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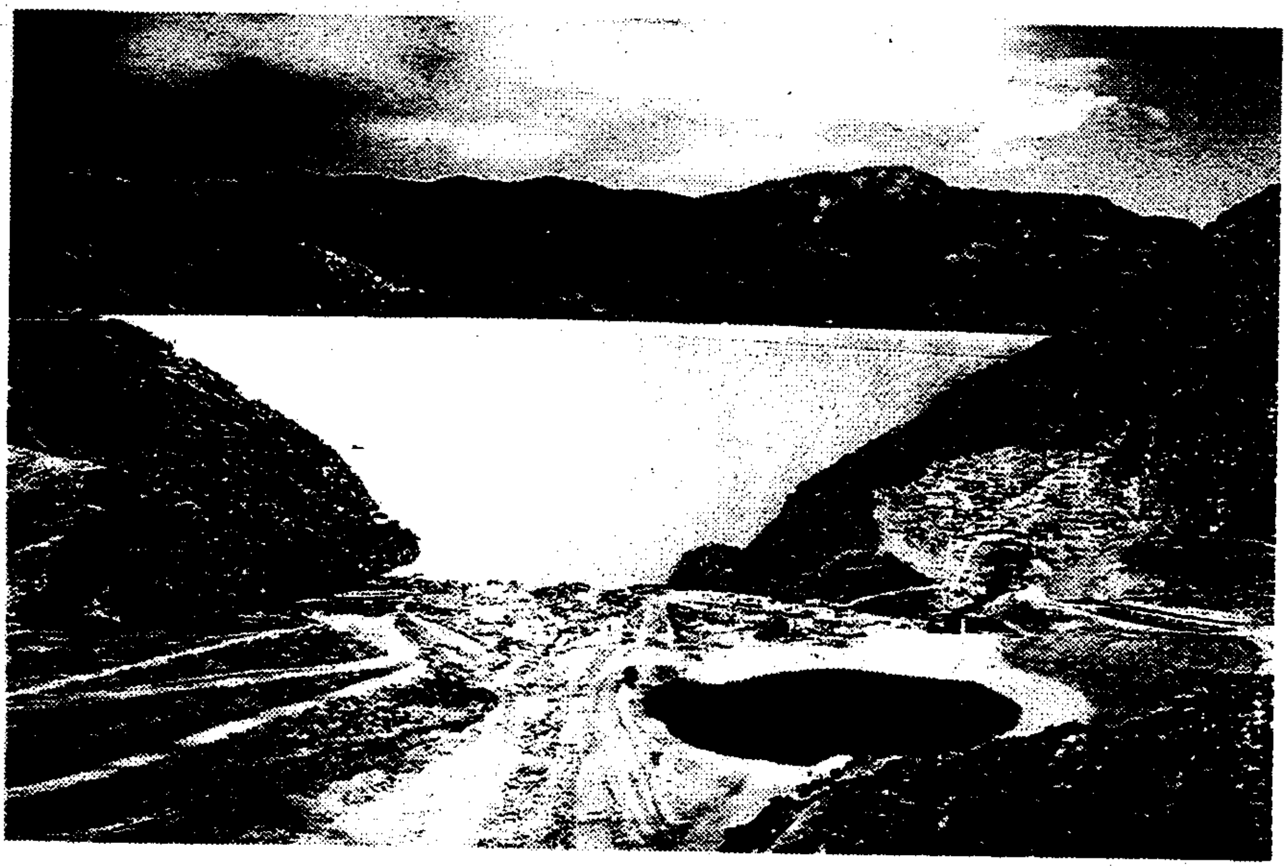
SEVEN OAKS DAM WATER CONSERVATION FEASIBILITY REPORT

US Army Corps
of Engineers®
Los Angeles District

Feasibility Report

Seven Oaks Dam Water Conservation
Santa Ana River Basin, California



Volume I
Main Report
Environmental Impact Statement/
Environmental Impact Report

June 1997

Seven Oaks Dam Water Conservation Feasibility Report

Guide to Volume I

Main Report . . . . White Pages

Environmental Impact Statement/
Environmental Impact Report . . . . Blue Pages

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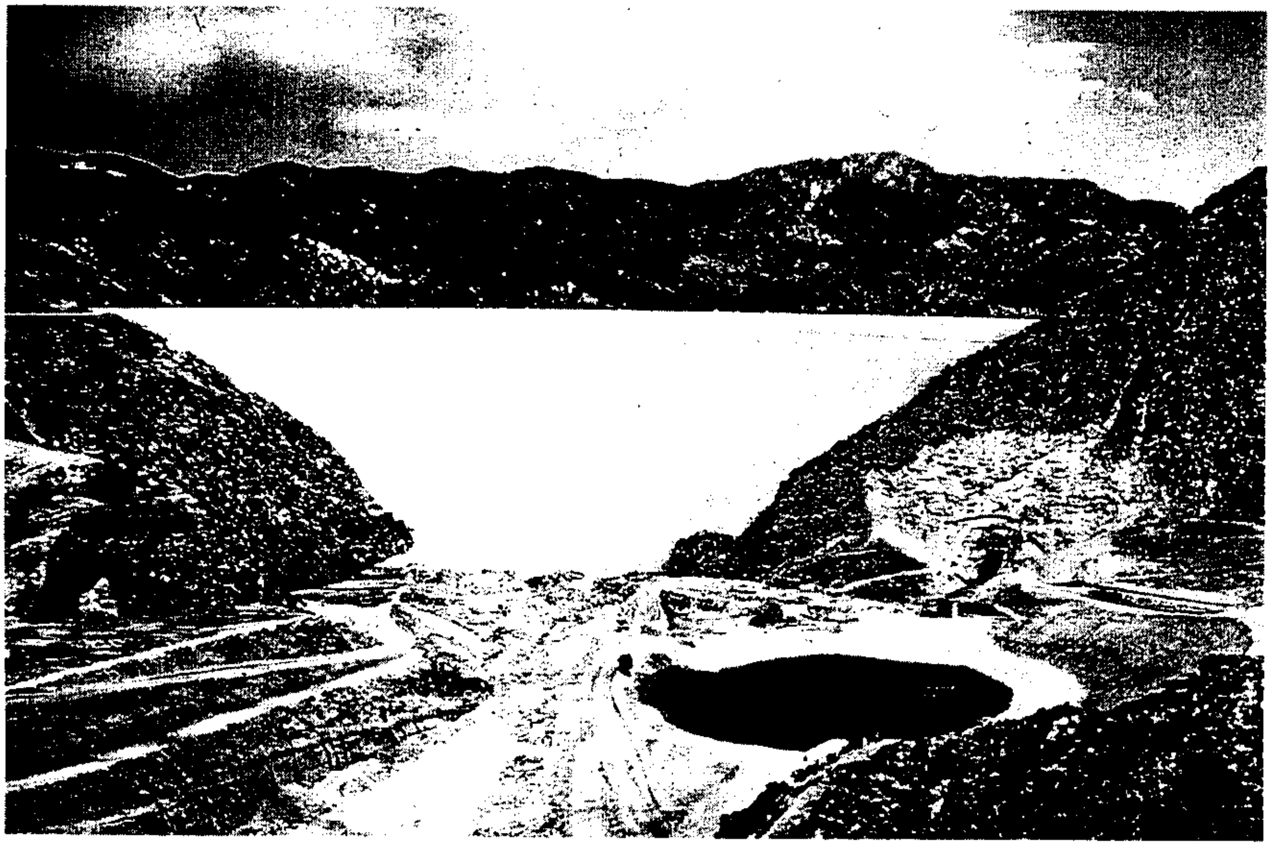


Main Report

June 1997

Syllabus

The Seven Oaks Dam Water Conservation Feasibility Report has been prepared in partial response to the resolution of the Committee of Public Works of the United States House of Representatives dated May 8, 1964. The Feasibility Study was conducted as a cost-shared study with the San Bernardino Flood Control District, in coordination with the San Bernardino Valley Municipal Water District and the Western Municipal Water District. The Feasibility Report presents the findings of studies conducted to determine the feasibility of modifying the Seven Oaks Dam Flood Control Feature of the Santa Ana River Flood Control Project to allow for water conservation. These studies include the analysis of problems and needs, the formulation of a selected plan, and the determination of Federal and Non-Federal requirements for implementing the selected plan.

The Seven Oaks Dam and Reservoir is being constructed as part of the Santa Ana River Mainstem Project (SARP), authorized by the Water Resources Development Act of 1986 for the purpose of providing flood control. The Dam is being constructed at elevation 2,100 NGVD (National Geodetic Vertical Datum) at a location about one mile east of the Santa Ana Canyon in the San Bernardino Mountains. The 550-foot-high earth rock dam will control a drainage area of 177 square miles and provide a gross capacity of 145,600 acre-feet of which 113,600 acre-feet is allocated to flood control and 32,000 acre-feet to sediment storage. The dam is scheduled to be completed in 1999 at which time it will be turned over to the Mon-Federal flood control sponsors for operation, maintenance, and any required replacements and rehabilitation. The Non-Federal Sponsors include the flood control districts of San Bernardino, Riverside, and Orange Counties.

The San Bernardino Valley Municipal Water District, which is a major supplier to water districts serving a number of communities in the San Bernardino County area, and the Western Municipal Water District, which is a major supplier for the City of Riverside and other communities, are interested in developing the opportunity for conserving water at the Seven Oaks Dam facility to supplement area water supply needs. The Feasibility Study analyzed the water districts' service areas water demands, and water supplies, and found that even with the measures being taken to reduce water usage, the existing local supplies for these service areas will need to be supplemented to meet the areas demands sometime after the Year 2000. The deficiencies in available local supplies are expected to be made up through the importation of water from the State Water Project, and other sources, and the implementation of water reclamation projects. The average annual cost for water needed to meet area demands for the San Bernardino Valley Municipal Water District is estimated to be over $27 million under without project conditions, and over $28 million for the City of Riverside.

The plan formulation process investigated four alternatives plus a no-action plan. The no-action plan represents the condition that would be expected to occur during the project life (50 years) in lieu of any project implementation, and it constitutes the basis against which all alternative plans are evaluated. The No-Action Plan for the Seven Oaks Water Conservation Feasibility Study includes operation of the Seven Oaks Dam for flood control only. These operations involve impounding water to the debris pool target level of 2,200 feet, NGVD, from the beginning of October and maintaining this level for flood control operations until the end of May at which time releases will be made to empty the pool by the end of August. The flood control operations would involve impounding flood flows with releases of about 50 cfs from elevation 2,200 feet to 2,298 feet, NGVD, and then further impoundment of flows with releases up to 500 cfs until the flood peak passed Prado Dam. Releases of the flood pool could reach up to 7,000 cfs, until the debris pool level is again attained. The No-Action Plan also assumes that all mitigation required for the flood control project are implemented, and that water supply needs and costs are based on the State Water Project and other imports and reclamation projects.

Because the entire capacity of the Seven Oaks Dam Reservoir is needed for flood control operations during the major flood season from October to the end of February, the alternative plans considered in the Feasibility Study were limited to the seasonal use of available storage capacity during the non-flood season. These plans involved impounding water for conservation during the flood transition period from the beginning of March to the end of May to alternative pool elevation, with releases to supplement area supplies from June through September. The seasonal conservation pools examined ranged included Plan 1 at an elevation of 2,300 feet, and seasonal storage capacity of 16,000 acre-feet under present conditions; Plan 2 at elevation 2,375 feet, and a present seasonal capacity of 35,000 acre-feet; Plan 3 at elevation 2,418 feet with a present seasonal capacity of 50,000 acre-feet; and Plan 4 at elevation 2,265 feet with a seasonal capacity of 10,270 acre-feet. The present conservation capacities and associated reservoir releases to supplement area supplies for all the alternatives would be reduced in the future as debris accumulates in the reservoir area.

The development of the alternative plans included comprehensive analysis of the impacts of water conservation on dam safety and operations for flood control. Modifications to dam facilities were included as needed to assure facility safety and maintenance of flood control operations. These measures included no major modifications for Plan 4, strengthening of the intake tower anchoring for Plan 1, and new access to the service deck, modifications to the intake tower, bulkhead and guides and other modifications for Plans 2 and 3. The plans also include relocation of reservoir road that provides upstream access to the Southern California Edison power plant. However, further consideration will be given during final design studies to the use of other existing roads within the U.S. Forest Service lands to provide the needed access. The first cost of the required modifications for each of the alternative plans are estimated to be $8,110,000 for Plan 1; $21,053,000 for Plan 2; $28,023,000 for Plan 3; and $2,161,000 for Plan 4. These costs include the cost for road relocation and also include an estimated value for the real estate rights required for water conservation operations. The real estate requirements are expected to be limited to obtaining a special use permit from the U.S. Forest Service for water conservation operations. The appropriate value for obtaining the needed real estate interest will be considered further during final design and arrangements for implementing any of the water conservation plans. The additional costs for Seven Oaks Dam operations, maintenance, replacement, and rehabilitation associated with water conservation operations ranges on an average annual basis from about $37,000 for Plan 4 to $140,000 for Plan 3.

The evaluation of the alternative plans included an assessment of contributions to the Nations Economic Development (NED) based on comparison of project monetary cost and benefits which indicated that all plans are economically justified, except for Plan 3 which was marginally unjustified. The evaluation of environmental impacts recognizes that the base condition for assessing impacts is based on the Seven Oaks Dam being completed and operating for flood control. Therefore, the impacts associated with the water conservation alternative plans were assessed based on determining any increased impacts above the flood control project. The impact analysis which is documented in the reports Environmental Impact Statement/ Environmental Impact Report indicates that none of the alternative plans are expected to result in any significant adverse impacts to the environment. The evaluation also considered impacts to regional economic development and the social well being of the public. These evaluations concluded that Plan 3, which maximizes water conservation yields would best meet regional economic development and social well-being considerations.

The National Economic Development (NED) Plan, which maximizes the net NED benefits is Alternative Plan 4, which would increase average annual water conservation by 2,510 acre-feet under present conditions (Year 2000) and by 640 acre-feet under future conditions (Year 2050). Average annual economic benefits associated with these increases amount to $499,000, with annual costs of $203,000. The project would produce $296,000 in net NED benefits annually and would have a benefit-cost ratio of 2.46.

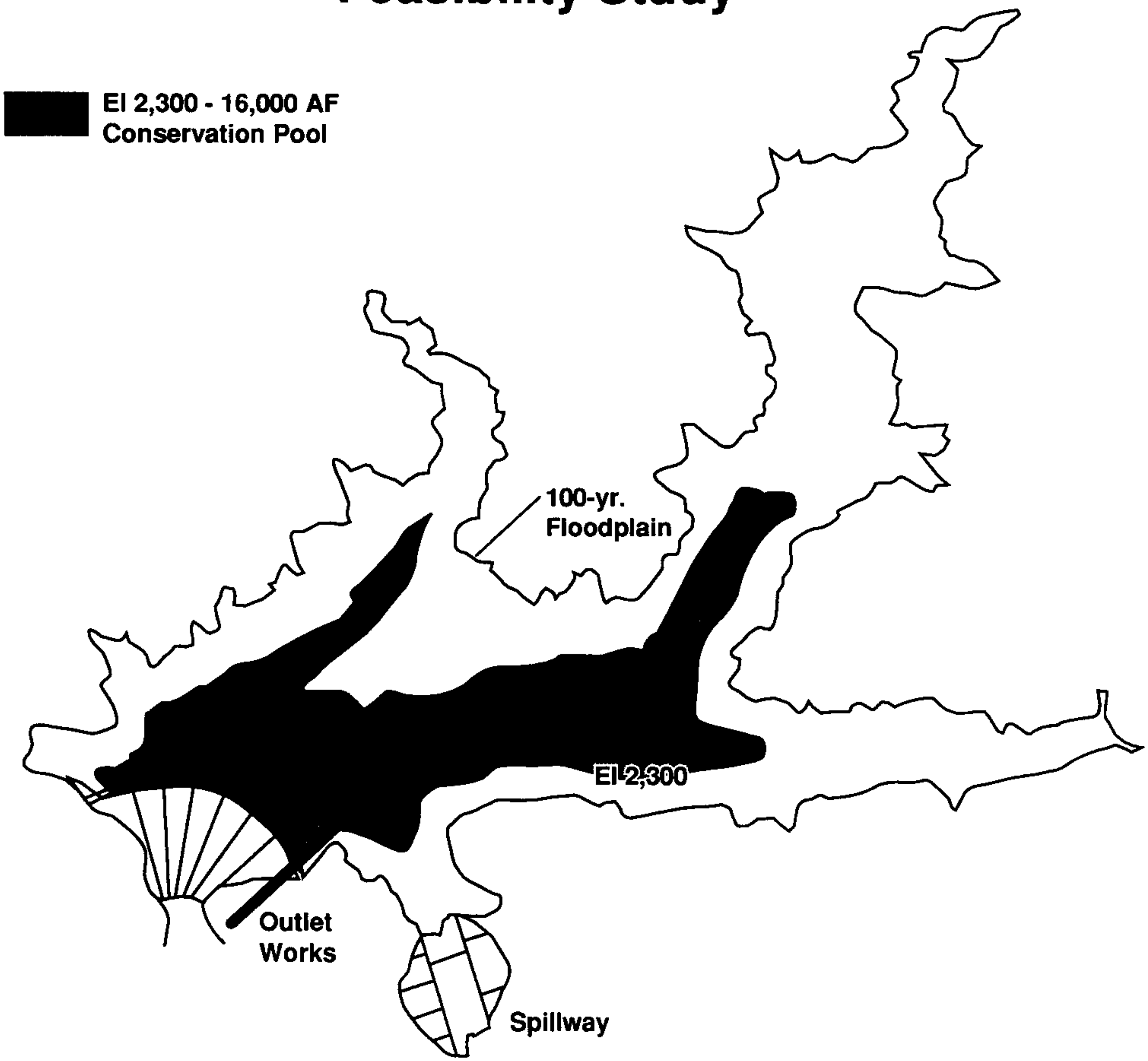
The Locally-Preferred Plan (LPP) is Alternative Plan 1, which would increase average annual water conservation by 4,120 acre-feet under present conditions (Year 2000) and by 2,140 acre-feet under future conditions (Year 2050). Average annual economic benefits associated with these increases amount to $868,000, with annual costs of $675,000. The project would produce $193,000 in net NED benefits annually and would have a benefit-cost ratio of 1.3.

The Locally-Preferred Plan is being selected for implementation because (1) it provides the local sponsor with a significant increase in the realizable water conservation yield compared to the NED Plan; (2) the Non-Federal Sponsor would be paying 100% of the first cost of construction and all OMRR costs associated with any alternative; since costs for water supply projects are 100% non-Federally funded, and (3) the locally-preferred plan will not result in any increase in significant adverse environmental impacts. The selected plan is shown on Page iv, and an economic analysis is presented on Page v.

This Feasibility Report includes the final Environmental Impact Statement/Environmental Impact Report (EIS/EIR), prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, as amended, and the California Environmental Quality Act (CEQA), amended January, 1995, and is summarized in this report. The requirements of Section 404(r) of Public Law 92-500, as amended, and other Federal and State laws have been addressed in the EIS/EIR.

Public and agency review of the draft feasibility report and draft EIS/EIR resulted in number of comments from Department of Interior, U.S. EPA, several water district agencies, and other interests. A major concern raised by water district agencies related to assuring that water rights and historic diversions be maintained. Discussions with San Bernardino County Flood Control District and the San Bernardino Valley Municipal Water District, who would be responsible for working out any water rights concerns as part of plan implementation, indicated their intention is to operate the dam for water conservation based on preserving water rights and historic diversions. The operations associated with meeting these concerns will be

Selected Plan
Seven Oaks Dam Water Conservation Feasibility Study



Economic Analysis of the Selected Plan
(Oct 1996 Price Levels)

Item	Amount
First Cost	$8,110,000
Interest During Construction	$224,000
Gross Investment	$8,334,000
Average Annual Cost	$675,000
Interest and Amortization	$633,000
Average Annual OMRR	$42,000
Average Annual Benefits	$868,000
Net NED Benefits	$193,000
Benefit/Cost Ratio	1.3

developed in detail as part of preparing the water control manual for water conservation operations. Several comments including the recommendations contained in the U.S. Fish and Wildlife Service indicated concern with biological impacts and the need for mitigation. The Corps of Engineers position on these concerns noted that the concerns raised relate primarily to the Seven Oaks Dam flood control project, and that the additional impacts associated with water conservation are not considered significant. These and other comments are further discussed in the Main Report and EIS/EIR.

The Federal and Non-Federal implementation requirements for the selected plan recognizes the requirements of the Water Resources Development Act (WRDA) of 1986, and the Local Cooperation Agreement (LCA) for the Santa Ana Flood Control Project that was executed on December 13, 1989, which requires the Non-Federal Sponsors for the flood control project to operate, maintain, and provide any replacements and rehabilitation of the Seven Oaks Dam project. The LCA also allows the Non-Federal Sponsors to request modifications to the Seven Oaks Dam Facility and operations to be approved at the discretion of the Federal Government. The Water Resources Development Act of 1996 also provides for Non-Federal interests being responsible for 100% of all separable first cost and OMRR cost associated with implementing water conservation. Accordingly, since the selected plan will not result in any adverse impacts on the flood control purpose of the Seven Oaks Dam, it is expected that Non-Federal interests may request approval to proceed with implementing the selected water conservation plan, subject to meeting certain requirements indicated in the report and to final approvals by the Federal Government.

Based on the findings and conclusions of the Feasibility Study, the District Engineer has determined that the addition of water conservation at the Seven Oaks Dam appears feasible, and recommends approval of implementing the Selected Plan subject to Non-Federal interests meeting certain requirements.

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Chapter 1. The Study

Authority

The Seven Oaks Dam Water Conservation Feasibility Study was authorized by a Resolution of the Committee on Public Works of the House of Representatives dated May 8, 1964.

The Corps of Engineers previously conducted a Reconnaissance Phase Study of water conservation along the Santa Ana River at Seven Oaks and Prado Dams, and determined that a separate Feasibility Phase Study is required to fulfill the intent of the study authority and identify the Federal interest in providing water conservation at Seven Oaks Dam.

The construction of the Seven Oaks Dam was authorized as part of the Santa Ana River Mainstem Flood control project by the Water Resources Development Act of 1986, 99th Congress 2nd Session, PL. 99-662. The authorizing language includes the following:

> *"...in lieu of the Mentone Dam feature of the project and subject to the provisions of section 903(b) of this Act, the Secretary is authorized to plan, design, and construct a flood control storage dam on the upper Santa Ana River..."*

Non-Federal Planning Partners

This Feasibility Study was cost shared on a 50/50 basis with the San Bernardino County Flood Control District (SBCFCD), in accordance with their arrangements with local water districts including the San Bernardino Valley Municipal Water District (SBVMWD) and the Western Municipal Water District (WMWD). Throughout the Study, coordination was maintained with the San Bernardino County Flood Control District, and the Riverside and Orange County Flood Control Districts, the Non-Federal Sponsors of the Santa Ana River Mainstem Flood Control Project (SARP). The U.S. Forest Service was a cooperating agency for the Environmental Impact Statement in accordance with National Environmental Protection Act guidelines.

Purpose and Scope

The study purpose was to investigate the feasibility of seasonal water conservation at Seven Oaks Dam. Seven Oaks Dam is being built for flood protection as part of the Santa Ana River Project. The flood control storage space behind the dam after the major flood season presents an opportunity to conserve runoff and groundwater flow disrupted by the dam. In the dry months, the stored water would be released to users downstream at a rate that could supplement their diversion and recharge requirements.

The specific Feasibility Study purpose was to select a specific plan for implementation. This included more detailed analyses of study area conditions; further definition of problems and needs and the establishment of planning objectives; the formulation, development and evaluation of alternative plans identified to meet the planning objectives; the selection of a plan that best met the planning objectives and evaluation criteria; and the definition of the Federal and Non-Federal requirements for implementing the selected plan, including cost-sharing and other responsibilities. The Study focused primarily on water conservation with consideration of other needs identified and defined throughout the planning process. The results presented in this report were developed in accordance with Federal water resources planning principles, policies, guidelines, and procedures as contained in Corps of Engineers' Engineer Regulation 1105-2-100 and other Corps of Engineers directives and authorities.

A major consideration that must be recognized is that in this study the without-project baseline condition assumed that the Seven Oaks Dam, presently under construction, will be completed and operated for flood control as part of the SARP. Accordingly, the baseline for this water conservation study reflects the Seven Oaks Dam flood control features and operation will be in place as described in the existing *Santa Ana River Phase II General Design Memorandum - Seven Oaks Dam* operation plan and other design and environmental compliance requirements associated with the flood control project. Therefore, the water conservation study is directed towards identifying the additional requirements above the flood control project that are needed to operate the Seven Oaks Dam for water conservation. This includes identifying alternative storage potentials above flood control, and any modifications or additional requirements to the flood control dam features and operations, real estate, additional costs, and identifying impacts and mitigation that may result of the changes needed to operate the Seven Oaks Dam flood control project for water conservation.

The plan formulation process leading to the selection of a plan to modify the Seven Oaks Dam flood control project for water conservation included the following activities:

1. describing the present and future conditions that would be expected to prevail under "without-project" conditions, i.e., conditions that are expected to exist if water conservation at Seven Oaks Dam is not implemented;

2. identifying problems and opportunities associated with water conservation and related water and other resource uses within the study area under these without project conditions;

3. establishing planning objectives and constraints;

4. developing alternative measures and plans to address the specific planning objectives;

5. assessing impacts of each alternative measured in changes comparing "with-project" conditions with "without project conditions" to national economic development, environmental quality, regional socio-economic characteristics, and the general social well-being;

6. evaluating beneficial and adverse tradeoffs between alternative plans, considering the assessed impacts and other evaluation criteria, and

7. selecting a plan for recommendation.

The scope of the technical studies included all investigations needed to identify physical, economic, and environmental conditions associated with determining water conservation problems and needs, and to develop and evaluate alternative solutions to reach a decision on a Selected Plan.

Economic studies included defining water supply demands and needs; determine potential benefits based on the savings that could occur in the cost of providing equivalent water supplies for each alternative, as compared to the cost of the most likely alternative sources under without project conditions; and to evaluate economic returns for each alternative as measured in net National Economic Development benefits.

Environmental studies included consideration of biological, water quality, air quality, cultural resources, and other environmental resources and conditions in areas that may be impacted by the alternatives, determination of impacts of alternatives, developing mitigation requirements to avoid or minimize impacts, and preparation and coordination of a combined Environmental Impact Statement and Environmental Impact Report in accordance with guidelines for complying with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), as well as other Federal and State laws, policies, and regulations associated with protecting the Nation's environmental resources.

Engineering studies included analyzing hydrologic and hydraulic conditions associated with operation of the Seven Oaks Dam for flood control, and identifying alternative dam operating conditions and storage potential for developing water conservation opportunities; design of alternative plan features including modifications to the Seven Oaks Dam and other requirements needed to develop the water conservation potential and any mitigation requirements; investigations on dam safety considerations associated with each water conservation alternative and designing measures to maintain acceptable dam safety requirements in coordination with the California Department of Dam Safety; and develop estimates for the cost of constructing plan features and any additional operation, maintenance, replacement, and rehabilitation costs that may be needed for each alternative plan. Real estate studies include identifying any additional lands, easements, rights-of-way needed for implementing each alternative and determining costs and implementation procedures needed for obtaining the necessary real estate rights.

All aspects of the Feasibility Study were coordinated with other Federal, State, and local public agencies, organizations and concerned individuals. These agencies include the U.S. National Forest Service, the U.S. Fish and Wildlife Service, the U.S. Environmental Protection Agency, California Department of Fish and Game, California Department of Dam Safety. Coordination was conducted in accordance with Federal and State guidelines, including compliance with Federal and State Clearinghouse requirements.

Prior Studies, Reports, and Existing Water Projects

Prior Studies and Reports

The following related Federal and non-Federal documents exist:

1. *Water Control Manual, Prado Dam & Reservoir, Santa Ana River, California.* Los Angeles District, Corps of Engineers, September 1994.

2. *Design Memorandum No. 8, Feature Design - Seven Oaks Dam Embankment and Spillway, Dynamic Analysis Supplement to Volume 2, Appendix A, Geotechnical.* Los Angeles District, Corps of Engineers, December 1992.

3. *Design Memorandum No. 8, Feature Design - Seven Oaks Dam Embankment and Spillway, Volume 2, Appendix A, Geotechnical/Attachment.* Los Angeles District, Corps of Engineers, November 1992.

4. *Seven Oaks and Prado Dams Water Conservation Reconnaissance Study.* Los Angeles District, Corps of Engineers, October 1992.

5. *Review of Prado Dam Operation for Water Conservation and Environmental Impact Statement.* Los Angeles District, Corps of Engineers, October 1992.

6. *Design Memorandum No. 4, Feature Design - Seven Oaks Dam Outlet Works, Volume 1-Report and Appendices.* Los Angeles District, Corps of Engineers, April 1991.

7. *Phase II General Design Memorandum, Santa Ana Mainstem Including Santiago Creek, Volume 7, Hydrology.* Los Angeles District, Corps of Engineers, August 1988.

8. *Operation of Prado Dam for Water Conservation.* Los Angeles District, Corps of Engineers, June 1988.

9. *Prado Dam Water Conservation Study.* Camp Dresser & McKee, Inc. October 1985; study prepared for the Orange County Water District.

10. *Existing and Potential Recreation Use and Benefit Analysis, Upper Santa Ana River and Lytle Creek.* Los Angeles District, Corps of Engineers 1985.

11. *Phase I GDM and SEIS on the Santa Ana River Mainstem.* Los Angeles District, Corps of Engineers, 1985.

Existing Water Projects and Facilities

Water projects and facilities in the Study Area, including facilities of both the Corps of Engineers and the cost-sharing Non-Federal Sponsors, are as follows.

SARP - Seven Oaks Dam

The Seven Oaks Dam flood control feature of the Santa Ana River Mainstem Project is scheduled for completion in the year 1999. In accordance the authority for constructing the project as contained in the Water Resources Development Act of 1986, and arrangements contained in the Local Cooperation Agreement between the Federal Government and the SARP Non-Federal Sponsors, the dam will be turned over to be operated and maintained by the San Bernardino Flood Control District, in coordination with the Flood Control Districts of Riverside, and Orange Counties, at 100% Non-Federal cost. The Local Cooperation Agreement specifies that any modifications to the Seven Oaks Dam or its operations will require Federal approval.

San Bernardino Valley Municipal Water District

The San Bernardino Valley Municipal Water District (SBVMWD) was incorporated on February 17, 1954. The SBVMWD is a wholesale water supplier serving area water districts which serve a population of about 600,000 people within a 328-square-mile area (210,000 acres), including Bloomington, Colton, East Highland, Grand Terrace, Highland, Loma Linda, Mentone, Redlands, Rialto, Yucaipa, and San Bernardino.

The SBVMWD's primary water source is the California State Water Project (SWP) via Lake Silverwood (also known as the East Branch of the State Aqueduct). The District's ultimate annual entitlement for SWP water is 102,600 acre-feet, out of a total of 4,230,000 acre-feet that are available statewide to 29 other SWP contractors. There are currently 33 miles of 12 inch to 78 inch diameter pipeline in the delivery system. SBVMWD has 28 service connections which supply both native and SWP water for direct delivery of water to areas within the District boundaries, as shown in **Figure 1-1**. The SBVMWD is a member of the Santa Ana River Mill Creek Cooperative.

Santa Ana River-Mill Creek Cooperative Water Project

This cooperative project is composed of water entities that have the shared goal of providing beneficial use of water resources by integrating existing local water supplies and available imported water supplies. Exchanges and transfers are used in order to provide the most economical, efficient, and dependable supply possible at minimum expense to water users and taxpayers, and at minimum energy cost. Figure 1-1 shows the locations of several pipelines as well as the service area boundary.

The cooperative project is composed of the following: (1) Bear Valley Mutual Water Company, (2) City of Redlands, (3) Crafton Water Company, (4) East Valley Water District, (5) Lugonia Water Company, (6) North Fork Water Company, (7) Redlands Water Company, (8) San Bernardino Valley Water Conservation District, (9) San Bernardino Valley Municipal Water District, and (10) Yucaipa Valley Water District. These eligible entities, other than the San Bernardino Valley Municipal Water District (SBVMWD), have water rights that include the Santa Ana River and Mill Creek.

Figure 1-1. San Bernardino Valley Municipal Water District Facilities Map

Chapter 2. The Study Area

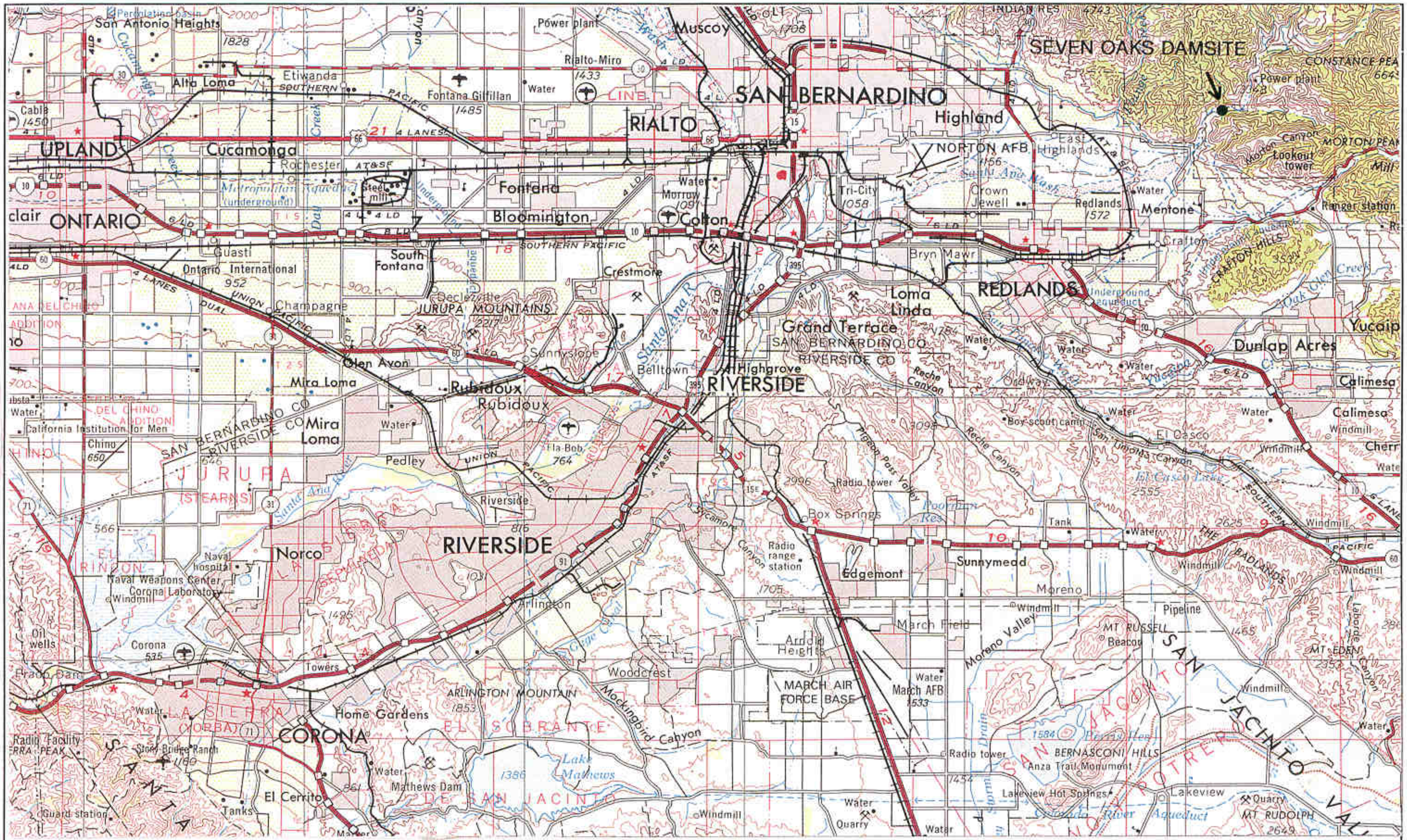
Seven Oaks Dam and Reservoir lie mostly within the San Bernardino National Forest in San Bernardino County, California. The dam is part of the Santa Ana River Basin, which drains approximately 2,450 square miles. Approximately 23% of the basin is within the San Gabriel and San Bernardino Mountains; about 9% is in the San Jacinto Mountains: and 5% is within the Santa Ana Mountains. Most of the remaining area is in the valleys formed by the broad alluvial fan along the base of these mountains. **Figure 2-1** shows the dams proximity to Mentone and Redlands.

The Seven Oaks Dam watershed drains approximately 177 square miles, excluding the 32 square miles tributary to Baldwin Lake. The 27 miles of river upstream of the dam have an average gradient of 300 feet/mile, with one individual stream gradient of more than 600 feet/mile. Some small tributaries in the upper portion of the watershed have gradients exceeding 1,900 feet/mile. The steep slopes of the watershed are generally covered with dense growth of chaparral and sage scrub. Above elevations of 5,000 feet NGVD, coniferous forest predominates.

The Seven Oaks Dam is located in the upper Santa Ana River Basin, and has headwaters in the San Bernardino Mountains, as shown in **Figure 2-2**. The dam is situated approximately one mile upstream of the mouth of the Santa Ana Canyon at the confluence of the Santa Ana River and Government Canyon. The steep-walled canyon is surrounded by the rugged foothills along the southern flank of the San Bernardino Mountains. The elevation of the damsite at the canyon floor is approximately 2,060 feet and the watershed elevations range to 11,503 feet NGVD at San Gorgonio Peak. The normal annual precipitation, just downstream of Seven Oaks Dam at the Santa Ana PH3 station, is 25.09 inches. Average summer and winter temperatures are 89° and 70°, respectively. The Study Area includes the service area for the San Bernardino Valley Municipal Water District (SBVMWD).

Seven Oaks Dam Project Area

The without-project condition is the condition expected to prevail if no action is taken. Because the Seven Oaks Dam is currently under construction, the without-project, existing condition is based on the operation of the dam in the Year 2000. The without-project, future condition is designated as the Year 2050. Future development in the Seven Oaks Dam watershed is projected to be negligible. Future conditions would only be affected by 50-year sediment deposition in the reservoir.

