. Based on an analysis of historic attendance and water level data for Castaic Lake, changes in water level were not found to be directly correlated with changes in annual attendance. While water level may affect attendance in some way, it can not be used to explain historic changes in attendance. Therefore, while increases in water levels from Scenario A may improve the recreation experience, corresponding changes in attendance and revenues are expected to be negligible unless new facilities are developed. The economic impacts on the local area would be negligible.

Scenario B. If Scenario B were implemented, a quarter of the years would experience minimal drawdowns to about 1,500 feet with refilling of the lake (i.e., to the typical high elevation level of 1,514 feet) in the same year (see Figure 4.7-4). In about a third of the years, larger drawdowns to approximately 1,480 feet elevation would occur with refilling occurring in the next year. Another quarter of the time, a greater and more prolonged drawdown would occur, with water levels decreasing to between 1,470 feet and 1,420 feet elevation year-round over a 3-year period. Finally, one year would entail a periodic maintenance and repair drawdown during which water levels could be between 1,460 and 1,360 feet elevation for most of the year.

Under Scenario B, water levels would be at or below 1,495 feet elevation (where exposed hazards begin to cause damage) 49 percent of

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Table 4.7-3
POTENTIAL RECREATION EFFECTS AT CASTAIC LAKE STATE RECREATION AREA DUE TO CHANGES IN SURFACE WATER LEVEL

Lake Surface Water Level (feet)	*Potential Effects*
1,515	Maximum operating surface elevation.
1,495	Potential for significant propeller damage to boats from exposed hazards begins and increases rapidly as the water elevation drops farther.
1,490	Two of the largest boat-in picnic areas on the lake, Sharon's Rest and Laura's Landing, become inaccessible unless willing to climb very steep shoreline.
1,480	Surface area of the lake is decreased by over 10 percent. Existing conflicts between user groups during heavy use periods would be exacerbated. Waiting lines for launching, which frequently occur during heavy use periods even at full lake capacity, would increase.
1,460	The west boat launch ramp loses two of its six lanes.
1,456	Of approximately 25 mapped lake hazards (i.e., points, islands, rocks, peninsulas, etc.) half would be exposed. Hazard areas are to be avoided when water levels are within 5 vertical feet of the hazard elevation.
1,450	The east (main) launch ramp begins to lose lanes, adversely affecting concessionaire's rental boat operation.
1,435	The west boat launch ramp becomes completely unusable. Additional pressure is placed on the main launch ramp and the potential for waiting lines for launching boats is greatly increased.
1,428	Approximately 75 percent of lake hazard areas would be exposed.
1,280	Minimum operating surface elevation.
1,280	Dead pool surface elevation.

Source: SAIC, 1995.

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the time (see Figure 4.7-5). Past operations have produced these or lower water levels 65 percent of the time. Water levels would be at or below 1,460 feet elevation 21 percent of the time. At this level, use of some of the boat launch ramp lanes begin to be unusable and two boat-in recreation areas would be inaccessible. Past operations have produced these or lower water levels 30 percent of the time. Water levels at or below 1,435 feet would occur 13 percent of the time. At this level the west boat launch is unusable and use of the east boat launch ramp is limited, affecting the concessionaire's rental boat operation. Past operations have produced these or lower levels 17 percent of the time. Average water levels in June through August, the peak recreation months, would be between 1,479 and 1,488 feet elevation (see Figure 4.7-6). These levels would be greater than in the past, when water levels were between 1,466 feet and 1,478 feet, a beneficial impact on peak-season recreation.

Under Scenario B, water levels would typically be higher than in the past and impacts on recreation would be beneficial. Changes in attendance and revenues are expected to be negligible unless new facilities are developed. The economic impacts on the local area would be negligible.

Scenario C. If Scenario C were implemented, a quarter of the years would experience minimal drawdowns to about 1,500 feet with refilling of the lake in the same year (see Figure 4.7-4). Another quarter of the years would involve larger drawdowns to approximately 1,460 feet elevation with refilling occurring in the next year, and a periodic maintenance and repair drawdown to between 1,460 and 1,360 feet elevation lasting about a year. Approximately half of the years would entail a greater and more prolonged drawdown, with water levels decreasing to between 1,460 feet and 1,413 feet elevation year-round over a 4-year period.

Water levels would be at or below 1,495 feet elevation, where exposed hazards begin to cause damage, 66 percent of the time (see Figure 4.7-5). Past operations have produced these or lower water levels a similar amount of the time, 65 percent. Starting at water levels around 1,490 feet elevation, Scenario C would produce lower water levels a greater percentage of time than in the past.

Water levels would be at or below 1,460 feet elevation 39 percent of the time, limiting use of some boat launch ramp lanes and eliminating access to two boat-in recreation areas. Past operations have produced these or lower water levels 30 percent of the time. The launch ramps at Castaic Lake are quite steep. Thus, when water levels drop appreciably, parking on the ramp is allowed to shorten the walk back up the ramp. This can increase traffic problems at the ramp and discourage use by senior citizens and visitors with physical impairments.

Water levels at or below 1,435 feet would occur 25 percent of the time. At this level the west boat launch is unusable and use of the east boat launch ramp is limited, delaying launches and affecting the concessionaire's rental boat operation. Past operations have produced these or lower levels 17 percent of the time. During a prolonged drawdown, water levels would be at 1,435 feet and below year-round for 3 consecutive years. Examples of effects include possible increases in boat and equipment damage and liability from exposed hazards, limited use of boat launch facilities and increased launch delays, increased use conflicts on the water, and reduced access to boat-in recreation areas. In addition, if lower water levels reduce fish habitat and spawning activities, success rates for anglers could be affected (see Biological Resources, Section 4.4).

Average water levels in June through August, the peak recreation months, would be between 1,466 and 1,476 feet elevation (see Figure 4.7-6). These monthly averages would be similar

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to the past, when water levels were between 1,466 feet and 1,478 feet.

Scenario C would have a potentially adverse effect on recreation because lower lake levels would occur more often than in the past, causing greater frequency of facility limitations, use conflicts, and lake hazards. Although proposed operations would affect lake levels, the correlation between lower lake level and lower attendance was not shown to be significant, based on historic data. Impacts on recreation area attendance and revenues, though possible, are not expected to be significant. Recreation impacts are considered to be adverse but not significant.

It is anticipated that operation of Castaic Lake in a manner like Scenario C would occur only under the most extreme circumstances. Castaic Lake provides a considerable portion of the emergency storage supplies available to Southern California. As a result, MWD would attempt to refill any such storage withdrawals as soon as possible in order to maintain adequate supplies in case of an earthquake or other emergency, or in preparation for a year with supply shortages.

Lake Perris State Recreation Area

Scenario A. If Scenario A were implemented, water levels at Lake Perris would typically vary a minimum amount each year, about 5-10 feet, and the reservoir would refill annually. Figure 4.7-7 shows the proposed monthly water level elevations over a 16-year period for Scenario A, compared to historic water levels. Water levels for Scenario A at typical high storage would be about 1,588 feet elevation and at low storage about 1,580 feet elevation.