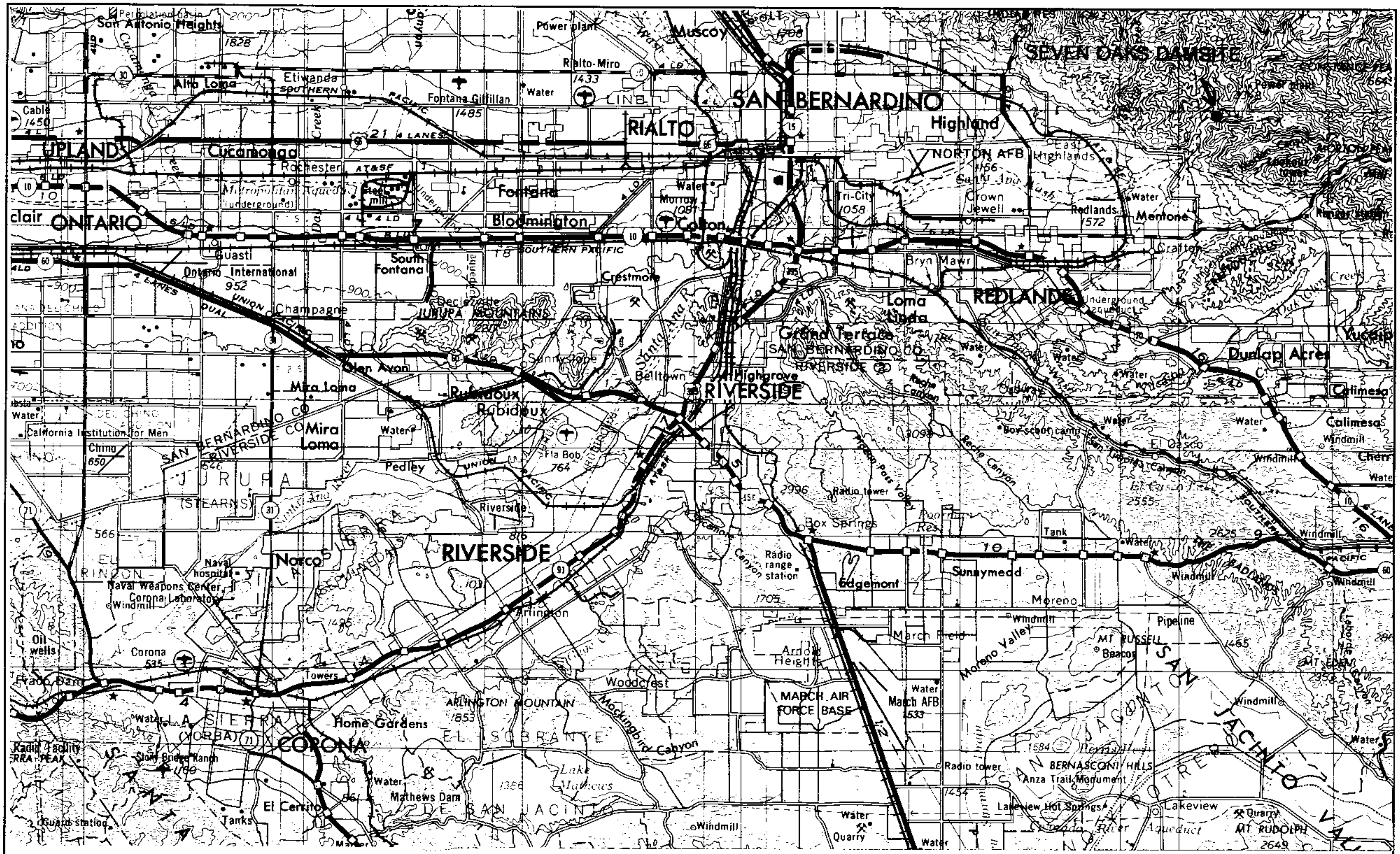


Map Source: USGS 1:250,000 Santa Ana and San Bernardino Topographic Maps

N

1"= 3.95 miles

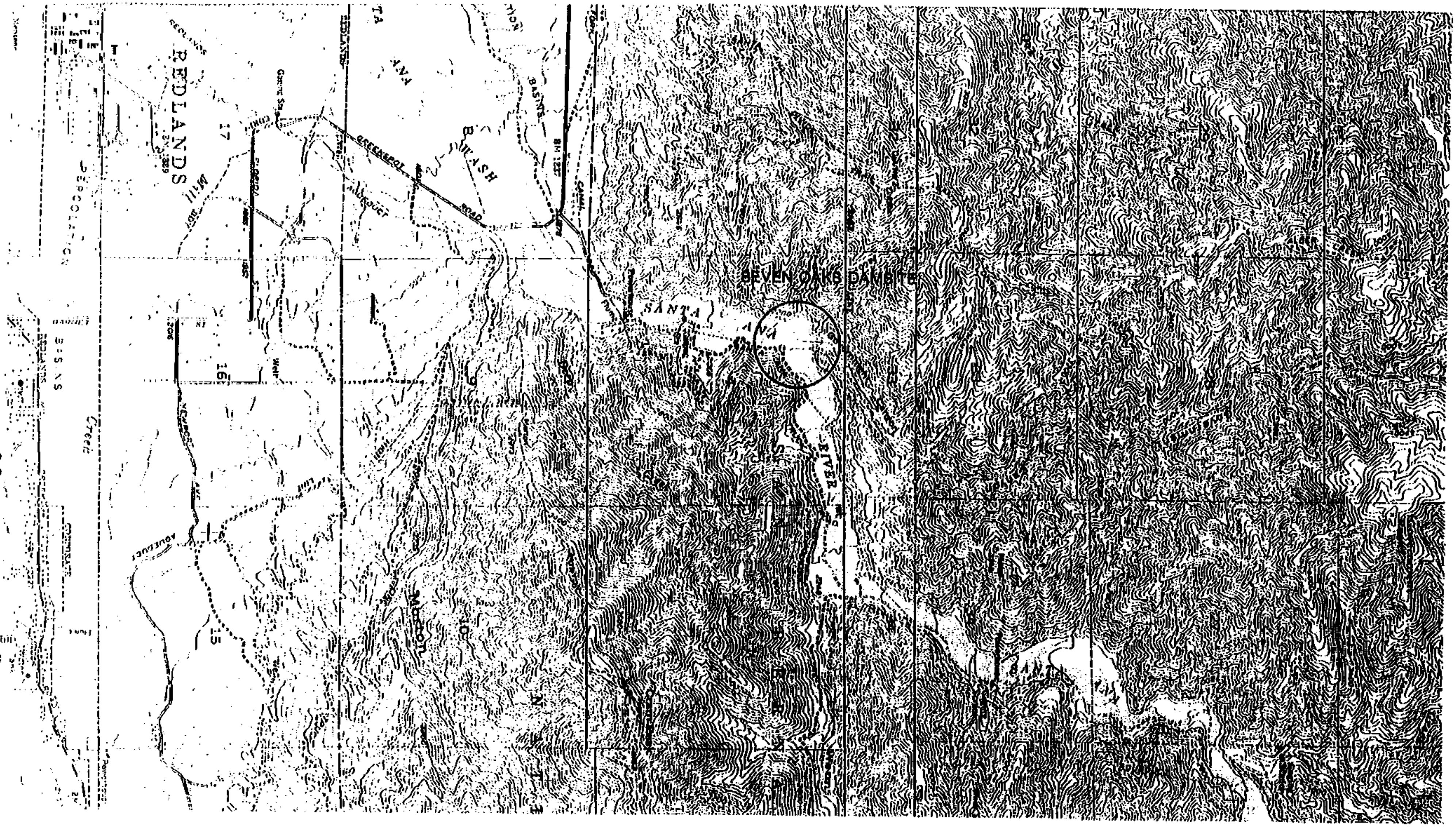
Figure 2-1. Regional Map



Map Source: USGS 1:250,000 Santa Ana and San Bernardino Topographic Maps

N 1"= 3.95 miles

Figure 2-1. Regional Map



Map Source: USGS 1:24,000 Yucaipa and Keller Peak Quadrangles

Scale: 1" = 1280'

Figure 2-2. Location Map

Relevant physical information for the Seven Oaks Dam and Reservoir is shown in **Table 2-1**. The dam has a reservoir area at spillway crest of 780 acres providing a gross capacity of 145,600 AF of storage. **Figure 2-3**, "Seven Oaks Dam Drainage Area," shows the 177 square miles of drainage area.

Table 2-1. Pertinent Information for Seven Oaks Dam and Reservoir

Drainage Area	**177 mi^2**
Outlet Works (gated conduit)	
Length of Conduit	**1,623 ft.**
High Level Intake Elevation	**2,265 ft. NGVD**
Embankment Height over Streambed	**550 ft.**
Embankment Height over Bedrock	**over 650 ft.**
Top of Embankment Elevation	**2610 ft. NGVD**
Top of Spillway Elevation	**2580 ft. NGVD**
Surface Area at Spillway Crest	**780 acres**
Storage Capacity	**145,600 ac-ft.**
Maximum Embankment Length	**2,980 ft.**
Maximum Crest Length	**2,630 ft.**
Basin Dimensions (approx. max. length)	**2 mi.**
Maximum Basin Intake Capacity	**85,000 cfs.**
Maximum Basin Outlet Discharge	**7,000 cfs.**
Sediment Storage over Life of Project	**32,000 ac-ft.**

Hydrology

The without-project operation of Seven Oaks Dam consists of the operation for flood control purposes, as described in the *Phase II General Design Memorandum* (GDM). From the beginning of November to the end of May, the target pool elevation is 2,200 feet NGVD (2,968 acre-feet). During this period, all inflow is stored until the target storage is attained — after which releases from the dam are adjusted to equal inflow. Beginning in June, releases from the dam include all inflows plus additional releases to empty the debris pool by the end of August. The debris pool releases for present conditions are as follows: June - 10 cfs; July - 20 cfs; and August - 20 cfs. The operation for future conditions, as described in the Phase II GDM, consists of a 100-year debris pool target elevation of 2,300 feet NGVD. Future releases follow the same

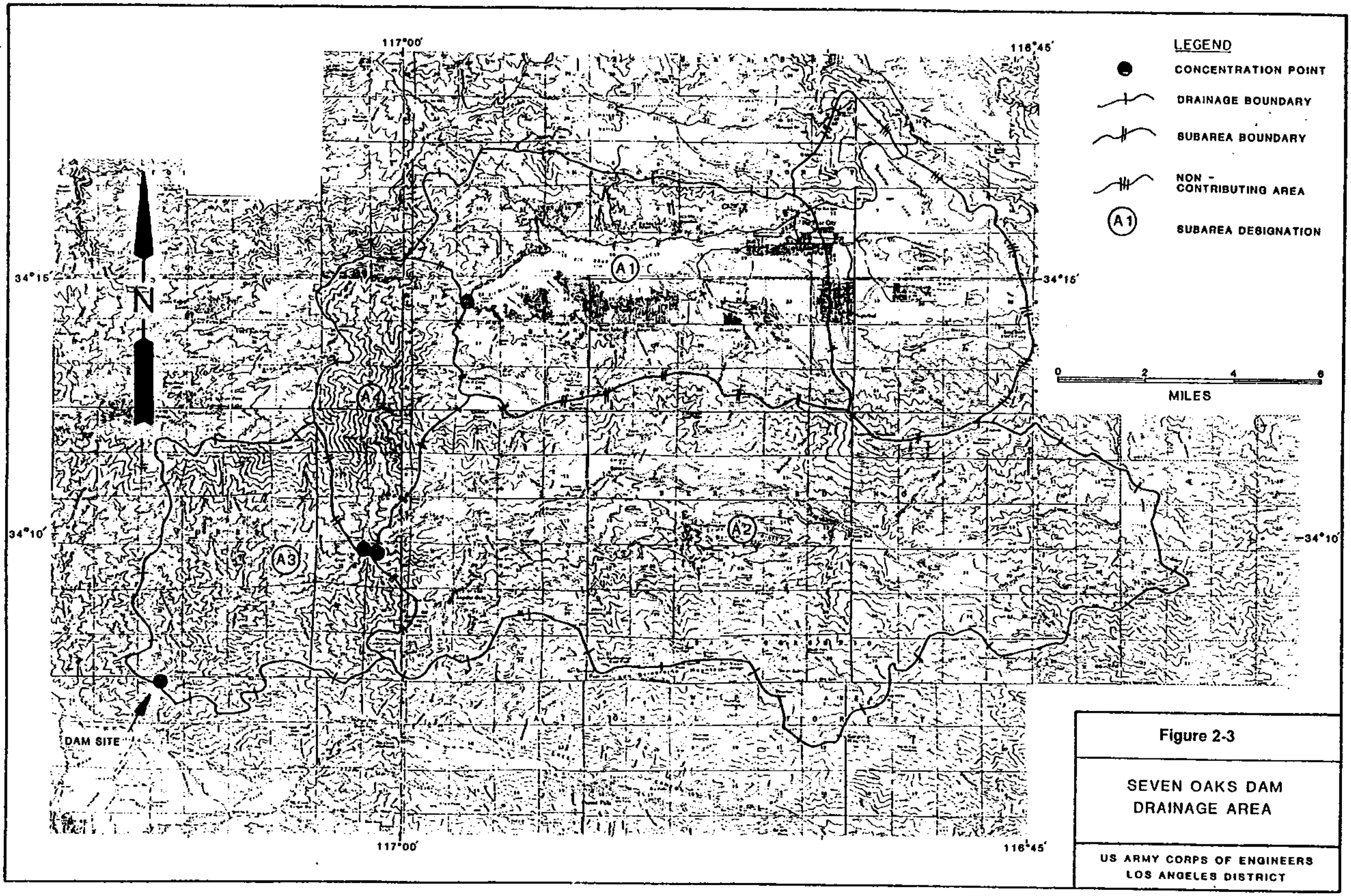


Figure 2-3

SEVEN OAKS DAM
DRAINAGE AREA

regime as the present (Year 2000) releases. The debris pool releases for future conditions are as follows: June - 6 cfs; July - 15 cfs; and August - 15 cfs.

Seven Oaks Dam operations criteria also indicate that from November through February, when no major flood events occur, release of outflow equals inflow up to 500 cfs. The releases are made from inflow that raises the pool above the designated target debris pool elevation of 2,200 feet NGVD. During major flood events, Seven Oaks Dam and Prado Dam are operated in tandem with each other. Flood control releases at Seven Oaks Dam are restricted to a constant 50 cfs release between elevations 2,200 feet and 2,298 feet to prevent floating material from collecting on the trash rack. Above 2,298 feet, the outflow is increased only to 500 cfs until the flood is over and the water surface at Prado Dam is decreasing. Subsequently, releases at Seven Oaks Dam increase up to a maximum of 7,000 cfs until the target level is met.

In 1971, a California Department of Water Resources Study estimated that the average amount of subsurface flow from the Santa Ana River Canyon totals 2,500 acre-feet/year (average flow of 3.5 cfs). At the damsite, about one mile upstream of the canyon mouth, the aquifer outflow is estimated to be 2,200 acre-feet per year, or an average of three cfs. It is expected that the construction of Seven Oaks Dam will block this natural subsurface flow since the impervious core of the dam will extend to the bedrock, thereby blocking the aquifer. The blockage will cause the groundwater to rise and become impounded behind the dam. A release of three cfs or greater will be made year-round, even when the debris pool is being formed, to maintain the historic groundwater flows below the dam.

Design

Dam Embankment

Seven Oaks Dam is constructed of earth and rockfill materials from spillway and drainage channel excavation, from required foundation excavation, and from designated nearby alluvial and silt deposits. The dam is approximately 650 feet above the lowest foundation bedrock contact and approximately 550 feet above the existing streambed at the dam axis. The crest elevation of the dam is at 2,610 feet NGVD with a crest length of 2,630 feet. The crest width is 40 feet. The outer slopes of the embankment are steeper on the downstream face, (1V on 1.8H, than on the upstream face, 1V on 2.2H.

The embankment section is designed for dam safety, while utilizing the materials available at the site in the most cost-effective manner. The inclined core extends from bedrock to within ten feet of the crest of the dam. The top width of the core is 16 feet. The upstream slope of the core is 1.33V on 1H, and the downstream slope is 2.8V on 1H. The upstream side of the core is flanked by a filter zone of 3/4-inch alluvial material. Next to this zone is an alluvial transition and shell zone of 12-inch alluvium produced from the streambed foundation and downstream pervious borrow excavations. A three-foot layer of 10-inch-to-30-inch armor stone covers the upstream slope. The downstream side of the core is flanked by a rock transition zone. Next to this zone is a rockfill zone. A ten-foot-wide inclined drain is located at the interface of these two zones. The inclined drain discharges any through-seepage into the rock toe at the downstream toe of the embankment through an eight-foot thick horizontal blanket drain. The rock toe consists of oversize alluvial boulders of 12-inch to 48-inch surrounded by a zone of three-inch-to-18-inch filter material on the upstream, top, and bottom sides. The eight-foot-thick blanket drain separates the rockfill zone from the streambed alluvium.

Embankment zoning provides resistance to concentrated leaks by placing high strength materials and those meeting filtering requirements within the embankment. The crack-resistant core and well-graded, cohesion-less filter and transition zones are designed to be effective in sealing internal cracks which may develop due to differential settlement or earthquake induced movement. The alluvial transition, rock transition and rockfill zones of free-draining sands, gravels and rockfill are designed with relatively flat slopes to provide stability during an earthquake.

Outlet Works

The outlet works consist of the following: a reinforced concrete intake structure with a maximum vertical height of 225.5 feet; a concrete-lined tunnel, 1,656-foot-long, consisting of an 18-foot diameter circular section in the upstream tunnel and an 18-foot-wide by 18-foot, 6-inch-high modified horseshoe section in the downstream tunnel; a gate chamber; an 18-foot-wide by 14-foot-high rectangular exit channel; an access structure above the exit channel at the downstream portal; a valve structure; and an apron slab and plunge pool for energy dissipation downstream of the channel.

The gate chamber, located at approximately two-thirds of the length of the tunnel from the upstream end and contains the regulating outlet (RO) gates, the low flow gates, the minimum discharge line (MDL) ball valve, and associated mechanical and electrical equipment. A 12-foot, 6-inch diameter, 1,322-foot high concrete-lined vertical air shaft extends from the gate chamber through the left abutment to the rock surface above to supply air to the gates during operations.

The midtunnel control RO gates consist of two hydraulically operated vertical slide gates; each service gate is five-feet-wide by 8.5-feet high. An emergency gate is provided upstream of each service gate for operational redundancy and emergency control of outlet releases. Flood flows which pass over the high-level intake sill are controlled by the RO gates to a design maximum outflow of 7,000 cubic feet per second.

Low flows are controlled by the 36-inch diameter MDL and a hydraulically-operated low flow gate in the gate chamber which measures two-feet-wide by three and one-half-feet high. The MDL delivers flows between ten and 90 cubic feet per second. The low flow gate delivers flows between 90 and 500 cubic feet per second.

The multilevel withdrawal system (MWS) allows control of the sediment level in the vicinity of the outlet structure by providing 18 elevation levels of intake ports that can be closed depending upon the relative level of the sediment/debris pool. The 18 pairs of 27-inch diameter ports are vertically spaced 10 feet apart along the inclined intake structure between elevations 2,100 and 2,265 NGVD. Stop logs are used to selectively close the intake ports along the structure; these are typically installed 20 to 30 feet above the sediment level prior to each flood season by use of a lifting beam and crane positioned on the maintenance deck. In addition, withdrawal of water takes place from the high-level sill at the top of the intake tower at elevation 2,265 NGVD, which is set at the estimated maximum sediment level that is expected over 100 years.

The outlet tunnel bulkhead provides the capability for inspection and repair of the tunnel and control gates downstream by preventing flow from discharging through the outlet tunnel. The bulkhead is manually positioned in place by a crane. The crane lowers the bulkhead along slotted guides from the maintenance deck at the top of the intake structure down to the tunnel inlet. The bulkhead itself is approximately 26-feet-high by 13-feet, and ten-inches-wide. When not in use, the gate is stored in a nearby storage slot.

Access to the maintenance deck on top of the intake structure is provided during non-flood events by a 19-foot-wide by 50-foot-long concrete bridge leading from the access road along the left abutment.

Spillway

The spillway is 560-feet wide and approximately 1,400-feet long, and excavated in rock through a natural saddle just east of the dam. The excavated material is used in the rock transition and rockfill zones of the dam's embankment. The spillway section is trapezoidal and unlined except for a concrete control sill located at the crest approximately 1,000 feet from the downstream end. The control sill is of cast-in-place concrete construction with the top of the control sill set at elevation 2,580 feet NGVD. The top of the spillway excavation daylights 370 feet above the crest at approximately elevation 2,950 feet NGVD. The peak water surface elevation during a probable maximum flood event is estimated at elevation 2,605 feet NGVD.

Access Roads

The permanent access roads are necessary to operate and maintain the flood control project. They will also be utilized by the U.S. Forest Service (USFS) to manage land resources and perform fire prevention activities, and by local hydropower and water companies to operate and maintain their facilities upstream from the dam. Paved all-weather access roads will be provided to the top of the dam, intake structure, air shaft, spillway, and the outlet works. Permanent access within the reservoir and upstream canyon is provided by a graded, unpaved, one-lane road, excavated in rock and colluvium, which joins the existing unpaved access road in the streambed.

Hydrologic Facilities

A balanced beam manometer, with a vertical range of 550 feet,is used to record reservoir water surface elevations. This device includes a purge bubbler system, a nitrogen storage tank, and a three-inch, rigid galvanized steel, water-tight conduit, installed just beneath the upstream face of the dam that runs from the top of the dam down to the reservoir bottom. A graphic water surface recorder and a digital recorder are installed to automatically record water surface measurements from the manometer.

A series of staff gauge plates provides non-mechanical redundancy for measuring the water surface. These are installed on the left abutment along the upstream face of the dam. Each plate is installed to be readable from the top of the dam and the intake structure service area to visually monitor water levels.

Each outlet service gate has an automatic recorder to document all gate movements. These recorders monitor and provide permanent records of gate settings by automatically activating each time a gate control switch is brought into service. The information is transmitted to the Corps of Engineers' Los Angeles District Office via radio telemetry equipment.

Three index range lines are established in the reservoir area to provide an indication of the amount of sediment deposition occurring in the reservoir during the project life and to help determine the need for additional topographic mapping. The index range lines consist of typical survey monuments (brass tablet set on a concrete base). One monument is positioned on each side of the reservoir for each line.

A remote terminal unit (RTU), compatible with the existing Los Angeles District telemetry system, is installed at the reservoir water surface level instrument house, the two upstream precipitation stations, and the downstream gauge house. These RTU's transmit the gauged information -- water surface elevation, gate positions, accumulated precipitation, and battery voltage -- to the Corps' Los Angeles District Office.

Hydraulic Instrumentation

Permanent operations instrumentation is provided to assist with the operation of the dam. The operations instrumentation provides water surface elevations and pressure readings to determine proper gate settings and to monitor trash blockage in the intake structure. The instrumentation consists of piezometers and pressure transducers. The piezometric head is measured with piezometers connected to a manifold located in the gate chamber. The piezometer taps are installed in steel mounting plates embedded flush with the concrete in the tunnel and intake structure

Geotechnical Instrumentation

Vertical movements within the embankment are measured with a combination of settlement monuments on the surface of the dam and inclinometers installed within the embankment. Horizontal movements on the surface of the dam are monitored with surface monuments. Horizontal movements within the embankment are measured with inclinometers and full profile horizontal displacement gauges.

An interconnected system of strong motion accelerographs, with 0.01-g accelerometers and peak recording accelerographs, is installed in the embankment, alluvial foundation and bedrock abutments to record the response of the dam and foundation to seismic activity.

Esthetic Treatment

The Seven Oaks Dam embankment visually dominates its surroundings because of its 2,630-foot-length and 550-foot height above the streambed. The downstream face is highly visible, and is treated with a rock coloration system to recreate the weathered look of the naturally exposed rock. The coloring blends the dam embankment face into the adjoining hills and other background features.

Operation and Maintenance

A fulltime dam tender and assistant are based onsite. All operations of the gates and valves are performed by either a remote control located in the access structure, or by a local control at the gate chamber and valve structure.

Real Estate

Seven Oaks Dam and Reservoir are predominately within the boundaries of the San Bernardino National Forest. The majority of the reservoir's take-line is owned by the USFS. In addition, Southern California Edison (SCE) has both easement interests over property owned by the Forest Service and land in fee within the project area.

In accordance with the Water Resources Development Act of 1986, and as agreed in the December 1989 Local Cooperation Agreement, the SARP Non-Federal Sponsors are responsible for acquisition of properties required for the dam for flood control, including those lands needed for environmental mitigation of the flood control project impacts.

The SARP Non-Federal Sponsors have acquired the non-USFS lands required for construction of Seven Oaks Dam project, including that owned by SCE, and the USFS has issued a permit for construction activities associated with the Seven Oaks Dam.

The U.S. Army Corps of Engineers (USACE) is negotiating an inter-agency transfer agreement with the U.S. Forest Service to transfer title to certain parcels of Forest Service lands on which the Seven Oaks Dam and associated facilities are located. These lands would be exchanged with parcels acquired by the SARP Non-Federal Sponsors. These negotiations also include arrangements for a permanent flowage easement on USFS lands for the flood control reservoir operations.

Environmental Conditions

It is emphasized that the without-project condition for the water conservation study is based on the Seven Oaks Dam and reservoir area being completed and operating for the purpose of flood control. Accordingly, all impacts associated with the flood control project, and measures being taken to mitigate these flood control impacts, are assumed to exist in the without-project condition.

A major consideration in this regard is that the Seven Oaks Dam flood control project includes mitigation based on 100% loss of biological resources located within the damsite and within the 50-year flood reservoir area up to elevation 2,425 feet NGVD, and 50% loss of floodplain vegetation above 2,425 to the maximum flood boundary. The flood control project also includes mitigation for downstream impacts associated with dam construction and operations for flood control. The impacts and mitigation requirements that are being implemented as part of the Seven Oaks Dam are described in the *Final Supplemental Environmental Impact Statement/Environmental Impact Report* dated 1988 and the *Phase II GDM*. Additional information on the area resources and the without-project conditions is presented in the EIS/EIR for the selected water conservation plan.

Biological Resources

Vegetation. The Seven Oaks Dam and Reservoir lies along the upper Santa Ana River in a canyon of the San Bernardino Mountains with steep chaparral and coastal sage scrub-covered side slopes. The canyon floor is characterized by alluvial scrub and alder woodland. Chaparral is a group of shrubs ranging from one-to-four meters in height. The density of this vegetation varies from dense on most slopes to sparse on the steepest slopes. Dominant species in this area include chamise, mountain mahogany, hoary-leafed ceanothus, and holly-leaf redberry. Understory species in the region include black sage, poison oak, and southern honeysuckle.

The alluvial scrub environment occurs on the canyon floor and downstream of the dam in the Santa Ana River Wash. Alluvial scrub is considered sensitive habitat by many resource agencies because of the scarcity of the habitat, its riparian nature, and its unique flora and fauna. On the canyon floor, common species include scalebroom, California buckwheat, California sagebrush, deerweed, and sweetbrush. Few trees are found in this community. However, those present include Fremont's cottonwood and the California sycamore. The wash portion of the alluvial scrub contains many of the same species as the canyon floor. The vegetation in the wash is generally more dense and also includes the following species: California juniper, holly-leaved cherry, and hairy yerba santa.

An alder woodland community is present in the upper portion of the Santa Ana Canyon at approximately 2,500 feet. Resource agencies consider this habitat sensitive because of its riparian nature. The alder woodland is confined to the river channel and is approximately 1,000 feet in length. The most common tree in the area is the White alder, with willows, California sycamore, and Fremont's cottonwood occurring less frequently. Understory species in the area include both mugwart and mulefat.

Wildlife. The upper Santa Ana River canyon and environs currently supports three known species of amphibians and 15 species of reptiles. The California chorus frog is the most common, with Pacific chorus frogs and western toads also present. Western fence lizards and side-blotched lizards are the most common reptiles, with locally abundant populations of western whiptails, sagebrush lizards and southern alligator lizards. The most common snakes are the western rattlesnake, California whipsnake, and gopher snakes. Fish, primarily rainbow trout, spawn in the Santa Ana River Canyon above the dam. Non-native brown trout are believed to be a self-sustaining species within the canyon.

Numerous breeding and nonbreeding birds species are present in the area. Common wintering birds include the ruby-crowned kinglet, yellow-rumped warbler, and dark-eyed junco. Common breeding species include the song sparrow, lesser goldfinch, Costa's hummingbird, brown towhee, rock wren, rufous-sided towhee, black-headed grosbeak, lazuli bunting, northern oriole, house wren, black phoebe, ash-throated flycatcher, scrub jay, Anna's hummingbird and wrentit. Breeding raptors include the golden eagle, Cooper's hawk, red-tailed hawk, American kestrel, barn owl, great horned owl and western screech owl.

More than 30 species of mammals have been detected in the project area. Small diurnal mammals in the area include California ground squirrel and the desert cottontail. Small nocturnal animals in the canyon include deer mouse, brush mouse, and Pacific kangaroo rat. Large mammals include raccoon, coyote, bobcat, and mule deer

Special Status Species. Two Federal-listed endangered plants are located downstream of the damsite -- the Santa Ana River woollystar and the slender-horned spineflower.

The environment around Seven Oaks Dam also supports special status wildlife. **Table 2-2**, contains the Federal candidate and listed species that are either known or believed to occur in the project area.

Table 2-2. Federal Status Wildlife Species

Type	Species	Status
Invertebrates	Greenest tiger beetle	Candidate
Amphibians	southwestern arroyo toad	Endangered
Birds	southwestern willow flycatcher California gnatcatcher least Bell's vireo	Endangered Threatened Endangered
Mammals	San Bernardino kangaroo rat	Candidate

Cultural Resources

At Seven Oaks Dam, the only cultural resources are the Southern California Edison hydroelectric facilities, which are eligible for the National Register of Historic Places. Mitigation for these historic properties has been completed as part of the SARP. The operation of Seven Oaks Dam for water conservation will not require additional investigations for cultural resources or create additional impacts on such resources above and beyond those already mitigated for as part of the SARP.

Land Use

The reservoir area formed by Seven Oaks Dam is surrounded by the San Bernardino National Forest. Facilities located within the project area include a USFS road, SCE Powerhouse No. 2 flume system and transmission lines, and a well that has been acquired by the SARP Non-Federal Sponsors and is currently operated by the Bear Valley Mutual Water Company. There are also several gauging stations with small structures and powerhouses along the Santa Ana River. Additional land use in the general area consists of dispersed, non-motorized recreational hunting, fishing and hiking. Historic land use in the canyon has been centered on the SCE hydroelectric generating facilities and water extraction activities. Public access to and through the canyon has been closed during dam construction.

Water Quality

Surface flow in the canyon is perennial, but is partially regulated by releases from Big Bear Lake. Additionally, there are some diversions by SCE. Nonetheless, surface flow is usually present for most of the year in the lower portion of the canyon.

Surface flows contribute to groundwater recharge of the Santa Ana River Groundwater Basin. The principal area of recharge near Seven Oaks is at the mouth of the canyon, where a deep, permeable alluvial fan begins. Recharge capabilities also enhanced by the activities of local water districts that manage percolation basins in downstream reaches.

The primary beneficial use of surface water along the Santa Ana River in San Bernardino County is for municipal and agricultural water supply. Groundwater supplies much of the local region's water needs. Beneficial uses include municipal and domestic, agriculture, industrial service, and industrial process supply. The Bear Valley Mutual Water Company operates a water supply well in the Seven Oaks area. The San Bernardino Valley Municipal Water District utilizes the wash area below the damsite for water spreading activities.

The surface water of the upper Santa Ana River is of high quality. The only significant water quality parameters that exceed the Regional Water Quality Control Board's objective minimums are total coliforms, inert ammonia, and DDT. However, according to the EIS/EIR, available data on these parameters is insufficient to form a definite conclusion. The groundwater within a one-mile radius of the damsite appears to be free of contaminants.

Air Quality

Seven Oaks Dam is located in the northeast portion of the South Coast Air Basin. This area, while not currently producing substantial air pollutants itself, frequently experiences poor air quality. The predominate easterly air flow, along with the location of the greatest pollution generators west of the area, results in the eventual transport of air pollutants toward the eastern portion of the basin on a daily basis. Additionally, the mountains display a "chimney" effect which is caused by the heating of mountain slopes, resulting in convective drafts of air upslope. These drafts can carry pollutants from the basin floor to higher altitudes. The mid- to late-afternoon progressive movement of air pollution up the canyons and mountain slopes which ring the eastern edge of the basin is commonly observable, particularly in the summer.

Like many other areas in southern California, the area surrounding Seven Oaks Dam does not meet some State and Federal air quality standards. According to South Coast Air Quality Management District's San Bernardino Air Monitoring Station, Federal and State standards for ozone (O_3) were exceeded every year between 1989 and 1993. The area also exceeded State standards for suspended particulates (PM10) for every year from 1989 to 1993. However, Federal standards were only violated from 1989 to 1991.

Noise

Typically, the rural and remote nature of the Seven Oaks Dam project area is characterized by low ambient noise levels. The noise contributing factors identified in the project area are nature sounds and occasional high-altitude aircraft or maintenance vehicles. No noise-sensitive land uses or wildlife species have been identified within the project area.

Aesthetic Resources

The Seven Oaks Dam drainage basin is a steep-sloped mountain valley system located within the San Bernardino National Forest. Seven Oaks Dam and Reservoir will have the visual quality of a typical mountain valley lake upstream of the dam structure. Vegetation at the lower elevations consists of chaparral and coastal sage scrub communities, gradually changing to a ponderosa pine community at the higher elevations.

Hazardous and Toxic Wastes

Based on the search described in the EIS/EIR, there are no known hazardous or toxic dump sites in the Seven Oaks Dam area.

Chapter 3. Problems and Needs

Water Conservation Needs

The investigations of Study Area problems and needs focused on determining the expected cost of water to meet area demands under without-project conditions. The analyses were based on information identified, defined and assessed through coordination with local and regional agencies and the public, and review of prior studies and reports. The assessments were based on existing and expected future conditions covering the period from Year 2000 to Year 2050. Details of the supply and demand analysis and development of the estimated cost of meeting the areas water supply needs under without project conditions are presented in Appendix E, Economics.

Conserved water would likely be used by the San Bernardino Valley Municipal Water District and Western Municipal Water District, which in this Feasibility Report is represented by the City of Riverside, the WMWD's largest single user agency . This section discusses the current (Year 2000) and future (Year 2050) water demand and supply costs for the SBVMWD and the City of Riverside.

Analyses of projected supply and demand for the Study Area indicate available normal-year supplies will begin to be inadequate to meet demands sometime during the decade from 2010 to 2020; thereafter, additional water supplies will be needed to meet demands during the peak summer water use period.

Water Demand

The water demand analysis assumes that water conserved at Seven Oaks Dam will be used primarily to meet the urban water demand of SBVMWD and WMWD. The forecasted demands assumes that conservation practicable measures to conserve water such as water saving equipment as part of any new development, redevelopment, or remodeling would be implemented. Future water demand for SBVMWD was estimated using the computer modeling program *IWR-MAIN 6.1* (Institute of Water Resources Municipal and Industrial Needs). Future urban water demands for WMWD were based on projections from the City of Riverside, one of the WMWD member agencies possibly entitled to water from new conservation within the basin, according to existing water law (Stipulated Judgement of 1969). **Tables 3-1and 3-2** summarize each agency's projected water demands.

Table 3-1. Projected Water Demand
San Bernardino Valley Municipal Water District

Year	2000	2005	2010	2015	2020	2025	2030-2049
A-F/Year	173,096	191,377	209,658	231,064	252,896	277,124	301,342

Table 3-2. Projected Water Demand
City of Riverside – Western Municipal Water District

Year	1995	2000	2005	2010	2015-2050
A-F/Year	67,000	68,692	72,197	78,545	85,452

Without-Project Water Supply Costs

In general, the primary sources of water available to meet area demands include locally supplied groundwater and surface runoff, the State Water Project (SWP), other imported water and reclaimed treated water. The estimated supplies available and the estimated cost of water includes review of the SWP's water supply studies, and other information provided by local and regional water supply districts.

San Bernardino Valley Municipal Water District

Within the SBVMWD's service area, the local supplier's primary means of supplying its water demands include local groundwater extractions and surface runoff. For purposes of this analysis, local groundwater extractions are expected to be 167,000 acre-feet. This number represents the surface and total extractions/diversions from ground and surface water within the San Bernardino Basin Area.

Based on the demand projections presented in Table 3-1, local groundwater and surface water sources will not meet demands beginning in 2000. The demand shortage is expected to be met by the SWP, importation, and reclamation.

SWP water will be provided to the water district. SBVMWD's yearly entitlement to SWP water is 102,600 acre-feet. However, the reliable amount which will be delivered is 60,000 acre-feet per year. The NED cost for this water varies from $135 per acre-foot in 2000 to $159 per acre-foot in 2035. This cost represents the fixed and variable cost of SWP delivery.

Reclaimed water has the potential to supply about 11,000 acre-feet annually beginning in 2015, when the average cost for reclaimed water is $565. **Table 3-3** presents the overall results of the water supply cost evaluation.

Table 3-3. Without-Project Projected Water Supply Costs San Bernardino Valley Municipal Water District

Year	Local Water Supply (AF)	SWP Water Supply (AF)	Reclaimed Water Supply (AF)	Total Cost
2000	167,000	6,096	--	$16,377,017
2005	167,000	24,377	--	$19,868,145
2010	167,000	42,658	--	$22,631,363
2015	167,000	60,000	4,064	$25,248,560
2035	167,000	60,000	*74,342	$60,971,630
2049	167,000	60,000	*74,342	$60,971,630

* These quantities reflect the 11,000 acre-feet reclaimed water and the 63,342 acre-feet deficit with an estimated cost of $565/acre-AF

City of Riverside — WMWD

The City of Riverside currently receives all but a small portion of its potable water from groundwater basins in the area. The City has a total combined local water right to 64,397 acre-feet, which is not sufficient to cover it's projected water demand.

Riverside can also obtain water from the Gage Exchange. The Gage Exchange consists of the delivery of potable water to the City from the Gage Canal Company in exchange for non-potable irrigation water. Currently, the amount of Gage Exchange water available is 6,400 acre-feet. However, projections indicate that by 2010, the City will be able to obtain up to 13,984 acre-feet. The estimated cost of water to City of Riverside customers is $350/acre-foot.

It is estimated that the City's existing groundwater supply and the Gage Exchange water will not be sufficient to meet demand. The two primary alternatives to meet demands include purchasing imported water from the WMWD, and reclamation.

For imported water, Riverside is currently charged $426/acre-foot. However, in the near future a new rate charge structure will be implemented. Under the new structure, Riverside will be able to purchase up to 3,600 acre-feet of water at $426/acre-foot. Beyond this amount, an additional demand charge estimated at $1,000/acre-foot will be in effect. Taking this new structure into account, the cost of water is approximately $726/acre-foot for the 3,600 acre-foot limit or higher above the limit.

The estimated cost of reclaimed water ranges from $400/acre-foot to $4,000/acre-foot. The average supply cost has been estimated at $800/acre-foot Since costs of imported water are expected to increase substantially after the 3,600 acre-feet is reached, it is assumed that the City would use reclaimed water for demand shortage once both existing groundwater supplies and the 3,600 acre-foot limit have be fully allocated. **Table 3-4** estimates the total cost of water for the City of Riverside.

Table 3-4. Without-Project Projected Water Supply Costs
City of Riverside

Year	Groundwater Supply (AF)	Imported Water Supply (AF)	Reclaimed Water Supply (AF)	Total Cost
2000	68,692	--	--	$24,042,000
2005	72,197	--	--	$25,269,000
2010	78,381	164	--	$27,552,000
2013	78,381	3,600	638	$30,557,000
2015-2049	78,381	3,600	3,471	$32,824,000

Water Rights

The Santa Ana River is fully appropriated throughout the year. The river is listed in the "Declaration of Fully Appropriated Stream Systems" as having no further water available to serve new water right requests. The USFS does not have any surface water rights in the Seven Oaks Dam watershed; however, water rights are claimed by the Lugonia Water Company, Redlands Water Company, North Fork Water Company, and Bear Valley Mutual Water Company. These companies have historically diverted water prior to 1900. The San Bernardino Valley Water Conservation District has certain water rights to divert water for groundwater recharge. Downstream, at or below Prado Dam, the Orange County Water District (OCWD) is free to engage in any activity for water conservation or storage of storm flows. OCWD has the annual right to receive 42,000 acre-feet of base flow waters at Prado Dam.

Environmental Considerations

As indicated previously, the without-project condition for the water conservation study recognizes the construction and operation of the Seven Oaks Dam and reservoir area for the purpose of flood control. The impacts and mitigation associated with the SAR Flood Control Project reflect a 100% loss of habitat areas within the 50-year flood control pool at elevation 2,425 feet NGVD and a 50% loss above 2,425 feet to the flood control reservoir boundary.

The impacts and mitigation also recognize changes to downstream areas as a result of the flood control release operations. Consequently, any opportunities for restoring or improving environmental conditions is limited by the flood control project.

Recreation

The USFS owns most of the lands at and surrounding Seven Oaks Dam and Reservoir. Low intensity recreation usage in the area is the result of limited access and Forest Service wilderness management policies. Because of the limited access to the overall area, fishing, hunting, hiking, and camping are the major recreational activities. Areas downstream of the dam is also used for recreation. The general plans for the Cities of Highland and Redlands identify the Santa Ana River Wash as a recreational area supporting both hiking and equestrian uses.

The recreation plan proposed for the Seven Oaks Dam as part of the SARP included trails, picnic areas, and two intensive use areas. This recreation plan was not consistent with the Forest Service's Land and Resource Management Plan, and further studies on recreational development were halted with the understanding that in the event of a water conservation pool being developed behind the dam, a reevaluation of recreational opportunities could be undertaken.

Development of facilities to support dispersed, non-motorized recreation at Seven Oaks may be examined, if interest is expressed by the USFS and a cost-sharing partner for recreation is identified. Any costs or impacts associated with developing recreation at Seven Oaks Dam would be addressed and agreed to by the SARP Non-Federal Sponsors. Such facilities could include picnic sites, sanitary facilities, potable water, hiking, equestrian and mountain bike trails, launching areas for small non-motorized boats and access roads. Items such as road access, trail location and informational kiosks may be investigated.

As demonstrated in the 1985 Corps of Engineers' report, *Existing and Potential Recreation Use and Benefit Analysis*, there is a need for such recreational facilities in the Upper Santa Ana River watershed. Between 1980 and 2000, the projected average annual growth rate of recreation activities in San Bernardino County is 3.73%. During the same period, the average annual population increase for San Bernardino County is projected to be 3.77%, and for Riverside County, 3.54%. Clearly, the need for recreation sites will increase with the expected population increases.

Chapter 4. Plan Formulation

Plan formulation for the Seven Oaks Dam Water Conservation Feasibility Study and the process leading to the selection of a water conservation plan for are detailed in this Chapter. It covers the establishment of planning objectives, and the development, impact assessment, and evaluation of alternative plans to meet the area's problems and needs as related to the primary study purpose -- to determine the Federal interest in modifying the Seven Oaks Dam, a feature of the Santa Ana River Flood Control Project, for water conservation.

The opportunity for water conservation to provide significant national and regional benefits is well-supported by Federal water supply laws and policies. The Corps of Engineers, as a Federal agency with the authority to regulate reservoir storage and releases, is urged to maximize water conservation in provisions of 33CFR 222.7 (f) (4), as follows:

> *"Development and execution of water control plans will include appropriate consideration for efficient water management in conformance with the emphasis on water conservation as a national priority. The objectives of efficient water control management are to produce beneficial water savings and improvements in the availability and quality of water resulting from project regulation and operation. Balanced resource use through improved regulation should be developed to conserve as much water as possible and maximize all project functions consistent with project/system management. Continuous examination should be made of regulation schedules, possible need for storage reallocation (within existing authority and constraints) and to identify needed changes in normal regulation. Emphasis should be placed on evaluating conditions that could require deviation from normal release schedules as part of drought continency plans."*

Section 301(a) of the Water Supply Act of 1958, as amended (43 U.S.C. 390b), established a policy of cooperation in developing water supplies for domestic, municipal, industrial, and other purposes. Section 301(b) is the authority for the USACE to include municipal and industrial water storage in reservoir projects. The terms "municipal and industrial," while not defined in the legislative history of the Water Supply Act, have been defined by the USACE as supply for uses customarily found in the operation of municipal water systems, and for uses in industrial processes. Large scale irrigation is not ordinarily found among customers of a municipal system and, therefore, is not eligible to be included in the project under the M&I authority unless so specifically authorized by Congress.

Planning Objectives and Constraints

The Federal objective of water and related land resources project planning is to contribute to National Economic Development (NED). NED contributions include increases in the net value of the national output of goods and services, expressed in monetary units. NED contributions must be consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders, other Federal planning requirements, and state and local statutes.

Planning Objectives

The establishment of planning objectives for this study were based on consideration of the study area problems, needs, and opportunities associated with water and related land resources development. The establishment of these objectives focused primarily on the authorized study purpose of determining the Federal interest in the possible modification of the Seven Oaks Dam flood control facility for water conservation; however related problems and needs in the Study Area were also given consideration.

The first planning objective established for plan development is to provide a more efficient means of meeting the Study Area's water demands. The efficiency of meeting these water demands is measured in the cost of providing the needed water supplies. A reduced cost in providing water supply as compared to the without-project condition will result in savings to the nations economic development.

From an environmental standpoint, the environmental resources and conditions located in the study area include significant biological species and habitat areas that need to be preserved. Accordingly, the second planning objective established for plan development is to preserve the study areas significant biological resources.

The potential for increasing recreation opportunities in the Study Area was considered as a possible planning objective. However, it is recognized that current Federal policy considers Federal participation in the development of recreation opportunities as a low priority and that any recreation development can be planned and implemented separately from measures and plans to meet the other objectives. Accordingly, increasing recreation opportunities was not included as a planning objective.

Planning Constraints

Opportunities to provide additional water conservation are limited by the flood control requirements of Seven Oaks Dam. It is recognized that the authorized purpose for the Seven Oaks Dam is flood control as part of the SARP. In discussions with the SARP Non-Federal Sponsors and with other interests, it was agreed by all that impacts to the authorized flood control purpose must be avoided. Therefore, a planning constraint is that no alternative can be considered if it has adverse impacts on the frequency, duration, or severity of flooding downstream of Seven Oaks Dam. Additionally, no alternative will be considered if it potentially increases the risk of dam failure due to the combined scenario of a maximum storage pool and a seismic event.

Formulation of Alternatives

The formulation of alternative plans to meet the established planning objectives was focused primarily on measures to conserve water at the Seven Oaks Dam flood control project.

The development of other water supply alternative plans including implementation of non-structural measures and development of other viable alternatives such as importing water and reclamation of water from treatment facilities is included and is considered as part of the most efficient plan to meet the area's water demands under without-project conditions. These without-project condition plans are based on several studies conducted by local and regional water supply districts.

Seasonal Water Conservation

Based on the planning constraint of avoiding any impact to the flood control purpose of the Seven Oaks Dam, the alternatives for water conservation are limited to providing seasonal water conservation. Hydrologic studies used in the design of the Seven Oaks Dam call for using the full capacity of the Seven Oaks Reservoir for flood control operations during the major flood season from October to March. March is a transitional period between the flood season and the potential conservation season, when the reservoir pool capacity can be used for water conservation without adversely impacting the flood control purpose. It is also noted that reservoir releases would require emptying the conservation pool by the end of September to allow for flood control operations to begin in October.

Selected Alternative Plans

Recognizing that any water conservation at Seven Oaks Dam must be limited to seasonal conservation, the primary factor in developing water conservation at the Seven Oaks Dam facility was the elevation to which water conservation pools could be developed during the conservation period. Accordingly, the alternative plans considered involved examining various levels of water conservation that could be developed in the Seven Oaks Dam and associated storage and outlet releases.

The selection of alternative water conservation pool levels to be considered in the Feasibility Study recognized the findings of preliminary studies conducted during the Reconnaissance Phase Study. Of the four alternatives that were developed during the Reconnaissance Phase, two were eliminated, and two were carried-forward for further evaluation and refinement. In addition, during the Feasibility Study two new alternatives were formulated.

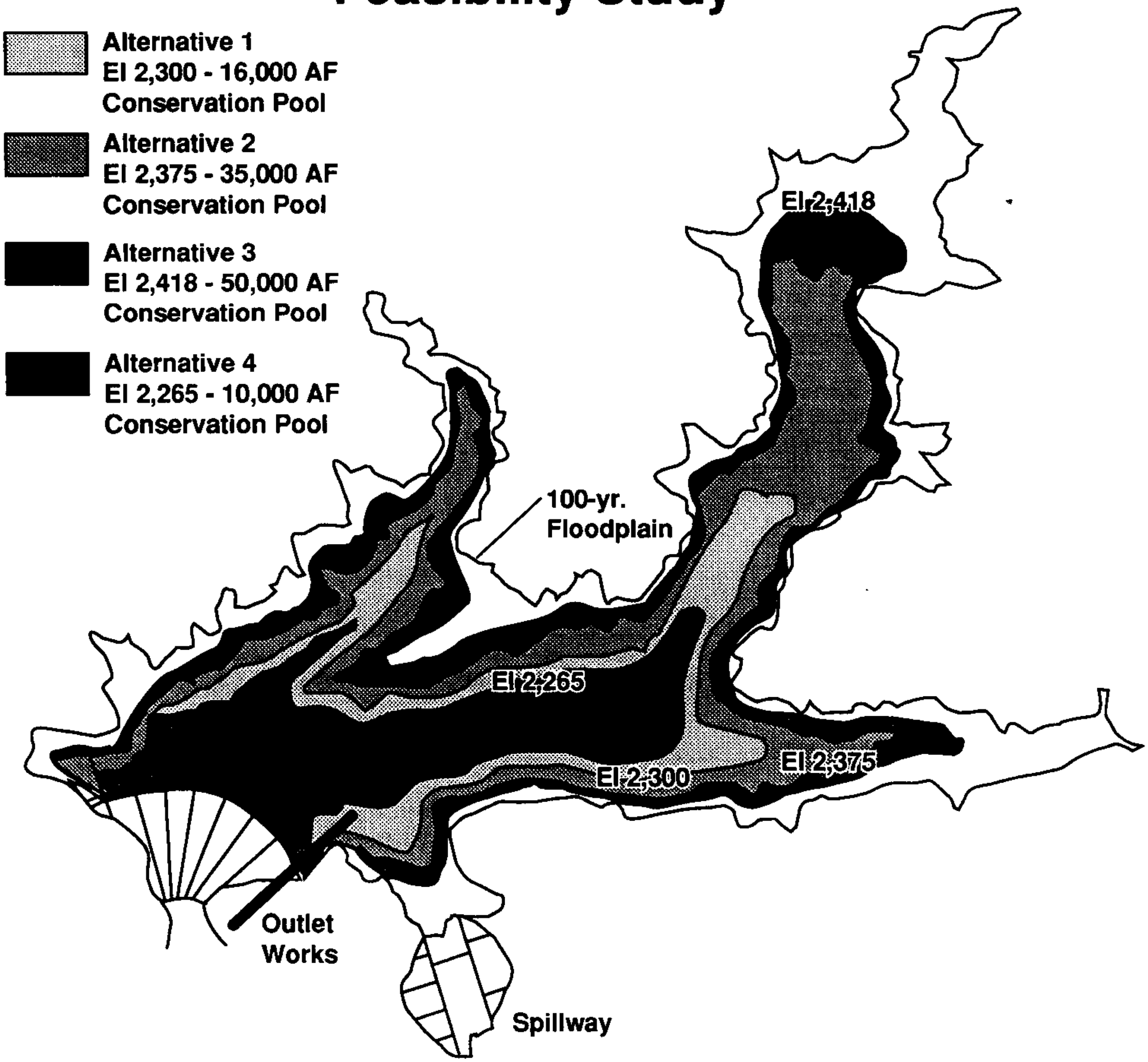
Reconnaissance Phase alternatives eliminated from further consideration included:

- a seasonal pool at elevation 2,318 feet NGVD, which was eliminated because of the higher construction costs and limited additional yield relative to the similar elevation 2,300 feet alternative, and

- a seasonal pool at elevation 2,378 feet NGVD using imported water, which was eliminated because of the low benefit-cost ratio due to high construction, pump equipment, and energy costs.

Figure 4-1.

Alternative Plans
Seven Oaks Dam Water Conservation Feasibility Study



The two reconnaissance-level alternatives carried forward to Feasibility include:

- a seasonal water conservation pool at elevation 2,300 feet NGVD, which was carried forward because use of the 100-year debris pool reduces the need for dam modifications, and

- a seasonal water conservation pool at elevation 2,418 feet NGVD, which provides the greatest water conservation yield and is the preferred plan of the Non-Federal Sponsor as the study progressed to Feasibility.

The two new alternatives that were added for consideration in the Feasibility Phase consist of:

- a seasonal water conservation pool at 2,375 feet NGVD, which represents a mid-range alternative, and

- a seasonal water conservation pool at elevation 2,265 feet NGVD, which represents an alternative that requires no structural modifications to the dam.

The four alternatives considered during the Feasibility Study are shown on **Figure 4-1**. **Table 4-1** presents a brief description of pool elevations and resulting storage volumes for each alternative, including the No Action Plan. **Figure 4-2** Seven Oaks Dam Inundation Area and Access Road Alternatives displays the areal extent of water surface inundation for each alternative.

Table 4-1. Water Conservation Alternatives

Alternative	Flood Control Elevation (ft NGVD)	Seasonal Elevation (ft NGVD)	Present (2000) Seasonal Storage (ac-ft)	Future (2050) Seasonal Storage (ac-ft)
No Action Plan	2,200	2,200	--	--
Alternative 1	2,200	2,300	16,293	7,194
Alternative 2	2,200	2,375	35,000	22,050
Alternative 3	2,200	2,418	50,000	36,500
Alternative 4	2,200	2,265	10,270	3,370

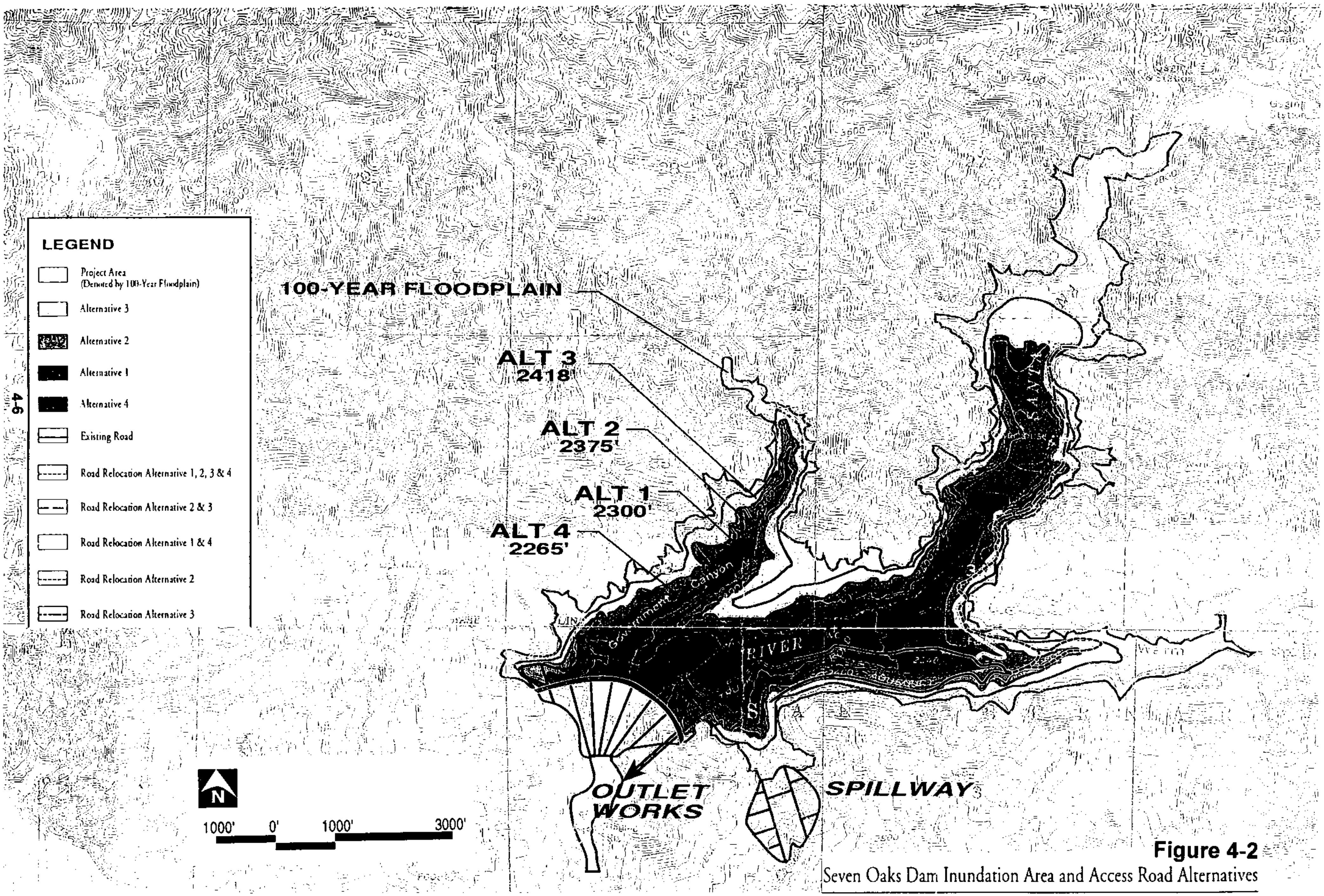


Figure 4-2
Seven Oaks Dam Inundation Area and Access Road Alternatives

Alternative Plans

Operations and Yields

Hydrologic studies were performed to determine the effective water conservation yields between the without-project condition and each alternative. The operation of Seven Oaks Dam was simulated in the with- and without-project conditions using the HEC-5 Reservoir Systems computer program. The without-project condition consists of storage capacity scenarios that were developed during the Phase II GDM. Future conditions storage capacities were computed using conic deposition computations for 50 years of sediment (16,000 acre-feet, at elevation 2,265 feet NGVD). In order to keep the yield determination simple, yields from the simulations were determined by summing the accumulated storage at the end of May each year over the period of record (1915-1990) and dividing by the number of years to obtain the average annual rate. It is recognized that the flow records from the Mentone gage, used in the simulations, include flows that have historically been diverted at the Santa Ana River Intake into the downstream recharge basin. The records also include diversions made by Bear Valley Mutual Water Company to the Edison Powerhouse No. 3 afterbay. However, there are also opportunities for increasing yield estimates for the reservoir by allowing for early releases of conservation storage during wet years to allow reuse of the storage capacity, and retaining water during periods of high groundwater levels. Further analysis of conservation operations to optimize yields including assuring historic diversions are considered and opportunities for recharge and reuse of storage capacity will be addressed in preparing the water control manual for water conservation operations.

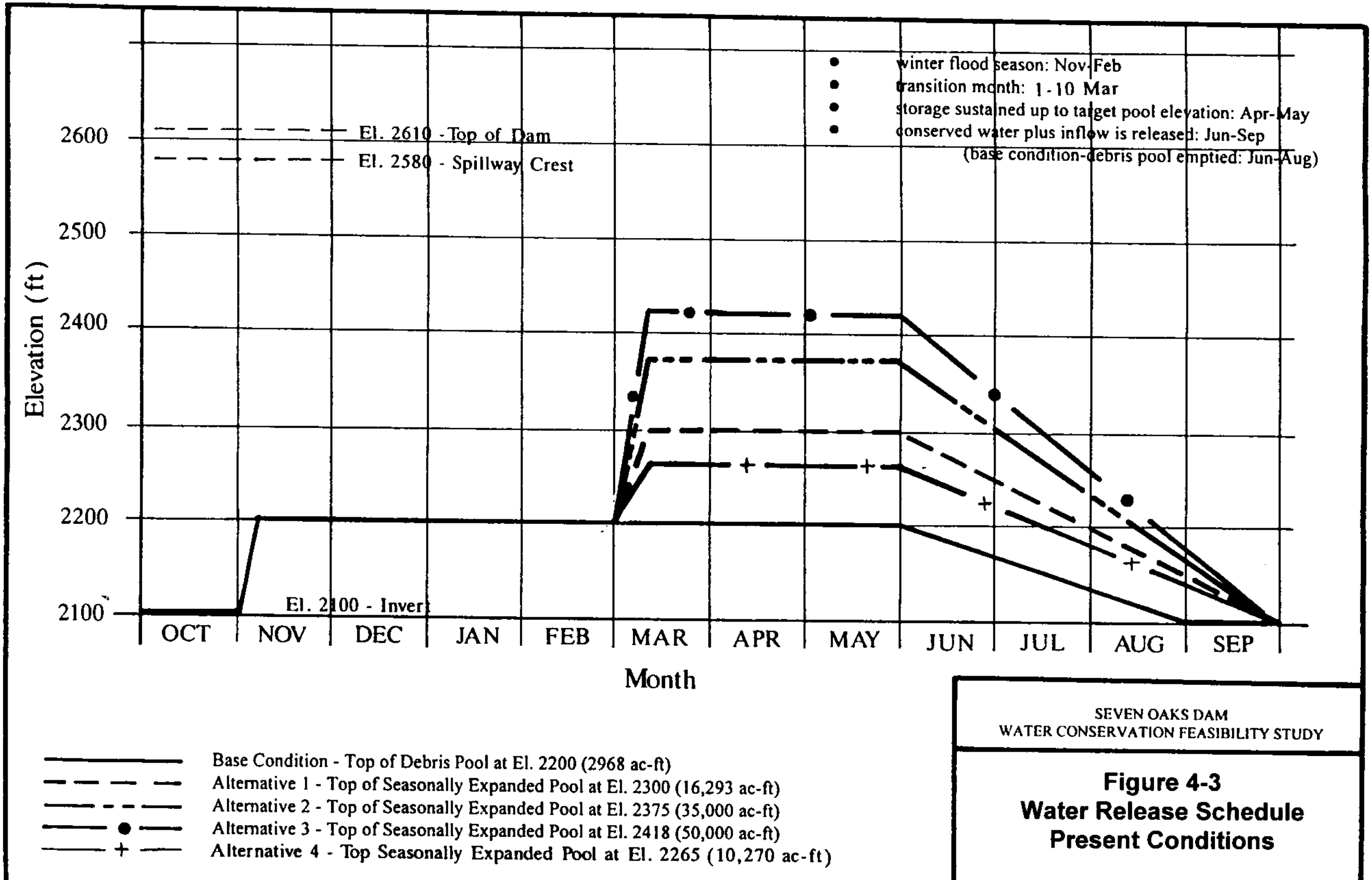
The average net evaporation was computed by compiling average monthly pan evaporation from records of San Bernardino County Flood Control Yard and the average monthly precipitation from Santa Ana River Powerhouse 3. In addition, in order to avoid "double-counting" economic benefits on a regional, National Economic Development (NED) basis, an analysis was conducted to identify the amount of water that would otherwise be conveyed to Prado Dam in lieu of water conservation features at Seven Oaks Dam. These results were used to reduce the preliminary yield figures for the proposed water conservation project to arrive at a "true yield" for water conservation at Seven Oaks Dam. This true yield is the quantity of water conserved at Seven Oaks Dam that does not impact yields downstream at Prado Dam. Additional information on hydrologic study results are presented in Appendix A, Hydrology.

Summaries of both present and the future operations including estimated schedules for reaching target levels and releases for each alternative plan are presented in **Table 4-2 and 4-3**. **Figure 4-3**, "Water Release Schedule, Present Conditions," and **Figure 4-4**, "Water Release Schedule, Future Conditions," are graphical displays of the release schedules discussed in the following paragraphs.

Table 4-2. Alternative Operations and Target Storage
Present Conditions

No Action Plan: Base Condition												
Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Storage[a] (ac-ft)	0	2968	2968	2968	2968	2968	2968	2968	2968	1168	0	0
Outflow (cfs)	I[b]	I	I	I	I	I	I	I	I+10[c]	I+20	I+20	I
Alternative 1: Elevation 2,300 Feet												
Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Storage (ac-ft)	0	2968	2968	2968	2968	16293	16293	16293	12500	8100	3800	0
Outflow (cfs)	I	I	I	I	I	I	I	I	I+65	I+70	I+70	I+70
Alternative 2: Elevation 2, 375 Feet												
Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Storage (ac-ft)	0	2968	2968	2968	2968	35000	35000	35000	26500	17500	8600	0
Outflow (cfs)	I	I	I	I	I	I	I	I	I+145	I+145	I+145	I+145
Alternative 3: Elevation 2,418 Feet												
Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Storage (ac-ft)	0	2968	2968	2968	2968	50000	50000	50000	37500	25000	12500	0
Outflow (cfs)	I	I	I	I	I	I	I	I	I+208	I+208	I+208	I+208
Alternative 4: Elevation 2,265 Feet												
Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Storage (ac-ft)	0	2968	2968	2968	2968	10270	10270	10270	7775	5197	2620	0
Outflow (cfs)	I	I	I	I	I	I	I	I	I+42	I+42	I+42	I+42

Note: a. All storages are end of month values.
b. I = release of natural inflow in cfs after the target storage is attained.
c. I+xx = release of natural inflow + conservation pool release (to empty pool no later than the end of September).



SEVEN OAKS DAM
WATER CONSERVATION FEASIBILITY STUDY

Figure 4-3
Water Release Schedule
Present Conditions

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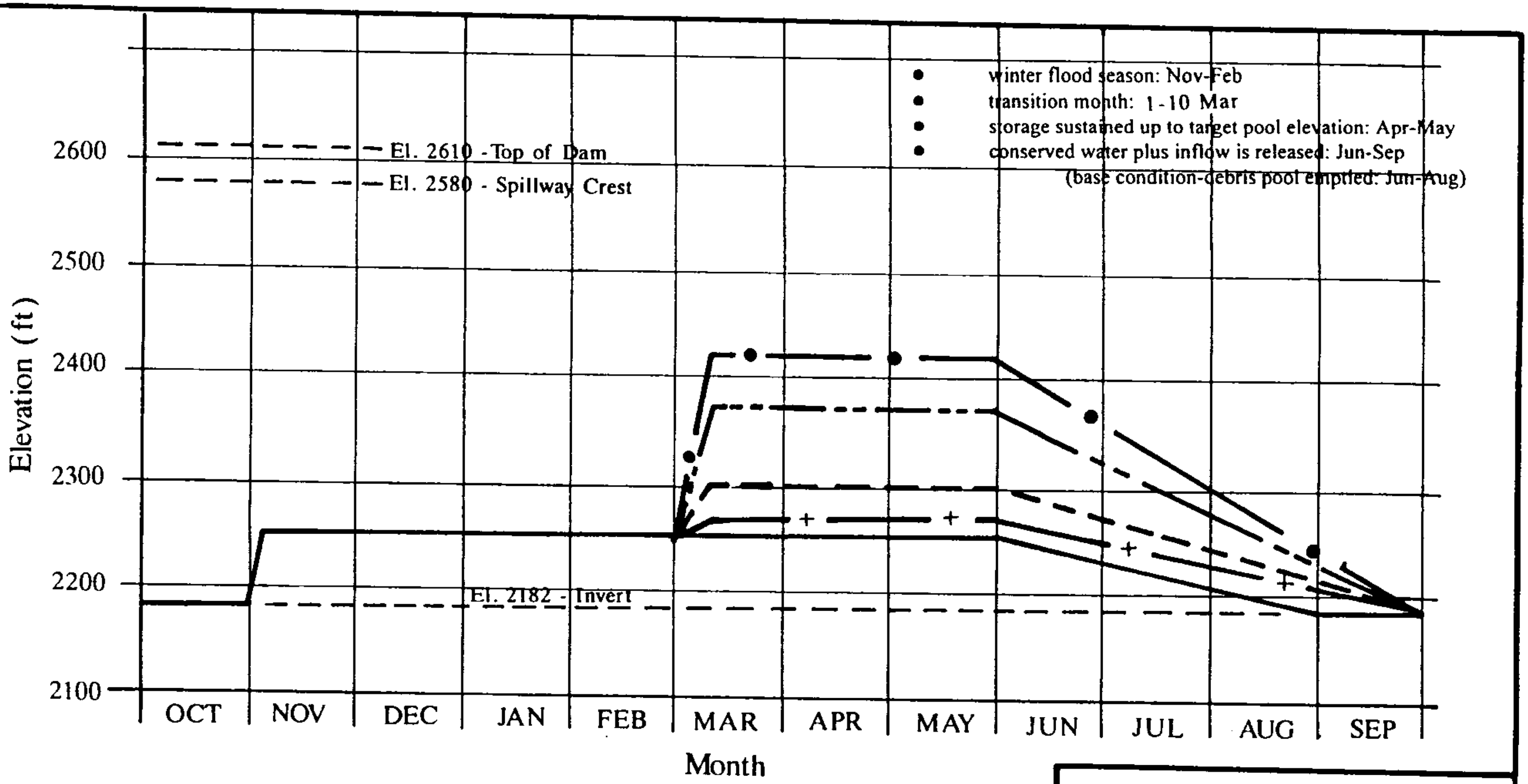
Table 4-3. Alternative Operations and Target Storage Future Conditions

No Action Plan: Base Condition												
Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Storage[a] (ac-ft)	0	2189	2189	2189	2189	2189	2189	2189	1830	910	0	0
Outflow (cfs)	I[b]	I	I	I	I	I	I	I	I+6[c]	I+15	I+15	I
Alternative 1: Elevation 2,300 Feet												
Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Storage (ac-ft)	0	2189	2189	2189	2189	7194	7194	7194	5400	3300	1100	0
Outflow (cfs)	I	I	I	I	I	I	I	I	I+25	I+32	I+32	I+32
Alternative 2: Elevation 2,375 Feet												
Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Storage (ac-ft)	0	2189	2189	2189	2189	22050	22050	22050	17000	11300	5600	0
Outflow (cfs)	I	I	I	I	I	I	I	I	I+85	I+93	I+93	I+93
Alternative 3: Elevation 2,418 Feet												
Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Storage (ac-ft)	0	2189	2189	2189	2189	35600	35600	35600	27600	17500	7330	0
Outflow (cfs)	I	I	I	I	I	I	I	I	I+135	I+155	I+155	I+155
Alternative 4: Elevation 2,265 Feet												
Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Storage (ac-ft)	0	2189	2189	2189	2189	3370	3370	3370	2717	1796	875	0
Outflow (cfs)	I	I	I	I	I	I	I	I	I+11	I+15	I+15	I+15

Note: a. All storages are end of month values.
b. I = release of natural inflow in cfs after the target storage is attained.
c. I+xx = release of natural inflow + conservation pool release (to empty pool no later than the end of September).



Base Condition - Top of Debris Pool at El. 2250 (2189 ac-ft)
Alternative 1 - Top of Seasonally Expanded Pool at El. 2300 (7,194 ac-ft)
Alternative 2 - Top of Seasonally Expanded Pool at El. 2375 (22,050 ac-ft)
Alternative 3 - Top of Seasonally Expanded Pool at El. 2418 (36,500 ac-ft)
Alternative 4 - Top Seasonally Expanded Pool at El. 2265 (3,370 ac-ft)

SEVEN OAKS DAM
WATER CONSERVATION FEASIBILITY STUDY

Figure 4-4
Water Release Scheduule
Future Conditions

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No-Action Plan

This operation is described as the existing Phase II GDM operation. From the beginning of November to the end of May, the target debris pool elevation is 2,200 feet NGVD (2,968 acre-feet) for present conditions, and 2,250 feet NGVD (2,189 acre-feet) for future conditions. During this period, all inflows are stored until the target storage is attained after which releases from the dam should equal inflow up to 500 cfs. Beginning in June, releases from the dam include all inflows, plus a conservation pool release to empty the pool by the end of August. The debris pool releases for present conditions are as follows: June - 10 cfs; July - 20 cfs; and August - 20 cfs. The debris pool releases for future conditions are as follows: June - 6 cfs; July - 15 cfs; and August - 15 cfs.

Alternative 1: Seasonal Storage of 16,000 Acre-Feet at Elevation 2,300 Feet

This operation involves normal flood operations in the winter months (debris pool to elevation 2,200 feet NGVD), then at the beginning of March, the seasonal conservation pool is expanded linearly over 10 days to a target conservation elevation 2,300 feet NGVD. This provides a storage volume of 16,293 acre-feet for present conditions (Year 2000) and 7,194 acre-feet for future conditions (Year 2050). From 10 March through May, all inflow is released from the dam after the target elevation is reached. From June through September, all inflow plus a conservation pool release is made to insure the conservation pool is drained by the end of September. Conservation pool releases for present conditions are as follows: June - 65 cfs; July - 70 cfs; August - 70 cfs; and September - 70 cfs. Conservation pool releases for future conditions are as follows: June - 25 cfs; July - 32 cfs; July - 32 cfs; August - 32 cfs; and September - 32 cfs.

Alternative 2: Seasonal Storage of 35,000 Acre-Feet at Elevation 2,375 Feet

This operation involves normal flood operations in the winter months, then at the beginning of March, the seasonal conservation pool is expanded linearly over 10 days to a target conservation level of elevation 2,375 feet NGVD. This provides a storage volume of 35,000 acre-feet for present conditions (Year 2000) and 22,050 acre-feet for future conditions (Year 2050). From 10 March through May, all inflow is released from the dam after the target elevation is reached. From June through September, all inflow, plus a conservation pool release, is made to insure the conservation pool is drained by the end of September. Conservation pool releases for present conditions are as follows: June - 145 cfs; July - 145 cfs; August - 145 cfs; and September - 145 cfs. Conservation pool releases for future conditions are as follows: June - 85 cfs; July - 93 cfs; August - 93 cfs; and September - 93 cfs.

Alternative 3: Seasonal Storage of 50,000 Acre-Feet at Elevation 2418 Feet

This operation involves normal flood operations in the winter months, then at the beginning of March, the seasonal conservation pool is expanded linearly over 10 days to a target conservation level of elevation 2,418 feet NGVD. This provides a storage volume of

50,000 acre-feet for present conditions (Year 2000) and 35,600 acre-feet for future conditions (Year 2050). From 10 March through May, all inflow is released from the dam after the target elevation is reached. From June through September, all inflow plus a conservation pool release is made to insure the conservation pool is drained by the end of September. Conservation pool releases for present conditions are as follows: June - 208 cfs; July - 208 cfs; August - 208 cfs; and September - 208 cfs. Conservation pool releases for future conditions are as follows: June - 135 cfs; July -155 cfs; August -155 cfs; and September -155 cfs.

Alternative 4: Seasonal Storage of 10,270 Acre-Feet at Elevation 2,265 Feet

This operation involves normal flood operations in the winter months, then at the beginning of March, the seasonal conservation pool is expanded linearly over 10 days to a target conservation level of elevation 2,265 feet NGVD. This provides a storage volume of 10,270 acre-feet for present conditions (Year 2000) and 3,370 acre-feet for future conditions (Year 2050). From 10 March through May, all inflow is released from the dam after the target elevation is reached. From June through September, all inflow plus a conservation pool release is made to insure the conservation pool is drained by the end of September. Conservation pool releases for present conditions are as follows: June - 42 cfs; July - 42 cfs; August - 42 cfs; and September - 42 cfs. Conservation pool releases for future conditions are as follows: June - 11 cfs; July - 15 cfs; August - 15 cfs; and September - 15 cfs.

Preliminary Yields

Yields determined for the various alternatives at Seven Oaks Dam are presented in **Table 4-4**. The results ranged from 133% to 433% for present conditions and from 40% to 461% for future conditions for the alternatives. These yields are considered preliminary and are subject to adjustment depending upon the impacts of Seven Oaks Dam water conservation activities on the water conservation yield at Prado Dam, as explained in the next section.

Table 4-4. Yields for Water Conservation Alternatives Present and Future Conditions

Alternative	Average Annual Inflow (ac-ft/yr)	Yield (acre-feet/year)		Increase in Yield (acre-feet/year)		% Increase in Yield	
		Present	Future	Present	Future	Present	Future
No Action Plan: Base Condition	24,000	2,430	1,890	-----	-----	-----	-----
Alternative 1: Elevation 2,300	24,000	7,450	4,410	5,020	2,520	207	133
Alternative 2: Elevation 2,375	24,000	11,120	8,460	8,690	6,570	358	348
Alternative 3: Elevation 2,418	24,000	12,950	10,600	10,520	8,710	433	461
Alternative 4: Elevation 2,265	24,000	5,560	2,650	3,220	760	133	40

Impact on Yield at Prado Dam/True Yield at Seven Oaks Dam

It is recognized that a certain percentage of water conserved at Seven Oaks Dam would otherwise continue to Prado Dam and be conserved there. Although upper basin interests have the legal rights to conserve water at Seven Oaks Dam—even if it would otherwise be conveyed to Prado Dam—an analysis is necessary to determine the impacts to the conservation yield at Prado Dam that would occur with the proposed project This analysis is necessary so that accurate NED benefits may be assigned to the conservation activities at Seven Oaks Dam; otherwise, regional benefits that were already considered as part of the Prado Dam Water Conservation Study would be "double-counted" by the current study. The following methodology was used to determine how water conservation at Seven Oaks Dam affects the conservation yield at Prado Dam. The analysis results in an estimate of the "true yield" at Seven Oaks Dam.

Yields were analyzed by examining the period of record for Prado Dam (1950-1988) and simulating the same period of record for Seven Oaks Dam. The analysis considered the amount of water above the debris pool as of May 31 as the simulated, preliminary conservation yield at Seven Oaks Dam.

Next, the analysis identified the percentage of years in which Prado Dam reaches its target conservation pool elevation. Simulated conservation yields at Seven Oaks Dam during these wet years represent true additional yields at Seven Oaks Dam since they would otherwise either be passed through Prado Dam, or would become infiltration/evapotranspiration losses. The potential conservation yield at Prado Dam during these years, therefore, is unaffected. The percentage of yield that occurs when Prado Dam reaches its target conservation pool differs for each alternative. For example, for Alternative 1 at elevation 2,300 feet NGVD, present conditions, 54% of the Seven Oaks Dam yield is produced in years when Prado Dam meets its target conservation elevation.

The remaining amount of the simulated, preliminary yield (for Alternative 1, this equals 46%, or 100% - 54%) occurs when the target conservation pool at Prado Dam is not achieved in the March-May period and, therefore, water saved at Seven Oaks Dam could have potentially instead been saved at Prado Dam. During these years, water flowing from the Upper Santa Ana Canyon is subject to channel infiltration and evapotranspiration losses. Based on (1) estimates for infiltration rates (1 cfs/wetted acre), and (2) actual measurements that compare releases of treated effluent with amounts reaching Prado Dam, an estimate of 40% was developed to approximate the amount of March to May, non-flood flow from Seven Oaks Dam that would be conveyed to Prado Dam. This percentage is applied to all alternatives to determine the amount of reduction in the preliminary yields that would be expected. For Alternative 1 present conditions, for example, the 46% of the preliminary Seven Oaks Dam yield, that is produced in years when Prado Dam could conserve more water from March to May, would be reduced by 40% to represent the amount that would otherwise be conveyed to Prado Dam. This results in an estimated reduction in the preliminary yields by 18% (0.40 x 0.46) and represents the true yield at Seven Oaks Dam in terms of NED benefits. The true, or adjusted yields are shown below in **Table 4-5**.

Table 4-5. Adjusted Yields for Seven Oaks Dam

Alternative	Yield (ac-ft/yr)		Increase in Yield (ac-ft/yr)		% of Yield That Has No Affect on Yield at Prado Dam		True Increase in Yield (ac-ft)		True % Increase Yield	
	Present	Future	Present	Future	Present	Future	Present	Future	Present	Future
No Action Plan	2,430	1,890	---	---	---	---	---	---	---	--
Alternative 1	7,450	4,410	5,020	2,520	82	85	4,120	2,140	170	113
Alternative 2	11,120	8,460	8,690	6,570	86	90	7,470	5,910	307	313
Alternative 3	12,950	10,600	10,520	8,710	88	92	9,260	8,010	381	424
Alternative 4	5,560	2,650	3,220	760	78	84	2,510	640	103	34

Design Considerations

This section presents summaries of the studies performed to design modifications to the Seven Oaks Dam facilities required to operate each alternative plan for water conservation. Further details on these studies are provided in Appendix B, Hydraulics; Appendix C, Geotechnical; and Appendix D, Design and Costs.

Geotechnical Studies

Geotechnical studies concentrated on evaluating Seven Oaks Dam's structural integrity for a longer period of water storage than is typically required for flood peak storage. The resistance to liquefaction is a concern when the dam's foundation and embankments are saturated from prolonged water storage in the reservoir. Both static and dynamic finite element analyses were performed to determine the seismic stability of the embankment. An effective stress slope stability analysis was also used to determine the post-earthquake stability of the embankment. In addition, a combined risk analysis was performed to assess the simultaneous effect of storage and a maximum conceivable earthquake. The potential for hydraulic fracturing, cracking, reservoir-induced seismic damage, and instability because of rapid drawdown were also analyzed. Finally, an evaluation of the foundation grout curtain for water conservation was conducted. The results of these studies were coordinated with the Non-Federal Sponsors for the Santa Ana River Flood Control Project, and the California Department of Dam Safety. Further details are presented in the Geotechnical Appendix.

The geotechnical analysis for the with-project, water conservation alternatives is similar to the analysis performed for the flood control project as found in the *Feature Design Memorandum No. 8, Volume 2, Appendix A*, dated December 1992. The analysis has been applied herein to three new seismic loading conditions (compared to those investigated in the 1992 FDM) for the proposed water conservation pool levels at 2,375 feet NGVD, 2,418 feet NGVD, and 2,265 feet NGVD. Finite element analyses, both static and dynamic, utilizing the maximum credible earthquake as the design earthquake, were performed for the more critical conservation pool elevations of 2,375 feet NGVD and 2,418 feet NGVD. The Geotechnical Appendix provides the details of the seismic stability evaluation for the proposed conservation pool levels, and addresses other pertinent issues such as the potential for hydraulic fracturing, drain and filter capacities, the possible need for additional grouting of the foundation, reservoir induced seismicity, and stability of the rockmass around the outlet tower. The effects of modifications to the embankment, foundation, and materials are also evaluated for seasonal storage feasibility.