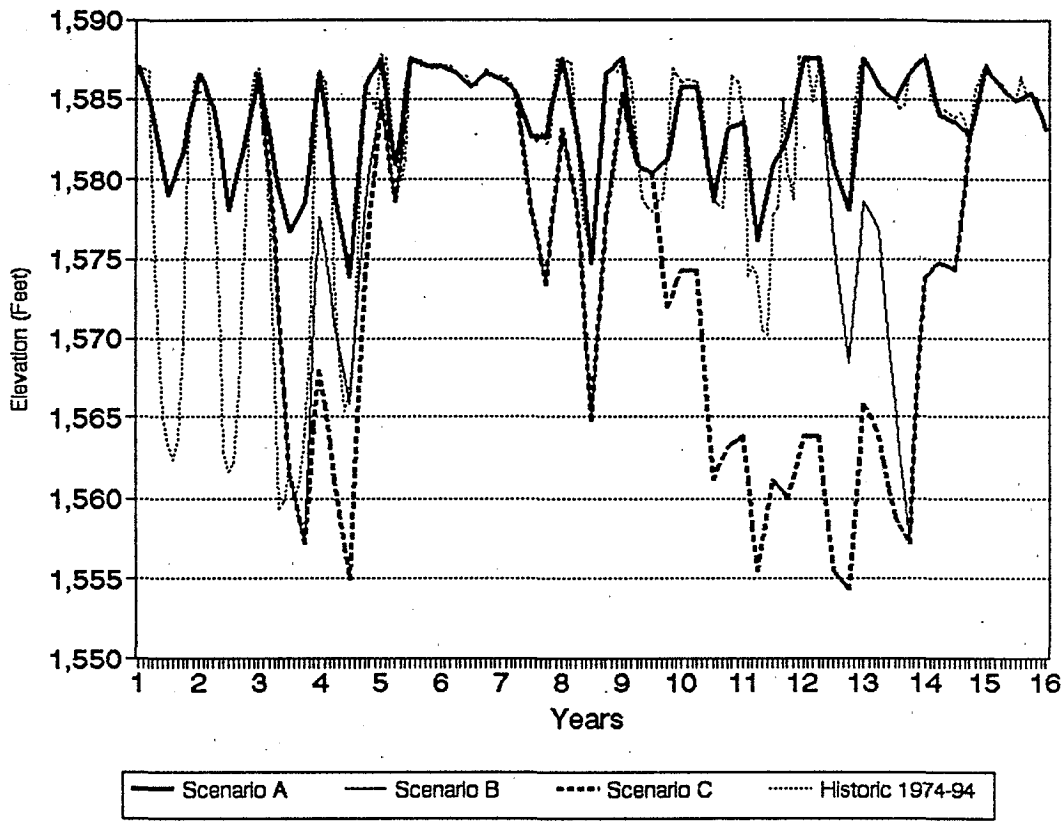
Projected water levels would be at or below 1,574 feet elevation less than one percent of the time under Scenario A (see Figure 4.7-8 and Table 4.7-2), compared to 27 percent historically, a beneficial impact on year-round recreation.

Average water levels in June through August, the peak recreation months, would be between 1,582 and 1,583 feet elevation under Scenario A (see Figure 4.7-9). Average water levels in these months have been between 1,575 feet and 1,580 feet elevation in the past. This would result in a beneficial impact on peak season recreation.

Table 4.7-4 shows the potential physical effects of a range of drawdown levels at Lake Perris. Since water levels would remain above 1,574 feet elevation under Scenario A, none of the potential effects identified in the table would occur.

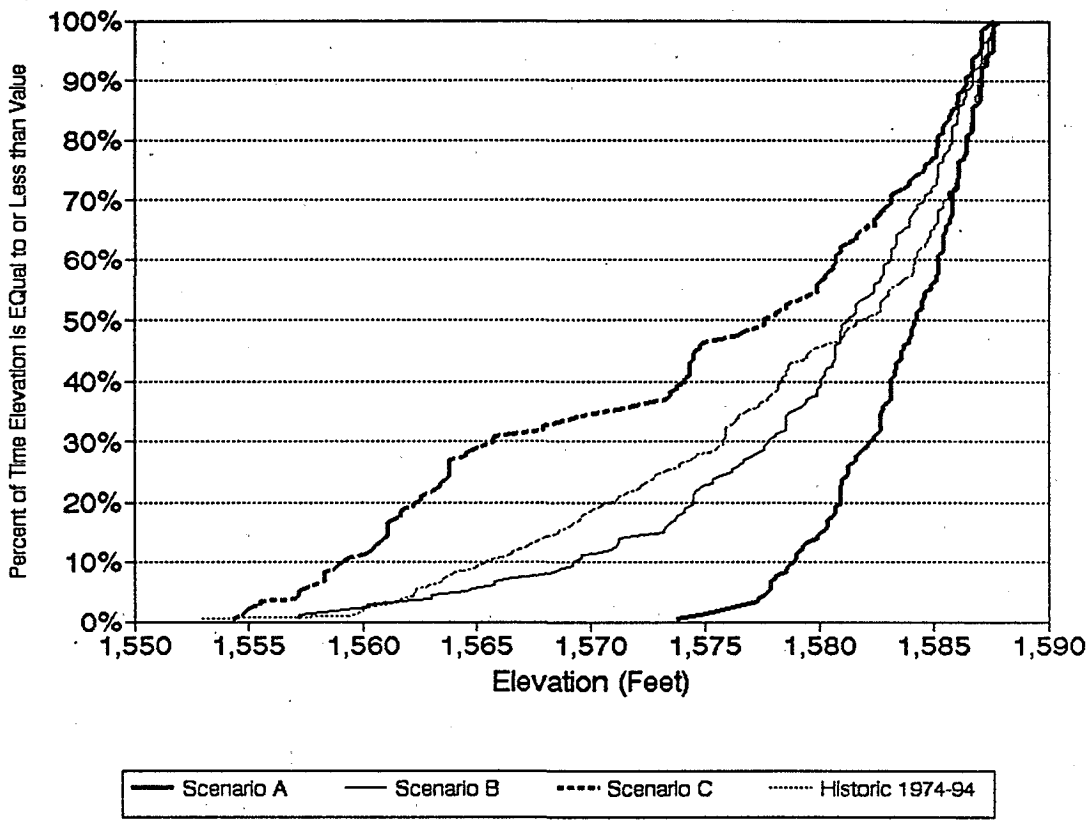
Overall, Scenario A would be beneficial to recreation since average water levels would be higher than in the past, and drawdowns would be reduced, avoiding some of the potential physical effects and use conflicts that would occur with lower lake levels. Based on an analysis of historic attendance and water level data for Lake Perris, changes in water level were not found to be directly correlated with changes in annual attendance. While water level may affect attendance in some way, it cannot be used to explain historic changes in attendance. Therefore, while increases in water level under Scenario A may improve the recreation experience, corresponding changes in attendance and revenues are expected to be negligible unless new facilities are developed. The economic impacts on the local area would be negligible.

Scenario B. If Scenario B were implemented, the majority of years would experience minimal drawdowns to about 1,580 feet, with refilling of the lake (i.e., to the typical high elevation level of 1,588 feet) in the same year (see Figure 4.7-7). In the remaining third of the years, larger drawdowns to between 1,557 and 1,573 feet elevation would occur with refilling not occurring until the next year. Under Scenario B, average water levels would be higher than in the past and impacts on recreation would be beneficial.



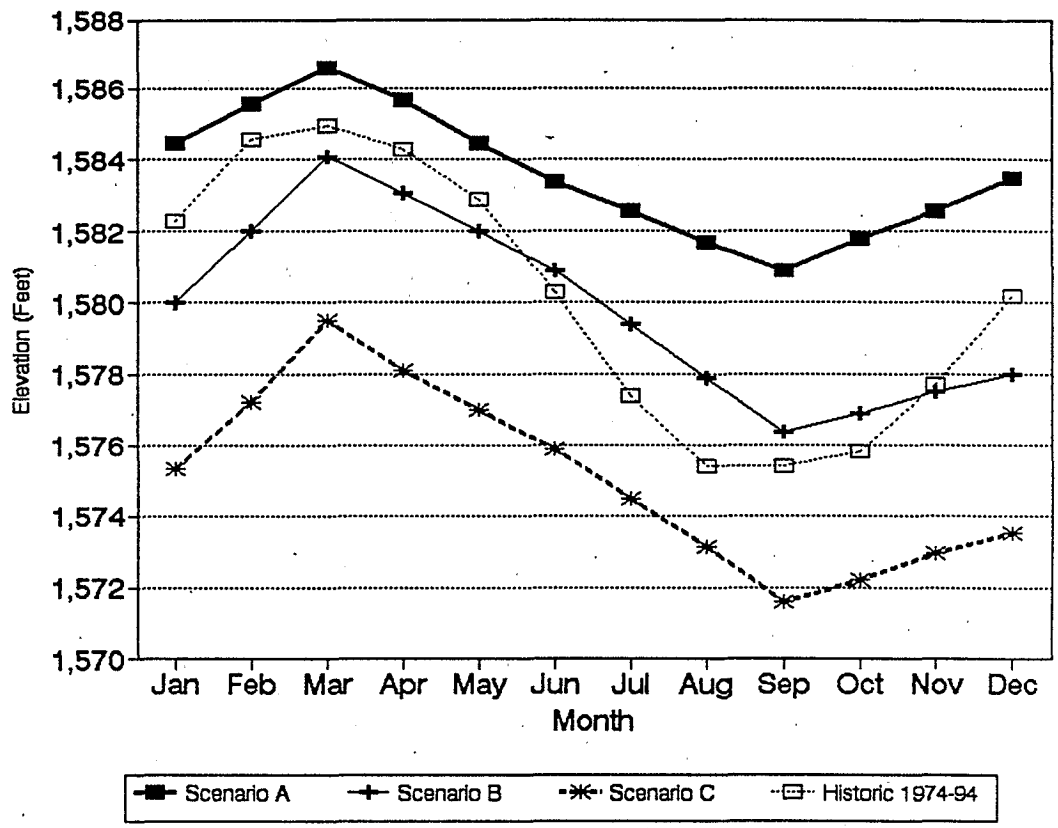
Source: MWD, 1994; SAIC, 1995

Figure 4.7-7. Lake Perris - Surface Elevation, Scenarios A, B & C



Source: MWD, 1994; SAIC, 1995

Figure 4.7-8. Lake Perris - Cumulative Frequency of Surface Elevations, Scenarios A, B & C