Seismic Stability

The seismic stability of the embankment and foundation of the dam under earthquake loading was evaluated using current dynamic analysis procedures. The dynamic stability of the dam was analyzed for conservation pools at elevations 2,375 feet NGVD and 2,418 feet NGVD, and a seismic load from the maximum credible earthquake (8+) on the San Andreas fault.

Results of the earthquake-induced deformation analyses indicated estimated maximum deformations for the maximum credible earthquake on the order of about five feet to 15 feet with a water level of 2,375 feet NGVD or 2,418 feet NGVD. These estimates were for potential slip surfaces located within the top one-quarter of the embankment.

The post-earthquake stability of the embankment was evaluated using an effective stress analysis together with the estimated residual excess pore pressure at the end of the earthquake. Even with the conservative assumption of ignoring potential reductions in pore pressures, the minimum computed post-earthquake stability factor of safety for the maximum probable earthquake loading for the Alternative 3 pool elevation of 2,418 feet NGVD was about 1.45. The factor of safety for the lower pool levels of the other three alternatives is expected to be higher than 1.45.

Based on the seismic stability evaluations summarized above and the dense character of both the embankment materials and the in-place alluvial foundation, it is concluded that the strength of the embankment and its foundation will not undergo significant loss due to earthquake shaking associated with the design earthquakes during the water conservation seasonal impoundment. Even with conservative reductions in the shear strength of these materials, the estimated earthquake-induced deformations are within tolerable limits in that sufficient freeboard remains to avoid an uncontrolled, catastrophic breach of the dam. Further, the computed factors of safety for post-earthquake slope stability are adequate. In addition, all proposed modifications to the dam embankment for water conservation purposes have been evaluated on the conservative side to ensure safety of the dam for all authorized purposes.

Risk Analysis

Combined risk is defined as the probability of the simultaneous occurrence of an earthquake and flood storage at least once during the lifetime of the dam. The probability of an earthquake and flood-storage occurring simultaneously during the lifetime of a dam depends upon the return periods (frequency of occurrence) of the earthquake, the return periods of the flood events, the duration of floodwater storage, and the expected design life of the dam.

The earthquake return period for the maximum credible earthquake (8+) as postulated by Bolt is 150 years, plus or minus 30 years. The frequency of the flood events is based on filling frequency curves determined by hydrologic analysis, and presented as Plate S-49 of Appendix C. The duration of floodwater storage is based on the elevation-duration-frequency curves presented on Plate S-50 of Appendix C. The risk analysis evaluated reservoir pool elevation ranging from 2,300 feet NGVD (Alternative 1) to 2,418 feet NGVD (Alternative 3). The conservation pool elevation of 2,265 feet NGVD (Alternative 4) was not used for risk calculations since it is below the normal debris pool. The risk assessment evaluated several scenarios by combining flood events, pool elevations, return periods, and storage durations, and is summarized in **Table 4-6**.

Table 4-6. Combined Risk of Occurrence of Storage and Earthquakes

Flood Event	Pool Elevation (Feet NGVD)	Flood Return Period (Years)	Storage Duration (Weeks)	Earthquake Event	Earthquake Return Period (Years)	Combined Risk	Free Board
Debris	2,300	2 2 2	52 52 52	MCE[1]	120 150 180	3.40E-01 2.83E-01 2.42E-01	310
Debris	2,300	2 2 2	0.8571 0.8571 0.8571	MCE	120 150 180	6.64E-03 5.48E-03 4.57E-03	310
Intermediate	2,375	6 6 6	26 26 26	MCE	120 150 180	6.70E-02 5.40E-02 4.52E-03	235
Intermediate	2,375	6 6 6	0.7143 0.7143 0.7143	MCE	120 150 180	1.91E-03 1.53E-03 1.27E-03	235
Intermediate	2,418	15 15 15	26 26 26	MCE	120 150 180	2.73E-02 2.19E-02 1.83E-02	190
Intermediate	2,418	15 15 15	0.5714 0.5714 0.5714	MCE	120 150 180	6.10E-04 4.88E-04 5.50E-06	190

Note: 1. Maximum Credible Earthquake: Return interval is 150 years, plus or minus 30 years

Hydraulic Fracturing

A finite element analyses was performed on sections of the Seven Oaks Dam embankment to assess the potential for arching or cracking at two cross sections of the embankment (Stations 16+00 and 8+00). The potential for hydraulic fracturing within the core with a proposed reservoir conservation pool elevation of 2,375 feet NGVD and 2,418 feet NGVD was also evaluated.

The results of the analysis show that no zones of tensile stresses or potential cracking exist at Stations 16+00 and 8+00, nor does the potential for arching effects due to the steep topography of the underlying foundation bedrock. Further, the results indicate that hydraulic fracturing would not occur for a permanent storage pool at elevation 2,375 feet NGVD nor elevation 2,418 feet NGVD.

In addition, an independent technical review of the potential for cracking and hydraulic fracturing was conducted at the request of the State Dam Safety Agency. The evaluation conservatively assumes that hydraulic fracturing may occur within the core at a pool elevation at the spillway crest (elevation 2,580 feet NGVD), but that filter zone materials within the embankment are specifically graded to seal cracks and preclude leaks that could result from these fractures or other types of cracks. In addition, the core of the embankment will be flared in both upstream and downstream directions to provide further defense.

Foundation Grouting

As a part of the dam foundation treatment, a single-line grout curtain to a maximum depth of 150 feet, was constructed in the bedrock under the core zone. The grouting program was essentially exploratory in nature and verified the overall low permeability of the rock mass. The grout curtain is not intended to preclude underseepage. While underseepage under flood control conditions would be relatively small due to the low hydraulic conductivity characteristics of the diorite and gneiss bedrock foundation, the implementation of prolonged reservoir storage would likely result in increased underseepage. Nevertheless, the grouting program implemented for flood control conditions is deemed adequate for long-term water storage from the perspective of dam safety.

Reservoir Induced Seismicity

Reservoir-induced seismicity (RIS) is defined as the occurrence of earthquakes which are triggered by or through the operation of a reservoir. The seismicity can range from various levels of micro-earthquake activity to damaging earthquakes.

A study of reservoirs throughout the world which have experienced possible RIS appear to have certain features in common, including:

1. the presence of a relatively permanent deep reservoir (greater than 91.5 meters, or 300 feet);

2. a site location that is in a tectonically prestressed condition, and

3. the presence of active and/or potentially active faults in or near the reservoir area.

Of these factors, the maximum height of the reservoir water column seems to have the predominant influence on triggering RIS.

The Seven Oaks Dam and Reservoir is located in a tectonically prestressed area, and the active north branch of the San Andreas fault crosses a portion of the reservoir. The embankment height additionally qualifies Seven Oaks as a large dam. And, maintaining a semi-permanent, deep water conservation pool behind the dam would increase the potential, if only statistically, for RIS. Based on the statistical relationship between reservoir capacity, depth, and surface area, the theoretical maximum magnitude (M) of an induced earthquake event at Seven Oaks Dam at the maximum proposed conservation pool elevation would be 4.2. This is significantly less than what can be expected due to naturally occurring earthquakes in the area.

Additional Evaluations

Additional evaluations discussed in the Geotechnical Appendix include an investigation of the intake portal slopes for static and earthquake loading based on different percentages of water assumed for the joints. No safety hazard to the operation of the dam, under flood control conditions, is indicated by the analysis. The results of periodic filling and drawdown of a conservation pool, especially above elevation 2,300, were not considered in the analysis.

Sudden drawdown was also evaluated using a sudden drawdown slope stability analysis in which water is theoretically stored at elevation 2,418 feet NGVD and rapidly drawn down to three water surface elevations—2,300, 2,200, and 2,100. Resulting factors of safety ranging from 1.3 to 1.4 indicate that the embankment does not appear to be in danger of instability due to sudden drawdown.

Alternative Plan Design

The design analysis investigates the dam features that would need to be added or modified under the various water conservation alternatives. All of the alternatives include consideration for the relocation of the access road that leads upstream of the reservoir to an elevation above the seasonal water conservation pool. However, it is noted that there are other existing roads that are available within the National Forest that can provide access above the conservation pools, although the use of these roads would require additional time. Consequently, final decisions on whether to include the relocation of the upstream access road will be dependent upon further negotiations between local sponsors for the water conservation project, the U.S. Forest Service, and Edison interests. A final alignment of the road, including supplemental NEPA and CEQA documentation, will be required at that time if relocation of the road proceeds to construction.

As described under without-project conditions, the existing top of the intake structure is located at elevation 2,302 feet NGVD. In order to control discharge within the tunnel during maintenance, inspection and repair, a bulkhead plate, approximately 26-feet by 14-feet, is lowered by crane over the upstream end of the outlet tunnel. Access to the bulkhead and top of the intake structure is provided by a maintenance bridge that connects the maintenance deck to the access road. For Alternative 4, with a seasonal pool elevation lower than elevation 2,300 feet NGVD, no modifications to the intake structure would be required. For Alternatives 1 through 3, however, the intake structure would have to be modified if dry access to the deck is desired when water is seasonally impounded for conservation. Various methods of modification have been investigated; these are described as options under Alternatives 2 and 3, below. Briefly, the modifications consist of either:

1. using the existing maintenance deck at elevation 2,302 ft NGVD;

2. raising the intake tower maintenance deck two feet above the seasonal pool elevation by extending the tower with a steel truss;

3. raising the intake tower maintenance deck two feet above the seasonal pool elevation by extending the tower with a concrete structure;

4. constructing a bulkhead positioning frame on top of the existing maintenance deck and using a cable and winch facility to remotely raise and lower the bulkhead from a location upslope and higher in elevation than the seasonal pool, or

5. excavating a new vertical shaft and gateroom approximately 200 feet downstream of the existing bulkhead structure; a new slidegate would be remotely operated through the vertical shaft by a hydraulic cylinder.

Alternative 1

The storage elevation for Alternative 1 is coincidental with the 100-year debris pool elevation for the flood control project. Water would be impounded behind the dam to elevation 2,300 feet NGVD. No significant changes to the intake and outlet works are required, since the conservation pool will always be below the top of the deck. Additionally, the hydrostatic loading would not adversely impact any of the hydraulic structures. This alternative does not significantly influence the estimated sediment deposition at the intake structure nor the distribution of deposition within the reservoir throughout the project life. Reservoir storage would not be adversely impacted during the flood season because establishment of a water conservation pool in March would be entirely dependent on the weather forecast.

No structural modification to the outlet works would be necessary to operate and maintain the dam and appurtenances for this alternative. Modifications to the intake tower would be required due to increased seismic loading. Also, the anchorage system will require modifications to increase the anchor hole diameter, anchor size, and length of the hole, which will require reworking the intake tower to allow construction access. Maintenance access to the intake structure would also be unaffected. However, an unpaved road in the streambed that provides access to the upper canyon for Southern California Edison, U.S. Forest Service , and local water district operation personnel, would be inundated with water more frequently than in the without-project condition. Portions of this road may need to be elevated or relocated above the conservation pool in order to maintain access upstream of the reservoir.

Alternative 2

Alternative 2 would provide a seasonal conservation pool at elevation 2,375 feet NGVD. Alternative 2 requires modification to the maintenance bulkheads and guides, as well as the intake structure in order to be able to inspect the outlet tunnel without first draining the conservation pool. The maintenance bulkheads would have to be redesigned for the additional 78 feet of hydrostatic head. As in Alternative 1, there would be no impact on sediment deposition or flood control storage. Five design options, which are presented in Appendices B and D, were considered for this alternative.

The selected option for Alternative 2 includes the construction of an 80-foot-high steel frame and concrete deck on top of the existing concrete deck to support a crane used for the dry installation of the maintenance bulkhead. The extension design uses various steel sections as beams, columns, and diagonal bracing. These members make up a three-story frame system oriented in a hexagonal fashion. The new extension at elevation 2,382 feet NGVD would keep access above the conservation pool. Access to the new deck would be by a 161-foot, two-span steel girder bridge that matches the elevation of the deck.

Bulkheads and Guides

Because of the increased static head for this alternative, a new bulkhead design would be required that increases the strength through the use of thicker web/flange plates and stiffening plates. Extended guide slots would be incorporated into the new deck addition.

Anchorage System

The additional mass of the steel frame extension has an affect on the overall intake structure anchorage system of less than 10%. Modifications due to the steel frame extension include concrete and anchor tendons added to the sides of the structure.

Intake Structure

To withstand additional seismic forces related to the mass of conservation pool water, reinforcement of the existing intake structure would include a concrete jacket surrounding the existing structure with additional concrete and anchor tendons attached to the sides of the structure.

Constructability

The existing concrete trash rack structure would not meet seismic requirements with the addition of the extension. Approximately 20% of the members in the existing trash rack would require modification to support the additional loads. Many of these members are the lower columns of the structure, and are therefore difficult and economically infeasible to replace or modify. Complete demolition and rebuilding of the trash structure would instead be necessary.

Existing Deck at Elevation 2,302

The existing deck at elevation 2,302 feet NGVD would be partially used in addition to the new deck at elevation 2,382 feet NGVD. However, the existing deck would require modifications including the addition of bulkhead guides and the hoisting slot. Further, the use of the existing deck by personnel would be restricted during bulkhead operation.

Alternative 3

Alternative 3 proposes a maximum 50,000 acre-feet seasonal conservation pool to reservoir elevation 2,418 feet NGVD. As in alternative 2, changes to the maintenance bulkheads and guides as well as the intake structure would be required to allow for inspection of the outlet tunnel without the drawdown of the conservation pool. The bulkheads must be redesigned to accommodate the additional 118 feet of hydrostatic loading. This alternative would not significantly impact the estimated elevation or distribution of sediment within the reservoir.

Modifications to the intake structure, and bulkhead guides, and construction of a bulkhead gate, access road, and bridge structure would be required. Five design options were considered, and are substantially similar to those for Alternative 2 except for features related to the increased elevation requirements of this alternative. Details on these options are presented in Appendices B and D.

The selected option for Alternative 3 includes the construction of a 123-foot high steel frame and concrete deck on top of the existing concrete deck to support a crane used for the dry installation of the maintenance bulkhead. The steel frame extension design in this option would be similar to option two of Alternative 2. This design consists of a four-story frame system. This 123-foot extension would allow a new maintenance deck to be located at elevation 2,425 feet NGVD, above the conservation pool. A new, 205-foot, two-span steel girder bridge at the elevation of the deck would be constructed.

Bulkheads

Due to the increased static head for this alternative, a new bulkhead design would be required that increases the strength through the use of thicker web/flange plates and stiffening plates. Extended guide slots would be incorporated into the new deck addition.

Anchorage System

The additional mass of the steel frame extension has an affect on the overall intake structure anchorage system of less than 10%. Modifications due to the steel frame extension include concrete and anchor tendons added to the sides of the structure.

Intake Structure

To withstand additional seismic forces related to the mass of conservation pool water, reinforcement of the existing intake structure would include a concrete jacket surrounding the existing structure.

Constructability

The existing concrete trash rack structure would not meet seismic requirements with the addition of the extension. Approximately 20% of the members in the existing trash rack would require modification to support the additional loads. Many of these members are the lower columns of the structure, and are therefore difficult and economically infeasible to replace or modify. Complete demolition and rebuilding of the trash structure would instead be necessary. While access to the existing bridge would be available for this option, additional diagonal bracing that would be required will block vehicular access to the existing bridge.

Existing Deck at Elevation 2,302

The existing deck at elevation 2,302 feet NGVD would be partially used in addition to the new deck at elevation 2,382 feet NGVD. However, the existing deck would require modifications including the addition of bulkhead guides and the hoisting slot. Further, the use of the existing deck by personnel would be restricted during bulkhead operation.

Alternative 4

Alternative 4 would provide a seasonal conservation pool at elevation 2,265 feet NGVD. The intake structure and outlet works would not require any structural modifications since the conservation pool would always be below the top of the maintenance deck on the intake structure. This alternative would not have any adverse effects on hydraulic structures due to hydrostatic loading, sediment deposition, or flood control storage. This alternative requires no structural modification to the intake tower, outlet works, maintenance deck, nor access bridge because these facilities were originally designed for a water surface elevation exceeding 2265 feet NGVD. There are also no changes required in the operation and maintenance procedures. However, as with Alternative 1, an unpaved road in the streambed that provides access to the upper canyon for Southern California Edison, U.S. Forest Service, and local water district operation personnel would be inundated with water more frequently than in the without-project condition. Portions of this road would need to be elevated or relocated above the conservation pool in order to maintain access upstream of the reservoir. The main capital costs for this alternative are related to the road modifications.

Real Estate Requirements

The determination of real estate requirements needed for each of the alternative plans recognizes that all arrangements for properties required for implementing the Seven Oaks Dam and Reservoir feature of the Santa Ana River Flood Control Project will be implemented as discussed in Chapter 6. This includes all lands associated with construction and operation of the dam facilities. These arrangements are continuing to be developed and should be finalized at the time of completion of the project in 1999. At this time, the USACE is negotiating with the USFS to obtain a permanent easement for flood control operations in the reservoir area, which is the primary area required for water conservation operations and road relocation. The acreage required depends on the chosen alternative. **Table 4-7**, shows the acreage required for each of the alternatives.

Table 4-7. Real Estate Requirements

Alternative	Water Surface Elevation (Feet, NGVD)	Acreage
1	2,300	182±
2	2,375	424±
3	2,418	570±
4	2,265	175±

Southern California Edison has lease interests over the land owned by the Forest Service. However, any of these interests that would normally affect this study were purchased and relocated during the acquisition process for the Seven Oaks Dam project. It is important to note that the property owned or leased by SCE has been acquired by the SARP Non-Federal Sponsors for flood control use, not water conservation. The water conservation sponsor would have to get additional rights to inundate the land for six to eight months a year.

The USFS may transfer title on their land (not including the land leased by SCE) to the Corps through an inter-agency transfer at no cost to the Government. The water conservation pool, specifically, would require a special use permit that would be issued for a minimum term of 20 years with options for renewal.

At this time it appears that no additional acreage would be required for mitigation. Mitigation lands have already been acquired for the construction of Seven Oaks Dam.

Facility and Utility Relocations

Access to SCE's Powerhouse Number 1 may require a new access road. During final negotiations of the water conservation agreement, the Non-Federal Sponsor, SCE, and the USFS will address the road relocation issue. If the lands required for road relocation are included as part of the real estate values and would be included as part of the Forest Service special use permit.

Operation and Maintenance Requirements

The determination of operation, maintenance, replacement, and rehabilitation (OMRR) effort required for the water conservation alternative plans was estimated considering the OMRR requirements for the Seven Oaks Dam Flood Control Project. Additional OMRR requirements include additional effort to monitor the reservoir, read and record instrumentations, and evaluate reservoir impacts. Maintenance repair frequency of the outlet tunnel is increased to account for the additional wear due to water conservation discharge in the main Regulated Outlet. Increased use of the electrical and mechanical parts and motors and additional wear to the mechanical control gates and valves are expected. For Alternatives 2 and 3, additional effort would be required to remove debris around the intake structure trash racks, the elevated service deck, and new steel frame structure. Increased effort would also be needed to install the bulkhead gate, inspection of the new bridge, and painting of the steel frame structure. In addition for each alternative, it may be necessary to maintain the relocated reservoir road to make it accessible for Southern California Edison to service their upstream facilities. Further details on each alternative are presented in Appendix D, Design and Cost.

Environmental Assessment of Alternatives

The without-project condition from which environmental impacts are assessed consists of a completed dam that operates for flood control at the present day debris pool elevation of 2,200 NGVD.

Seven Oaks Dam is currently under construction. Environmental impacts which were identified during the Feasibility Study are those that:

1. are associated with additional construction impacts related to the alternatives, and

2. occur from the Seven Oaks Dam water conservation operations related to each alternative.

This section addresses the environmental impacts associated with the alternative plans The impacts are categorized as either (1) beneficial, (2) adverse, but less than significant, or (3) adverse significant.

This section also includes potential mitigation measures for the associated impacts. For a detailed discussion of the impacts, their consequences, and mitigation, please refer to the EIS/EIR that is part of this document. Also, the EIS/EIR addresses the cumulative impacts from both dam construction and water conservation operation.

Hydrologic Impacts

Hydrologic impacts include:

1. increased erosion and sedimentation caused by construction activities,

2. accumulation of sediment or debris within Seven Oaks Dam, and

3. decreased downstream sedimentation rates due to construction of Seven Oaks Dam.

Impacts 1 and 2 are both classified as adverse, but insignificant, since there will be only minor earth movement and disturbance required for the construction of any of the alternatives, and the increase in sediment accumulation from water conservation operations will be minor as compared to without-project flood control operations.

Impact 3 is considered beneficial. All three impacts are associated with each alternative. However, the affects of the impacts typically increase with increased conservation pool elevations.

Water Quality Impacts

Water quality impacts include:

1. increased turbidity caused by grading activities,

2. potential for the release of toxic materials from construction equipment,

3. decreases in suspended solids downstream of the Seven Oaks Dam

4. increased groundwater recharge, and

5. increased likelihood for anaerobic conditions.

Impacts 1 and 2 are considered insignificant based on compliance with proper construction methods. Impact 5 is considered adverse significant. Impacts 3 and 4 are considered beneficial.

Mitigation for Impact 1 is the same as that listed for Impact 1 in the Hydrologic Impacts Section. Mitigation for Impact 2 requires that the contractor carefully monitor and clean all equipment and affected areas. Impacts 3 and 4 require no mitigation. Mitigation for Impact 5 requires that a Water Quality Monitoring Program be implemented as described in the EIS/EIR, with remedial measures taken if necessary.

Vegetation Impacts

Construction activities for the Seven Oaks Dam and associated impacts are not related to the water conservation project since the dam must be built and be operational for its flood control purpose prior to the initiation of the water conservation project. Impacts to the habitat above the dam are addressed in the 1988 *Phase II General Design Memorandum on the Santa Ana River Mainstem including Santiago Creek, California Supplemental Environmental Impact Statement* (SEIS). The SEIS indicated that vegetation between the upstream toe of the dam and the 50-year flood line would be lost, and approximately 50% of the floodplain vegetation beyond the 50-year flood line to the maximum flood boundary would also be lost. These losses were considered to be significant and were mitigated under the 1988 SEIS.

The reservoir's 50-year flood line is at an elevation of approximately 2,425 feet NGVD. Therefore, since all vegetation impacted within the 2,300-, 2,375-, 2,418-, and 2,265-foot water levels was previously addressed and mitigated as part of the SEIS, no additional impacts are anticipated.

A Section 7 consultation between the USACE and USFWS was required as part of the project planning for the entire Santa Ana River Mainstem Project, which included a discussion of construction impacts associated with Seven Oaks Dam. The consultation considered impacts to the endangered woollystar, slender-horned spineflower, and least Bell's vireo (*Vireo bellii pusillus*). As mitigation, 700 acres of woollystar habitat are being preserved in the Santa Ana River Wash and borrow sites are being reseeded. No mitigation was required for the loss of slender-horned spineflower habitat or the impact to the least Bell's vireo.

As mitigation for impacts to vegetation, riparian habitat, wildlife habitat, mule deer migration routes and trout spawning habitat, two parcels of land, the Filaree Flats (139 acres) and Section 5 (649 acres) were to be acquired and turned over to the U.S. Forest Service. Sixty (60) acres of the Santa Ana River Wash between Greenspot Road and Seven Oaks Dam were to be acquired and improved after completion of the dam.

Wildlife Impacts

The 1988 SEIS states that significant wildlife habitat will be lost as a result of building Seven Oaks Dam. Mitigation for all impacts associated with construction and operation of the dam have been implemented as part of the earlier SEIS (refer to Vegetation Impacts above). Therefore, there are no additional impacts associated with any of the water conservation alternatives.

Sensitive Plant Species Impacts

Since water conservation alternatives would nominally change downstream water flows and the peak water release during flood control conditions would remain the same, no adverse impacts to downstream sensitive plants are expected to occur.

Sensitive Wildlife Species Impacts

No impacts regarding sensitive wildlife resources are anticipated as any known resources were identified and fully mitigated as part of the construction of the Seven Oaks Dam. Other wildlife species considered sensitive or listed following completion of the 1988 FSEIS are under the jurisdiction of the Santa Ana River Mainstem Project.

Land Use Impacts

If the service access roads are relocated, there would be no adverse impacts to land use due to the increased impoundment of water. The inundation level would be no different than that studied in the 1988 SEIS. Therefore, no mitigation is being considered.

Recreation Impacts

The implementation of Alternatives 1, 2, 3 or 4 would not interfere with the current limited recreational uses.

Transportation Impacts

Each alternative will result in construction-related vehicular traffic at the project site and on the surrounding roadway system. However, the local roadways are projected to continue to operate at acceptable levels of service. In addition, the project alternatives would not result in an increase in the number of long-term (post-construction) vehicles on the local roadways.

The access road to the Southern California Edison Powerhouise will be periodically inundated by the conservation pool. Currently, the U.S. Forest Services prefers that SCE use existing roads to access the facilities. Arrangements for mitigation of this impact will be made by the Non-Federal Sponsor, SCE, and the USFS during final negotiations of the water conservation agreements.

Air Quality Impacts

Air quality impacts associated with construction include:

1. construction emission during grading,
2. exhaust emissions from construction equipment, and
3. fugitive dust emissions.

These air quality impacts result from all of the alternatives, with adverse significant ratings. Each successive alternative creates significantly greater air quality impacts because more grading is involved.

Long-term air quality would be impacted by maintenance activity. Approximately 10 vehicles per day would be traveling on unpaved access roads. Because of the relatively low volume of daily maintenance traffic, no significant long-term air quality impacts are expected to occur.

Mitigation for the three impacts associated with construction include, but are not limited to: watering, paving, setting a speed limit, maintaining vehicles in good condition, and keeping idle time for construction equipment under 60 seconds. For detailed description of the proposed mitigation measure refer to the EIS/EIR.

Noise Impacts

Short-term noise impacts are associated with construction impact ambient noise levels.

Because of the location of the site, there are no receptors adjacent to or in the near vicinity of the site. Therefore, no significant impacts would occur.

Cultural Resources Impacts

The construction of the dam would have an affect on the Santa Ana hydroelectric system. Mitigation for the hydroelectric system has already been completed as part of the Mainstem Project, and the water conservation features would have no further effect on the area.

Hazardous and Toxic Waste Impacts

As noted in the Without-Project Conditions Section, no known hazardous and/or toxic wastes contaminate the area.

Alternative Plan Costs

The first costs of constructing each alternative plan are presented in **Table 4-8.** First Costs include all construction costs; real estate values; additional costs for the next project development phase, Preconstruction Engineering and Design -- including detailed design of plan features and preparation of plans and specifications, as well as costs for completing project cooperation agreements or other approval documents. First costs also include costs for construction management, including supervision and administration and engineering during construction . All costs are based on October 1997 price levels and include contingencies from 20% to 25% for each item to cover uncertainties in design and construction. Further details on the cost estimate are presented in the Design and Cost Appendix.

Real Estate Costs

Real estate values are based on a general survey of similar property types applying recognized appraisal principles. The values include costs for administration and contingencies of 25% based on the Government's and Non-Federal Sponsor's estimates of labor costs involved with providing the required lands, easements, rights-of-way for the project. The real estate values presented are based on fair market values. However, these values are somewhat speculative because the required lands under any water conservation alternative will involve arrangements already provided to the USACE and the SARP Non-Federal Sponsors. In addition, there is the uncertainty of the frequency of water conservation use of these areas, as well as the future debris accumulation impact on the value of using the properties. Consequently, the values and costs of real estate associated with the water conservation alternatives can range from zero to fair market value -- estimated to be in the vicinity of $2,500 an acre.

Table 4-8. First Costs of Alternatives (Oct 1997 Prices)

Item	Alternative 1 El. 2,300	Alternative 2 El. 2,375	Alternative 3 El. 2,418	Alternative 4 El. 2,265
Intake Structure Modification				
Raise Height	No Action	$1,741,742	$2,493,237	No Action
Seismic	$3,261,852	$4,684,765	$6,334,553	No Action
Intake Road Modification	No Action	$371,137$	$919,198	No Action
Relocated Road in Reservoir	$1,965,194	$4,204,256	$4,591,748	$1,075,800
Intake Slope Treatment	No Action	$1,871,928	$2,591,639	No Action
Dam Modification (Drain Fill)	No Action	$822,500	$1,289,500	No Action
Total Construction Cost	$5,227,046	$13,696,328	$18,219,875	$1,075,800
PED	$1,395,000	$3,658,289	$4,866,529	$287,346
EDC	$413,000	$1,083,380	$1,441,192	$85,096
Construction Mgmt (S&A)	$418,000	$1,095,706	$1,457,590	$86,064
Lands and Damages	$657,000	$1,519,000	$2,038,000	$627,000
TOTAL COST	$8,110,046	$21,052,703	$28,023,186	$2,161,306

Average Annual Costs

The average annual costs estimated for each alternative are presented in **Table 4-9**. Average annual costs include interest and amortization of the gross investment cost over a 50-year period at an interest rate of 7⅜%. It also includes estimated costs for operation, maintenance, replacement, and rehabilitation as necessary for project features. The gross investment includes interest during construction on all first cost items except for real estate costs.

Table 4-9. Project Costs
(Oct 96 Price Levels)

Costs	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Construction	$5,227,000	$13,696,000	$18,220,000	$1,076,000
Real Estate	$657,000	$1,519,000	$2,038,000	$627,000
PED	$1,395,000	$3,658,000	$4,867,000	$287,000
Engr During Construction	$413,000	$1,083,000	$1,441,000	$85,000
Construction Management	$418,000	$1,096,000	$1,458,000	$86,000
Total First Costs:	**$8,110,000**	**$21,052,000**	**$28,023,000**	**$2,161,000**
Interest During Construction	$224,000	$834,000	$1,270,000	$32,000
Gross Investment Cost	$8,334,000	$21,886,000	$29,293,000	$2,193,000
Interest & Amort@7⅜%, 50 yrs	$633,000	$1,662,000	$2,224,000	$166,000
O & M Cost	$42,000	$111,000	$140,000	$37,000
Total Annual Cost	**$675,000**	**$1,773,000**	**$2,364,000**	**$203,000**

Economic Benefits

The economic benefit assessment of the alternative water conservation at Seven Oaks Dam are based upon the difference in the cost of urban water supply under the with- and without-project conditions. The findings of this assessment are presented below. Further details on the determination of the potential water conservation benefits are presented in Appendix E, Economics .

Water Conservation Yield

The average annual water conservation yield was determined for each alternative's specific operation according to the hydrologic methodology identified in the Hydrology Appendix. This analysis resulted in average annual yields as shown in **Table 4-10**.

Table 4-10. Average Annual Water Conservation Yield of Alternatives

Alternative	Present Yield (acre-ft/year)	Future Yield (acre-ft/year)
Alternative 1-El 2,300	4,116	2,142
Alternative 2-El 2;375	7,473	5,913
Alternative 3-El 2,418	9,258	8,013
Alternative 4-El 2,265	2,512	638

Estimated Benefits

Benefits for each alternative were calculated as the difference in the average annual cost of municipal water with and without the proposed plans based on demand projections and hydrologic estimates of water yield. Water demand for San Bernardino Valley Municipal Water District and the City of Riverside were forecast and compared to available local supply in the without-project condition. Additional sources of water supply in the study area include the State Water Project (SWP) and water reclamation. Average annual costs and benefits were calculated using a 7⅜% discount rate and a 50-year project life, at October 1996 price levels.

For this analysis, it is assumed that the water conserved at Seven Oaks Dam will be used by member agencies of the San Bernardino Valley Municipal Water District and Western Municipal Water District which serves the City of Riverside. The SBVMWD's and the City of Riverside's allocations of additional water supplies developed within the basin are 72% and 6.16%, respectively. The remaining 21.84% of additional water supplies is apportioned to member water districts of WMWD.

The economic analysis considered the true water conservation yield for each alternative as determined by the hydrologic analysis. It was assumed that 100% of all increases in yield will be used to meet water demands because it is the next least expensive source of water after locally-available groundwater and surface water supplies. To this annual yield, a value per acre-foot per year was assigned to obtain benefits for each alternative, as described in succeeding paragraphs.

The value of the water conserved at the dam is measured by the opportunity cost of supplying water from the next least-costly alternative to the project. This is the cost to satisfy the demand for water that the project beneficiaries would otherwise have to pay if water were not conserved at the dam. The next best alternative to local groundwater is water imported from the State Water Project, followed by reclaimed water.

The value of water conserved per acre foot varies depending upon two factors. First, it depends on the beneficiary/agency to which portions of the yield are allocated. As mentioned above, SBVMWD, the City of Riverside, and member water districts of WMWD have specific percentages of water sources within the basin to which they are entitled. Since the cost of water differs to each agency as shown in **Table 4-11**, the price per acre-foot to meet future demands and the resulting benefit also varies.

Table 4-11. Water Supply Costs Per Acre-Foot

	Groundwater (Cost/Acre-Foot)	Imported Water Variable Cost (Cost/Acre-Foot)	Reclaimed Water (Cost/Acre-Foot)
SBVMWD	$30 to $120	$134.55 to $158.49[1]	$565.00
City of Riverside	$350.00	$726.00	$800.00
1 Price differs according to year.			

Secondly, the value of water conserved per acre-foot depends on the particular year in which it is analyzed. Since there is a continuous increase in the projected future demand for water, the sources of water with which this demand is satisfied also changes depending upon price and availability. Normally, the least cost source of water is used first. For example, SBVMWD would not be expected to utilize reclaimed water until 2015, when the projected supply of groundwater, surface water, and imported water is estimated to be inadequate to meet demand. The overall cost per acre-foot of water after 2015 that would otherwise have to be supplied in lieu of the project, therefore, would increase to reflect the increased cost for supplying reclaimed water.

The additional allocation of 21.84% attributed to the member water districts served by WMWD is analyzed by taking a weighted average of the respective portions of the increased yields benefitting SBVMWD and the City of Riverside.

The sum of all values projected to 2050 was annualized to get the average annual benefits of different conservation pool elevations. The results are shown in **Table 4-12**.

Table 4-12. Total Average Annual Benefits

Alternative	SBVMWD	City of Riverside	Additional Benefits (WMWD)	Total Average Annual Benefits
1	$677,000	$143,000	$48,000	$868,000
2	$1,381,000	$295,000	$98,000	$1,774,000
3	$1,739,000	$373,000	$123,000	$2,235,000
4	$398,000	$75,000	$26,000	$499,000

Evaluation of Alternative Plans

The U.S. Water Resources Council System of Accounts is used as a method of displaying the positive and negative effects of the proposed alternatives including and as compared to the No-Action Plan. The accounts are categories of long-term environmental, economic, and other social impact of alternatives, including a no-action alternative. These are displayed in tables that allow efficient consideration of comparative effects. The Water Resources Council suggests using four accounts to compare proposed water resource development plans. These are the National Economic Development (NED); Environmental Quality (EQ); Regional Development (RD); and Other Social Effects (OSE) Accounts.

National Economic Development Account

The National Economic Development (NED) Account identifies the economic effects of alternative plans on the nation's economic development. Beneficial effects are increases in the economic value of the national output of goods and services attributable to a plan. For the Seven Oaks Dam water conservation alternatives under consideration, the increases in NED reflects the economic benefits of the alternative plans of the additional yields supplied by the water conservation alternatives minus the costs each alternative. **Table 4-13** compares the alternative plans under consideration using the NED Account based on net NED benefits (average annual benefits less average annual cost) which reflects the increases in the NED account and benefit/cost ratio, which reflects the rate of return on the invested cost. The Table indicates that Plans 1, 2, and 4 all contribute positive net NED benefits and are considered economically justified. Although Plan 3 is not justified, it is pointed out that should road relocation be determined to be not necessary or real estate values be reduced, the plan would be justified. Alternative 4 has the highest net benefits and therefore contributes the most to National Economic Development, and is selected as the NED Plan.

Table 4-13. System of Accounts - National Economic Development Account (Oct 96 Price Levels)

Category	No-Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
I. Average Annual Benefits		$868,000	$1,774,000	$2,235,000	$499,000
II. Project Costs					
First Costs					
Construction Costs		$5,227,000	$13,696,000	$18,220,000	$1,076,000
Real Estate		$657,000	$1,519,000	$2,038,000	$627,000
PED		$1,395,000	$3,658,000	$4,867,000	$287,000
EDC		$413,000	$1,083,000	$1,441,000	$85,000
Construction Management		$418,000	$1,096,000	$1,458,000	$32,000
Total First Costs		$8,110,000	$21,053,000	$28,023,000	$2,161,000
Interest during Construction		$224,000	$834,000	$1,270,000	$32,000
Gross Investment		$8,334,000	$21,887,000	$29,293,000	$2,193,000
Annual Costs					
Annual First Costs		$633,000	$1,662,000	$2,224,000	$166,000
Annual OMRR Costs		$42,000	$111,000	$140,000	$37,000
Total Annual Costs		$675,000	$1,773,000	$2,364,000	$203,000
III. Net Benefits (Total Annual Benefits Less Cost)		$193,000	$1,000	($129,000)	$296,000
IV. B/C Ratio		1.29	1.00	0.95	2.46

Environmental Quality Account

The Environmental Quality (EQ) Account displays the effects of alternative plans on significant environmental resources. Significant environmental resources are defined by the Water Resources Council as those components of the ecological, cultural, and aesthetic environments which, if affected by the alternative plans, could have a material bearing on the decision-making process of plan selection.

Table 4-14 presents the possible adverse and beneficial effects that the alternative plans would have on EQ resources. This information is based on findings contained in the EIS/EIR. In general, the Table shows that all of the alternative plans appear to be environmentally acceptable with no significant long-term adverse impacts to any environmental resources.

A major consideration in this determination is that all water conservation alternatives are located within the area determined to be 100% lost as a result of the Santa Ana River Flood Control Project, and has already been mitigated for by that project. Some adverse impacts would occur as a result of construction activities, but this will be temporary and minimized by requiring certain environmental protection measures during construction, such as monitoring and cleaning up spills, and controlling turbidity. It is also noted that further site specific investigations and supplemental NEPA and CEQA documents will be required for the final alignment of road relocation, and adverse impacts should be avoided or minimized with appropriate mitigation if necessary. A comparison of the alternative plans indicates that in general the adverse impacts would increase as the scope of the project increases. However, these impacts are not considered significant.

Regional Economic Development Account

The Regional Economic Development (RED) Account is intended to illustrate the effects that the proposed plans would have on regional economic activity, specifically regional income and regional employment. **Table 4-15** compares the possible effects that the plans may have on these resources. The RED account considers effects on employment, local business and industries, local government spending and reliability of water supplies. The beneficial contributions to the regional economy for each of the alternatives as compared to the No-Action Plan reflect savings in the cost of providing needed water supply, except for Plan 3. As noted previously, Plan 3 could also result in considerable savings if road relocation is found not to be necessary, and real estate values are reduced. Plan 4 would maximize savings for the cost of water.

Another consideration in regional economic development, is the reliability and availability of water supplies to meet area needs. The study area region is expected to continue to experience deficits in water supplies over time. The No Action Plan does not provide for increasing water availability but relies on meeting future needs through importation of water and use of reclaimed water. It is also noted that the availability of water supply from any of the alternative plans will decrease in time as the debris accumulates in the water conservation pool. Plan 3 would allow for water conservation pools to be used over a much longer period of time than the other alternatives. Accordingly, Plan 3 provides the largest volume of water under present and future conditions and is considered the best plan from a RED standpoint. Table 4-15 presents information on each plan's contributions to the RED and the Other Social Effects (OSE) Accounts.

Table 4-14. System of Accounts - Environmental Quality Account

Category	No Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
I. PHYSICAL ENVIRONMENT					
a. Water Quality	Dam will decrease suspend solids downstream, increase sediment within reservoir	Some minor increase in suspended solids downstream, increased sedimentation within the dam	More severe impacts than Alternative 1, but less than Alternative 3	Most impact on resources listed under Alternative 1	Least effect on resources listed under Alternative 1
b. Air Quality	OMRR activities for flood control project will cause minor adverse impacts	Minor increase in long term effects due to OMRR activities	Same as Alt 1.	Same as Alt 1.	Same as Alt 1.
c. Noise Conditions	OMRR activities for flood control will cause minor adverse impacts	Minor increase in long term impacts due to OMRR activities	Same as Alt 1.	Same as Alt 1.	Same as Alt 1.
d. Hazardous, Toxic & Radioactive Waste	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts
II. BIOLOGICAL ENVIRONMENT					
a. Vegetation	100% loss within 50-yr flood pool elev 2425, 50% loss above to reserve limits. Downstream impacts also occur. Mitigation has been developed.	No additional impacts (impacts are being mitigated for the construction of the dam)	Same as Alt 1.	Same as Alt 1.	Same as Alt 1.
b. Wildlife	Same as (a) above.	No additional impacts (impacts are being mitigated for the construction of the dam)	Same as Alt 1.	Same as Alt 1.	Same as Alt 1.
c. Endangered Species	Protection of endangered species has been arranged for the flood control project.	No additional impacts (impacts are being mitigated for the construction of the dam)	Same as Alt 1.	Same as Alt 1.	Same as Alt 1.
III. CULTURAL ENVIRONMENT					
a. Cultural Resources	Mitigation for dam impacts has been arranged.	No additional impacts (impacts are being mitigated for the construction of the dam)	Same as Alt 1.	Same as Alt 1.	Same as Alt 1.
b. Aesthetics	Change in natural conditions. Mitigation is	No additional impacts (impacts are being mitigated for the	Same as Alt 1.	Same as Alt 1.	Same as Alt 1.

Table 4-15. System of Accounts - Regional Economic Development and Other Social Effects Accounts

Category	No Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
I. REGIONAL ECONOMIC DEVELOPMENT					
a. Employment/Labor Force	Employment related to developing other sources of water	Temporary increase in construction-related employment for dam modifications and OMRR activities	Same as Alt 1	Same as Alt 1	No Impact
b. Business and Industrial Activity	No change in business and industrial activity	Same as No Action	Same as No Action	Same as No Action	Same as No Action
c. Local Government Finance	Higher cost for importing water and reclamation projects	Reduction in costs associated with water purchases	Same as Alt 1	Same as Alt 1	Same as Alt 1
d. Increase Water Present (ac-ft): Increase Water Future (ac-ft):	No increase in water- relies on imports and reclaimed water	4,116 2,142	7,473 5,913	9,258 8,013	2,512 638
II. OTHER SOCIAL EFFECTS					
a. Public Health and Safety	Flood control pools in reservoir could attract undesired visitors	Water Conservation Pools could increase attraction of undesired visitors	Same as Alt 1	Same as Alt 1	Same as Alt 1
b. Public Facilities and Services Increase Water Present (ac-ft): Increase Water Future (ac-ft):	No increase in yield- relies on imported water and use of reclaimed water	4,116 2,142	7,473 5,193	9,258 8,013	2,512 638
c. Recreation and Public Access	No Impact although flood control pool may attract visitors	Same as No Action although conservation pools may attract visitors	Same as Alt 1	Same as Alt 1	Same as Alt 1
d. Traffic/Transportation	Reservoir road would provide access to upstream areas	Relocation of reservoir access road may be needed	Same as Alt 1	Same as Alt 1	Same as Alt 1
e. Man Made Resources	Seven Oaks Dam and reservoir is constructed. Water supplies rely on importing water and use of reclaimed water.	Modifications to Dam	Additional Modifications to Dam	Additional Modifications to Dam	No modifications required
f. Natural Resources	No Conservation of Water- water is lost	Conservation of water that would have been lost	Same as Alt 1	Same as Alt 1	Same as Alt 1

Other Social Effects Account

The Other Social Effects (OSE) Account typically includes long-term community impacts in the areas of public facilities and services, recreational opportunities, transportation and traffic, and man-made and natural resources. Table 4-15 compares the effects that the proposed alternatives would have on OSE resources. The primary consideration for this account is the availability of water to meet community and individual needs. There would appear to be significant improvements to the OSE account for all alternatives compared to the No-Action Plan, with Alternative 3 having the most positive impact and Alternative 4 having the least.

Additional Evaluation Criteria

The alternative plans were also evaluated using the four criteria suggested by the Water Resources Council. These criteria area completeness, effectiveness, efficiency, and acceptability.

Completeness

Completeness is the determination of whether or not the plan includes all elements necessary to achieve the national objectives of the plan. The Alternatives 1 through 4 may be considered as satisfying the criterion. Three of the four alternatives are considered cost-effective, or more efficient means of increasing water supply through water conservation measures at Seven Oaks Dam.

Effectiveness

Effectiveness is defined as a measure of the extent to which a plan achieves its objectives. Alternatives 1 through 4 achieve the objective of increased water conservation. However, the degree to which the plans address this objective differ. The effectiveness of the plans also needs to consider the frequency that runoff would be adequate during the non-flood season to fill the conservation pool to the target level. In this regard, it is noted that over the project life, Plan 4 conservation level would be reached 64% of the time under present conditions, and 70% of the time under future conditions. However, Alternative 4 provides the least amount of water yield due to conservation. While Alternative 3 provides the most yield, the water conservation pool elevation would be reached only 11% of the time under present conditions and 13% of the time under future conditions. Alternatives 1 and 2 produce a yield between Alternatives 3 and 4, while the No-Action Alternative does not produce any increase in yields but relies on importing water and use of reclaimed water and is therefore not effective in increasing water conservation. The water pool elevation for Alternative Plan 1 would be reached 25% of the time under present conditions, and 36% of the time under future conditions. Plan 2 would reach the conservation level 13% of the time under present conditions and 22% of the time in the future. Alternative 3 is considered the most effective plan since it provides the highest yield as compared to the other alternatives.

Efficiency

Efficiency is the cost effectiveness of the plan expressed in net economic benefits. Alternative 4 produces the greatest net economic benefits and is therefore the most efficient plan. Net economic benefits for all alternatives are shown in **Table 4-16**. The No-Action Alternative produces no benefits, but it also does not incur any costs.

Table 4-16. Benefit/Cost Summary

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Average Annual Benefits	**$868,000**	**$1,774,000**	**$2,235,000**	**$499,000**
Average Annual Costs	**$675,000**	**$1,773,000**	**$2,364,000**	**$203,000**
Net Benefits	**$193,000**	**$1,000**	**($129,000)**	**$296,000**
B/C Ratio	**1.29**	**1.00**	**0.95**	**2.46**

Acceptability

Acceptability is defined as acceptance of the plan by the concerned public. Water conservation is an acceptable concept to all interests who have expressed their views during the study. Based on public review of the draft report, all the alternative plans appear to be acceptable. However, some concerns were expressed by some water suppliers on impacts to water rights, while some environmental interests expressed concerns with further impacts on the area resources, in particular downstream impacts. It is expected that the development of the water control manual will demonstrate that historic water rights will be maintained, and that this will be worked out through the California State Water Resources Control Board. Additional information has been presented in the report and EIS/EIR to indicate that downstream adverse impacts are expected to be negligible. Accordingly, all plans are considered acceptable at this time.

Risk and Uncertainty Considerations

The determination of increases in water conservation yields for all alternatives was based on analysis of historic runoff records and therefore does reflect a probability of the yields being realized during the project life as discussed earlier and in the Hydrology Appendix. It is recognized that there are certain degrees of risk in any given year and over the project life that the estimated yields will be somewhat higher or lower. This is further complicated by the impact of accumulated debris on storage capacity as well as the potential for releasing and reusing storage capacity during the period when the conservation pool is being filled from March to May. These uncertainties are extremely difficult to quantify, but it is considered reasonable that any losses in yield resulting from differences in runoff estimates or increases in debris accumulation would be offset by the potential for increasing yields through reuse of capacity. There is also degrees of uncertainty that exist under the No-Action Plan which relies on importing water and water reclamation projects. Imported water requires the Study Area water districts to be dependent on other supplies developing sources, and also causes local suppliers to be vulnerable to higher cost sources. Although reclamation projects provide some additional source supplies, the volume of water and use of this water is somewhat limited. Based on the above, it appears that the development of water conservation at Seven Oaks Dam will provide the most reliable source of water to meet future supplies.

There are also some uncertainties regarding the cost of each alternative plan as previously discussed. Although project costs include cost for road relocation and real estate, there are existing roads in the National Forest that would provide SCE crews access to the upstream power plant, although it may take additional time. This will be further addressed during the design phase of project development. The real estate values included in project costs reflect a fair market value for similar properties. However, in view of the flood control operations that will exist on these properties, the values could be substantially lower. The effects of eliminating road relocation and lower real estate values would substantially reduce the cost of the alternative plans, resulting in significant increases in net NED benefits, including justification of Plan 3.

Tradeoffs Between Alternatives

A review of the System of Accounts Tables and above evaluations indicate that there would be certain tradeoffs between each of the alternative plans, including the No-Action Plan, that should be considered in selecting a plan for implementation. Plan 4 is the plan that maximizes net NED benefits, and will result in the least adverse environmental impacts. However, except for the No-Action Plan, Plan 4 is the least effective in developing water conservation yields, and consequently local suppliers would still be required to import and develop reclamation projects to meet future demands.

Plan 3 maximizes the water yield at Seven Oaks Dam and would allow local suppliers more flexibility in meeting the areas demands, particularly if imported water supplies and costs are adversely changed in the future to meet future demands. However, the economic justification for Plan 3 is dependent on the costs for road relocation and real estate. In addition, the environmental impacts would be greater for this plan, although still considered to be insignificant. It is also expected that over the 50-year project life, the water pool elevation for this alternative would be reached only 11% of the time under present conditions and 13% of the time under future conditions. Consequently, there may be a greater risk of limited use of the additional capacity available from this Plan.

Plan 1 does provide a significant increase in water yield at Seven Oaks Dam, and is the next best plan from a National Economic Development standpoint, with less environmental impacts than Plan 3. The targeted water conservation would be reached 25% of the time under present conditions, and 36% of the time for future conditions, and therefore there is a greater reliability for using the full pool over the project life, and in particular during the earlier years when greater capacity is available.

Plan 2 is marginally justified, again depending on the cost for road relocation and real estate, and would increase yields much higher than Alternative Plans 4 and 1. However, it is expected that the full pool would be reached only 13% of the time under present conditions, and 22% of the time under future conditions.

Plan Selection

The selection of plan to be recommended for implementation considered the results of the formulation process as presented in the previous section. These results recognize the tradeoffs between alternative plans which were carefully considered by the Corps of Engineers and the Non-Federal Sponsors in reaching a decision on the plan to be recommended.

NED Plan

Based on Corps of Engineers policy as contained in ER 1105-2-100, the NED Plan shall be selected as the recommended plan to be considered for Federal participation, unless there is adequate justification, including the potential for environmental restoration benefits, to select a different alternative. Plan 4 is the NED Plan. There does not appear to be justification for selecting a different alternative from a Federal National Economic Development or environmental restoration standpoint.

Locally-Preferred Plan

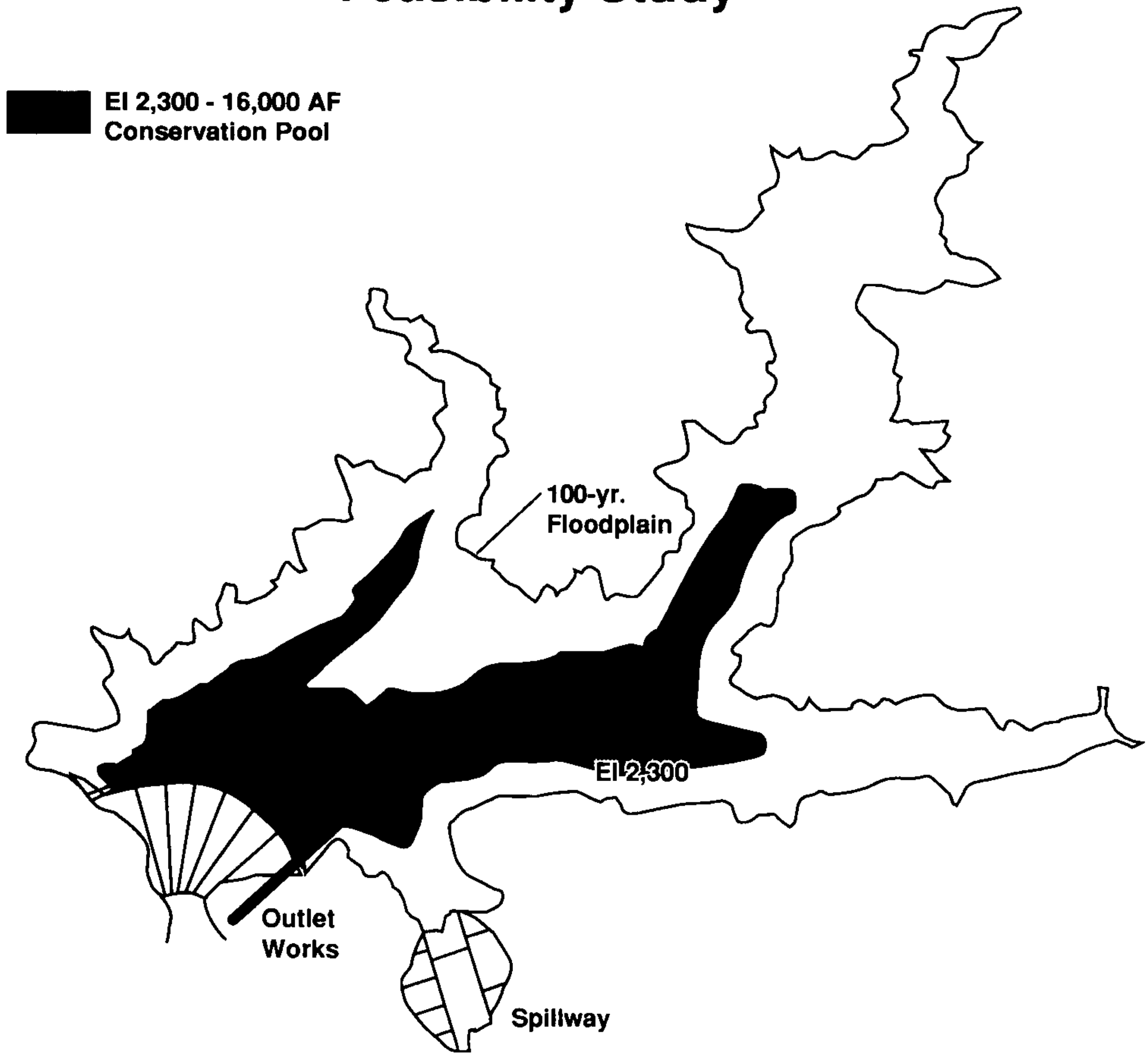
The San Bernardino County Flood Control District, in coordination with the San Bernardino Municipal Water District, has selected Plan 1 at this time. Plan 1 provides considerable water conservation yields that would meet near term needs with a savings in cost as compared to importing water and developing reclamation projects. Plan 1 requires a lesser modification to the Seven Oaks Dam which could be implemented in less time and at a lesser cost than Plans 2 and 3, and provides a higher reliability of using the full conservation pool during the project life. The Non-Federal Sponsors also recognized that there may also be an opportunity in the future to consider implementing Plans 2 or 3 to further increase water conservation levels above Plan 1.

The Selected Plan

The alternative selected for implementation is the Locally-Preferred Plan, Plan 1. Plan 4, the NED Plan, would be much less effective in increasing water conservation than Plan 1. Plan 1 would result in some increase in adverse environmental impacts; however, these impacts are not considered significant.

Figure 5-1.

Selected Plan
Seven Oaks Dam Water Conservation Feasibility Study



Chapter 5. The Selected Plan

Plan Description

The plan selected for implementation is the Locally-Preferred Plan, presented as Alternative Plan 1 in Chapter 4, Plan Formulation, and the EIS/EIR. The Selected Plan, shown on **Figure 5-1**, provides for a seasonal water conservation impoundment up to elevation 2,300 feet NGVD. The Plan provides an estimated storage capacity of 16,000 acre-feet in 2000 and approximately 7,000 acre-feet in 2050. The selected plan would impound water during the transition period between the flood season and non-flood season, beginning in March and maintaining the conservation level up to the end of May, at which time the conservation pool would be emptied over the summer months through September. Conservation pool releases for present conditions include all inflows, plus the additional flows to empty the pool by the end of September as follows: June - 65 cfs; July - 70 cfs; August - 70 cfs; and September - 70 cfs. Conservation pool releases for future conditions include all inflows, plus the following releases: June - 25 cfs; July - 32 cfs; July - 32 cfs; August - 32 cfs; and September - 32 cfs.

The Selected Plan will require certain modifications to be made to the Seven Oaks Dam Flood Control facility including modifying the existing intake structure with additional concrete and anchor tendons to the sides of the structure, and strengthening of the trash structure for the high level intake. The Plan may also require relocation of the reservoir road above the conservation pool elevation.

Real Estate Requirements

Lands, easements, rights-of-way and other arrangements needed for implementation of the Selected Plan recognizes that arrangements are presently being made to acquire lands and easements needed for the Seven Oaks Dam feature of the Santa Ana River Mainstem Flood Control Project. The additional lands, easements, and rights-of-way needed for the water conservation project is expected to involve a special use permit from the U.S. Forest Service to allow impoundment of water for water conservation purposes up to elevation 2,300 feet, NGVD. The permit would include lands necessary for relocation of the reservoir access road and any temporary construction areas. USFS lands involved in the permit are estimated to be about 182 acres.

Operation, Maintenance, Replacement, and Rehabilitation Requirements

The water control manual for flood control operations, as well as guidelines provided by the Corps of Engineers for maintenance, replacement, and rehabilitation of the Seven Oaks Dam Flood Control feature will need to be revised to incorporate the water conservation operations for the selected plan. The development of the water control manual and revised guidelines will include the additional monitoring, reading and recording instrumentations, and evaluation of the reservoir impacts. Maintenance repair frequency of the outlet tunnels, electrical and mechanical parts and motors, and mechanical control gates and valves is also expected due to the additional wear from water conservation discharge in the main Regulated Outlet. In addition, maintenance of the relocated road if implemented will be required.

Table 5-1. Selected Plan M-CACES First Cost Estimate (Oct 1996 Price Levels)

Code of Account	Description	First Cost	Contin-gencies	First Cost With Contingencies
04.	DAMS			
04.03.	OUTLET WORKS			
04.03.56	Intake Structure Modification - Strengthen Intake Structure (Seismic)	$2,609,000	25%	$3,262,000
04.03.56.03	Seismic Improvements	$1,689,526	25%	$2,112,000
04.03.56.05	Structural/Miscellaneous Steel	$9,987		$12,000
04.03.56.13	Additional Tower Strengthening (20 feet)	$524,366	25%	$655,000
04.03.56.99	Concrete Belts @ 20 feet	$385,604	25%	$482,000
08.	ROADS			
08.01.	RELOCATED ROAD IN RESERVOIR	$1,637,662	20%	$1,965,000
08.01.19	Construct Roadbed to Subgrade			
08.01.19.02	Site Work (Earthwork)	$1,571,232	20%	$1,885,000
08.01.99.	Associated General Items			
08.01.99.02	Site Work (Barrier Fence)	$66,430	20%	$80,000
	TOTAL CONSTRUCTION COST	$4,247,144		$5,227,000
01.	LANDS AND DAMAGES	$525,998	25%	$657,000
30.	PLANNING, ENGINEERING AND DESIGN (PED)	$1,395,000	N/A	$1,395,000
30.10.	Engineering During Construction (EDC)	$413,000	N/A	$413,000
31.	CONSTRUCTION MANAGEMENT (S&A)	$418,000	N/A	$418,000
	TOTAL COST	$6,999,142		$8,110,000

Project Costs

First Cost

A detailed cost estimate has been developed. applying M-CACES procedures in accordance with Corps of Engineers regulations. **Table 5-1** presents the summary of the First Costs of implementing the Selected Plan. The cost estimate includes all construction costs, estimated real estate values, costs for Preconstruction Engineering and Design, Engineering during Construction, and Construction Management. The costs are based on October 1996 price levels.

As previously indicated, the majority of lands, easements, rights-of-way required for implementation of the Selected Plan are within the jurisdiction of the U.S. Forest Service. The remaining lands need for modifications to the intake structure will be under the jurisdiction of the Corps of Engineers and the Santa Ana River Mainstem Flood Control Project (SARP) Non-Federal Sponsors as part of SARP. The Project Cost estimate includes the estimated fair market value of these lands, without considering the affect of the flood control operations. Consequently, the actual cost, if any, could range from zero to full fair market value. Appendix F, Real Estate, presents further details on the estimated real estate costs.

Operation, Maintenance, Replacement, and Rehabilitation Costs

The average annual costs for OMRR was based on determining the incremental additional average annual cost required for OMRR activities for the Selected Water Conservation Plan, above the OMRR requirements for the Santa Ana River Mainstem Flood Control Project. This was based on analyzing the increased OMRR activities and costs previously identified in the *Santa Ana River Mainstem Project Design Memorandum No. 4, Feature Design-Seven Oaks Dam Outlet Works, Volume 1-Reports and Plates*, dated April 1991; and *Design Memorandum No. 1, Phase 2 GDM Volume 1-Seven Oaks Dam*, dated August 1988. **Table 5-2** presents the estimated increase in OMRR average annual costs based on October 1996 price levels.

Project Benefits

The Selected Plan will increase average annual water conservation yields by 4,120 acre-feet under present conditions (Year 2000), and by 2,140 acre-feet (113%) under future conditions (Year 2050). Average annual economic benefits associated with these increases amount to $868,000.

Table 5-2. Estimated OMRR Costs for the Selected Plan

Item	Description	Additional Annual Cost
1	Operations	
	Potential Flood Control Operations	$2,000
	Facilities Maintenance	
	Relocated Reservoir Road	$2,700
	Relocated Intake Structure Access Road	N/A
	Painting New Steel Frame	N/A
	Install New Bulkhead Gate	N/A
2	Inspection and Monitoring	
	Evaluations	$1,000
	Bridge Inspections	N/I
	Reservoir Monitoring	$1,000
	Instrumentation	$500
3	Debris Removal	N/I
4	Steel/Concrete Repair	
	Tunnel Invert	$5,000
5	Electrical	
	Motors and Parts	$400
6	Mechanical	
	Motors and Parts	$13,000
	Control Gates and Valves	$15,000
	TOTAL COST	$41,000

Notes: N/A - Not Applicable; N/I - No Increase.

Economic Analysis

Table 5-3 presents the economic analysis of the Selected Plan. The analysis is based on October 1996 price levels, and an interest rate of 7⅜% over a 50-year period. The analysis shows the Selected Plan is economically justified, with an estimated $193,000 in net NED benefits annually and would have a benefit-cost ratio of 1.3.

Table 5-3. Economic Analysis of the Selected Plan (Oct 1996 Price Levels)

Item	Amount
First Cost	$8,110,000
Interest During Construction	$224,000
Gross Investment	$8,334,000
Average Annual Cost	$675,000
Interest and Amortization	$633,000
Average Annual OMRR	$42,000
Average Annual Benefits	$868,000
Net NED Benefits	$193,000
Benefit/Cost Ratio	1.3

Environmental Affects and Mitigation Requirements

This Report includes a combined Environmental Impact Statement/Environmental Impact Report (EIS/EIR), prepared in full compliance with the requirements and guidelines of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The combined document also includes documentation in compliance to other Federal and State laws, policies, and procedures including the Fish and Wildlife Coordination Act, Clean Air Act, Clean Water Act, National Historic Preservation Act and other requirements.

The findings of the environmental studies as documented in the EIS/EIR indicate that no significant adverse impacts are expected from implementation of the Selected Plan. The EIS/EIR does indicate potential for adverse impacts associated with construction activities, in particular those related to relocation of the reservoir access road. It is expected that construction impacts will be minimized by complying with measures included in Corps of Engineers guide specifications and local ordinances associated with environmental protection, such as monitoring and cleaning up spills, watering and grading controls, and equipment air quality standards.

The EIS/EIR recognizes that the Seven Oaks Dam and Reservoir is being constructed as part of the Santa Ana River Flood Control Project, and that the impacts and mitigation requirements have been addressed in the 1988 Supplemental EIS/EIR for the flood control project. This includes mitigation based on 100% of the vegetation and habitat located within the 50-year flood control pool at elevation 2,425 feet NGVD and 50% loss above this elevation to the flood control boundary. Mitigation is also being provided as part of the Santa Ana River Project for adverse impacts to downstream areas as a result of flood control operations.

Of particular concern to several interests are the potential downstream impacts of water conservation operations. The results of a closer review of these impacts for the selected plan is presented in Appendix A, Hydrology. **Table 5-4** shows the differences in discharges downstream of the dam, based on seasonal operations from March to May under base conditions (flood control operations) and water conservation operations. The information presented in the Table shows relatively small differences, except for relatively infrequent events around the 50-year event. The Table also presents discharges for Mill Creek, near the confluence with the Santa Ana River some 2.5 miles from Seven Oaks Dam. The environmental preservation provided as mitigation for the flood control project is located just downstream of the of the confluence on the river's north bank. Comparisons of these values with Santa Ana River flows, shows that Mill Creek runoff controls downstream of the confluence. It is also noted that under both flood control and water conservation operations , all releases up to about 200 cfs will normally be captured by the distribution system or the downstream groundwater recharge basins. Based on these analyses, the downstream impacts of water conservation are expected to be insignificant.

Table 5-4. Discharge Frequency Values

Outflow from Seven Oaks Dam	Frequency of Peak Discharges (cfs)					
	2-yr	5-yr	10-yr	20-yr	50-yr	100-yr
Annual Maximum Base and alternatives	400	500	500	2500	4000	5200
Seasonal March thru May, Base conditions	90	500	500	600	2500	4500
Seasonal March thru May, Alternative 1 condition	3	200	500	500	550	4000
Mill Creek March thru May Base and Alternative Conditions	100	450	1000	2000	4000	7000

Chapter 6. Plan Implementation

This Chapter presents the Federal and Non-Federal responsibilities and procedures for implementation of the Selected Plan. Information presented includes a review of Federal laws and policies related to the Federal interest in implementation of water conservation projects and its applicability to the Selected Plan. It also includes a review of Federal and non-Federal responsibilities regarding the implementation of the Santa Ana River Mainstem Flood Control Project (SARP) as it relates to construction of the Seven Oaks Dam and any modifications required for implementing water conservation. The expected procedures for implementing the requirements and a general schedule for accomplishing these requirements are also covered.

Water Conservation Plan

The addition of seasonal water conservation at Seven Oaks Dam is expected to occur after the flood control project is completed and turned over to the SARP Non-Federal Sponsors for Operation, Maintenance, Replacement, and Rehabilitation (OMRR). The Selected and Locally-Preferred Plan is to allow for seasonal water conservation to a maximum elevation of 2,300 feet-NGVD, which is coincidental with the long term flood control debris pool. The addition of seasonal water conservation would not adversely impact on the flood control purpose of the Seven Oaks Flood Control Dam and Reservoir. The requirements for adding water conservation based on the Selected Locally Preferred Plan include:

Facility Modifications

- Intake structure. Modifications needed to strengthen the anchoring of the intake structure.

- Access Roads to Southern California Edison Power Plant. The access road to the SCE power plant will be periodically inundated by the conservation pool. At this time, the U.S. Forest Service prefers that SCE use other existing Forest Service roads as an alternate route to the plant, rather than relocate the present access road. This will be addressed by representatives of the SARP Non-Federal Sponsors, SCE, and the USFS during final negotiations regarding water conservation agreements. It is shown as part of the recommended plan as a worst case analysis for environmental impact considerations at this time.

Real Estate Requirements

- A special use permit or other mutually agreed-to mechanism with the USFS will be required for the water conservation pool. This arrangement, if necessary, would relate to the flood control debris pool that would be inundated for a longer duration and more frequently for seasonal water conservation storage.

- A temporary special use permit or easement for construction of water conservation modifications to the dam features would be required.

Change in OMRR Requirements

The OMRR requirements for the flood control project would need to be modified to reflect any new requirements associated with adding seasonal water conservation including increased maintenance of facilities, debris clearing activities, and roadway maintenance.

Water Rights

The State Water Resources Control Board has justification over issuing a new permit for water rights to Santa Ana River water that is conserved by a water conservation project at Seven Oaks Dam.

Santa Ana River Mainstem Flood Control Project

The U.S. Army Corps of Engineers is presently constructing the Seven Oaks Dam as part of the Santa Ana River Mainstem Flood Control Project under the authority of the 1986 Water Resources Development Act. The Flood Control Districts of the Non-Federal Sponsors for the flood control project include the Counties of San Bernardino, Riverside, and Orange. The arrangements between the USACE and non-Federal sponsors are currently related only to the flood control project in accordance with the Local Cooperation Agreement (LCA) dated 13 December 1989. The USACE is arranging for USFS lands needed for the flood control project.

Federal and Non-Federal Responsibilities

The Federal and Non-Federal responsibilities for implementation of the Seven Oaks Dam for the purpose of flood control are contained in the LCA for the Santa Ana River Mainstem Flood Control Project. The LCA was reviewed to determine how the roles and responsibilities for the flood control project relate to the implementation requirements for water conservation. The provisions of the LCA that appear to be pertinent to implementing water conservation are presented as follows:

Article IIB. "When the Government determines that a feature or phase of the Project is complete and appropriate for operation and maintenance by a Sponsor or Sponsors, the Government shall turn the completed feature or phase over to the responsible Sponsor or Sponsors, who shall accept the feature or phase of the Project, and all responsibility for operating, repairing, maintaining, replacing, and rehabilitating the feature or phase in accordance with Article VIII hereof. The Sponsors shall share the cost for operation, maintenance, ..."

Article IIC. "Pursuant to Section 103(a)(1) of the Act, 33 U.S.C. 2213(a)(1) and in accordance with Article III of this agreement the sponsors shall provide all lands, easements, rights-of-way, excavated material disposal areas, and perform relocations (excluding railroad bridges and approaches thereto) required for construction of the project as determined by the Government, except that the acquisition and restoration of enhancement lands shall be the sole responsibility of the Government. In the event any such lands, easements, rights-of-way required for the Project (e.g., haul roads, borrow sites, or disposal areas) are common to more than one feature, acquisition of said lands, easements, and rights-of-way will be performed by the Sponsors in the counties in which they are situated, unless otherwise agreed to among the Sponsors. The Sponsors shall share costs for lands, easements, rights-of-way and disposal areas and relocations, as specified in the following subparagraphs . . ."

Article IIIA. "The Sponsors shall furnish to the Government all lands, easements, and rights-of-way, including suitable borrow and dredged material disposal areas, as may be determined by the Government to be necessary for the construction, operation, and maintenance of the Project, and shall furnish to the Government evidence supporting the sponsors' legal authority to grant rights-of-way to such lands. The necessary lands, easements, and rights-of-way may be provided incrementally, but all lands, easements, and rights-of-way determined by the Government to be necessary for work to be performed under a construction contract must be furnished prior to the advertisement of the construction contract."

Article IIID. "Titles or rights to lands acquired or necessary for project purposes which are currently held for the Project by the Sponsors or the United States shall remain in the current holder of such rights or title, except that the Government may accept title and rights to lands at Seven Oaks Dam and Basin and Prado Dam and Basin provided by the Sponsors for the Project."

Article VIII. "After the Government has turned a completed feature or phase over to the responsible Sponsor or Sponsors, the Sponsor(s) in whose county the feature or phase is located shall be responsible for its operation, maintenance, or replacement, and rehabilitation of that feature or phase, except that Orange shall also be responsible for the operation, maintenance, replacement and rehabilitation of Prado Dam and Basin. All such operation, maintenance, replacement, and rehabilitation shall be in accordance with regulations or directions prescribed by the Government. During the life of the Project, the Sponsors may make recommendations to the Government concerning the operation, maintenance, replacement, and rehabilitation of the Project. The Government has complete discretion to accept, reject, or modify the Sponsor's recommendations regarding such operation, maintenance, replacement, and rehabilitation. The costs of said operation, maintenance, replacement, and rehabilitation shall be shared in accordance with Article II.B. of this Agreement."

U.S. Forest Service Lands

The implementation of water conservation at Seven Oaks Dam involves more frequent and longer durations of inundation within the flood control basin. These lands are within the jurisdiction of the San Bernardino National Forest owned by the United States and administered by the U.S. Forest Service. Accordingly, the arrangements with the Forest Service for flood control operations within the basin must be reviewed to determine modifications, if any, needed to allow implementation of water conservation. A Memorandum of Understanding between the USACE and USFS is presently being worked out for Forest Service lands needed for the flood control purpose of the project. The authorities for interchanging lands between the USFS Service and the Department of Defense are contained in Title 16 of United States Code Annotated Section 505a. Arrangements being considered which are pertinent to the addition of water conservation at Seven Oaks Dam are:

1. Interchange of 110 acres of land from the USFS to the USACE for construction of

Seven Oaks Dam and associated features. Lands have been acquired by the SARP Non-Federal Sponsors which are expected to be provided to the USACE for the interchange with USFS lands.

2. Permanent flowage easements from the USFS to the USACE for inundation lands including 47 acres for spillway flows and 780 acres for the flood control reservoir. The Forest Service shall continue to administer National Forest System lands within and adjacent to the Project (including, but not limited to, the area within the high water level of the flood reservoir of the Seven Oaks Dam) in accordance with the San Bernardino National Forest Land and Resource Management Plan.

Summary

In summary, upon completion of the flood control project, the following arrangements will be made:

1. Dam Facilities and Operations -- Seven Oaks Dam will be turned over to the SARP Non-Federal Sponsors for operation, maintenance, replacement, and rehabilitation in accordance with USACE regulations and directions. Real Estate on which the Dam features are located include lands owned by the SARP Non-Federal Sponsor and lands that are expected to be interchanged from theUSFS to the USACE via a Memorandum of Understanding currently being negotiated. The interchange is expected to involve off-project site lands that have been acquired by the SARP Non-Federal Sponsors, who are expected to convey these lands to the USACE. The USACE is expected to interchange these lands for project lands presently owned by the USFS. Based on Article IIID of the LCA and prior discussions with the USFS, the USACE is expected to retain the lands interchanged between the Federal agencies. However, discussions with the USFS and coordination with SARP Non-Federal Sponsors regarding the Memorandum of Understanding may address the viability of ultimately turning all the lands over to the SARP Non-Federal Sponsors.

2. Flowage Easements -- Reservoir lands will be owned by USFS with a permanent easement for flood control given to the USACE. It is presently expected that the easement will be retained by the USACE when the dam is turned over for OMRR to the SARP Non-Federal Sponsors. The USFS is expected to continue to administer and manage these lands based on the San Bernardino National Forest Land and Natural Resource Management Plan. Coordination of OMRR requirements for the flood control dam and reservoir will be coordinated between the USACE and the USFS and related to the SARP Non-Federal Sponsors by the USACE as part of OMRR guidelines and directions.

Corps of Engineers' Water Conservation Authorities

Federal laws and U.S. Army Corps of Engineers' policies and regulations were reviewed with respect to the Federal interest and responsibilities in implementing the Recommended Plan. Pertinent laws and guidelines as contained in Corps of Engineer's regulations are summarized as follows:

1. The Corps of Engineers, especially as a Federal agency with the authority to regulate reservoir storage and releases, is urged to maximize water conservation in provisions of 33CFR 222.7(f)(4) as follows:

> *"Development and execution of water control plans will include appropriate consideration for efficient water management in conformance with the emphasis on water conservation as a national priority. The objectives of efficient water control management are to produce beneficial water savings and improvements in the availability and quality of water resulting from project regulation and operation. Balanced resource use through improved regulation should be developed to conserve as much water as possible and maximize all project functions consistent with project/system management. Continuous examinations should be made of regulation schedules, possible need for storage reallocation (within existing authority and constraints) and to identify needed changes in normal regulation. Emphasis should be placed on evaluating conditions that could require deviation from normal release schedules as part of drought contingency plans."*

2. Section 301(a) of the Water Supply Act of 1958, as amended (43 U.S.C. 390b), established a policy of cooperation in developing water supplies for domestic, municipal, industrial and other purposes. Section 301(b) is the authority for the USACE to include municipal and industrial storage in reservoir projects.

3. Engineer Regulation 1105-2-100, paragraph 4-30a(3) provides for seasonal water conservation in a dam operated by the Federal Government. Since the Seven Oaks Dam is being turned over to the SARP Non-Federal Sponsors for OMRR, the cost allocation provisions contained in the Engineer Regulation do not apply.

4. Section 311 of the Water Resources Development Act of 1996 addresses the non-Federal share for a project to add water conservation to the Seven Oaks Dam.

> *"Section 311. Seven Oaks Dam, California. The non-Federal share for a project to add water conservation to the Seven Oaks Dam, authorized as part of the project for flood control, Santa Ana River Mainstem, California, by section 401(a) of the Water Resources Development Act of 1986(100 Stat.4113), shall be 100 percent of separable first costs and separable operation, maintenance, and replacement costs associated with the water conservation purpose."*

Federal and Non-Federal Responsibilities for Implementation

Based on review of the Federal and Non-Federal responsibilities for the Seven Oaks Dam as part of the Santa Ana River Mainstem Flood Control Project, and USACE authorities for implementing water conservation, the following conclusions are noted as a basis for defining Federal and Non-Federal responsibilities for implementing the recommended plan for adding seasonal water conservation at Seven Oaks Dam.

Approval Authority

The project authorization and the 1989 LCA for the Santa Ana Mainstem Flood Control Project are directed only to the purpose of flood control and do not include the issue of water conservation at Seven Oaks Dam. However, Section VIII of the LCA does allow Non-Federal interests to recommend modifications in the operation, maintenance, replacement, and rehabilitation of the project which are subject to the discretionary acceptance or rejection of the Federal Government. Accordingly, the Government could approve a Non-Federal request to modify features or operations for other purposes including seasonal water conservation as long as such modifications do not impact the authorized flood control purpose.

In the case of Seven Oaks Dam, although water conservation is not "officially authorized" by WRDA 1996, the operation may be modified to accommodate seasonal water conservation to meet the intent of 33CFR 222.7(f)(4) and Section 301(a) of the 1958 Water Supply Act and under Corps of Engineers policies indicated in ER 1105-2-100. Such a use would "enhance general usage of the project for municipal and industrial water supply purposes" since use of the Dam for water conservation purposes is desired by local water districts and is expected to be acceptable to the SARP Non-Federal Sponsors, subject to the water districts entering into an agreement acceptable to SARP Non-Federal Sponsors to implement water conservation.

Since water conservation is not expected to be added to the project until the dam is "turned over" to the SARP Non-Federal Sponsors, the SARP Sponsors may recommend modifications to facilities and operations to add water supply under their OMRR responsibilities pursuant to Article VIII of the LCA. In that case, it would be appropriate for the USACE to approve such request to meet the intent of water supply laws and policies, subject to such water conservation modifications not impacting the authorized flood control purpose, and meeting other Federal requirements such as permits, as necessary, under Section 404 of the Clean Water Act, and other applicable Federal and State laws and policies.

Cost-Sharing

Section 311 of WRDA 1996 makes reference to the cost-sharing formula to be used if water conservation were added to Seven Oaks Dam. The Section indicates that the SARP Non-Federal Sponsors shall be responsible for 100% of the separable first cost and separable operation, maintenance, and replacement costs associated with adding water conservation to Seven Oaks Dam. The cost-sharing requirements for seasonal water conservation as contained in ER 1105-2-100 apply to Corps of Engineers' operated dams. Since the Seven Oaks Dam will be turned over to Non-Federal interests for operation, these requirements do not apply. Accordingly, the proposed Federal and Non-Federal cost-sharing for the Recommended Plan is that Non-Federal interests provide 100% of all separable first costs and separable operation, maintenance, replacement, and rehabilitation.

Real Estate Requirements

The SARP Non-Federal Sponsors will be required to obtain any additional arrangements from the U.S. Forest Service for operating the Seven Oaks Dam for seasonal water conservation. The USFS is authorized to sell, exchange, or interchange lands of the National Forest System with the other interests as provided in Title 16 of United Stated Code Annotated Section 521d.