Source: MWD, 1994; SAIC, 1995

Figure 4.7-9. Lake Perris - Average Monthly Surface Elevations, Scenarios A, B & C

Table 4.7-4 POTENTIAL RECREATION EFFECTS AT LAKE PERRIS STATE RECREATION AREA DUE TO CHANGES IN SURFACE WATER LEVEL	
Lake Surface Water Level (feet)	*Potential Effects*
1,588	Maximum operating surface elevation.
1,574	Guest boat slips at marina would not be usable.
1,573	Non-guest boat slips at marina would not be usable. Exposed hazards would begin to cause potential vessel damage. Increased safety risks to boating public and personal watercraft from reduced surface area and increased hazards.
1,570	Watercraft and wind surfing would be adversely affected as mud and silt layers are within the wading zone where users access the beach for launching. Aesthetics would be negatively affected as aquatic organisms and vegetation begin to be exposed and start to decompose. The sharp edges of exposed freshwater clams would result in higher frequency of injuries to the feet of visitors and employees. Swimming would be adversely affected by reduced aesthetics, odor, and unpleasant beach conditions, due to exposure of wading zone. Increased workload to employees from relocation of buoys marking safe swim areas, underwater hazards, etc. Hazards from exposed clam beds and vegetation. Habitat and cover would be exposed and begin to affect sportfishing. Shore fishing would be affected due to increased difficulty of accessing the lake, especially for park users that are physically challenged.
1,565	Exposure of numerous underwater hazards would result in 50 percent reduction in the area available for waterskiing and the recreational use of personal watercraft.
1,560	Launch ramp exposed. Aesthetic impacts. Most boat-in facilities would be unusable due to exposed mud, underwater vegetation, and hazards. Use conflicts would be significantly increased. Normal operating capacity of 500 vessels would be decreased due to reduced water surface area. Boater delays, which are currently up to four hours or more on weekends during May through October, would be increased.
1,544	Water intake for park's "domestic" water supply would become inoperable affecting both park users and employees' residences.
1,540	Minimum operating surface elevation.
1,500	Dead pool surface elevation.

Source: SAIC, 1995.

Under Scenario B, water levels would be at or below 1,574 feet elevation only 19 percent of the time, a beneficial impact when compared to 27 percent under past operations (see Figure 4.7-8 and Table 4.7-2). At this level, some of the boat slips at the marina would not be usable and exposed lake hazards would begin to cause damage to boats and equipment. Water levels would be at or below 1,565 feet elevation 6 percent of the time under Scenario B, compared to 9 percent historically, again a beneficial impact. At this level, there would be a 50 percent reduction in the area available for water-skiing and personal watercraft due to reduced surface area, exposure of numerous underwater hazards, exposure of the wading zone and reduced lake aesthetics.

Water levels at or below 1,560 feet would occur about 2 percent of the time under Scenario B, similar to past operations. At this water level, portions of the boat launch ramps are exposed and most boat-in recreation areas would be inaccessible.

Average water levels in June through August, the peak recreation months, would be between 1,578 and 1,581 feet elevation (see Figure 4.7-9). These levels would be higher than in the past, when water levels were between 1,575 and 1,580 feet. The impact of Scenario B on peak-season recreation would be beneficial.

Overall, Scenario B would have a beneficial impact on recreation due to higher water levels. Although increases in water levels from Scenario B may improve the recreation experience, changes in area attendance and revenues are expected to be negligible. Economic impacts on the local area would also be negligible.

Scenario C. If Scenario C were implemented, about a quarter of the years would experience minimal drawdowns with refilling of the lake in the same year (see Figure 4.7-7). Another quarter of the years would involve larger drawdowns to between 1,555 and 1,574 feet elevation with refilling occurring in the next year. The remaining years would entail a greater and more prolonged drawdown, with water levels decreasing to between 1,555 and 1,574 feet elevation year-round for 5 years in a row.

Under Scenario C, average water levels would be lower than in the past. Water levels would be at or below 1,574 feet elevation 43 percent of the time, compared to 27 percent in the past (see Figure 4.7-8 and Table 4.7-2). At this level some boat slips become unusable and exposed lake hazards begin to cause equipment damage. Water levels would be at or below 1,565 feet elevation 29 percent of the time, compared to 9 percent under past operations. At this level, the area available for water-skiing and personal watercraft is reduced by 50 percent.

Water levels at or below 1,560 feet would occur 12 percent of the time, compared to 2 percent of the time under past operations. At this level, launch ramps would be exposed. Other effects at this level include reduced marina capacity from unusable boat slips, increased exposure of boats and personal watercraft to water hazards resulting in possible equipment damage and liability, greater possibility of injury to swimmers and personal watercraft launchers due to exposure of clams, vegetation, mud, and silt in the wading zone, and reduced accessibility for shore fishing and boat-in recreation areas.

Average water levels in June through August, the peak recreation months, would be between 1,573 and 1,576 feet elevation, compared to 1,575 to 1,580 in the past (see Figure 4.7-9). This includes a consecutive 5-year period when water levels would be below 1,574 feet and as low as 1,555 feet year-round.

Scenario C would have a potentially adverse effect on recreation. Lower lake levels would occur a greater percentage of time than in the past, and could in turn cause more frequent

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facility limitations, use conflicts, and lake hazards. While it is possible that lower lake levels may affect attendance and revenues in some way, analysis of past lake levels and associated attendance have not shown a significant correlation between the two. Therefore, impacts on attendance and revenues are not anticipated to be significant and economic impacts on the local areas would be negligible.

It is anticipated that operation of Lake Perris in a manner like Scenario C would occur only under the most extreme circumstances, since Lake Perris provides emergency storage for supplies to Southern California. As a result, MWD would attempt to refill any such storage withdrawals as soon as possible in order to maintain adequate supplies in case of an earthquake or other emergency, or in preparation for a year with supply shortages.

NO PROJECT ALTERNATIVE

Under the No Project Alternative, the KFE would continue to be owned by DWR. New recharge facilities and habitat management areas would probably be developed. Some undesignated area could be developed for recreation use, but the amount and location are not known. Impacts on recreation would be negligible. No significant impacts are anticipated as a result of implementation of the Monterey Agreement and none would be avoided by implementing the No Project Alternative.

Under the No Project Alternative, Castaic Lake and Lake Perris would continue to be operated by DWR in a manner similar to their past operations. As in the past, recreation would periodically be adversely affected by lower water levels. The No Project Alternative would avoid adverse, but not significant, impacts on Castaic Lake State Recreation Area and Lake Perris State Recreation Area from lower water levels that would occur a greater percentage of the time under Scenario C. The No Project Alternative would avoid beneficial impacts on recreation from Scenarios A and B because these scenarios would produce higher water levels a greater percentage of the time.

4.7.3 Mitigation Measures

1. Under Scenario C for Castaic Lake and Lake Perris, water storage should be maximized to the extent possible during peak recreation use periods, especially summer months.

2. Under all scenarios, when annual reservoir drawdown schedules are being developed and if changes in these drawdown schedules are made during the year, input from officials at Lake Perris and Castaic Lake State Recreation Areas should be considered so that ongoing planning and management of the recreation facilities can be coordinated with reservoir operations. Once schedules are known, recreation area operators should be notified as soon as possible, in order to maximize management efforts.

4.8 SOCIOECONOMICS

4.8.1 Kern Fan Element

Over what could be an extended period, relatively minor construction activities could occur in relation to the development., maintenance, and operation of spreading ponds and associated recharge and recovery facilities. The exact nature and duration of such activities are currently not known. Socioeconomic impacts associated with such activities would be addressed at the time when specific activities are proposed.

4.8.2 Castaic Lake

Changes in the operation of Castaic Lake are not expected to change characteristics of the workforce in a measurable way. Thus, negligible impacts on employment and population are anticipated.

4.8.3 Lake Perris

Changes in the operation of Lake Perris are not expected to change characteristics of the workforce in a measurable way. Thus, negligible impacts on employment and population are anticipated.

4.9 HUMAN HEALTH

4.9.1 Existing Conditions

KERN FAN ELEMENT

San Joaquin Valley Fever

San Joaquin valley fever has its highest incidence in Central California. The principal cause of valley fever is a fungus (*Coccidioides immitis*) that is generally released from the soil following surface disturbance (e.g., plowing).

Vectors

Mosquitoes are common within the project site. Five species in particular occur in abundance and can cause health and nuisance problems. They are *Culex tarsalis* (the encephalitis mosquito), *Aedes melanimon, Anopheles freeborni* (the western malaria mosquito), *Anopheles franciscanus*, and *Culiseta inornata*. The KFE area falls within the jurisdiction of two local mosquito abatement districts (Kern and Westside Mosquito Abatement Districts), that monitor and, when necessary, eradicate mosquito larvae and adults.

TERMINAL RESERVOIRS

Implementation of the Monterey Agree-ment would not be expected to affect human health of inhabitants or visitors of the terminal reservoirs areas. Reduction in water depth and the resulting safety consideration would be within existing conditions.

4.9.2 Environmental Consequences

KERN FAN ELEMENT

Proposed Action

Human health impacts of all specific projects stemming from the implementation of the Monterey Agreement will be addressed, as appropriate, in future CEQA analyses. These analyses would be expected to describe the potential impacts of the detailed project in regard to human health.

During construction, project workers may be exposed to San Joaquin valley fever. No significant adverse impacts are expected.

Several utilities cross or overlie the project area, such as oil and gas pipelines, electrical transmission facilities, and telephone lines. Some of these facilities could be damaged, disrupting service to neighboring areas and workers could be injured if precautions are not taken.

The use of KFE lands for groundwater recharge could cause mosquito-associated problems by creating more habitat for mosquito larvae. Increases in the current mosquito populations could result in greater nuisance problems and also create increase health risks associated with diseases carried by mosquitoes, including encephalitis and malaria.

NO PROJECT ALTERNATIVE

The potential for impacts of the No Project Alternative are identical to those described under the proposed action.

4.9.3 Mitigation Measures

KERN FAN ELEMENT

The potential risk of contracting valley fever should be specified in all construction contracts. Construction workers should be

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C-094863

advised of the potential risk as a condition of employment.

Several measures would be taken to mitigate possible mosquito-related problems. The mosquito abatement district would be consulted to determine the best means to provide adult and larvae mosquito monitoring, mosquitofish planting, and, if necessary, eradication of the larvae and/or adults. The mosquito abatement districts would also recommend operation and maintenance procedures that could include levee placement, side-slope and water requirements, and vegetation control. If the mitigation measures described above are implemented, no significant impacts are expected as a result of this project.

TERMINAL RESERVOIRS

No mitigations are necessary.

C—094864

C-094864

5. POTENTIALLY SIGNIFICANT EFFECTS OF PROPOSED PROGRAM AND PROPOSED MITIGATION

This section describes significant environmental effects of the proposed implementation of the Monterey Agreement, and mitigation for these effects that could be included as part of the program.

5.1 BIOLOGICAL RESOURCES

Potentially significant adverse effects are anticipated at the KFE property under all scenarios of the Proposed Action. No significant effects are anticipated at other locations.

5.1.1 Kern Fan Element

Implementation of actions described in each of the Proposed Action scenarios involve the development of spreading basins and associated water conveyance and other facilities. The number, design and location of such facilities is not currently known.

Due to the widespread distribution of a number of sensitive wildlife species (Tipton kangaroo rat, blunt-nosed leopard lizard, San Joaquin antelope squirrel, and San Joaquin kit fox) it is likely that considerable areas of habitat occupied by these species could be disturbed and/or destroyed.

5.1.2 Mitigation

The following general mitigation measures are suggested for the construction of spreading basins and new facilities on the KFE. Because this is a Program EIR, it is recognized that some or all of these measures may be inapplicable to the facilities when they are designed and constructed. It is equally possible that when the precise location and design of these facilities later is determined and analyzed under CEQA, new mitigation measures will be found to be more appropriate than the ones listed below. Specific project(s) for recharge facilities on the KFE will require compliance with CEQA and other applicable regulations including state and federal Endangered Species Acts. It is for these reasons that the following mitigation measures are suggestions only and may be replaced with specific mitigation measures following consultation with governmental wildlife agencies and incorporated into an approved Habitat Conservation Plan.

1. Prior to construction of spreading basins and new facilities, surveys of the proposed impacted area for sensitive species will be conducted as may be required. To the extent feasible, locate, design, and construct facilities in a manner that avoids significant adverse impacts to sensitive species. To the extent avoidance is infeasible, mitigate impacts with other mitigation measures.

2. Where on-site mitigation is infeasible, off-site mitigation should be considered, selecting lands that will provide suitable habitat for the impacted species.

3. Design spreading (ponding) and extraction facilities and appurtenances to provide, to the extent feasible and without interfering with the project objectives, in a manner that provides habitat both when inundated and when dry. For example, design berms to conform to the natural setting and revegetate with native plants (where the plants are likely to succeed and will not be outcompeted by exotics already existing in the vicinity). In this way, the loss of habitat can be minimized. The native and other vegetation will provide habitat and a food source for the Tipton kangaroo rat as well as for rabbits, ground squirrels, lizards, insects and the like, comprising a food source for the San Joaquin kit fox and the blunt-nosed leopard lizard. Tipton

C—094865

C-094865

kangaroo rats would likely use the upper portions of the berms for burrows rather than the basin areas where repeated flooding will occur, thus increasing the likelihood of their hampering recharge operations. The presence of sensitive species in ponding-recharging basins should not be a basis for precluding use and maintenance of the basins.

The same mitigation measures (or reasonable substitutes for them as discussed above) would be equally applicable if DWR were to continue to own the KFE and were to implement any recharge activities within it. As with the Monterey Agreement implementation program, it is not presently possible to predict either what DWR's activities would be or what potentially significant environmental impacts, if any, would result.

NO PROJECT ALTERNATIVE

Selection of the No Project Alternative, i.e., not implementing the principles of the Monterey Agreement, could have similar impacts on biological resources as the proposed project. Mitigation of these impacts would require similar actions, but the agency responsible for the implementation of the mitigation measure would likely be DWR rather than a local agency delegated the operational responsibility.

Development of the KFE lands for water spreading by DWR and local agencies is a possible outcome of selection of the no project alternative. Development of such facilities would be constrained by the same physical features (e.g., soils permeability) and regulatory issues (e.g., protected species) that are expected to constrain development under the proposed project alternative.

5.2 CULTURAL RESOURCES

Potentially significant adverse effects are anticipated at the KFE property under all scenarios of the Proposed Action and at both Castaic Lake and Lake Perris under Scenario C.

5.2.1 Kern Fan Element

Activities associated with construction of water recharge spreading basins and associated water conveyance and other facilities could result in ground disturbance that would directly affect recorded (and potentially unrecorded) cultural resources.

5.2.2 Mitigation

All proposed areas of ground disturbances including filling and grading on land not previously disturbed in the KFE area should be surveyed by an archaeologist qualified under State Historic Preservation Office (SHPO) guidelines. Native American representatives also desire to be included in the survey. If archaeological materials are identified, they shall be recorded consistent with SHPO guidelines. Project plans should be designed to the maximum extent feasible to avoid resources, establishing an 80-foot buffer between the resource and disturbance activities. The archaeological site boundary shall be fenced during construction to ensure that no construction equipment accidentally encroaches within the resource.