Federal Responsibilities for Implementing the Selected Plan

The Federal Government will be responsible for approving any modifications to the Seven Oaks Dam flood control feature of the Santa Ana River Mainstem Project for the purpose of adding water conservation. Based on the results of this feasibility study, the addition of water conservation is consistent with the authorized Santa Ana River Mainstem Flood Control Project. Final approval will be subject to the completion and turning over the Seven Oaks Dam Facility to the SARP Non-Federal Sponsors, a specific request from the SARP Sponsors to modify the flood control project for water conservation, and the execution of a Memorandum of Agreement with the SARP Non-Federal Sponsors. Execution of the Memorandum of Agreement is by the authority of the Assistant Secretary of the Army for Civil Works, who executed the LCA for the Flood Control Project.

The Corps of Engineers will review and further define requirements for water conservation based on the Flood Control Project completed features and OMRR arrangements. This includes reviewing as-builts, the water control manual and other OMRR guidelines and directions for the flood control project that may need to be addressed in reviewing the water conservation request. The USACE will also identify funds to be provided to the Corps to complete required reviews for approval and to inspect the constructed modifications.

The USACE may provide technical assistance to the SARP Flood Control Sponsors in completing design, plans and specifications, supplemental environmental documentation, construction management, and other work as needed to complete the implementation of the Recommended Plan under the USACE Work For Others Program at 100% Non-Federal cost.

Non-Federal Responsibilities For Implementing the Selected Plan

Once the Seven Oaks Dam is turned over to the SARP Non-Federal Sponsors for OMRR, they will be required to submit a request for Corps of Engineers approval for any modifications to the Seven Oaks facilities and OMRR for implementing the Selected Plan. It is emphasized that the water conservation districts would be required to execute acceptable arrangements with the SARP Non-Federal Sponsors who are responsible for OMRR for the flood control project. The SARP Non-Federal Sponsors would be responsible for arranging for 100% of all separable costs for implementing water conservation.

The SARP Non-Federal Sponsors will also be responsible for providing the following:

1. Final Design of flood control facility modifications needed based on review of as-built of Seven Oaks Dam facilities;

2. Final Design of associated features such as relocation of the Edison access road, if necessary;

3. Proposed revisions to the Water Control Manual;

4. Proposed revisions to other OMRR guides and directions;

5. Further analysis as needed to demonstrate that the modifications for water conservation will not impact on the flood control purpose of the Seven Oaks Dam facility;

6. Supplemental NEPA/CEQA document as needed to address changes in the Recommended Plan or changed conditions;

7. Approvals and if necessary executed arrangements between U.S. Forest Service and SARP Non-Federal Sponsors for modifications;

8. Approvals from California Department of Dam Safety;

9. Section 404 and other regulatory permit requirements needed to implement the recommended plan;

10. Documentation that water rights have been arranged; and

11. Letter of intent indicating that the SARP Non-Federal Sponsors are willing and able to provide all costs needed to implement the water conservation requirements and other assurances noted above.

Procedures for Obtaining Approval and Implementing the Selected Plan

Upon review of the above items, the USACE will provide final approval for implementing the selected plan. A Memorandum of Agreement between the Assistant Secretary of the Army for Civil Works, or his delegate, and the SARP Non-Federal Sponsors will be executed indicating approval and any requirements associated with that approval.

The SARP Non-Federal Sponsors will arrange for completion of Plans and Specifications and submit them to the Corps for review and approval. The USACE will approve Plans and Specifications, and advise the SARP Non-Federal Sponsors of funds needed by the USACE for inspection during construction.

The SARP Non-Federal Sponsors will be responsible for award and management construction contracts. Any major modifications during construction to be submitted for USACE approval.

Upon completion of construction, the SARP Non-Federal Sponsors will submit any final revisions to the water control manual and other OMRR guidelines and directions for USACE approval.

The SARP Non-Federal Sponsors will perform OMRR responsibilities as required.

Schedule

The completion of construction of the Seven Oaks Dam Facility is scheduled during 1999. At that time, the facility will be turned over to the SARP Non-Federal Sponsors for OMRR. It is expected that the USACE will be operating the facility for the first three years at 100% Non-Federal cost. It is also expected that at that time, final arrangements on real estate associated with the flood control project will also be completed with the SARP Non-Federal Sponsors and the U.S. Forest Service. Accordingly, a request for approval to implement the recommended water conservation plan could be submitted in the year 1999. A preliminary schedule to complete these procedures follows;

1. Submission of a Request by the SARP Non-Federal Sponsors.

2. Corps of Engineers review of requirements for approval -- three months.

3. Sponsor completion of review requirements -- 12-18 months (Time depends on significance of changes from Feasibility Report).

4. Corps of Engineers completes review -- three months.

5. Execution of MOA -- three months.

6. Sponsor completion of Plans and Specifications -- six months.

7. Corps of Engineers approval of Plans and Specifications -- two months.

8. Sponsor construction award -- three months.

9. Construction period -- 12 months.

10. Sponsor completes final OMRR guides --three months.

11. Corps approval of OMRR guides - two months.

Expedited Schedule

The schedule for implementing water conservation shown above is based on actions being taken after the Seven Oaks Dam is turned over to the SARP Non-Federal Sponsors for OMRR. Consequently, the earliest water conservation operations would begin is about three years after the dam is turned over to the SARP Non-Federal Sponsors.

It may be possible to arrange for earlier operations for water conservation based on an earlier request from the SARP Non-Federal Sponsors to allow them to operate the dam for water conservation. Earlier completion of review requirements, earlier approval and execution of a Memorandum of Agreement, and modification of intake structure and any necessary road relocations could help to expedite this schedule. The intake structure is scheduled to be completed in 1998. Consequently, retrofitting of anchoring requirements may be possible to complete in the 1998 to 1999 period.

Views of the Non-Federal Sponsor

The San Bernardino County Flood Control District (SBCFCD) in partnership with the Flood Control Districts of the Counties of Riverside and Orange is expected to be responsible for flood control OMRR of the Seven Oaks Dam. The SBCFCD has expressed interest in continuing to be the SARP Sponsor for implementation of the Recommended Plan for Water Conservation, and to continue representing the local water districts and coordinating approvals with the other SARP Non-Federal Sponsors. The SARP Sponsors have expressed interest in proceeding with implementation of the recommended plan, subject to appropriate cost-sharing and other arrangements with the benefitting water districts. These arrangements are Non-Federal responsibilities to negotiate and reach agreements.

Need for Federal Assistance

Based on the above understanding, it appears at this time that the Non-Federal Sponsors can implement the selected water conservation plan on their own. If this is not so, and the Corps of Engineers must Participate in the implementation, a report to Congress or Headquarters, U.S. Army Corps of Engineers would be required to request approval to add water conservation to the Federal Project as project purpose. Cost sharing for water conservation would be based on Section 311 of the Water Resources Development Act of 1996 as previously described.

Chapter 7. Public and Agency Coordination

Public workshops, scoping meetings, and coordination with Federal, State, and local agencies have been accomplished to aid in the formulation and evaluation of the proposed recommended Plan. A Fish and Wildlife Coordination Act Report has been received and is included in the EIS/EIR.

In accordance with NEPA guidelines, a Notice of Intent (NOI) to prepare the EIS was published in the Federal Register on March 27, 1995. Additionally, in accordance with CEQA Guidelines, a Notice of Preparation was distributed on September 15, 1995 to various Federal, State, regional, and local government agencies and interested parties. In each of these notices, the proposed project was described in general, and agencies and interested parties were requested to review and comment on the proposed action.

A public workshop and scoping meeting for the EIS/EIR was held on September 14, 1995 in the City of Redlands, San Bernardino County, California. At this meeting, Corps of Engineers and San Bernardino County representatives provided information to agencies and the public on the purpose of the project and solicited input on the needs and desires for water conservation improvements, and the nature of environmental issues to be addressed in the Study and EIS/EIR. Input provided by the attendees covered such topics as recreation opportunities desires to be part of the project, and the need to prioritize flood control and water conservation over recreation. USACE representatives explained that the study purpose is focusing on water conservation and that there are no plans presently for recreation use at the dam for reasons of dam safety and operations. It was also noted that the dam is located on U.S. Forest Service property, and should any recreation activities be determined possible, they will be managed by that agency. Based on the scoping process, it was determined that the primary area of concern was the impacts of water conservation on biological resources. Southern California Edison representatives also stated concern on the impact of water conservation on access to their upstream power plant. Copies of the notices and additional information on the scoping process results are presented in the EIS/EIR.

Public and agency review of the Draft Feasibility Report and Draft EIS/EIR was conducted in April and May, 1997. A public meeting was conducted on April 30, 1997 at the San Bernardino Valley Municipal Water District Office in San Bernardino. Many of the letters and comments received from the public review period were from area water districts. The comments indicated general support for including water conservation at Seven Oaks Dam, with some questions on the estimated conservation yields and their interest in assuring that historic diversions and water rights will be maintained.

The U.S. Environmental Protection Agency in their letter stated the EIS was rated an EC-2, indicating environmental concerns and that additional information must be included in the final EIS to address their concerns. Their concerns related to their interest in plans involving "end of pipe" conservation measures being considered in the formulation and evaluation of alternatives; that such measures should be in placed to reduce future demands; the downstream impacts should be better evaluated; Fish and Wildlife Service concerns, including potential impacts to sensitive and endangered species that should be addressed and that the least environmentally damaging practicable alternatives should be presented in the 404(b)(1) evaluation.

The final report and EIS presents additional information to clarify the "end of pipe" conservation measures are considered in the IWR-Main Model used to estimate demand estimates, these are included in without-project demands, and that it is understood that local agencies require these measures to be implemented as part of new development, remodeling, and other redevelopment. Additional information in presented in the Hydrology Appendix and Main Report to show that there would be no significant changes in downstream discharges from water conservation operations as compared to flood control operations.

In regard to impacts on sensitive and endangered species, many of the concerns raised by the U.S. Fish and Wildlife Service relate to flood control operations, and are being addressed by the USACE and USFWS. The water conservation plan would not result in any change in potential impacts to these resources as compared to flood control. The 404(b)(1) analysis further clarifies that none of the alternative plans would in any long-term significant impacts, and that Plan 4 is the least environmentally damaging based on lesser short-term construction impacts. It is noted that the relocation of the reservoir road, if necessary, will require a supplemental NEPA document based on the final alignment which will consider avoiding significant impacts and other mitigation.

In regard to impacts on biological resources, the USFWS completed a Draft Coordination Act Report (CAR) which indicates their evaluation of potential impacts and recommendations on further studies needed and mitigation. The Draft CAR indicates concerns on impacts of the Seven Oaks Dam on area biological resources. The USACE views many of the concerns raised by the USFWS are related to the Seven Oaks Dam as part of the Santa Ana River Mainstem Flood Control Project. These concerns were addressed in the 1988 Supplemental EIS/EIR on that project.

The USACE position on the concerns and recommendations contained in the USFWS Draft CAR is that they related primarily to, and will be resolved as part of, the flood control project. The water conservation plan will not result in any increase in the concerns raised on the flood control project.

Comments were received during the public review period from the Orange County Public Facilities and Resources Department, the City of Redlands, the California EPA, the California Water Resources Board, and the Southern California Association of Governments. In general, these comments required clarification of certain items in the Feasibility Report. The Tri-County Conservation League expressed concerns with the environmental impacts, and the adequacy of the analysis. Copies of the letters, and responses to them are included in the EIS/EIR.

Chapter 8. Conclusions

The Seven Oaks Dam Water Conservation Feasibility Study focused on modifying the Seven Oaks Dam and Reservoir Flood Control Project for the purpose of providing seasonal water conservation.

The Seven Oaks Dam Flood Control Project is presently under construction as part of the Santa Ana River Mainstem Flood Control (SARP) Project, authorized by the Water Resources Development Act of 1986. The current design and operation of the Seven Oaks Dam and Reservoir is directed only at the authorized purpose of providing flood control to the Santa Ana River Basin.

Under without-project conditions, local water supply sources would not meet municipal demand beginning in the Year 2000, and would have to turn to more costly alternative water supply sources. These sources include the State Water Project water, importation, and reclamation. By the Year 2017, even these sources would not meet the projected municipal and industrial demands.

The Feasibility Study examined alternative plans involving a range of impoundments and frequencies for different seasonal water conservation pool elevations. These impoundment conditions were compared to impoundment durations and frequencies for the existing condition to determine seasonal storage available for water conservation. This storage would be available for release to supplement downstream groundwater sources and increase water available to local water district suppliers.

An economic evaluation was performed, based on:

1. the projected yield of water that is seasonally available for the Seven Oaks Dam alternatives;

2. the estimated cost of alternative water supply sources that would be implemented to provide the same yield supplied by the Seven Oaks Dam alternatives;

3. the estimated First Cost and the Operation, Maintenance, Replacement, and Rehabilitation (OMRR) Costs of modifications required to implement each of the alternative water conservation plans considered for the Seven Oaks Dam Facility, and

4. the estimated average annual net savings based on comparing alternative plans for water conservation at Seven Oaks Dam with alternative supply costs.

The economic analysis identified that a National Economic Development (NED) Plan exists for water conservation at Seven Oaks Dam. The NED Plan, Alternative 4, with a seasonal pool at elevation 2,265 feet NGVD, optimizes economic outputs. The NED Plan has a benefit-cost ratio of 2.46, with average annual net benefits of $296,000.

In addition, a Locally-Preferred Plan has been identified. Alternative 1, with a seasonal pool at elevation 2,300 feet NGVD, has been identified by San Bernardino Flood Control District, on behalf of the local water districts, as the preferred plan. The Locally-Preferred Plan has a benefit-cost ratio of 1.29 with net benefits of $193,000.

An Environmental Impact Statement/Environmental Impact Report has been prepared which documents the analysis of impacts that could result for each of the alternative plans considered for modifying the Seven Oaks Dam for seasonal water conservation. The analysis indicates that no significant adverse impacts are expected from implementation of any of the alternative plans.

The Locally-Preferred Plan is chosen as the Selected Plan for implementation because (1) an NED plan for water conservation exists, (2) the SARP Non-Federal Sponsors would be responsible for 100% funding for all features related to water supply, regardless of which plan is selected, and (3) the plan will not result in any significant adverse environmental impacts.

Upon completion of construction of the Seven Oaks Dam, the SARP Non-Federal Sponsors will be responsible for operation and maintenance of the Seven Oaks Dam and Reservoir Flood Control Project in accordance with the project authorization and the Local Cooperation Agreement executed for the Santa Ana River Mainstem Flood Control Project. Any request for implementing the Selected Plan for seasonal water conservation must be through the SARP Non-Federal Sponsors, and is subject to final approval by the Federal Government in accordance with Article VIII of the Local Cooperation Agreement for the Flood Control Project. Approval of the project is subject to certain conditions being met by the Non-Federal Sponsors, including responsibility for 100% of the separable first cost and OMRR cost associated with implementation of the Selected Water Conservation Plan. The separable first cost is presently estimated to be $8,110,000, and the average annual OMRR cost, $42,000.

Based on these conclusions, it appears at this time that the Non-Federal Sponsors can implement the selected water conservation plan on their own. If this is not so, and the Corps of Engineers must Participate in the implementation, a report to Congress or Headquarters, U.S. Army Corps of Engineers would be required to request approval to add water conservation to the Federal Project as project purpose. Cost sharing for water conservation would be based on Section 311 of the Water Resources Development Act of 1996 as previously described.

Chapter 9. District Engineer's Recommendation

The findings and conclusions of the Seven Oaks Dam Water Conservation Study indicate that the Locally-Preferred Plan will result in significant net water conservation benefits without adversely impacting the flood control purpose of the Seven Oaks Dam, and that the plan will not result in any significant adverse impacts to the environment.

I recommend that the Locally-Preferred Plan, to modify and operate Seven Oaks Dam for seasonal water conservation at a pool elevation of 2,300 feet NGVD -- as described in Chapter 5, be approved for implementation by the the Non-Federal Sponsors of the Santa Ana River Mainstem Flood Control Project (SARP). Approval will be subject to a request from the SARP Non-Federal Sponsors to implement the water conservation plan when the flood control project is turned over to them for Operation, Maintenance, Replacement, and Rehabilitation (OMRR). Approval will also be subject to the execution of a Memorandum of Agreement between the Assistant Secretary of the Army for Civil Works and the SARP Non-Federal Sponsors, in accordance with Section VIII of the Local Cooperation Agreement for the Santa Ana River Mainstem Flood Control Project, dated December 13, 1989.

I further recommend that all separable costs for implementation of the Selected Plan be a 100% non-Federal responsibility in accordance with Section 311 of the Water Resources Development Act of 1996. These recommendations are contingent upon the SARP Non-Federal Sponsors complying with all requirements necessary to implement the plan, including:

1. Hold and Save harmless the United States from any claims for damages caused by construction and OMRR of the project;

2. Provide all costs and arrangements for obtaining any additional easement or special use permit needed for seasonal water conservation from the U.S. Forest Service;

3. Provide 100% of all separable first cost for design, plans and specifications, and construction of modifications required for implementing the selected plan, presently estimated to be $8,110,000.

4. Provide 100% of all separable costs for OMRR required for the selected plan, presently estimated to be $42,000, on an average annual basis;

5. Complete final design of the project, including any necessary mitigation, for impacts to access to Southern California Edison facilities;

6. Revise the water control manual and other OMRR guidelines and directions to incorporate seasonal water conservation facilities and operations, and any associated requirements from the U.S. Forest Service, or other regulatory provisions;

7. Complete any necessary additional analysis required to demonstrate that the requested modifications will not impact on the flood control purpose of Seven Oaks Dam and Reservoir;

8. Complete any necessary Supplemental NEPA/CEQA documents, required to address impacts associated with changes resulting from the final design or construction plans for the Selected Plan, or changed conditions;

9. Obtain a Section 404 permit, if needed, and all other regulatory or State Division of Dam Safety requirements for project implementation;

10. Complete Plans and Specifications for construction and future OMRR associated with implementing the selected plan;

11. Provide funds required by the Corps of Engineers for the review and approval of requested modifications, and any required USACE inspection of modifications during and after construction is completed; and

12. Arrange for water rights.

The Selected Plan is recommended with such further modifications thereto, as in the discretion of the Chief of Engineers, may be advisable.

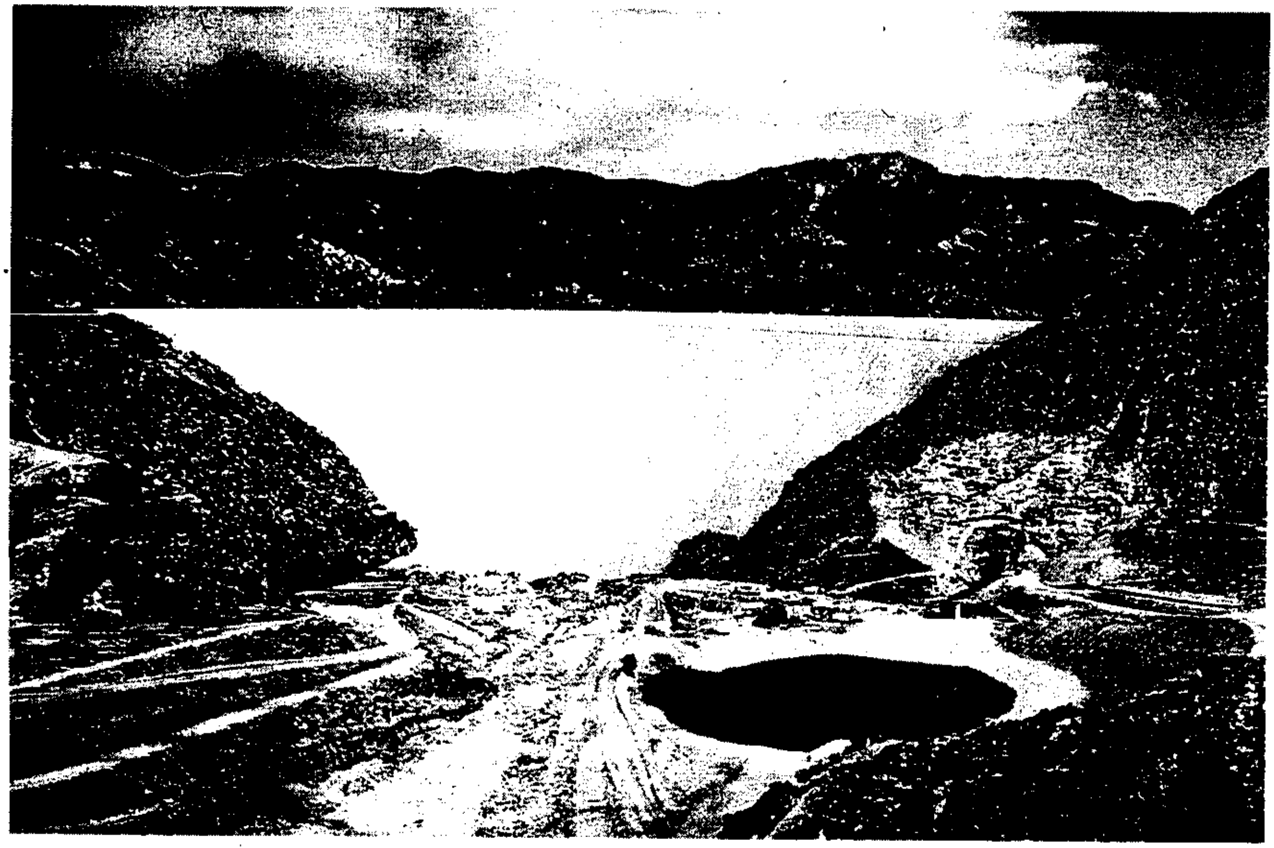
The recommendations contained herein reflect information available at this time and current Department of the Army policies governing formulation of individual projects. They do not reflect the program and budgeting priorities in the formulation of a National Civil Works construction program, or the perspective of higher review levels within the Executive Branch.

Robert L. Davis
Colonel, Corps of Engineers
District Engineer

US Army Corps
of Engineers®
Los Angeles District

Feasibility Report

Seven Oaks Dam Water Conservation
Santa Ana River Basin, California



Environmental Impact Statement/
Environmental Impact Report
State Clearinghouse No. 95091036

June 1997

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FORWARD

The Seven Oaks Dam Water Conservation Study Environmental Impact Statement/ Environmental Impact Report (EIS/EIR) addresses the potential environmental impacts associated with allowing the Seven Oaks Dam to provide for water conservation. The objective of the project is to use the dam for seasonal water conservation. The proposed plan would allow for increasing the water pool elevation behind Seven Oaks Dam from 2,200 feet NAVD to 2,300 feet NAVD from March to May and an increase in releases from about 20 cfs to 70 cfs from June to September. The seasonal storage is expected to increase water supply yields by 4,120 acre-feet per year (ac-ft/yr) in the year 2000 and by 2,140 ac-ft/yr in the year 2050 for diversion and groundwater recharge. Modifications to the Seven Oaks Dam facility would include strengthening of the intake structure and possible relocation of an access road to upstream facilities (i.e., Edison Power Plant 1).

The main purpose of the already approved and under construction Seven Oaks Dam is to assist in providing flood protection for communities downstream of the dam as a component of the ongoing Santa Ana River Mainstem Project (SARP). The proposed Seven Oaks Dam water conservation project cannot proceed until the Seven Oaks Dam is completed, which is anticipated to occur in the year 2000. Therefore, the environmental analysis of the Seven Oaks Dam water conservation project contained in this EIS/EIR assumes the completion of the dam.

All mitigation measures required as part of the construction of the Seven Oaks Dam are included in the *1988 Phase II General Design Memorandum on the Santa Ana River Mainstem Including Santiago Creek, California, Main Report and Supplemental Environmental Impact Statement*. The need for any additional mitigation associated with the implementation of the Seven Oaks Dam Flood Control Dam is the responsibility of the U.S. Army Corps of Engineers (USACE) as part of the Santa Ana River Mainstem Project. This Seven Oaks Water Conservation Study EIS/EIR addresses and mitigates for new impacts that would occur at the Seven Oaks Dam associated with physical and operational changes at the facility to allow for water conservation.

SECTION S
SUMMARY

S.1 INTRODUCTION

This EIS/EIR has been prepared for several alternatives that would provide water conservation in addition to the flood protection currently provided by Seven Oaks Dam, by using the dam for seasonal water conservation. The proposed plan would allow for increasing the water pool elevation behind Seven Oaks Dam from 2,200 feet NAVD to 2,300 feet NAVD from March to May and an increase in releases from about 20 cfs to 70 cfs from June to September. The seasonal storage is expected to increase water supply yields by 4,120 ac-ft/yr in the year 2000 and by 2,140 ac-ft/yr in the year 2050 for diversion and groundwater recharge. Modifications to the Seven Oaks Dam facility would include strengthening of the intake structure and possible relocation of an access road to upstream facilities (i.e., Edison Power Plant 1). The project site is located in the steep-walled upper Santa Ana River Canyon, approximately 1 mile upstream from the mouth of the canyon at the confluence of the Santa Ana River and Government Canyon. The dam is approximately 8 miles northeast of the City of Redlands in San Bernardino, California, and is entirely within the boundaries of the San Bernardino National Forest.

S.2 SUMMARY OF ALTERNATIVES

Four water conservation alternatives are considered in addition to the No Action (No Project) Alternative in this EIS/EIR. The No Action Alternative assumes no additional impound capacity at the Seven Oaks Dam for water conservation purposes; the dam would continue to only provide for flood control. Under Alternative 1–Impound Plan 1: 2,300 Feet, beginning March 1, the seasonal conservation pool would be expanded linearly for 10 days to a target conservation storage elevation of 2,300 feet (16,293 acre-feet for present conditions and 7,194 acre-feet for future conditions) on March 10. Demolition and modifications to a portion of the Seven Oaks Dam intake structure and the addition of anchors would be required to operate and maintain the dam and appurtenances under this alternative. Under Alternative 2–Impound Plan 2: 2,375 Feet, the seasonal conservation pool would be expanded linearly at the beginning of March over 10 days to reach a target conservation storage elevation of 2,375 feet (35,000 acre-feet for present conditions and 22,050 acre-feet for future conditions) on March 10. Modifications to the intake structure, bulkhead and guides, and the construction of a new bridge and access road would be required to allow the continued operation and maintenance of the Seven Oaks Dam under this alternative. The seasonal conservation pool under Alternative 3–Impound Plan 3: 2,418 Feet, would also be linearly expanded at the beginning of March for 10 days to a target conservation storage elevation of 2,418 feet (50,000 acre-feet for present conditions and 35,600 acre-feet for future conditions) on March 10. Implementation of this alternative would require modifications to the intake structure and bulkhead and guides, and the construction of a bulkhead gate, new bridge, and access road. For Alternative 4–Impound Plan 4: 2,265 Feet, the seasonal conservation pool would also be linearly expanded at the beginning of March for 10 days to reach a target conservation storage elevation of 2,265 feet (10,270 acre-feet for present conditions and 3,370 acre-feet for future conditions). Under this alternative, no structural modifications to the outlet works would be required to operate and maintain the dam and appurtenances. Under each of these alternatives, from April through May, downstream releases will be reduced to 3 cfs until the target pool elevation is reached, after which releases will equal inflow up to a maximum of 500 cfs during a flood event. From June through September, all inflow plus a conservation release would be made to ensure the conservation pool is drained by September 30 (before the "winter months" commence).

S.3 SUMMARY OF SIGNIFICANT CONCLUSIONS OF THE ALTERNATIVES

The scope of this EIS/EIR covers the issues of water resources (hydrology and water quality), biological resources, land use and recreation, transportation, air quality, noise, cultural resources, and public health and safety. Significant (adverse and beneficial) conclusions of each of the alternatives, after the implementation of mitigation, are identified below.

NO-ACTION (NO PROJECT) ALTERNATIVE

Water Resources: No effect.

Biological Resources: No effect.

Land Use and Recreation: No effect.

Transportation: No effect.

Air Quality: No effect.

Noise: No effect.

Cultural Resources: No effect.

Public Health and Safety: No effect.

ALTERNATIVE 1-IMPOUND PLAN 1: 2,300 FEET

Water Resources: Increased short-term erosion and sedimentation caused by construction activities; accumulation of sediment or debris within Seven Oaks Dam; increased short-term turbidity caused by grading activities; potential release of toxic materials from construction equipment; decrease in suspended solids downstream; and increased groundwater recharge and increase in possible development of occasional anaerobic conditions. Impacts can be mitigated to a level considered less than significant.

Biological Resources: No effect.

Land Use and Recreation: No effect.

Transportation: No adverse effect from the relocation of onsite access roads and the increase of additional construction-related vehicular trips along 5th Street and Greenspot Road.

Air Quality: Short-term increases in exhaust and fugitive dust emissions from construction equipment and vehicles would be significant and long-term air emissions would be less than significant.

Noise: No adverse effect.

Cultural Resources: No effect.

Public Health and Safety: No effect.

ALTERNATIVE 2–IMPOUND PLAN 2: 2,375 FEET

Because the impound elevation of Alternative 2 is substantially similar to Alternative 1, implementation of Alternative 2 would result in essentially the same impacts as those identified in Alternative 1. However, it should be noted that the level of impact, whether adverse or beneficial, may be minimally greater (e.g., total daily construction emissions because of larger disturbed area, etc.) based upon the increased impound elevation.

ALTERNATIVE 3–IMPOUND PLAN 3: 2,418 FEET

Because the impound elevation of Alternative 3 is substantially similar to Alternative 1, implementation of Alternative 3 would result in essentially the same impacts as those identified in Alternative 1. However, it should be noted that the level of impact, whether adverse or beneficial, may be minimally greater (e.g., total daily construction emissions because of larger disturbed area, etc.) based upon the increased impound elevation.

ALTERNATIVE 4–IMPOUND PLAN 4: 2,265 FEET

Because the impound elevation of Alternative 4 is less than Alternative 1, implementation of Alternative 1 would result in essentially the same impacts as those identified for Alternative 1. However, it should be noted that the level of impact, whether adverse or beneficial, may be minimally less than those identified for Alternative 1 because the elevation of the impound area is lower. However, the mitigation requirements for Alternative 4 would be the same as for Alternative 1.

S.4 AREAS OF CONTROVERSY

The primary area of controversy associated with the proposed project centers on perceived effects to biological resources in the project area and whether such effects are attributable to Mainstem activities or the proposed water conservation project. The U.S. Fish and Wildlife Service (USFWS) believes that the environmental conditions and habitat in the vicinity of the Seven Oaks Dam have changed significantly since the preparation of the 1988 Final Supplemental Environmental Impact Statement (FSEIS) for the Santa Ana River Mainstem Project (SARP), and as a result of these changes they believe the evaluation of environmental impacts in the 1988 FSEIS is incomplete. The USACE believes that the water conservation project alternatives would not result in any significant additional biological resource impacts beyond those already analyzed and mitigated for as part of the Mainstem project and Seven Oaks Dam construction and flood control operation.

Discussions with the USFWS are ongoing relative to post-1988 environmental conditions in the project area. Where warranted, the USACE has prepared and will continue to prepare additional NEPA environmental documentation to supplement the 1988 FSEIS. R

SECTION 1
INTRODUCTION

1.1 INTRODUCTION

This EIS/EIR has been prepared to satisfy the requirements of the National Environmental Policy Act (NEPA) of 1969, as amended, per the President's Council on Environmental Quality (CEQ) NEPA Regulations and the Department of Army Guidelines. In addition, this EIS/EIR has been prepared in conformance with the CEQA (California Public Resources Code Section 21000 et seq.), California CEQA Guidelines (California Code of Regulations, Title 14, Section 15000 et seq.), and the rules, regulations, and procedures for the implementation of CEQA, as adopted by San Bernardino County.

The NEPA lead agency for this project is the U. S. Army Corps of Engineers, with the U. S. Forest Service a cooperating agency. The CEQA lead agency (and non-Federal sponsor) is the San Bernardino County Flood Control District.

The USACE is the federal agency with jurisdiction over the proposed seasonal water conservation practices at the Seven Oaks Dam site. The County of San Bernardino Flood Control District is the local sponsor with jurisdiction over the proposed project alternatives. However, the San Bernardino County Flood Control District, Riverside County Flood Control District, and the Orange County Flood Control District all share ownership and operational control responsibilities of the dam.

This EIS/EIR is further intended to serve as the primary environmental baseline document for all actions associated with the water conservation project, including all discretionary approvals requested or required to implement water comnservation at Seven Oaks Dam.

1.2 PURPOSE AND NEED OF PROJECT

It is the USACE's policy to balance the use of reservoir resources by conserving as much water as possible consistent with other constraints. The USACE regulation entitled *Water Control Management* states in its policy section (33 CFR 222.7, 6d) development and execution of water control plans will include appropriate consideration for efficient water management in accordance with the emphasis on water conservation as a national priority. The objectives of efficient water control management are to produce beneficial water savings and improvements in the availability and quality of water resulting from project regulation/operation. Balanced resource use through improved regulation should be developed to conserve as much water as possible and maximize all project functions consistent with project/system management.

All water from the Santa Ana River is fully appropriated throughout the year. The river is listed in the *Declaration of Fully Appropriated Stream Systems* as having no further water available to serve new water rights requests. Water flowing into the dam is used by multiple water agencies for agricultural and domestic use. Normal-year water supplies for Southern California will begin to be inadequate to meet anticipated demands during the decade of year 2010 to 2020. Additional water supplies will be needed to meet demands during peak summer water use periods. Therefore, the purpose of the Seven Oaks Dam Water Conservation Feasibility Study project is to use the dam for seasonal water conservation. The proposed plan would allow for increasing the water pool elevation behind Seven Oaks Dam from 2,200 feet NAVD to 2,300 feet NAVD from March to May and an increase in releases from about 20 cfs to 70 cfs from June to September. The seasonal storage is expected to increase water supply yields by 4,120 ac-ft/yr in the year 2000 and by 2,140 ac-ft/yr in the year 2050 for diversion and groundwater recharge. Modifications to the Seven Oaks Dam facility would include strengthening of the intake structure and possible relocation of an access road to upstream facilities (i.e., Edison Power Plant 1).

1.3 PURPOSE OF THE EIS/EIR

This draft EIS/EIR for the proposed Seven Oaks Dam Water Conservation Feasibility Study EIS/EIR (State Clearinghouse No. 95091036) has been prepared to evaluate the potential environmental impacts associated with the implementation of the proposed project alternatives. It is intended to serve as an informational document for the decision makers and the public regarding the objectives and components of the project alternatives and any potentially significant environmental impacts that may be associated with the planning, construction, and operation of the project alternatives, as well as to identify appropriate feasible mitigation measures that may be adopted to reduce or eliminate these impacts.

Under NEPA, the USACE is the lead agency for this project, as defined in Section 1501.5 of the CEQ's NEPA Regulations. Under CEQA, the County of San Bernardino Flood Control District is the lead agency for this project, as defined in Section 21067 of the California Public Resources Code. The lead agency supervises the preparation of the environmental documentation for a proposed action and has the principal responsibility for carrying out or approving a project which may have a significant effect upon the environment. In this case, the USACE and the County Flood Control District have prepared this EIS/EIR as part of the Seven Oaks Dam Water Conservation Feasibility Study in San Bernardino County., California.

Other agencies (i.e., cooperating, responsible, and trustee agencies) that may use this EIS/EIR in the decision making or permit process will consider the information in this EIS/EIR along with other information that may be presented during the NEPA/CEQA process. These agencies and their anticipated responsibilities are addressed in Section 2 of this EIS/EIR.

1.4 PROJECT ALTERNATIVES DESCRIPTIONS

This EIS/EIR assesses the potential project-specific and cumulative impacts associated with implementing the following five alternatives.

1.4.1 NO ACTION (NO PROJECT) ALTERNATIVE

The No Action (No Project) Alternative assumes no additional impound capacity (for water conservation purposes) at the Seven Oaks Dam. Under this alternative, Seven Oaks Dam would continue to operate principally for flood control purposes as described in the *Phase II GDM (General Design Memorandum) for the Santa Ana River Mainstem Project*.

1.4.2 ALTERNATIVE 1-IMPOUND PLAN 1: 2,300 FEET

This alternative would impound water behind the dam up to elevation 2,300 NGVD (national geodetic vertical datum), in the 100-year debris pool. The water surface acreage associated with the additional impound area is approximately 182 acres. At the beginning of March, the seasonal conservation pool would be expanded linearly for 10 days to a target conservation storage elevation of 2,300 feet (16,293 acre feet for present conditions [year 2000] and 7,194 acre-feet for future conditions [year 2050]) on March 10). From March 10 through May, all inflow would be released from the dam after the target elevation is reached. From June through September, all inflow plus a conservation release would be made to ensure the conservation pool is drained by the end of September. Demolition and modifications to a portion of the Seven Oaks Dam intake structure and the addition of anchors would be required to operate and maintain the dam and appurtenances under this alternative.

1.4.3 ALTERNATIVE 2–IMPOUND PLAN 2: 2,375 FEET

This alternative would impound water behind the dam up to elevation 2,375 NGVD 35,000 acre-feet for present conditions and 22,050 acre-feet for future conditions in the 100-year debris pool. The water surface acreage associated with the additional impound area is approximately 424 acres. Modifications to the intake structure, bulkhead and guides, and the construction of a new bridge and access road would be required to allow the continued operation and maintenance of the Seven Oaks Dam under this alternative.

1.4.4 ALTERNATIVE 3–IMPOUND PLAN 3: 2,418 FEET

This alternative would impound water up to elevation 2,418 NGVD (50,000 acre-feet for present conditions and 35,600 acre-feet for future conditions). The water surface acreage associated with the additional impound area is approximately 570 acres. Implementation of this alternative would require modifications to the intake structure and bulkhead and guides, and the construction of a bulkhead gate, new bridge, and access road.

1.4.5 ALTERNATIVE 4–IMPOUND PLAN 4: 2,265 FEET

This alternative would impound water up to elevation 2,265 NGVD (10,270 acre-feet for present conditions and 3,370 acre-feet for future conditions). The water surface acreage associated with the additional impound area is 175 acres. Under this alternative, no structural modifications to the outlet works would be required to operate and maintain the dam and appurtenances.

1.5 BACKGROUND

The USACE conducted a reconnaissance study (*Seven Oaks and Prado Dams Water Conservation Study Final Reconnaissance Report*, October 1992) of the water conservation plan along the Santa Ana River at the Seven Oaks Dam and Prado Dam, pursuant to House of Representatives Report 101-96, June 20, 1986. The reconnaissance study was undertaken to determine the feasibility of expanding the authorized purposes of the Prado and Seven Oaks dams to provide water conservation as well as flood protection.

The study recommended a feasibility phase study be conducted. This EIS/EIR only addresses Seven Oaks Dam. The purpose of the feasibility study is to further investigate the potential for water conservation at Seven Oaks Dam assuming the completion of the Santa Ana River Mainstem Project. Preparation of this EIS/EIR is a part of the feasibility study; the study will also include detailed engineering and economic studies. Both the reconnaissance study and feasibility study assume the completion of the Seven Oaks Dam.

This EIS/EIR is intended to serve as the baseline environmental document to determine the feasibility of implementing water conservation at Seven Oaks Dam. The actual implementation of water conservation at Seven Oaks Dam would not occur until sometime after construction of the dam was complete and the facility had been turned over to the San Bernardino Flood Control District for operation. The steps leading to implementation of water conservation would include a specific and formal request from a willing sponsor together with permit approvals. This EIS/EIR will be reviewed to determine if the impacts associated with issuance of the permits are adequately addressed.

In accordance with the Local Cooperation Agreement for the Santa Ana River Mainstem Project, the local sponsors are required to take over OMRR of the Seven Oaks Dam facility when the Corps considers the feature has been completed. Arrangements are currently being made for the Corps to provide OMRR for the first three years of project operations. At the conclusion of this three-year period, the dam will be turned over to the SARP Sponsors, with the San Benardino County Flood Control District expected to operate the dam on behalf of the SARP Sponsors.

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Several previous studies have been prepared for the Seven Oaks Dam project and the proposed water conservation at the Seven Oaks Dam. These reports include the following, which are incorporated by reference into this EIS/EIR.