If cultural resources cannot be avoided by redesign, a significance assessment excavation should be performed consistent with SHPO guidelines. If the site is determined to be significant pursuant to CEQA Appendix K criteria, a mitigation data recovery program shall be performed consistent with SHPO guidelines. All recovered artifacts shall be curated in a SHPO-qualified facility within the KFE project area.

5.2.3 Castaic Lake and Lake Perris

Increased duration of water surface lowering, greater than those experienced in the past, could cause increased erosion of known and unrecorded prehistoric archaeological site surfaces. Increased exposure could also increase access to sites by recreational boaters and illicit artifact collection. Such conditions are most likely to occur under Scenario C of the Proposed Action.

5.2.4 Mitigation

Subsequent to maximum drawdown of the reservoir conservation storage capacity, previously uninvestigated areas within Castaic Lake and Perris Lake should be systematically surveyed by a qualified archaeologist consistent with SHPO guidelines. All cultural resources identified as part of this investigation and all previously recorded sites shall be stabilized and protected from wave action. The sites shall be covered with protective covering such as a filter fabric. Placement of the covering shall be supervised by an archaeologist and a Native American monitor. An erosion control treatment plan and monitoring program shall be prepared by engineers and reviewed and approved by a qualified archaeologist and Native Americans to ensure that cultural resources are not disturbed during anchoring of the hard-cover protection.

Implementation of these measures would reduce potential impacts on cultural resources to less than significant levels. Native Americans consulted agree that preservation of archaeological sites through identification and protection with non-intrusive covering material would reduce impacts on ethnic resources to less than significant levels.

C—094867

C-094867

6. CUMULATIVE EFFECTS

As a result of the programmatic, and necessarily speculative, nature of the Monterey Agreement and the environmental impacts resulting from its implementation, detailed cumulative impact analysis of the Monterey Agreement program with past, present, and reasonable anticipated future projects is also speculative. The Central Valley Project Improvement Act EIS and the Bay/Delta Accord and subsequent EIR/EIS are two major programmatic water management actions that are being developed and independently analyzed. These results and other site-specific impacts of these analyses are not yet fully developed or disclosed. Details of the implementation of the Monterey Agreement are unlikely to be affected by or effect these analyses.

The following summarizes the potential program impacts associated with implementation of those Monterey Agreement principles that have the potential for ascertainable environmental impacts that may cumulatively influence other water management actions.

Retirement of 45,000 AF of Agricultural Entitlement

Contractors that would be expected to relinquish entitlement to SWP water are Dudley Ridge Water District and Kern County Water Agency (KCWA). The following member units of KCWA are expected to relinquish entitlement: Wheeler Ridge-Maricopa Water Storage District, Semitropic Water Storage District, Lost Hills Water Storage District, Belridge Water Storage District, and Improvement District Number 4. No projects with similar impacts (the reduction of irrigated cropland use) have been sufficiently identified to allow specific analysis. The impact to natural systems that may be the beneficiary of the retirement of this entitlement would not be expected to be significantly impacted (either positively or negatively) since the receiving systems are able to accommodate the flow and already receive approximately 100 times this amount. SWP operations would not be adversely affected by the reduction in deliveries.

Sale of 130,000 AF Entitlement by Agricultural Contractors to Urban Contractors and Non-Contractors

Water agencies that would be expected to give up their entitlements have not been identified nor have willing buyers announced their intention to purchase entitlement. No projects with similar impacts in location or type (the reduction of irrigated cropland use or the augmentation of supply) can be sufficiently identified to allow specific analysis until buyers and sellers are identified. SWP operations would not be adversely affected by the shift in deliveries among Contractors.

Transfer (Sale or Lease with Purchase Option) of the KFE Lands from DWR to Designated Agricultural Water Agencies

Development of later phases of the Kern Water Bank would cumulatively add to the development of the Kern Fan Element properties. Since specific plans describing either of these potential projects have yet to be developed, detailed cumulative impact analysis is speculative. Specific development of these lands is likely to be completed in conjunction with detailed habitat and projected species management planning. The Habitat Conservation Plan process is ongoing and expected to adequately mitigate impacts of development of spreading basins and other water management projects by regional water agencies.

Modification of Operation of Terminal Reservoirs

No similar projects have been identified for the region containing Castaic Lake.

C—094869

C-094869

The approved MWD Domenigoni Reservoir project would have the potential for cumulative impacts to regional recreational, cultural, and biological resources.

Following its construction, Domenigoni Reservoir has the potential to offset, to a degree, potentially adverse impacts to biological and recreation resources at both Castaic Lake and Lake Perris associated with implementation of Scenario C of the Proposed Action. The new reservoir is within approximately 1/2-hour drive (25 miles) of Lake Perris and 2 hours drive (100 miles) of Castaic Lake. It is projected that Domenigoni Reservoir will attract up to 1.9 million people a year through the provision of a variety of outdoor recreational features blended together at a single location. The reservoir will constitute the largest body of freshwater in Southern California and will offer boating, fishing, sailing, and waterfowl hunting. Additional recreational activities include equestrian, hiking, and bicycle trails, a swimming lagoon, campsites, an equestrian center, a full-feature waterpark, and group and family picnic areas.

Site-specific cultural and biological impacts at Domenigoni Reservoir have been independently mitigated. Consequently, as a result of the combined projects, no cumulative impacts are expected to cultural resources and neutral-to-positive cumulative impacts would be expected to aquatic species and waterfowl.

C—094870

C-094870

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C-094873

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C—094874

C-094874

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C—094875

C-094875

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APPENDIX A

Monterey Agreement Statement of Principles

December 1, 1994

THE MONTEREY AGREEMENT -- STATEMENT OF PRINCIPLES

by the

STATE WATER CONTRACTORS

and the

STATE OF CALIFORNIA, DEPARTMENT OF WATER RESOURCES

FOR POTENTIAL AMENDMENTS TO THE STATE WATER SUPPLY CONTRACTS

INTRODUCTION

State Water Project ("SWP") shortages in recent years have prompted both Agricultural Contractors ("Ag Contractors"), and Municipal and Industrial Contractors ("Urban Contractors"), (collectively, the "Contractors") to consider amendments to their water supply contracts with the State of California, Department of Water Resources ("DWR"). Some of the Contractors have considered litigation to resolve differences over water allocations. To avoid litigation, and to make the SWP operate more effectively for all Contractors, the parties, including DWR, have engaged in mediated negotiations toward a settlement of their disputes.

This document contains an agreed Statement of Principles that is the foundation for an agreement among the Contractors and DWR that will settle their disputes over water allocations and certain operational aspects of the SWP. The undersigned negotiators pledge their good faith efforts to work diligently toward a final written agreement. The Contractor negotiators further pledge to obtain ratification of these Principles by their respective Contractor groups and the Boards of Directors that they individually represent.

C-094878

C-094878

STATEMENT OF PRINCIPLES

A written agreement with contract amendments and other implementing documents will contain provisions in accord with the following principles:

1. **Water allocations.** The SWP contracts shall be amended to provide that all future allocations of project water from existing project facilities are to be based on entitlements.

2. **Water allocations when requests exceed available supply.**

   a. The water contracts will be amended to provide that each Contractor will be allocated the portion of total available project water supply equivalent to the ratio of its annual entitlement irrespective of type of use, as identified in its Table A, to the total annual entitlements of all Contractors as identified in Table A. If a Contractor declines allocated water, such water will be allocated in the same manner among other Contractors. The Contracts will further provide that the only permitted exceptions to this requirement are those necessary to comply with (i) a valid order of a court or the state water resources control board, or (ii) a valid declaration of emergency by the Governor pursuant to the Emergency Services Act in order to meet minimum demands for domestic supply, fire protection, or sanitation during the year.

   b. Article 18(b) through the end of subparagraph (1) will be deleted.

3. **Kern Water Bank.** The Kern Fan Element property and related assets of the Kern Water Bank will be sold or leased on a long-term basis by DWR to designated Ag Contractors. In exchange, 45,000 acre-feet of Ag water entitlements will be transferred to DWR and retired. All fixed conservation and transportation charges for the transferred and retired entitlements will be added to the Contractors' Delta Water Charges. Subject to the approval of designated Ag Contractors, Urban Contractors may be provided access to and use of Kern Fan Element property and related assets of the Kern Water Bank for water storage.

Any project water remaining in the Kern Water Bank at the time of transfer of the property will split 50% to the project and 50% to be transferred with the property. The schedule and costs of delivery will be addressed in the implementation documents.

4. **Permanent Sales of Entitlement.**

   a. **Ag-to-Urban entitlement transfers.**

      i. Ag Contractors will make available for permanent transfer to Urban Contractors on a willing buyer-willing seller basis 130,000 acre-feet of annual entitlements, with Kern County Water Agency ("KCWA") being responsible for any portion of this amount not made available by other Ag Contractors. This provision will apply only to those transfer contracts executed prior to January 1,

2011.

ii. Ag Contractors and DWR will expeditiously approve such sales. As a condition of KCWA's approval of sales from within its service area, KCWA shall be entitled to receive a percentage of the gross sales price determined by that portion of the total SWP costs paid by KCWA's Zones of Benefit or other KCWA resources.

iii. KCWA member units shall have 90 days to exercise a right of first refusal to purchase any entitlement being offered to Urban Contractors by agreeing to pay the same price offered by the Urban purchaser. Such sales to KCWA member units will not diminish the 130,000 acre-foot obligation of KCWA.

b. **Ag-to-Non-Contractor transfers.** Any permanent transfers of entitlement by Ag Contractors to parties who are not Urban Contractors, including transfers to KCWA urban member units or to KCWA's Improvement District No. 4, will be considered a part of the 130,000 acre-feet to be made available to Urban Contractors pursuant to subsection (a), above, provided that Urban Contractors have been allowed 90 days to exercise a right of first refusal to purchase such entitlement at the price being offered by the prospective purchaser without conditions.

c. **Other Water transfers.** DWR will expeditiously approve permanent sales of entitlements among Contractors, including between Urban Contractors.

5. **Restructuring to ensure financial integrity of the SWP.** The SWP Contractors and DWR will develop financial programs involving funds related to State Water Project operations and payment of debt service on bonds to (i) bring the obligations of the parties into line with current market and regulatory circumstances facing the SWP, DWR and the Contractors; (ii) ensure the continuing financial viability of the SWP and improve security for bondholders; and (iii) provide for more efficient use of project water and facilities. These programs shall include:

a. In 1995, DWR will establish a general capital operating fund of $15 million to be made available from bond reserves that are no longer required by bond covenants.

b. It is expected that new capital projects will be financed with revenue bonds, consistent with past practice. The definition of Water System Facilities in the Water Supply Contracts will be expanded to include a State Water Project Corporation Yard and a Project Operation Center and to allow DWR to finance these facilities with water system revenue bonds if DWR decides to build them. These facilities are estimated to cost $35 million and $45 million, respectively, in 1995 dollars. DWR will fully consult with the Contractors prior to issuing each series of water system revenue bonds for defined project facilities.

c. When DWR pays off its obligation to the California Water Fund in 1997, additional moneys that become available will be dedicated to rate payment and other programs for Contractors. In 1997, $14 million will be available for these purposes and will be applied as follows: $10 million will be placed into a separate DWR trust fund ("Trust Fund") for stablizing payments for Ag Contractors, and $4 million will be distributed directly to Urban Contractors, as directed by the Urban Contractors for their management.

d. In 1998, $7.7 million will be placed in the DWR capital operating fund, bringing the balance to $22.7 million. An additional $17 million will be used as follows: $10 million will be placed in the Trust Fund, and $7 million will be distributed to Urban Contractors, as they direct.

e. In 1999, $32 million in additional funds will be used as follows: $10 million will be placed in the Trust Fund and $22 million will be distributed to Urban Contractors, as they direct.

f. In 2000, funds will be used as follows: $10 million will be placed in the Trust Fund and $23 million will be distributed to Urban Contractors, as they direct.

g. In 2001 when funds available exceed $40.5 million, $10 million will be placed in the Trust Fund, and $30.5 million will be distributed to Urban Contractors, as they direct. The Director of DWR, in consultation with Contractors, will review the financial requirements of the SWP to determine if the amounts over $40.5 million should be retained or whether such amounts can be applied to the Trust Fund and Urban Contractor disbursements on a 24.7%-75.3% basis, respectively. If amounts in excess of $40.5 million are not retained by DWR, up to the first $2 million will be disbursed to Urban Contractors, then the remaining amounts, if any, in excess of $40.5 million will be applied to the Trust Fund and Urban Contractor disbursements on a 24.7%-75.3% basis respectively. Urban Contractors will receive up to the first $2 million in excess of $40.5 million every year until it has received a total of $19.3 million, then all amounts in excess of $40.5 million will be split between the Trust Fund and Urban Contractor disbursements on a 24.7%-75.3% basis. The Director of DWR and the Contractors will review this arrangement every five years after the initial review.

h. The numbers and percentages in this Principle reflect certain estimates of dollars and sharing of revenue. The actual numbers may vary slightly from the numbers described above. These calculations shall be completed before and used in the implementing documents.

i. The attached Exhibit A worksheet illustrates the estimated amounts and use of funds described above.

j. Approval of these Principles is subject to the satisfactory resolution of issues relating

to the allocation of Urban refunds among Urban Contractors.

6. **Terminal Reservoirs - Points of Delivery.**

DWR commits to develop, in cooperation with Contractors participating in repayment of the costs of Perris and Castaic Reservoirs, ways to utilize the respective capacities and stored water to increase the reservoirs' potentials for more effective utilization in conjunction with local water supply facilities. As part of this process, DWR will analyze the impacts on the contractors and on SWP operations. Subject to terms and conditions to be negotiated, Contractors participating in repayment of the costs of these terminal reservoirs will be provided the opportunity to directly utilize the respective capacities in order to optimize the operation of both local and SWP facilities.

Access to such capacity will be provided in a manner designed to ensure that any resulting changes in flow regimes into the reservoirs do not cause a significant adverse effect upon the manner in which these reservoirs were designed to function pursuant to the state water contracts and statutory requirements. The objective of this process is to provide additional flexibility and water management benefits to participating contractors consistent with the usage of such reservoirs as transportation facilities in the overall SWP operations.

DWR will attempt to work out similar arrangements for Del Valle Reservoir.

7. **Interruptible Water Service Program.**

a. Present Surplus (including unscheduled), Wet Weather and 12(d) water will be replaced by Interruptible water service. Whenever DWR has project water available for delivery to Contractors that is not needed for fulfilling entitlement delivery requests or meeting the project operational commitments, including storage goals for the current or following years, DWR will offer such water to Contractors in proportion to their annual entitlements for that year and Contractors taking such water will pay to DWR the Melded Power Rate for power costs incurred by DWR for such service.

b. Implementation would be in substantial conformance with the attached Exhibit B entitled "Possible Implementation of an Interruptible Water Service Program" dated December 1, 1994.

8. **Non-project water transport.** Contractors shall have the right to transport non-project water in project facilities. Power charges for non-project water delivered to Contractors shall be the same as for project water. Priority for conveyance of non-project water shall be as set forth in Principle 7.

9. **Water storage outside service area.**

a. Water stored outside a Contractor's service area is reserved exclusively for use in the

storer's service area. Such water cannot be sold.

b. "Storer" vs. "seller" alternative tracks: in any water year, a Contractor may elect to be a storer or seller, but not both.

i. Storing Contractors will not be allocated water beyond their total demand, including storage.

c. Existing carryover rules under Article 12(e) will be maintained. If a Contractor uses Article 12(e), the Contractor cannot sell water in the next year pursuant to Principle 10. If a Contractor follows the storage track, the Contractor cannot sell water, pursuant to Principle 10, in the year in which it adds to storage. The timing of the election will be determined during implementation.

d. There will be no limits on the amount of ground water storage outside a Contractor's service area in an existing and operational ground water storage program. Contractors will cooperate to develop or establish ground water storage programs.

e. The annual water supply allowed to be stored in current SWP surface conservation facilities and non-SWP surface water storage facilities located outside a Contractor's service area shall be limited, per Contractor, as follows: A floor of 25% of annual Table A entitlement, not to exceed 100,000 acre-feet/year in any year in which DWR can meet less than 50% of requests. In any year in which DWR can meet 75% or more of requests, a maximum of 50% of annual Table A entitlement, not to exceed 200,000 acre-feet/year. There will be a sliding scale between 50% and 75% of requests from the floor to the maximum on a straight-line basis. In a year when DWR can meet 100% of requests, there will be no limit on surface water storage in non-project facilities. Storage capacity will be allocated on the basis of entitlements.

f. The storage constraints in Principle 9e shall not apply to any new South-of-Delta off-stream storage facilities involving SWP Contractor(s).

g. Bona fide exchanges (as distinguished from sales) will be defined during implementation.

h. Carryover water in project surface water conservation facilities is subject to "spill" in the following priority:

i. water stored for non-SWP Contractor;
ii. water stored for a SWP Contractor above its proportional share of available storage capacity based on Table A annual entitlement;
iii. water stored for a SWP Contractor within its proportional share of available storage capacity based on Table A annual entitlement.
iv. project water.