- *Seven Oaks and Prado Dam Water Conservation Study F3 Conference Responses to South Pacific Division.* U.S. Army Corps of Engineers. No date.
- *Upper Santa Ana River Flood Storage Alternatives Study: Main Report and Supplemental Environmental Impact Statement.* U.S. Army Corps of Engineers. 1985 (Dec).
- *Phase II General Design Memorandum on the Santa Ana River Mainstem Including Santiago Creek, California: Main Report and Supplemental Environmental Impact Statement.* U.S. Army Corps of Engineers. 1988 (Aug).
- *Seven Oaks and Prado Dams Water Conservation Study Final Reconnaissance Report.* U.S. Army Corps of Engineers. 1992 (Oct).
- *Seven Oaks and Prado Dams Water Conservation Study Assessment of Without-Project Conditions, Identification of Problems and Opportunities, and Plan Formulation.* U.S. Army Corps of Engineers. 1995 (Jan).
- *Appendix Real Estate Supplement Seven Oaks Dam Water Conservation Study San Bernardino County, California.* U.S. Army Corps of Engineers. 1995 (Jun).
- *Hydrologic Feasibility Report for Seven Oaks Dam Water Conservation Study.* U.S. Army Corps of Engineers. 1996 (Aug).

1.6 SCOPE OF THE EIS/EIR

1.6.1 PUBLIC INVOLVEMENT

The scoping process is a key component to the EIS/EIR process (40 CFR 1501.7 and CEQA Guidelines Section 15083, respectively). NEPA Guidelines require an early scoping process to determine the scope of issues to be addressed and the significant issues related to a proposed action. During the preparation of an EIS, federal agencies must make diligent efforts to involve the public, provide notice of public meetings, hold or sponsor public meetings or hearings, solicit information from the public, explain where interested persons can receive information, and make EISs available to the public (40 CFR 1506.6). In compliance with NEPA and the state CEQA Guidelines, the USACE and the San Bernardino County Flood Control District have taken steps to maximize opportunities to participate in the environmental process.

In accordance with NEPA Guidelines, a Notice of Intent (NOI) to prepare this EIS was published in the Federal Register on March 27, 1995. The NOI is included in this document in Appendix A. Additionally, in accordance with CEQA Guidelines, a Notice of Preparation (NOP) was distributed on September 15, 1995, to various federal, state, regional, and local government agencies and interested parties. The proposed project was described, and agencies were requested to review and comment on the NOP. The close of the NOP review and comment period was October 16, 1995. The NOP, distribution list, and comment letters received are included in this EIS/EIR in Appendix A.

In accordance with NEPA Guidelines, a public scoping meeting is required for all projects that involve preparation of an EIS. The purpose of a scoping meeting is to provide an opportunity for input from agencies and interested parties. As part of the scoping process, the lead agency is to (1) invite the participation of federal, state, and local agencies; (2) determine the scope and significant issues to be addressed in the EIS; (3) identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review; (4) allocate assignments for the preparation of the EIS and indicate any environmental assessments and other EISs which are being prepared; and (5) indicate the timing between the preparation of the EIS and the agency's planning and decision making schedule.

A public scoping meeting was held on September 14, 1995, in the City of Redlands, San Bernardino County, California. At this scoping meeting, the USACE and the county provided information to agencies and the public on the purpose and status of the project and solicited input on the nature of environmental issues to be addressed in the EIS/EIR. Notification of the public scoping meeting was mailed to public agencies, individuals, and groups that have expressed interest in issues related to the Santa Ana River Mainstem project, particularly Seven Oaks Dam. Input provided by the attendees covered such topics as recreational opportunities requested to be provided as part of the project and the need to prioritize water conservation and flood control over recreation. A public scoping report is provided in Appendix A and provides further detail as to the concerns and issues raised during the scoping process.

A public meeting was held on Wednesday, April 30, 1997 at the San Bernardino Valley Municipal Water District, 1350 South "E" Street, San Bernardino, California. At the meeting the Draft Report findings and the Draft EIS/EIR were reviewed and the public was afforded an opportunity to express their views on matters pertinent to water conservation at Seven Oaks Dam. All statements, both written and oral, have become part of the official public record, a copy of which can be found in Appendix A of this document. .

1.6.2 ORGANIZATION AND FORMAT OF THIS EIS/EIR

This EIS/EIR addresses the potential environmental effects of the proposed project alternatives. The scope of the EIS/EIR includes issues identified by the USACE, the San Bernardino County Flood Control District, and issues raised in response to the NEPA NOI and CEQA NOP, as well as environmental issues raised by agencies and the general public in response to the NOI and NOP and at the public scoping meeting.

This EIS/EIR provides a detailed description of the alternatives, including the mandated No Action (No Project) Alternative. These descriptions are provided in Section 2 of this EIS/EIR. A description of the affected environment, which describes the existing conditions of all areas encompassed by an alternative (study area), is provided in Section 3. A detailed impact analysis for each alternative is provided in Section 4, Environmental Consequences, as well as mitigation measures to reduce the adversity of the impacts identified for each alternative. Section 5 identifies the expected long-term implications of the proposed project. Section 6 lists those agencies and individuals to whom a copy of the draft EIS/EIR was provided, and Section 7 lists those individuals and organizations who participated in the preparation of the EIS/EIR. Sections 8 and 9 are the references used in the preparation of the EIS/EIR and index to the EIS/EIR, respectively.

Environmental impacts are not always mitigable to a level that is considered less than significant. In those cases, impacts are considered significant unavoidable adverse impacts. In accordance with Section 15093(b) of the state CEQA Guidelines, if a public agency approves a project that has significant impacts that are not substantially mitigated (i.e., significant unavoidable impacts), the agency shall state in writing the specific reasons for approving the project, based on the final EIR and any other information in the public record for the project. This is termed, per Section 15093 of the state CEQA Guidelines, a "statement of overriding considerations."

1.6.3 EFFECTS NOT FOUND TO BE SIGNIFICANT

Through the NOI, NOP, and the scoping process, the USACE and the county determined that there was no evidence that the project would cause significant effects in the following areas and determined that no further environmental review of these issues was necessary.

- Population and Housing
- Geology
- Energy and Mineral Resources
- Public Services
- Utilities and Service Systems
- Aesthetics

1.6.4 AREAS OF CONTROVERSY

This EIS/EIR addresses the areas of environmental controversy which are known to the USACE and the county or were raised by other agencies and the public during the scoping process. The following summarizes the primary area of controversy raised related to significant environmental effects associated with the proposed project alternatives and identifies where this issue is addressed in this EIS/EIR.

- Effects on biological resources (see Section 4.3)

1.6.5 ISSUES TO BE RESOLVED

The issues to be resolved by the USACE and the county include the choice among alternatives, and whether and how to mitigate the environmental effects of the project.

1.6.6 REVIEW OF THE DRAFT EIS/EIR

A Notice of Availability (NOA) was prepared for the draft EIS/EIR and was published by the Army in the Federal Register on April 9, 1997 to inform the public that the draft EIS/EIR was available for review. The draft EIS/EIR was filed with the EPA Office of Federal Activities (OFA) the week of

March 31, 1997, and published by the EPA in the Federal Register on April 11, 1997 in their Notice of Availability of Weekly Receipts of EIS's (NWR). The NWR is published each Friday and lists the EIS's that were filed the previous week. The NWR officially begins the public review period. The public review period for the EIS/EIR ended on May 29, 1997.

As part of the EIS/EIR process, this draft EIS/EIR is subject to public review pursuant to Section 1503 of the CEQ's NEPA Regulations and to Section 15087 of the CEQA Guidelines. During the 45-day review period, comments on the draft EIS/EIR should be forwarded to the following address:

U.S. Army Corps of Engineers
Los Angeles District
P.O. Box 532711
Los Angeles, California 90053-2325
Attn: William Butler, Room 14005
Comments can also be faxed to (213) 452-4204

Upon completion of the public review period, comments received on the draft EIS/EIR will be incorporated into the final EIS/EIR. All parties commenting on the EIS/EIR will receive responses that either modify alternatives including the proposed action; develop and evaluate alternatives not previously given serious consideration; supplement, improve, or modify the analysis in the EIS/EIR; make factual corrections; or explain why comments do not warrant further response. The Corps responses to comments received from the public review of the draft Feasibility Report and draft EIS/EIR are included in Appendix F.

In accordance with CEQA requirements, the Corps responses to comments received during the public review period will be available for review at least 10 days prior to consideration of certification of the final EIS/EIR. After the preparation and review of the final EIS/EIR, the USACE will prepare a Record of Decision (ROD) regarding which of the alternatives was chosen and why. Should the project be approved, the county is required to issue a Notice of Determination (NOD).

1.6.7 MITIGATION MONITORING

CEQA requires public agencies to adopt a monitoring or reporting program for the purpose of ensuring compliance with those mitigation measures adopted or made a condition of project approval in order to mitigate or avoid significant environmental effects identified in an EIR. A mitigation monitoring program in accordance with the requirements of AB 3180 will be adopted at the time of certification of the EIS/EIR.

1.7 RELATIONSHIP TO ENVIRONMENTAL PROTECTION STATUTES AND OTHER REQUIREMENTS

Consideration of federal, state, and local environmental laws, executive orders, and other policies in theplanning process is noted as follows:

1.7.1 FEDERAL

National Environmental Policy Act (NEPA) of 1969, as Amended

This project has been prepared in accordance with the requirements as set forth in Section 102 of the NEPA, the CEQ *Regulations for Implementing the Procedural Provisions of NEPA* (40 CFR 1500 et seq.), and the Corps of Engineers, Department of the Army Environmental Quality, *Procedures for Implementing the National Environmental Policy Act (NEPA)* (33 CFR Parts 230 and 325). Reasonable alternatives have been considered during the planning process. Potential environmental effects have been included in the evaluation of the proposed project actions, and all procedural review requirements of the aforementioned rules and regulations will have been met as part of the EIS process.

Clean Air Act (CAA)

Air quality in the South Coast Air Basin (basin) is regulated by federal, state, and regional control authorities. The U.S. Environmental Protection Agency (EPA) is involved in local air quality planning through the Federal Clean Air Act (CAA), as amended by the Clean Air Act Amendments of 1990 (the "1990 Amendments"). The EPA is responsible for setting and enforcing the national standards for atmospheric pollutants. The EPA enforces these national standards and also regulates emission sources that are under the exclusive authority of the federal government. Potential impacts resulting from the implementation of the proposed alternatives are assessed in Section 4.7 of this EIS/EIR. Potential impacts are examined and compared to the significance thresholds identified by the South Coast Air Quality Management District (SCAQMD). The SCAQMD is the agency with jurisdiction to enforce the CAA regulations and other local air quality provisions and regulations.

Clean Water Act (CWA) of 1977

The CWA requires that no discharge of dredged or fill material due to a project shall be permitted which will cause or contribute to significant degradation of the waters of the United States. The proposed project has been developed in accordance with guidelines promulgated by the Administrator of the Environmental Protection Agency (EPA) in conjunction with the Secretary of the Army under the authority of Section 404(b)(1) of the Clean Water Act, as amended. A Section 404(b)(1) Evaluation and Compliance Determination has been prepared for the proposed water conservation project and included in Appendix E of this document. The recommended plan will be in full compliance with the CWA, Section 404(b)(1) Guidelines prior to the initiation of project construction. R

Endangered Species Act (ESA) of 1973, as Amended

This EIS/EIR has been formally coordinated with the United States Fish and Wildlife Service (USFWS) through their office in Carlsbad, California, and is considered to be in compliance with the Endangered Species Act.

As required by Section 7 of the Endangered Species Act, the USACE requested from the USFWS a list of threatened, endangered, proposed candidate, and other species in the study area. This request was made on July 26, 1995. The USFWS responded by letter on August 29, 1995. The list is provided in Appendix D of this EIS/EIR.

Farmland Protection Policy Act

The Farmland Protection Policy Act requires federal agencies to coordinate with the U.S. Soil Conservation Service (USSCS) and to consider impacts on prime and unique farmland in the project planning process. The USACE requested information from the USSCS on farmland as part of the *Phase II General Design Memorandum on the Santa Ana River Mainstem Including Santiago Creek, California, Supplemental Environmental Impact Statement* (1988). The USSCS identified that no prime or unique farmlands would be affected by development of the Seven Oaks Dam; no additional impacts would be created by the currently proposed project alternatives. Therefore, the proposed action is in compliance with the federal Farmland Protection Policy Act.

Federal Water Project Recreation Act of 1965 (Public Law 89-72)

The Federal Water Project Recreation Act states that full consideration shall be given to recreation and fish and wildlife enhancement as purposes of federal water resources projects (federal navigation, flood control, hydroelectric, or multi-purpose). This act established development of recreation potential at federal water resource projects as a full project purpose. The law requires that any project that can reasonably serve these purposes be constructed, operated, and maintained for fish and wildlife and outdoor recreation purposes. Planning with respect to the development of the recreation potential of any such project shall be based on the coordination of the recreation use of the project area with the use of the existing and planned federal, state, or local public recreation developments. The act specifies that non-federal public bodies are encouraged to assume responsibility for the management of project areas and facilities except at those projects which are appropriate for federal administration because of other federal programs. In particular, areas which are part of the National Forest system are identified as areas appropriate for federal administration and are, therefore, excluded from the cost-sharing and reimbursement provisions of the act.

The proposed water conservation project is not requiring the acquisition of additional rights/easements for recreation purposes above and beyond the acquisition of lands required for the SARP Mainstem project. Therefore, the USACE has no authority to cost-share in recreational facilities. Additionally, none of the local sponsors of the project have made commitments regarding the provision and maintenance of recreational facilities.

Fish and Wildlife Coordination Act, as Amended

The proposed action is in compliance with the requirements of the Fish and Wildlife Coordination Act. The USFWS has submitted a Planning Aid Report, dated March 1996, a draft Coordination Act Report, dated March 1997, and a final Coordination Act Report, dated June, 1997, as part of the feasibility phase of this study. The final Coordination Act Report is included in Appendix B of this report. R

Copies of the draft EIS/EIR were sent to representatives of the USFWS and the California Department of Fish and Game (CDFG) for their comment during the public review period. No letters of comment on the draft EIS/EIR were received from either agency by the close of the public review period.

Numerous meetings have been held with the USFWS and CDFG since the early stages of the planning process for this project. These agencies have played a major role in helping to evaluate the project-associated impacts as well as mitigation needs and opportunities. The USACE has, and will continue to coordinate with, the USFWS and CDFG during al subsequent phases of the proposed project.

Migratory Bird Treaty Act

The analysis of the alternatives addressed in this EIS/EIR were performed in conjunction with the USFWS and the CDFG. The alternatives should not entail the taking, killing, or possession of any migratory birds and are, therefore, in compliance with the Migratory Bird Treaty Act.

National Historic Preservation Act of 1966, as Amended

This project is in compliance with the National Historic Preservation Act (36 CFR 800). In accordance with 36 CFR 800 which implements Section 106 of the National Historic Preservation Act, a records search and an archaeological survey of the study area were performed as part of the *Phase II General Design Memorandum on the Santa Ana River Mainstem Including Santiago Creek, California Final Supplemental Environmental Impact Statement* (1988). All cultural resources–historic and prehistoric–within the Seven Oaks Dam's Area of Potential Effect (APE) were evaluated for listing on the National Register of Historic Places. The results of these investigations were coordinated with the California State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP). The Southern California Edison Company Santa Ana River System was determined to be eligible for listing on the National Register. A Memorandum of Agreement was negotiated among USACE, SHPO, and ACHP stipulating a mitigation program for the hydroelectric system. The mitigation program has been completed. The water conservation project alternatives will not adversely affect any additional historic or prehistoric resources.

Flood Control Act of 1944

Section 4 of the Flood Control Act of 1944, as amended, states that projects are "...to construct, maintain, and operate public park and recreational facilities at water resource development projects under the control of the Secretary of the Army, and to permit the construction, maintenance, and operation of such facilities." The act also provides that the water areas of projects are available for public use generally for fishing, boating, and other recreational purposes. In addition, ready access to and exit from project shore areas shall be maintained for general public use when in the public interest. However, as indicated above, no recreational facilities are proposed as part of the project alternatives.

Wild and Scenic Rivers Act (Public Law 90-542)

In accordance with the Wild and Scenic Rivers Act, certain selected rivers in the United States are to be protected and preserved in free-flowing condition because of their "outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values...." Every wild, scenic, or recreational river in a free-flowing condition, or upon restoration of this condition, is eligible for inclusion in the national wild and scenic rivers system. The "Nationwide Rivers Inventory," Phase II (Department of the Interior Heritage Conservation and Recreation Service, Pacific Southwest Region, March 1982) indicates that portions of the Santa Ana River are designated as Wild or Scenic Rivers. The project portion of the river provides no potential as a wild and scenic river because of the influences of man in diverting water and constructing improvements along the river.

Executive Order 11988, Floodplain Management, May 24, 1977, as Amended

Under this Executive Order, the USACE must take action to avoid development in the base (100-year) floodplain unless it is the only practicable alternative to reduce hazards and risks associated with floods; to minimize the impact of floods on human safety, health, and welfare; and to restore and preserve the natural and beneficial value of the base floodplain.

The planning of this action has considered the objectives of the Executive Order. The main purpose of the previously approved and under construction Seven Oaks Dam is to assist in providing flood protection for communities downstream of the dam as a component of the ongoing Santa Ana River Mainstem project. The objective of the currently proposed water conservation project is to use water retention space behind the dam to conserve runoff and groundwater brought to the surface by the dam after the annual flood season has passed. The proposed action would not adversely affect the purpose of the Seven Oaks Dam to provide flood protection. Therefore, this action is considered to be consistent with Executive Order 11988.

Executive Order 11990, Protection of Wetlands

In developing alternatives, the USACE considered the effects of the project on the survival and quality of wetlands. Projects are to "...avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative...." The project alternatives will not adversely affect wetlands. All impacts to wetlands have been mitigated as part of the Santa Ana River Mainstem Project.

U.S. Forest Service Management Plans

The United States Department of Agriculture, Forest Service, controls land in the San Bernardino National Forest. The San Bernardino National Forest Land and Resource Management Plan of 1988 (Forest Plan) is required by the Forest and Rangeland Renewable Resources Planning Act, as amended by the National Forest Management Act. The Forest Plan was developed to direct the management of the San Bernardino National Forest. The goal of the Forest Plan is to provide a management program that reflects a mix of activities which allows use and protection of forest resources; fulfills legislative requirements; and addresses local, regional, and national issues.

The Seven Oaks Dam is within the San Bernardino National Forest Santa Ana Management Area. The 94,350-acre Santa Ana Management Area is divided into three districts; the project site is located within the San Gorgonio District. Each management area contains one or more Management Emphasis Zones (MEZs) which are used to define areas that will receive particular management emphasis. The predominant emphasis is watershed/wildlife; non-motorized recreational activities are acceptable. Specific to the project area, the Forest Plan states that "non-motorized recreation will be emphasized in the area behind the Seven Oaks Dam." To implement the proposed water conservation pool activities at the Seven Oaks Dam, a special use permit and/or an additional easement will be required from the Forest Service. As previously noted, no recreational activities are proposed as part of the project. The proposed water conservation project would not preclude the Forest Service from ongoing implementation of its goals and programs.

1.7.2 STATE, LOCAL, AND SPECIAL DISTRICTS

1.7.2.1 State

California Environmental Quality Act. The project requires the acceptance of an environmental document as having been prepared in compliance with state CEQA Guidelines, and County of San Bernardino CEQA Guidelines, and certification that the data was considered in the final decisions on the project.

California Regional Water Quality Control Board. State of California, Regional Water Quality Control Board. Pursuant to the federal Clean Water Act [Section 402(g)] and the state General Construction Activity Storm Water Permit, a National Pollution Discharge Elimination System permit (NPDES) would be required for any project construction activities that would result in the disturbance of 5 or more acres.

California Clean Air Act Requirements. The California Clean Air Act of 1988 (CCAA), amended in 1992, requires all air districts in the state to endeavor to achieve and maintain state ambient air quality standards for ozone, carbon monoxide, sulfur dioxide, and nitrogen dioxide by the earliest practicable date. California's ambient air standards are generally stricter than national standards for the same pollutants. California also has established its own standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles.

1.7.2.2 Local

County of San Bernardino General Plan. The project is considered consistent with the designation of the county General Plan.

County of San Bernardino Zoning Ordinance. The project is considered consistent with the designations of the county zoning ordinance.

1.7.2.3 Special Districts

South Coast Air Quality Management District. Air quality in the basin is regulated by federal, state, and regional control authorities. At the state level, the Lewis-Presley Air Quality Management Act (originally adopted in 1976 and substantially amended in 1987) and the California Clean Air Act of 1988 (the Sher Bill, AB 2595) set air quality planning and regulatory responsibilities for the basin. The California Air Resources Board (ARB), which became part of the California Environmental Protection Agency (Cal EPA), is charged with the responsibility for ensuring implementation of the California Clean Air Act (CCAA), responding to the federal Clean Air Act (CAA), coordinating efforts to attain and maintain ambient air quality standards and conducting research into the causes of, and solutions to, air pollution problems. The SCAQMD and the Southern California Association of Governments (SCAG) have responsibility for preparing and periodically revising the Air Quality Management Plan (AQMP), which contains measures to meet state and federal requirements. SCAG also serves as the regional clearinghouse for projects requiring environmental documentation under federal and state law. In this role, SCAG reviews proposed projects to analyze their impacts on SCAG's regional plans.

SECTION 2
DESCRIPTION OF PROJECT ALTERNATIVES

2.1 INTRODUCTION

Pursuant to 40 CFR 1502.14 and California Resources Code Section 21000 et seq., this EIS/EIR analyzes four alternatives for providing additional impounding capacity for water conservation purposes for the Seven Oaks Dam, as well as the NEPA (and CEQA) mandated No Action (No Project) Alternative. The currently proposed project assumes that the Seven Oaks Dam has been completed. The following section provides a description of the process used to develop the alternatives analyzed in this EIS/EIR, a description of the alternatives' physical, construction, and operational characteristics, and a discussion of those alternatives that have been eliminated from further analysis and the reasons for their elimination. The objectives of the proposed actions are addressed in Section 1.2, Purpose and Need.

2.2 PROJECT SITE LOCATION

The Seven Oaks Dam is located in the steep-walled upper Santa Ana River Canyon, approximately 1 mile upstream from the mouth of the canyon at the confluence of the Santa Ana River and Government Canyon. The dam is approximately 8 miles northeast of the City of Redlands in San Bernardino County, California, and is entirely within the boundaries of the San Bernardino National Forest. The elevation of the dam site at the canyon floor is approximately 2,060 feet above sea level. Access to the Seven Oaks Dam site is limited. The only open public access is via Monroe Canyon Road. Vehicular access to the canyon from Greenspot Road to Santa Ana Canyon Road is gated and closed to public use because of the construction of the dam and power station operational activities by Southern California Edison Company. The site is depicted in its regional and local setting in Exhibits 2-1 and 2-2, respectively.

The drainage area for the dam is approximately 177 square miles, excluding the 32-square-mile tributary to Baldwin Lake. The headwaters lie within the San Bernardino Mountains.

2.3 PROJECT OBJECTIVES

The federal objective of water and related land resources project planning is to contribute to national economic development (NED). Such contributions are considered increases in the net value of the national output of goods and services expressed in monetary units. These contributions are to be consistent with the protection of the nation's environment, pursuant to applicable executive orders and other federal planning requirements, including the consideration of state and local concerns. The NED objective of this project is to develop a plan that will provide the maximum water conservation benefits to the Seven Oaks Dam extended study area which is defined as the service areas of the San Bernardino Valley Municipal Water District and the Western Municipal Water District.

The main purpose of the Seven Oaks Dam is to assist in providing flood protection for communities downstream of the dam as a component of the ongoing Santa Ana River Mainstem project. The objective of the currently proposed water conservation project is to use water retention space behind the dam to conserve runoff and groundwater brought to the surface by the dam after the annual flood season has passed. In the dry summer months, the water level behind the dam would be drawn down by releasing water to downstream users at a rate commensurate with diversion and groundwater recharge needs.

Any modification and/or operation of the Seven Oaks Dam for water conservation would be accomplished subsequent to the completion of the dam and the transfer of the facility to the local sponsors as a local flood protection project.

2.4 EXISTING SEVEN OAKS DAM DESIGN FEATURES AND OPERATIONAL CHARACTERISTICS

The dam has a reservoir area at spillway crest of approximately 780 acres. The elevation of the dam site at the canyon floor is approximately 2,060 feet. The 550-foot-high earth-rockfill dam provides a gross storage capacity of 145,600 acre-feet at the spillway crest elevation of 2,580 feet NGVD, with 113,600 acre-feet allocated to flood control and 32,000 acre-feet to sediment storage. The average annual inflow is 24,000 acre feet per year. The boundaries of the dam inundation area are depicted in Exhibit 2-3. Completion of the Santa Ana River Project, including the Seven Oaks Dam, is projected to be in year 2000.

For each project alternative, present and future conditions have been analyzed in this EIS/EIR. Present conditions are defined as year 2000, which is when the Seven Oaks Dam is to be completed. Future conditions are defined as year 2050.

2.4.1 EXISTING SEVEN OAKS DAM OPERATIONAL CHARACTERISTICS

From the beginning of November to the end of May (assuming no major flood events, all inflows would be stored until the target debris pool elevation of 2,200 NGVD (2,968 acre-feet) for present conditions and 2,250 feet (2,194 acre-feet) for future conditions. Once this elevation is attained, any releases of outflow from the reservoir will equal inflow up to 500 cfs from storage above the debris pool elevation. During major flood events, the Seven Oaks and Prado dams are operated in tandem. Flood control releases at the Seven Oaks Dam are restricted to a constant 500 cfs until the peak water surface has passed at Prado Dam. Subsequently, releases at Seven Oaks Dam increase up to a maximum of 7,000 cfs until the debris pool level is again attained. March is a transitional period between the flood season and the conservation season where the maximum conservation pool is expanded linearly to the maximum target level. The seasonally expanded target pool level is sustained in April and May. All inflow to bring the reservoir to the target elevation is stored during this time except for minimum 3 cfs release. Beginning in June and continuing through September, the pool is drained at a discharge level that includes any coincident inflow plus a rate designed to empty the reservoir by the end of September. The purpose of this operation is to allow for routine maintenance and to minimize any potential problems (e.g., mosquitos and odors) involved with the perennial impoundment of water.

2.4.2 EXISTING SEVEN OAKS DAM DESIGN COMPONENTS

2.4.2.1 Dam Embankment

The Seven Oaks Dam is being constructed with earth and rockfill materials from spillway and drainage channel excavation, materials acquired from foundation excavation, and alluvial and silt deposits. The dam will be approximately 650 feet above the lowest foundation bedrock contact and approximately 550

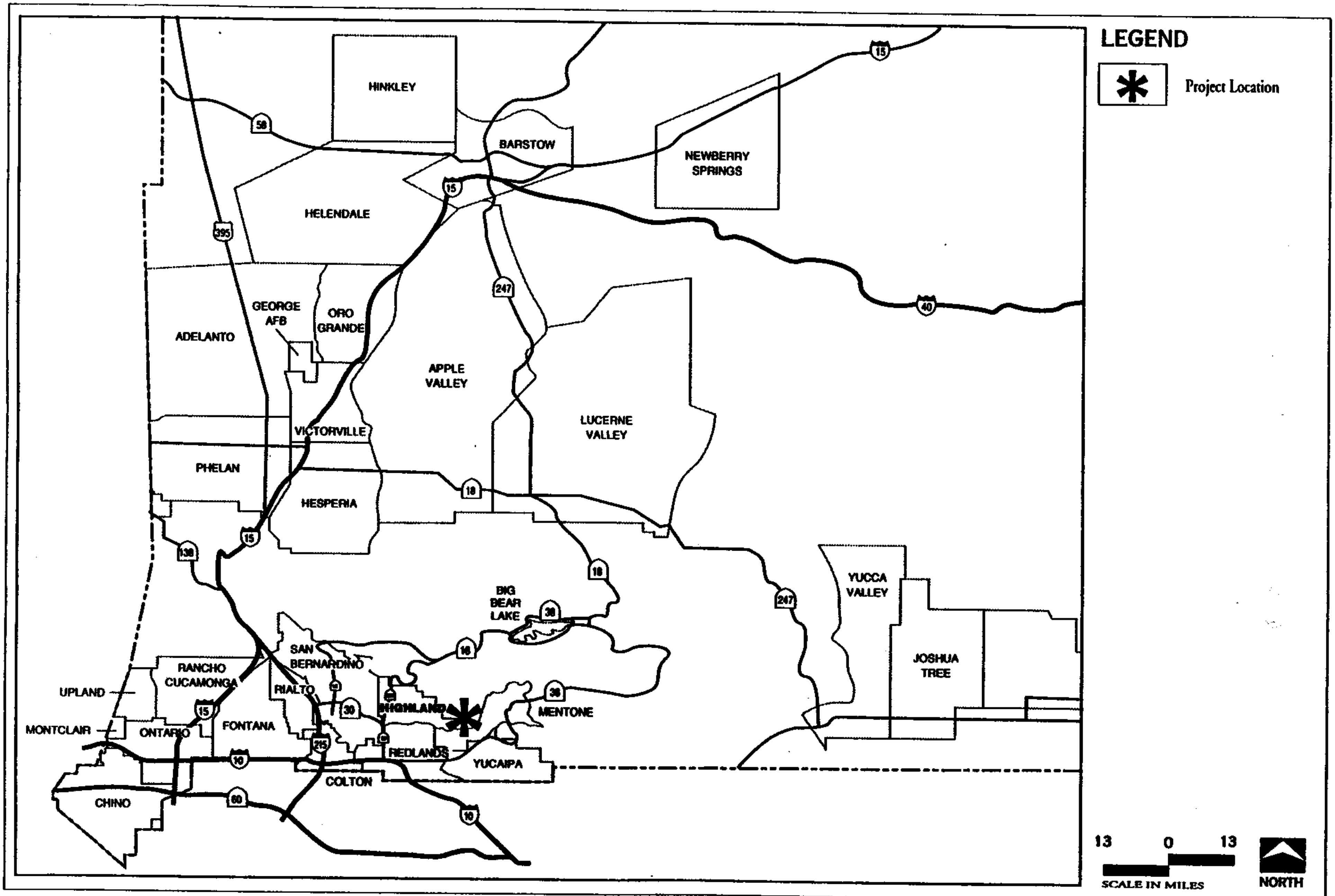

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EXHIBIT **2-1**
Regional Location Map

SEVEN OAKS DAM WATER CONSERVATION FEASIBILITY STUDY

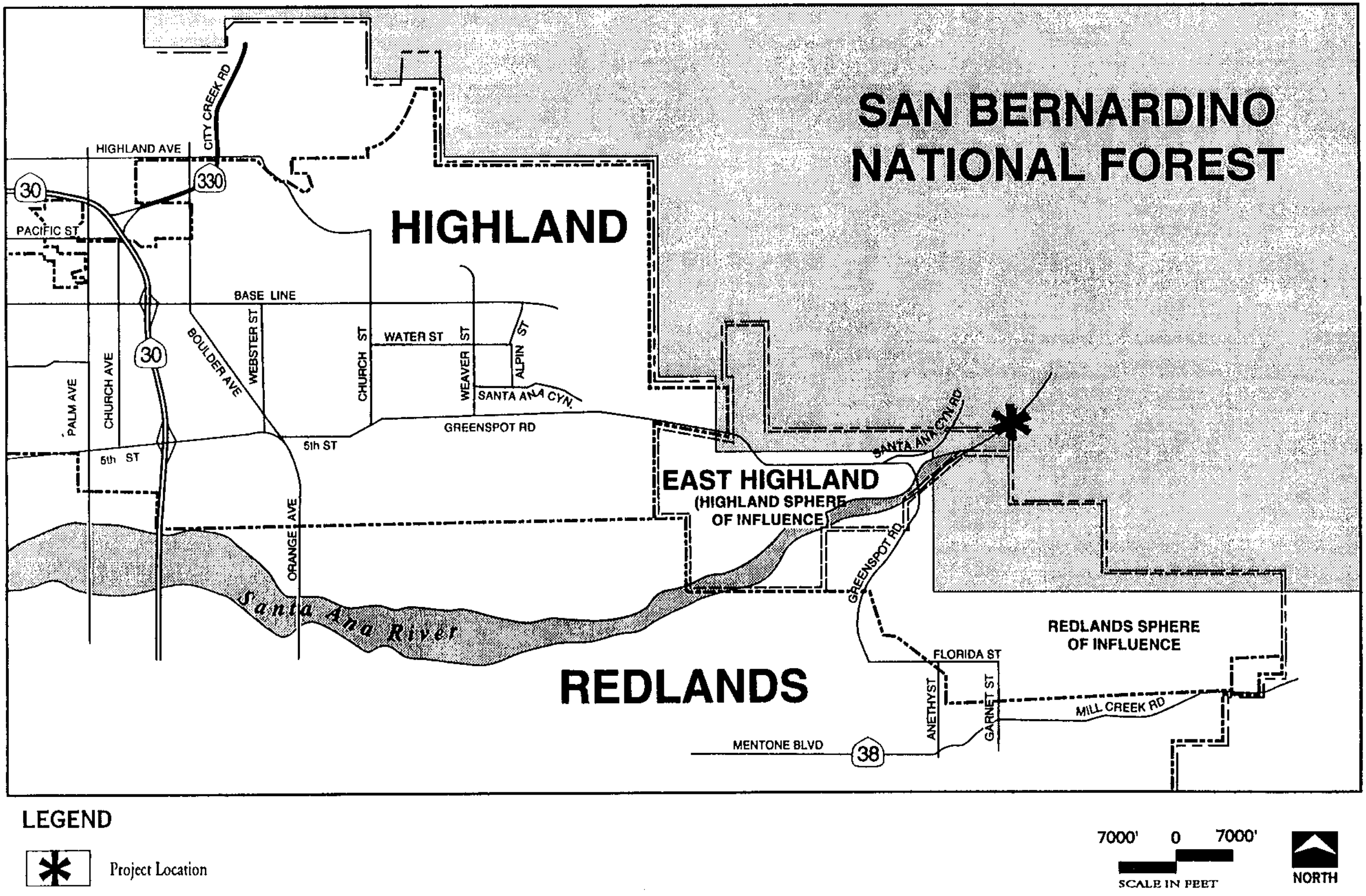

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EXHIBIT **2-2**

Local Vicinity Map

SEVEN OAKS DAM WATER CONSERVATION FEASIBILITY STUDY

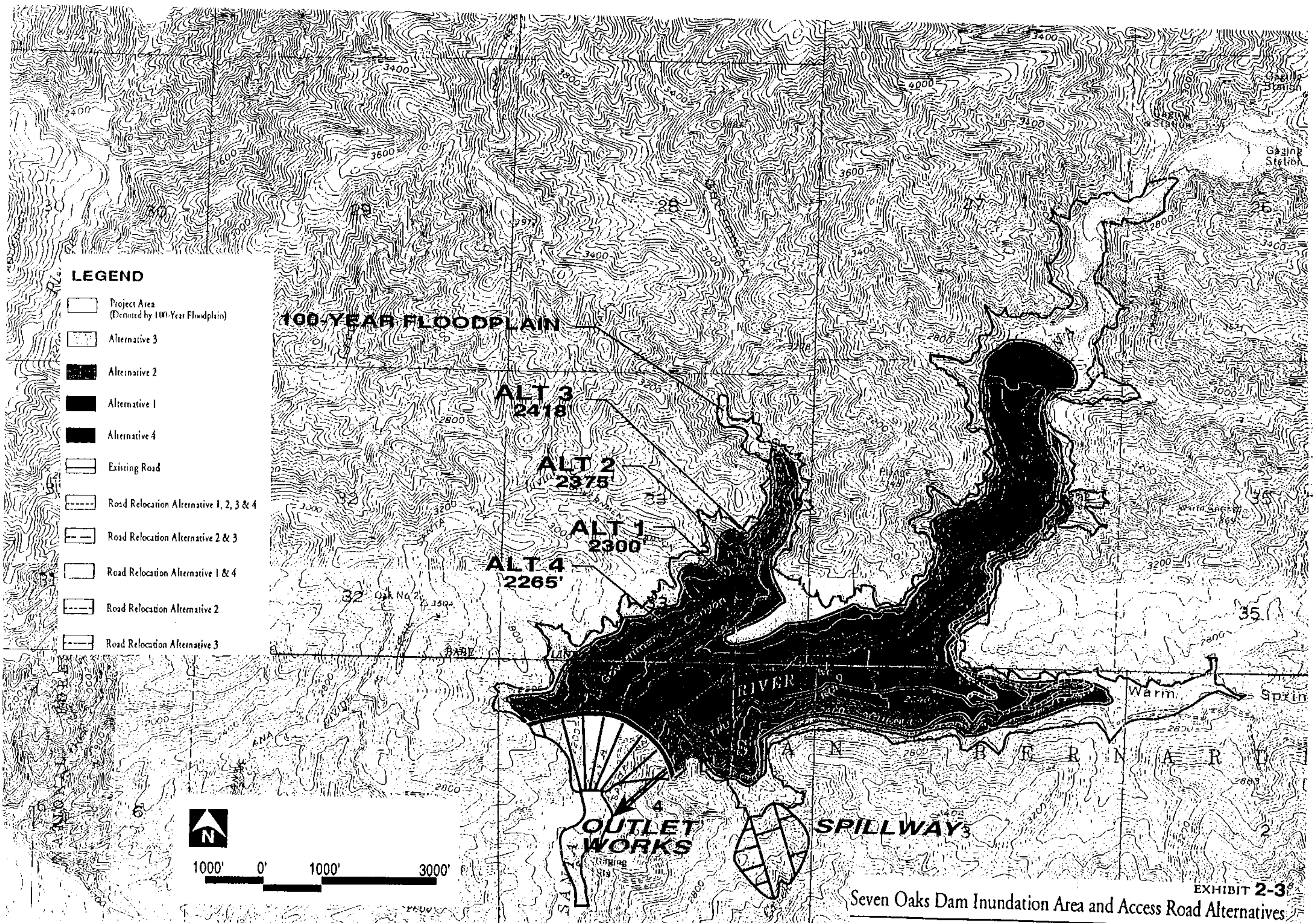


EXHIBIT 2-3

Seven Oaks Dam Inundation Area and Access Road Alternatives feet above the existing streambed. The crest elevation of the dam will be at 2,610 NGVD with a crest length of 2,630 feet; the crest width will be is 40 feet.

2.4.2.2 Outlet Works

The outlet works consist of the following elements:

- Reinforced concrete intake structure with a maximum vertical height of 225.5 feet. There will be two intake structures: a high-level intake to release flow through the main regulating outlet gates, and a low pool multi-level withdrawal intake system to pass flows at low pool elevations.

  The high-level intake will have a trash structure to prevent large debris from entering the outlet works and damaging/jamming the gates and a wet well. The trash structure would be submerged when the pool elevation exceeds 2,300 feet.

  The low pool multi-level withdrawal intake system is designed to pass flows up to 500 cfs.

- Concrete-lined 1,656-foot-long tunnel
- Gate chamber
- Rectangular exit channel: 18 feet wide by 14 feet high
- Access structure above the exit channel at the downstream portal
- Valve structure
- Apron slab and plunge pool for energy dissipation downstream of the channel

2.4.2.3 Spillway

The spillway will be 560 feet wide and approximately 1,400 feet long. To construct the spillway, the area is being excavated in rock through a natural saddle east of the dam. The excavated material will be used in the rock transition and rockfill zones of the embankment. The spillway will be trapezoidal and unlined except for a concrete control sill at the crest approximately 1,000 feet from the downstream end. The top of the spillway excavation will daylight at 370 feet above the crest at approximately 2,950 feet NGVD. The peak water surface elevation during a Probable Maximum Flood event is estimated at 2,605 feet NGVD.

2.4.2.4 Access Roads

There are existing access roads used by the USACE to operate and maintain the dam, by the Forest Service to manage land resources and perform fire prevention activities, and by local hydropower and water companies to operate and maintain their facilities located upstream of the dam. Paved all-weather access roads will be constructed on the top of the dam, intake structure, air shaft, spillway, and outlet works. Permanent access within the reservoir and upstream canyon will be provided by a graded, unpaved, one-lane road joining the unpaved access road located in the streambed. The access roads are depicted in Exhibit 2-3.