Determination of the allocation of spill will be made during implementation.

10. **Turn-back water pool sales.** There will be a turn-back water pool sales mechanism. For Contractors following the "seller" track, allocations of entitlement water not required by a Contractor will be sold according to the following priorities:

a. Contractors will be encouraged to amend downward their Table A build-up schedule consistent with their actual needs. All Contractors will cooperate in such amendments, and DWR will process amendments expeditiously.

b. An annual entitlement water pool will be formed by DWR for willing SWP sellers and buyers and priced as follows.

i. For water offered on or before:

February 15 -- the seller will receive 50% of Delta Rate for water sold;

March 15 -- the seller will receive 25% of Delta Rate for water sold.

c. On the dates above, SWP Contractors will have first priority to purchase the water. If water is not sold by March 1, an offering Contractor can cancel its offer by March 1 or it will be considered re-offered on March 15.

d. On the dates above, water offered but not sold to other Contractors may be purchased by DWR at the same price as in item a, above, for the purpose of providing additional carryover storage for the SWP Contractors. DWR will consult with Contractors regarding such purchases.

e. In the March 15 market, water offered but not sold under the first two priorities may be offered to non-Contractors at market price, subject to a right of first refusal for SWP Contractors.

f. Sellers must elect to either store or sell. Sellers will not be permitted to store pursuant to Principle 10 during any year in which they have elected to sell water, except that under the short term provisions of Art. 12(e) they can carryover water during the last three months of the year, but cannot elect to sell in the subsequent year.

11. **Conforming contract amendments.** SWP contracts will be amended as appropriate to conform to this Statement of Principles.

12. **Project improvements.** DWR reaffirms its obligation under Article 6(c) of the water supply contracts, subject to the availability of funds, to make all reasonable efforts consistent with sound fiscal policies and proper operating procedures to complete the project facilities and other water management programs necessary for delivery of project water to the Contractors in

the total amounts designated in each contract's Table A.

13. **Integrated package.** Contractors will participate in all of the provisions of these Principles or none. A Contractor who chooses not to participate shall receive none of the benefits provided in these Principles.

14. **No precedent.** If the parties do not enter into the amendments, the parties agree not to utilize this document in any court proceedings relating to matters addressed in this agreement.

IMPLEMENTATION

The Contractors agree to expeditiously obtain preliminary determinations from their respective Boards of Directors as to whether this Statement of Principles is acceptable. The parties set March 31, 1995, as the goal for reaching final agreement.

Nothing in this Statement of Principles is intended to be, nor shall it be interpreted as, a waiver by any party of its rights in law or equity.

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Executed this 1st day of December, 1994:

Kern County Water Agency

by _____

General Manager

Department of Water Resources

by _____

Director

Tulare Lake Basin Water Storage District

by _____

Member, Board of Directors

Coachella Valley Water District

by _____

General Manager

Metropolitan Water District of Southern California

by _____

General Manager

Central Coast Water Authority

by _____

General Counsel

Solano County Water Agency

by _____

General Manager

C-094886

EXHIBIT A

STATE WATER PROJECT
PAYMENT MANAGEMENT PROGRAM

(Millions of Dollars)

	(1)	(2)	(4)	(5)	(6)
			Contractor Payment Management Program		
	[1] Revenue	SWP [2] Capital Resources	Funds Available Col 1-2	Ag Contractors 24.7%	Urban Contractors 75.3%
1995	0.0	0.0	0.0	0.0	0.0
1996	0.0	0.0	0.0	0.0	0.0
1997	14.0	0.0	14.0	10.0	4.0
1998	23.0	6.0	17.0	10.0	7.0
1999	38.0	6.0	32.0	10.0	22.0
2000	39.0	6.0	33.0	10.0	23.0
	Consultation with DWR and SWC's to discuss use of funds above $40.5 million				
2001	45.0	4.5	40.5	10.0	30.5
2002	45.0	4.5	40.5	10.0	30.5
2003	45.0	4.5	40.5	10.0	30.5
2004	45.0	4.5	40.5	10.0	30.5
2005	44.0	3.5	40.5	10.0	30.5
2006	44.0	3.5	40.5	10.0	30.5
2007	45.0	4.5	40.5	10.0	30.5
2008	45.0	4.5	40.5	10.0	30.5
2009	44.0	3.5	40.5	10.0	30.5
2010	45.0	4.5	40.5	10.0	30.5
2011	47.0	6.5	40.5	10.0	30.5
2012	49.0	8.5	40.5	10.0	30.5
2013	48.0	7.5	40.5	10.0	30.5
2014	51.0	10.5	40.5	10.0	30.5
2015	56.0	15.5	40.5	10.0	30.5
2016 to 2035	56.0 [3]	15.5	40.5	10.0	30.5

[1] Data from Bulletin 132-93

[2] DWR to create a Capital Resources Account of $22.7 million from Bond Reserve Funds separate from the amounts shown.

[3] Initial estimate

Exhibit B

POSSIBLE IMPLEMENTATION

of an

INTERRUPTIBLE WATER SERVICE PROGRAM

* Present Surplus, Wet Weather and 12(d) water replaced by Interruptible water service. Any existing priorities to delivery of water beyond scheduled entitlement is eliminated; all Contractors will have equal priority to Interruptible water in proportion to entitlements.

Delivery Priority:

1. scheduled entitlement deliveries;
2. interruptible up to Table A;
3. non-project up to Table A;
4. all additional interruptible; and
5. all additional non-project water.

* Existing balances of the above water types eliminated.

* All Scheduled delivery allocations to be based on contractual Table A.

* Interruptible available only as determined by DWR after Scheduled deliveries and operational commitments are met.

* Interruptible allocations based on Table A for that year.

* Interruptible plus Scheduled entitlement may add up to more than a Contractor's Table A for that year.

* Submit request for Scheduled deliveries, if Interruptible water is available, then anything over Scheduled deliveries considered Interruptible as long as it's available.

* Interruptible water may not be carried over.

* Conveyance charges for interruptible deliveries same as Scheduled deliveries, even if the total amount goes over Table A for that year.

* Interruptible available to all reasonable, beneficial uses. (Not restricted to storage or recharge programs.)

* Delivery of Interruptible water in one year does not impact a Contractor's Table A or the allocation in the next year.

* Contractor can adjust delivery schedule for Interruptible at any time but can only adjust Scheduled Entitlement deliveries weekly.

* DWR will use best effort to avoid economic impacts due to inability to Contractors to take water during wet periods (specific language to be developed during implementation).

December 1, 1994

APPENDIX B

Memorandum of Understanding between the Department of Water Resources of the State of California and Kern County Water Agency for Developing and Operating the Kern Water Bank

MEMORANDUM OF UNDERSTANDING
BETWEEN
THE DEPARTMENT OF WATER RESOURCES OF THE
STATE OF CALIFORNIA
AND
KERN COUNTY WATER AGENCY
FOR
DEVELOPING AND OPERATING THE KERN WATER BANK

THIS MEMORANDUM OF UNDERSTANDING (MOU), made this 25th day of March, 1987, sets forth the principles for developing, operating, and managing the proposed Kern Water Bank, located within Kern County, as an additional conservation facility of the State Water Project (SWP). The Department of Water Resources (Department) executes this Agreement for and on behalf of the State Water Project. The Kern County Water Agency (Agency) executes this Agreement for and on behalf of its Member Units, local water districts, and all other parties within the Agency having a physical or economic interest in the Kern Water Bank. It is the intent of the parties that this MOU serve as the statement of principles on which the negotiation of a comprehensive contract between the Department and the Agency will be based, and will, among other things, be consistent with the SWP water service contracts, provide for definition of Elements of the Kern Water Bank, define program management and operation responsibilities, and provide for supplemental land use.

The Department and Agency hereby agree to the following principles:

1. Kern Water Bank: Definition and Purpose. All opportunities by the Department to store imported surface water in the Kern Ground Water Basin by contract with the Agency are collectively referred to as the "Kern Water

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Bank". The primary purpose of the Kern Water Bank is to augment the dependable water supply of the State Water Project. Incidental to its primary purpose, the Kern Water Bank will produce local benefits in the form of conservation of local water supplies, ground water overdraft correction and improved ground water levels.

2. Contract. This memorandum of understanding shall constitute agreement between the Department and the Agency under Section 11258 of the Water Code for the Department to proceed with the purchase of land for the project, but a further contract shall be required for compliance with Section 11258 before construction and operation of the Kern Water Bank project can proceed. The Contract shall be consistent with the principles contained in this MOU.

It is recognized that there may be a number of phases or "Elements" to the Kern Water Bank. The Contract will provide that each Element to the Kern Water Bank be subject to Agency approval, consistent with Section 11258 of the California Water Code. The Department will consult with the Agency as to all substantive matters relating to the planning, construction and operation of Elements of the Kern Water Bank.

3. Consultation. The Department will consult with its State Water Project contractors and the Agency will consult with its Ground Water Storage Advisory Committee (GWSAC) as to the terms and conditions of this MOU, the Contract and all other substantive matters relating to the planning, construction and operation of Elements of the Kern Water Bank.

4. Kern Water Bank - General Provisions. The following provisions shall be applicable to all Elements of the Kern Water Bank:

(a) Kern Water Bank Elements. The Contract shall include provisions covering how the Department and the Agency will work with local districts in the development of Elements to the Kern Water Bank. Elements

shall be included only if agreement is reached as provided in paragraph 2 above, and the Department makes the determination that such Elements are engineeringly feasible, capable of producing water for the SWP, and economically competitive with alternative new SWP water supply sources. Elements to be considered shall include but not be limited to direct ground water recharge and in-lieu programs.

(b) Develop Plans. Prior to inclusion of an Element to the Contract, the Department shall prepare a plan of development. Criteria for development plans shall be included in the Contract.

(c) Management Responsibilities. The Department shall have overall management responsibilities for the Kern Water Bank. All decisions pertaining to the scheduling of water operations are considered management responsibilities.

(d) Responsibilities for Operations. The Department will contract with the Agency, and subject to Department approval, the Agency with local districts, for the physical operation and maintenance of Kern Water Bank facilities, including transportation of SWP water for storage and extraction and maintenance of canals, recharge basins, and extraction wells associated with Elements of the Kern Water Bank. The contract will provide for periodic reevaluation of the arrangements for operating and maintaining the facilities and shall allow for possible adjustments in the contract.

(e) Operational Criteria.

(1) The operation of the Kern Water Bank as an additional SWP conservation facility shall be integrated with overall SWP operations under the Rule Curve in effect at the time.

(2) No deliveries to storage in the Kern Water Bank shall be made if such deliveries would otherwise cause an increase in entitlement deficiencies to long-term SWP water supply contractors in the year of storage.

(3) The Contract will provide that Elements of the Kern Water Bank will minimize any interference with local ground water uses. Improved ground water conditions that result from the State Water Project Kern Water Bank program will be considered when evaluating any interference with local ground water uses.

(4) The Department and the Agency shall develop monitoring programs to evaluate the specific and cumulative effects of each Element's operation on local ground water operations. Significant adverse impacts on local ground water operations shall be mitigated by the Department. The Department and the Agency shall also develop technical models to predict potential such impacts of Kern Water Bank activities on local ground water operations.

(5) Significant adverse environmental impacts shall be mitigated to the extent required by law.

(6) The Contract shall specify the manner in which the maximum amounts to be extracted and the maximum rates of extraction from Elements of the Kern Water Bank in any one year shall be determined. Water may be extracted from the Kern Water Bank only to the extent that it was stored previously.

(7) The Department and the Agency shall agree on assumptions for water losses associated with Kern Water Bank activities. After allowances for losses and mitigation all remaining stored water shall be available for SWP extraction and use.

(8) The Contract shall specify for each element the amount of storage that will be available for SWP purposes in the Kern Water Bank.

(f) Local Uses. In consideration for SWP use of the local ground water storage capacity, the Contract will provide for local uses of land and improvements acquired or constructed for each Element of the Kern Water Bank. Such local uses shall be defined and compensation therefore, if required, shall be provided for in the Contract.

5. Kern Fan Element. The Department, assisted by the Agency, is conducting appraisals and studies to determine the desirability of acquiring up to 46,000 acres of property located on the Kern River Fan west of Bakersfield. Acquisition of the property and construction of related recharge, extraction and conveyance facilities is hereinafter defined as the "Kern Fan Element" of the Kern Water Bank. In addition to the other provisions contained in this MOU, the Contract shall include, but not necessarily be limited to, the following specific provisions associated with the Kern Fan Element:

(a) Agency Option of Purchase. The Agency shall have the option to acquire all or any portion of the land associated with the development of the Kern Fan Element, consistent with provisions of the Contract. If the Agency does not exercise this option in accordance with provisions of the Contract within 90 days of a decision by the Department to proceed with land purchase, the Department shall purchase the land as part of the State Water Resources Development System. For a period of ten years after the date of acquisition by the Department, the Agency shall have the right to purchase the land from the Department, under terms specified in the Contract, provided that the Department's right to use the area for project purposes will be preserved. Consistent with Section 11464 of the Water Code the Department shall not sell facilities constructed or acquired for the Kern Water Bank.

(b) Land Uses. The Contract will provide for a consultation process among the Agency, DWR and appropriate local agencies in determining nonwater related uses of the property acquired for the Kern Fan Element.

(c) Management and Operations and Maintenance. The Department will manage and the Agency will operate and maintain the Kern Fan Element property and facilities, including canals, recharge basins and extraction wells associated with direct recharge and extraction activities. The Agency's operation shall include transportation of imported water from the California

Aqueduct to storage facilities and from extraction facilities to the Aqueduct (Section 4(d)).

(d) Overdraft Correction. Farming operations associated with the property to be acquired for the Kern Fan Element shall be taken out of production over a five (5) year period from the date of purchase of the property. Water associated with the reduction of ground water overdraft as a result of said idling of land shall remain as a benefit to the local ground water basin, and shall not be exported, either directly or indirectly, from the basin. It is understood and agreed, however, that the reduction of overdraft shall be defined and agreed to in the Contract, and the resultant improvement in ground water levels will be considered when evaluating the adverse effects of project extractions on local ground water uses.

(e) Local Water Related Uses. The Contract will provide for local uses of the land acquired for the Kern Fan Element, and will provide that facilities constructed for use by the SWP be available for recharge and extraction of local water by the Agency. Such local uses shall be defined and compensation therefore, if required, shall be provided for in the Contract.

6. Legal and Policy Considerations.

(a) The Department and the Agency in consultation with the other SWP contractors and affected local districts will identify and resolve to the satisfaction of the Department any legal issues related to storage and extraction of SWP water prior to execution of the Contract.

(b) The Department will initiate no legal actions or other activities to adjudicate the Kern Ground Water Basin as a result of its interest in the Kern Water Bank. This will not restrict the right of the Department to take action other than basin adjudication to recover SWP water stored in the Kern Water Bank as provided in the Contract between the Department and Agency. The Contract will provide for remedial actions in the

event that the Department is prevented from recovering water, as provided in the Contract.

IN WITNESS WHEREOF, the parties hereto have executed this Memorandum of Understanding.

APPROVED AS TO LEGAL FORM
AND SUFFICIENCY:

By _____
Chief Counsel

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

By _____
Director

KERN COUNTY WATER AGENCY

By _____

Title President, Board of Directors

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