2.4.2.5 Hydrologic Facilities

As part of the Seven Oaks Dam, hydrologic facilities include the following:

- Balanced beam manometer recording the reservoir's water surface elevation. A graphic water surface recorder and digital recorder automatically record water surface measurements from the manometer.

- Staff gauge plates installed on the left abutment along the upstream face of the dam allow for visual monitoring of water levels.

- An automatic recorder is on each outlet service gate to document all gate movements.

- Three index range lines in the reservoir area indicate the amount of sediment deposition occurring in the reservoir to determine the need for additional topographic mapping.

- Remote terminal units transmit water surface level elevation, gate positions, accumulated precipitation, and battery voltage information to the district office.

2.4.2.6 Geotechnical Instrumentation

As part of the dam, vertical and horizontal movements within the embankment will be measured, and horizontal movements on the surface of the dam will be monitored.

2.4.2.7 Hydraulic Instrumentation

Permanent operational instrumentation will provide the dam operator with information regarding water surface elevations and/or pressure readings to determine proper gate settings and to monitor trash blockage in the intake structure.

2.5 ALTERNATIVES FORMULATION PROCESS

This EIS/EIR includes a range of reasonable alternatives that would feasibly attain most of the basic objectives of the project, but that would avoid or substantially lessen any of the significant effects of the project. As noted above, the federal objective is to provide the maximum water conservation benefits to the Seven Oaks Dam service area. Opportunities to provide additional water conservation are limited by the flood control capacity of the Seven Oaks Dam. No alternative will be considered if it would increase the frequency, duration, or severity of flooding downstream of the dam.

Four water conservation alternatives and the No Action (No Project) Alternative are being considered in this EIS/EIR. The alternative plan formulation process involved the refinement of the reconnaissance-level alternatives and the inclusion of two new seasonal pool alternatives. Non-structural water conservation measures were also considered as part of the alternative process. The without project condition assumes urban conservation measures are in place and that reclaimed water would be reused if another source, such as water conservation at Seven Oaks Dam were not available. However, water demand forecasting accomplished through the use of a water demand computer model (IWR-MAIN) has indicated that conservation measures alone would not be sufficient to meet future demand. The non-structural alternative would not meet the proposed project's objective of maximizing water conservation benefits to the Seven Oaks Dam. Therefore, the non-structural alternative was eliminated from further consideration.

The following alternatives were addressed in the *Seven Oaks and Prado Dams Water Conservation Study Final Reconnaissance Study* (October 1992).

- No action
- Seasonal water conservation pool at elevation 2,300 feet (16,000 acre-feet with natural flows) (referred to as Alternative 1 below)
- Seasonal water conservation pool at elevation 2,318 feet (20,000 acre-feet with natural flows)
- Seasonal water conservation pool at elevation 2,378 feet (36,000 acre-feet with natural flows and imported water)
- Seasonal water conservation pool at elevation 2,418 feet (50,000 acre-feet with natural flows) (referred to as Alternative 3 below)

2.6 ALTERNATIVES ELIMINATED FROM FURTHER ANALYSIS

Two of the five reconnaissance-level alternatives were eliminated from further consideration.

1. Seasonal pool at elevation 2,318 feet. This alternative was eliminated because of higher construction costs and limited additional yield relative to Alternative 1 (impound to 2,300 feet).

2. Seasonal pool at elevation 2,378 feet with imported water. This alternative was eliminated because of the low benefit-to-cost ratio. This alternative would have high construction, pump equipment, and energy costs relative to its benefits.

2.7 RECONNAISSANCE-LEVEL ALTERNATIVES CARRIED FORWARD FOR DETAILED ANALYSIS

Three of the five reconnaissance-level alternatives are being considered in this feasibility phase, of which this EIS/EIR is a part. Two additional alternatives are also addressed. These reconnaissance-level alternatives are referred to below as the No Action (No Project) Alternative, Alternative 1-Impound Plan 1: 2,300 feet, and Alternative 3-Impound Plan 3: 2,418 feet. Alternative 1 is being considered because the 100-year debris pool would not require dam modifications to implement and no geotechnical impacts are anticipated. Alternative 3 is being considered because it provides the greatest water conservation yield. Alternative 2-Impound Plan 2: 2,375 feet and Alternative 4-Impact Plan 4: 2,265 feet are being addressed in this EIS/EIR to provide mid-range alternatives.

2.7.1 PROJECT ASSUMPTIONS

The flood season is defined as beginning in November and concluding at the end of February. March is a transitional month between the flood season and the dry season. The flood runoff potential in early March is determined by the preceding conditions in January and/or February. For example, if January and/or February are wet months and early March produced flood conditions, the dam would be operated under flood control conditions. If January and/or February are dry and early March floods occur, the runoff potential is low and the dam would be operated under water conservation conditions. The remainder of the year is defined as the nonflood season.

For each project alternative discussed below, present and future conditions have been analyzed in this EIS/EIR. Present conditions are defined as year 2000 which is when the Seven Oaks Dam is to be completed. Future conditions are defined as year 2050. Development in the Seven Oaks Dam watershed has been projected by the USACE to be negligible; therefore, the future conditions are expected to be affected solely by the 50-year sediment deposition in the reservoir.

2.7.2 NO ACTION (NO PROJECT) ALTERNATIVE

The No Action (No Project) Alternative assumes no additional impound capacity (for water conservation purposes) at the Seven Oaks Dam. Under this alternative, Seven Oaks Dam is considered to be fully constructed and operational as described in the *Phase II GDM (General Design Memorandum) for the Santa Ana River Mainstem Project*.

2.7.3 ALTERNATIVE 1-IMPOUND PLAN 1: 2,300 FEET

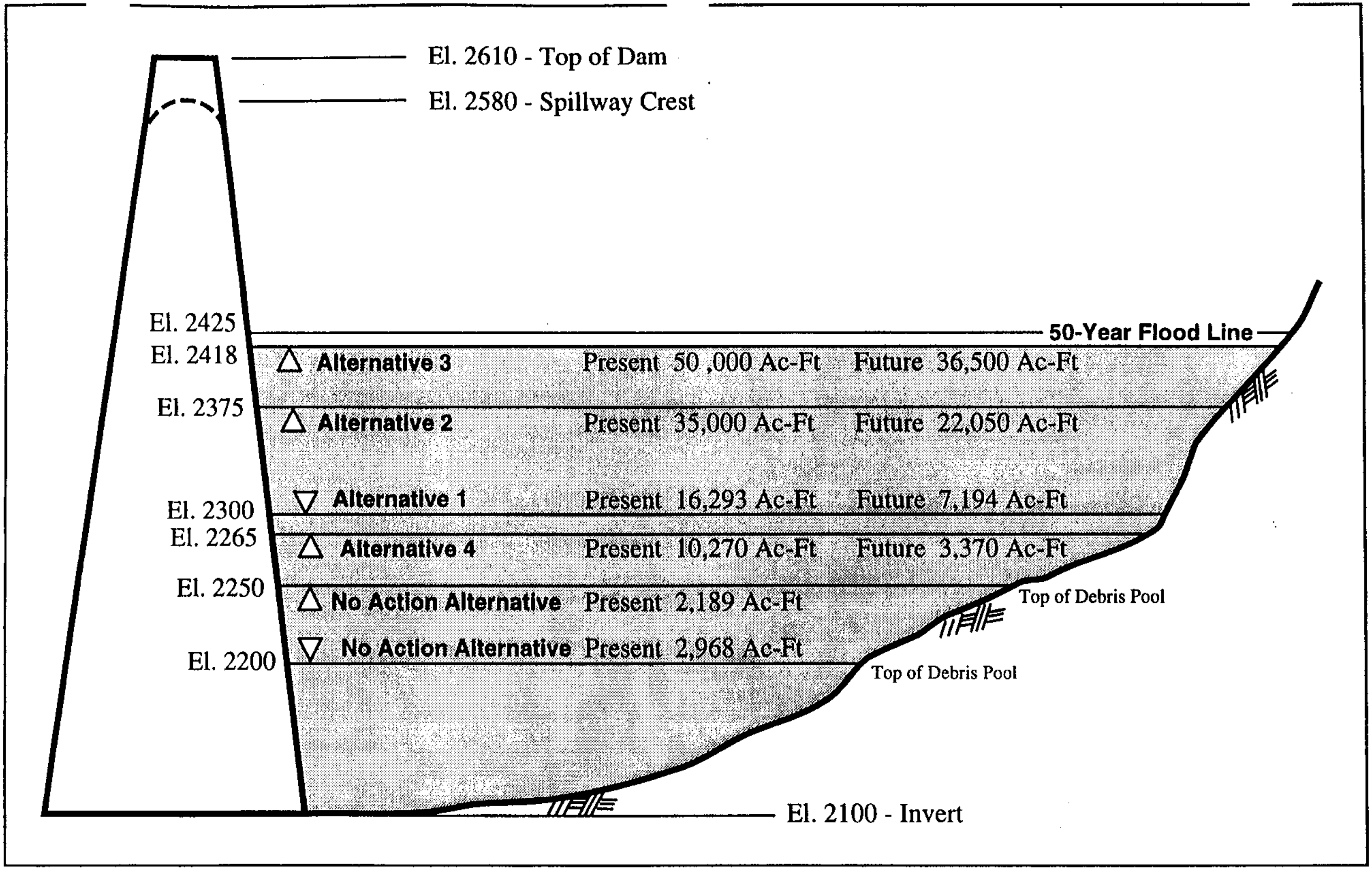
This alternative would impound water behind the dam up to a target conservation elevation of 2,300 NGVD in the 100-year debris pool; 2,300 feet is the 100-year debris pool elevation for the Seven Oaks Dam. This elevation is an increase of 100 feet in elevation from the No Action Alternative (Exhibits 2-3 and 2-4). The water surface acreage associated with the additional impound area is approximately 182 acres.

Normal flood operations would occur in the winter months (October through February). Therefore, from approximately October 1 through February 28, the water elevation would be maintained at 2,200 feet for present conditions and 2,250 feet for future conditions.

Beginning March 1, the seasonal conservation pool would be expanded linearly for 10 days to a target conservation storage elevation of 2,300 feet (16,293 acre-feet for present conditions and 7,194 acre-feet for future conditions) on March 10 of each year. From March 10 through May, all inflow would be released from the dam after the target elevation is reached. From June through September, all inflow plus a conservation release would be made to ensure the conservation pool is drained by the end of September (before the "winter months" commence).

The percentage of years that the target elevation is expected to be attained is identified in Table 2-1.

Releases for present conditions are as follows: June-65 cfs, July-70 cfs, August-70 cfs, and September-70 cfs and releases for future conditions are as follows: June-25 cfs, July-32 cfs, August-32 cfs, and September-32 cfs (Exhibits 2-5 and 2-6). Therefore, as part of this alternative, releases would be extended from August to September when compared to the No Action (No Project) Alternative.



SOURCE: U.S. Army Corps of Engineers, Los Angeles District

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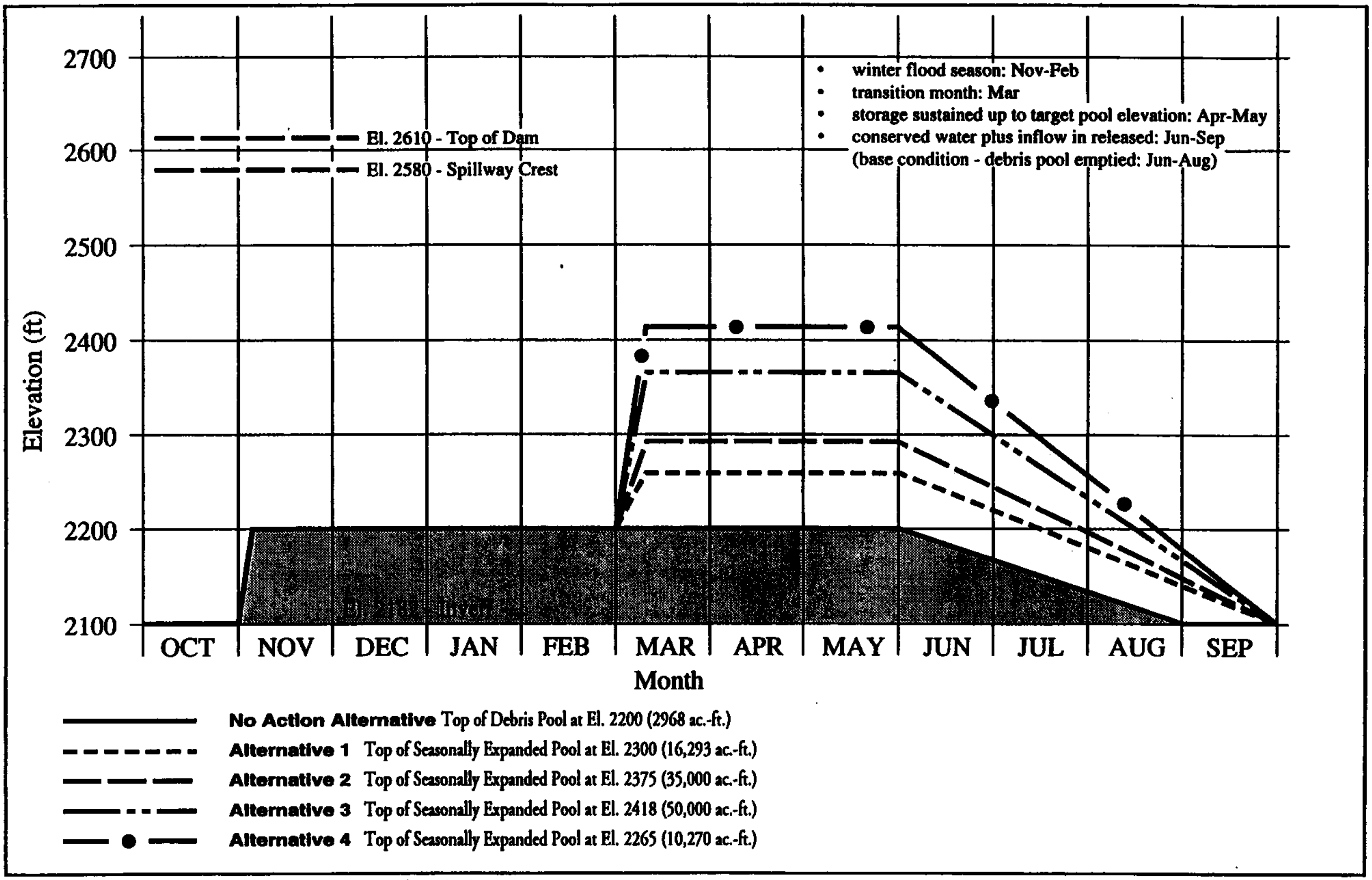
EXHIBIT **2-4**

Alternative Impound Elevations



SOURCE: U.S. Army Corps of Engineers, Los Angeles District.

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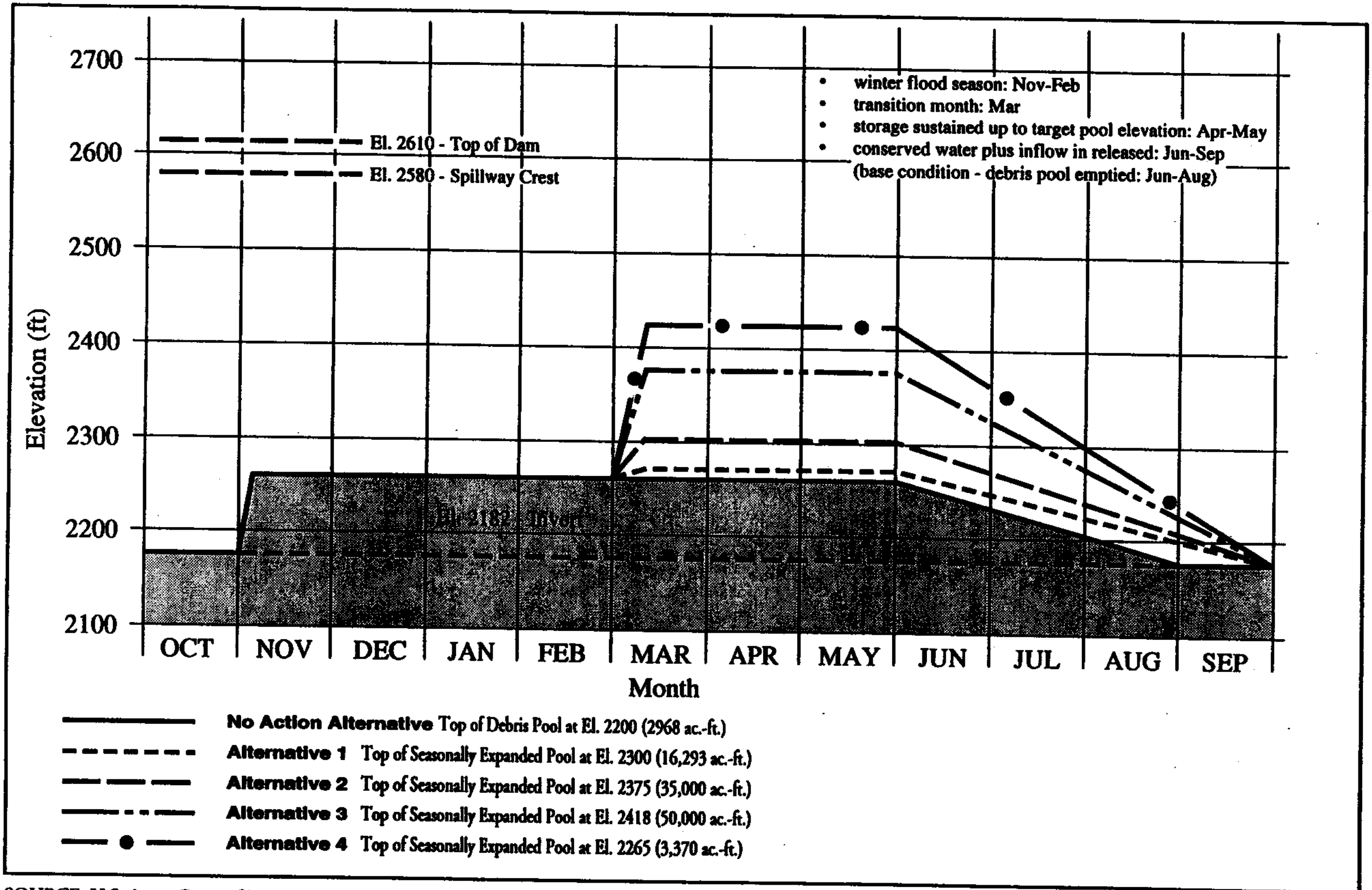
EXHIBIT **2-5**

Water Release Schedule: Present Conditions



SOURCE: U.S. Army Corps of Engineers, Los Angeles District

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EXHIBIT **2-6**

Water Release Schedule: Future Conditions

SEVEN OAKS DAM WATER CONSERVATION FEASIBILITY STUDY

Release rates and changes over existing conditions are indicated in Table 2-2. As shown in Table 2-3, the amount of water in storage on March 10 (before any releases) is considered the additional yield for water conservation purposes because this is the amount of water that would have otherwise flowed downstream and had less recharge capability. Additional water yield is attained by storing flood flows behind the dam during flood season and releasing water at a lower rate.

TABLE 2-1

PERCENTAGE OF YEARS TARGET ELEVATIONS ARE EXPECTED TO BE ATTAINED

	Present (percentage)	Future (percentage)
No Action (No Project)	64	70
Alternative 1	25	36
Alternative 2	13	22
Alternative 3	11	13
Alternative 4	33	57
Source: U.S. Army Corps of Engineers 1995.		

TABLE 2-2

CONSERVATION POOL RELEASES
(in cubic feet per second)

	June		July		August		September	
	Present[a]	Future[b]	Present	Future	Present	Future	Present	Future
No Action (No Project)	10	6	20	15	20	15	--	--
Alternative 1	65	25	70	32	70	32	70	32
Change[c]	**55+**	**19+**	**50+**	**17+**	**50+**	**17+**	**70+**	**32+**
Alternative 2	145	85	145	93	145	93	145	93
Change[c]	**135+**	**79+**	**125+**	**78+**	**125+**	**78+**	**145+**	**145+**
Alternative 3	208	135	208	155	208	155	208	155
Change[c]	**198+**	**129+**	**188+**	**140+**	**188+**	**140+**	**208+**	**155+**
Alternative 4	42	11	42	15	42	15	42	15
Change[c]	**32+**	**5+**	**22+**	**0**	**22+**	**0**	**42+**	**15+**

[a] Present: Year 2000 (Seven Oaks Dam completed).
[b] Future: Year 2050.
[c] Difference between Alternative 1, 2, 3, or 4 and the No Action (No Project) Alternative.

Source: U.S. Army Corps of Engineers 1995.

TABLE 2-3

STORAGE ALTERNATIVES FOR WATER CONSERVATION
AT SEVEN OAKS DAM

	Average Annual Inflow (ac-ft/yr)		Yield (ac-ft/yr)		Increase in Yield (ac-ft/yr)		True Increase in Yield (ac-ft/yr)		Increase in True Yield (%)	
Alternative	Present	Future	Present	Future	Present	Future	Present	Future	Present	Future
No Action (No Project)	24,000	24,000	2,430	1,890	--	--	--	--	--	--
Alternative 1	24,000	24,000	7,450	4,410	5,020	2,520	4120	2140	170	113
Alternative 2	24,000	24,000	11,120	8,460	8,690	6,570	5910	5910	307	313
Alternative 3	24,000	24,000	12,950	10,600	10,520	8,710	9260	8010	381	424
Alternative 4	24,000	24,000	5,650	2,650	3,220	760	2510	640	103	34

Source: U.S. Army Corps of Engineers 1995.

Demolition and modifications to a portion of the Seven Oaks Dam intake structure and the addition of anchors would be required to operate and maintain the dam and appurtenances under this alternative scenario. These construction activities would occur during the dry summer months. Due to a constant surface water flow at the dam due to groundwater, diversion berms would be constructed upstream of the dam to divert these water flows away from the construction activities. Specific location and design of these diversion berms are currently unknown. Maintenance access to the intake structure would not be affected. However, access to the upper canyon for Southern California Edison Company (SCE), the U.S. Forest Service, and the local water district would be impeded more frequently because of the impoundment of the conservation pool. Various options to maintain access to upstream areas are being considered. As a worst-case option, portions of the existing unpaved road in the streambed that serves as the access roadway to upstream of the reservoir would need to be elevated or relocated above the conservation pool elevation. The proposed alignment of the relocated access road is depicted in Exhibit 2-3. Another option includes automating SCE equipment for the upstream gates. Still another option is to designate existing fire access roads as secondary (alternative) routes to upstream areas during the inundation of the primary access road. At this time, the option to be selected is unknown. Additional environmental documentation may be required depending on the selected option. For the purpose of this EIS/EIR, the worst-case option (improved/new access road as depicted in Exhibit 2-3) is assumed.

Operations and Maintenance procedures for Seven Oaks Dam have not been finalized at this time. The Corps will prepare a Water Control and O & M Manual at the end of the dam construction and circulates these documents to the local sponsors and others, as appropriate, for comment and concurrence. At this time only minor changes in OMRR requirements as a result of water conservation appear likely. R

2.7.4 ALTERNATIVE 2-IMPOUND PLAN 2: 2,375 FEET

This alternative would impound water behind the dam up to elevation 2,375 NGVD in the 100-year debris pool. The boundaries of the impound area for Alternative 2 are depicted in Exhibit 2-3. This elevation is an increase of 175 feet in elevation from the No Action (No Project) Alternative (Exhibit 2-4). The water surface acreage associated with the additional impound area is approximately 424 acres.

As with the No Action (No Project) Alternative and Alternative 1, this operation would involve normal flood operations in the winter months; water would be stored up to 2,200 feet.

At the beginning of March, the seasonal conservation pool would be expanded linearly over 10 days to reach a target conservation storage elevation of 2,375 feet (35,000 acre-feet for present conditions and 22,050 acre-feet for future conditions) on March 10. From March 10 through May, all inflow would be released from the dam after the target storage is reached. From June through September, all inflow plus a conservation pool release would be made to ensure the conservation pool is drained by the end of September. Releases for present conditions are as follows: June, July, August, and September–145 cfs; for future conditions: June–85 cfs, July–93 cfs, August–93 cfs, and September 93 cfs (Exhibits 2-5 and 2-6) (see Table 2-2).

Modifications to the intake structure, bulkhead and guides, and the construction of a new bridge and access road would be required to allow for the continued operation and maintenance of the Seven Oaks Dam. The required modifications are described below.

Intake Structure

An 80-foot-high steel frame and concrete service deck would be constructed on top of the existing concrete deck to maintain access above the conservation pool. This deck would support a crane used for the dry installation of the maintenance bulkhead. The new deck elevation would be 2,382 feet. Use of the deck would be restricted by the addition of the steel frame/deck and the modifications performed during the installation of the bulkhead.

The trash rack structure that would be constructed as part of the Seven Oaks Dam would need to be modified to meet seismic requirements because of additional loads induced by the steel frame extension. Many of these members of the structure are the lower columns of the structure. Modification and/or replacement of these members would be difficult and may be economically unfeasible.

The modifications to the intake structure would require additional anchors to operate and maintain the dam.

Bridge

A new bridge would be required to connect the new service area to the elevated maintenance deck at elevation 2,382. A 161-foot, two-span steel girder bridge at the same elevation as the deck would be constructed. The bridge would be of unequal spans, with the longer span from the support pier to the intake structure. This design would preserve access to the existing bridge at elevation 2,302 feet.

Bulkhead and Guides

A new bulkhead design would be required to resist increased hydrostatic pressure.

Diversion Berms

During construction activities, which are expected to occur during the dry summer months, diversion berms upstream of the dam would be constructed. These berms would be required because there is a constant surface water flow at the dam created when the embankment construction blocked the subsurface flow of groundwater in the reservoir area. The diversion berms would divert these water flows away from the construction activities. Specific location and design of these diversion berms are currently unknown.

Operations and Maintenance

Operations and maintenance procedures will be similar to the existing intake structure. Bulkhead installation and removal will require additional hoisting time and the handling and storage of additional pendants. Since the maintenance deck is more than 80 feet above the trash rack, debris removal from the trash rack will require more time compared to the requirements of the existing dam operation.

Access

Vehicular Access to Intake Structure

A new access road would be constructed on the face of the embankment starting from the turnaround near the right abutment at approximate station 26+00 to a new service area on the left abutment (Exhibit 2-3). The road is proposed to be a 22-foot-wide dirt road. Approximately 2,200 feet of the new road would be built on fill, and 300 feet would be excavated into rock, for a total length of 2,500 feet. The road fill would be constructed on the dam face after the removal of the 3-foot layer of armor stone. Crib walls with vertical anchorage may be required to retain the fill on the existing slope of the dam.

Streambed Access Road

Because of the increased period of inundation, various options to maintain access to upstream areas are being considered. As a worst-case option, the existing access road inside the reservoir would need to be elevated or relocated above the conservation pool to maintain access for SCE, the Forest Service, and the water district (Exhibit 2-3). Another option includes automating SCE equipment for the upstream gates. Still another option is to designate existing fire access roads as secondary (alternative) routes to upstream areas during the inundation of the primary access road. At this time, the option to be selected is unknown. Additional environmental documentation may be required depending on the selected option. For the purpose of this EIS/EIR, the worst-case option (improved/new access road as depicted in Exhibit 2-3) is assumed.

2.7.5 ALTERNATIVE 3-IMPOUND PLAN 3: 2,418 FEET

This alternative would impound water up to elevation 2,418 NGVD (50,000 acre-feet). This alternative would increase the impound elevation by 218 feet from the No Action (No Project) Alternative (Exhibit 2-4). The water surface acreage associated with the additional impound area is approximately 570 acres (Exhibit 2-3).

This operation involves normal flood operations in the winter months. At the beginning of March, the seasonal conservation pool would be expanded linearly over 10 days to a target conservation storage elevation of 2,418 feet (50,000 acre-feet for present conditions and 35,600 acre-feet for future conditions) on March 10. From March 10 through May, all inflow is released from the dam after the target storage elevation is reached. From June through September, all inflow plus a conservation pool release is made to ensure that the conservation pool would be drained by the end of September. The releases for present conditions are as follows: June through September–208 cfs; for future conditions: June–135 cfs and July through September–155 cfs (Exhibits 2-5 and 2-6) see (Table 2-2).

Implementation of this alternative would require modifications to the intake structure, bulkhead, and guides and the construction of a bulkhead gate, new bridge, and access road. These actions are described below.

<u>**Intake Structure**</u>

A 123-foot-high steel frame and concrete service deck would be constructed on top of the existing concrete deck to support a crane used for the dry installation of the maintenance bulkhead. The new maintenance deck elevation would be 2,425 feet. Use of the deck would be restricted by the addition of the steel frame/deck and the modifications performed during the installation of the bulkhead.

The existing trash rack structure would need to be modified to meet seismic requirements because of additional loads induced by the steel frame extension. Many of these members of the structure are the lower columns of the structure. Modification and/or replacement of these members would be difficult and may be economically unfeasible.

The modifications to the intake structure would require additional anchors to operate and maintain the dam.

Bridge

A new bridge would be required to connect the new service area to the elevated maintenance deck at elevation 2,425 feet. Access to the new service deck would be provided by a 205.2-foot, two-span steel girder bridge at the same elevation as the deck. Access to the existing bridge would continue. However, deck access would be limited. Because the steel frame extension would require additional bracing, vehicular access to the existing deck at elevation 2,302 would be blocked.

Bulkhead and Guides

Strengthening of the bulkhead would not be possible without extensive refabrication. A new bulkhead would be fabricated to resist the increase in hydrostatic pressure. The design would be similar to that proposed for Alternative 2.

Diversion Berms

During construction activities, which are expected to occur during the dry summer months, diversion berms upstream of the dam would be constructed. These berms would be required because there is a constant surface water flow at the dam created when the embankment construction blocked the subsurface flow of groundwater in the reservoir area. The diversion berms would divert these water flows away from the construction activities. Specific location and design of these diversion berms are currently unknown.

Operations and Maintenance

Operations and maintenance procedures will be similar to the existing intake structure. Bulkhead installation and removal will require additional hoisting time and the handling and storage of additional pendants. Since the maintenance deck is more than 123 feet above the trashtruck, debris removal from the trash ruck will require more time compared to the requirements of the existing dam operation.

Access

Vehicular Access to Intake Structure

A new access road would be constructed on the face of the embankment starting from the turnaround near the right abutment at approximate station 26+00 to a new service area on the left abutment (Exhibit 2-3). The road is proposed to be a 22-foot-wide dirt road. Approximately 2,200 feet of the new road would be built on fill, and 200 feet would be excavated into rock for a total length of 2,400 feet. The road fill would be constructed on the dam face after the removal of the 3-foot layer of armor stone. Crib walls with vertical anchorage may be required to retain the fill on the existing slope of the dam.

Streambed Access Road

Because of the increased period of inundation, various options to maintain access to upstream areas are being considered. As a worst-case option, the existing access road inside the reservoir would need to be elevated or relocated above the conservation pool to maintain access for SCE, the Forest Service, and the water district (Exhibit 2-3). Another option includes automating SCE equipment for the upstream gates. Still another option is to designate existing fire access roads as secondary (alternative) routes to upstream areas during the inundation of the primary access road. At this time, the option to be selected is unknown. Additional environmental documentation may be required depending on the selected option. For the purpose of this EIS/EIR, the worst-case option (improved/new access road as depicted in Exhibit 2-3) is assumed.

2.7.5 ALTERNATIVE 4–IMPOUND PLAN 4: 2,265 FEET

This alternative would impound water up to elevation 2,265 NGVD. This alternative would increase the impound elevation by 65 feet from the No Action (No Project) Alternative (Exhibit 2-4). Acreage associated with the additional impound area is approximately 175 acres (Exhibit 2-3).

This alternative assumes normal flood operations in the winter months. At the beginning of March, the seasonal conservation pool would be expanded linearly over 10 days to a target conservation storage elevation of 2,265 feet (10,270 acre-feet for present conditions and 3,370 acre-feet for future conditions) on March 10. From March 10 through May, all inflow is released from the dam after the target storage elevation is reached. From June through September, all inflow plus a conservation pool release is made to ensure that the conservation pool would be drained by the end of September. The releases for present conditions are as follows: June through September–42 cfs; for future conditions: June–11 cfs and July through September–15 cfs (Table 2-2).

No structural modifications to the outlet works would be required to operate and maintain the dam and appurtenances under this alternative scenario. Maintenance access to the intake structure would not be affected. However, access to the upper canyon using the existing streambed road for SCE, the U.S. Forest Service, and the local water district would be impeded more frequently because of the impoundment of the conservation pool. Various options to maintain access to upstream areas are being considered. As a worst-case option, portions of the existing unpaved road in the streambed that serve as the access roadway to upstream of the reservoir would need to be elevated or relocated above the conservation pool elevation (Exhibit 2-3). Another option includes automating SCE equipment for the upstream gates. Still another option is to designate existing fire access roads as secondary (alternative) routes to upstream areas during the inundation of the primary access road. At this time, the option to be selected is unknown. Additional environmental documentation may be required depending on the selected option. For the purpose of this EIS/EIR, the worst-case option (improved/new access road as depicted in Exhibit 2-3) is assumed.

2.8 PROJECT PHASING

The proposed water conservation project would be implemented subsequent to the completion of the Seven Oaks Dam in the year 2000. The precise timing of the project is yet to be determined; however, arrangements are being made for the Corps to provide OMRR for the first three years of flood control operations and the County of Orange (one of the Local Sponsors of SARP Mainstem) has suggested it may be appropriate to monitor dam flood control operations for a few years prior to embarking on a water conservation proposal, it is likely that water conservation would not be considered for several years after dam completion..

2.9 INTENDED USES OF THE EIS/EIR

2.9.1 LEAD AGENCIES

The USACE is the NEPA lead agency for the EIS, while the San Bernardino National Forest (U.S. Forest Service) has been designated as a cooperating agency; the San Bernardino County Flood Control District is the CEQA lead agency for the EIR. The following actions by the USACE and the San Bernardino County Flood Control District will authorize the implementation of the project. The USACE and the San Bernardino County Flood Control District are expected to use the EIS/EIR in the consideration of the following project approvals:

Certification of a Final Environmental Impact Statement/Environmental Impact Report. The project requires the acceptance of an environmental document as having been prepared in compliance with NEPA, CEQA, state CEQA Guidelines, and county CEQA Guidelines, and certification that the data were considered in the final decisions on the project.

Revision to the Operation of Seven Oaks Dam. Approval will be required from USACE for a request to use the Seven Oaks Dam for seasonal water conservation.

Permit in Accordance with Section 404 of the Clean Water Act. Construction-related activities such as the construction of a diversion berm or the relocation of an access road may require dredging and filling of areas classified as "waters of the United States." If dredging or filling is required, a 404 permit will need to be issued by USACE.

2.9.2 COOPERATING AGENCIES/RESPONSIBLE AND TRUSTEE AGENCIES

The Council on Environmental Quality Regulations for Implementing NEPA (40 CFR Park 1501.6) specifies that any other federal agency can be designated as a cooperating agency if that agency has jurisdiction by law or has special expertise with respect to any environmental issue. Cooperating agencies have specific responsibilities to participate in the NEPA process, develop information, provide staff support, and assist the lead agency as requested and mutually agreed to. The lead agency is required to use the environmental analysis and proposals of cooperating agencies to the maximum extent possible, consistent with its responsibilities as lead agency.

In accordance with CEQA, a responsible agency has permit authority or approval power over some aspect of the project for which a lead agency is conducting the CEQA review. Responsible agencies rely on the lead agency's environmental documentation in acting on whatever aspect of the project requires the responsible agency's approval, although the responsible agency must issues its own findings. Responsible agencies are contacted regarding the appropriate scope of the EIR and the substance of the draft EIR.

A trustee agency is a state agency having jurisdiction by law over natural resources affected by a project which are held in trust for the people of the State of California. A trustee agency may or may not have permitting authority or approval power over aspects of the project. Trustee agencies are contacted regarding the scope of the EIR and the substance of the draft EIR.

Subsequent project actions may be required from cooperating and responsible and trustee agencies. These agencies are expected to use the information contained in this EIS/EIR for consideration of approvals related to and involved in the implementation of this project. These agencies and approvals may include the following:

U.S. Forest Service. The Corps is presently negotiating real estate arrangements with the U.S. Forest Service to include interagency transfer of lands and a permanent easement for the flood control pool operations. The non-Federal sponsors will be required to obtain real estate interest from the Forest Service for water conservation operations, which at this time is expected to be a Special Use permit.

Regional Water Quality Control Board. Pursuant to the federal Clean Water Act [Section 402(g)] and the state General Construction Activity Storm Water Permit, a National Pollution Discharge Elimination Systems (NPDES) permit would be required for the project because construction activities would result in the disturbance of more than 5 acres.

SECTION 3
AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This section provides a discussion of the environmental setting of the study area described in Section 2.2, Project Site Location. As noted, the existing conditions (or affected environment) assume that the Seven Oaks Dam component of the Santa Ana River Mainstem Project has been completed (year 2000).

During the planning and design phase of Seven Oaks Dam as well as during the course of this feasibility study, a commitment has been made to the local water agencies that own or operate facilities within the affected area that their facilities will be honored as they have been historically and legally operated. There is no intention on the part of the Sponsors of Seven Oaks Dam to impede the rights of the owners of such facilities to utilize the legally-held water rights within the Santa Ana River canyon due to construction or operation of Seven Oaks Dam. It is the intention of the Sponsors to honor the rightful business interests these agencies have in the canyon and to work with them during the operation of the dam to provide for their interests while providing flood protection for the inhabitaints of the floodplain downstream in each of the three counties involved.

3.2 WATER RESOURCES

Following is a summary of the hydrologic feasibility report and hydraulic analysis for the Seven Oaks Dam Water Conservation Feasibility Study. The hydrologic feasibility report and hydraulic analysis can be found in their entirety in Appendices A and B, respectively, of the Santa Ana River Basin Seven Oaks Dam Water Conservation Study, Technical Appendices.

3.2.1 HYDROLOGY

As noted in Section 2.2, the Seven Oaks Dam is located entirely within the boundaries of the San Bernardino National Forest. Specifically, it is located within the Santa Ana River, approximately 1 mile upstream from the Santa Ana Canyon mouth at the confluence of the Santa Ana River and Government Canyon. The dam is being constructed to augment the currently inadequate flood protection provided to Orange County by Prado Dam, which previously was the only major flood control structure on the Santa Ana River.

3.2.1.1 Surface Flows

The headwaters of the Santa Ana River are located in the San Bernardino Mountains, east of the City of San Bernardino. At the headwaters, the river originates as a clear, cold mountain stream and flows through steep canyons until it reaches the Seven Oaks Dam. As depicted in Exhibit 3.2-1, the Seven Oaks Dam controls a water drainage area of approximately 177 square miles, or 7 percent of the drainage area for the entire Santa Ana River Basin. During most of the year, surface flow is present in the upper canyons of the Santa Ana River and in the headwaters of most of its tributaries. Upstream of the Seven Oaks Dam, runoff characteristics of the Santa Ana River are directly related to the natural condition of the adjacent environment and the intensity of the precipitation event. High intensity precipitation, in combination with the effects of steep gradients and possibly denuded slopes from wild fires, results in increased stream velocities and sediment-laden floods with some debris load in the form of shrubs and trees. Deposition of these sediments occur when stream velocities are substantially decreased, as is the case when the stream encounters the Seven Oaks Dam.

3.2.1.2 Groundwater

The Santa Ana River Groundwater Basin (also called the Bunker Hill-San Timoteo Groundwater Basin) is a large, regional groundwater basin defined by the San Bernardino Mountains to the east, the San Gabriel Mountains to the north, the Bunker Hill dike to the west, and the Santa Ana Mountains to the south. One of the principal areas of regional groundwater recharge is at Seven Oaks Dam due to the presence of a substrate characterized by coarse, permeable alluvial fans formed by streams originating in the mountain canyons. Generally, this substrate allows for low stream flows to percolate into the ground while flood flows continue to travel downstream.

3.2.2 WATER QUALITY

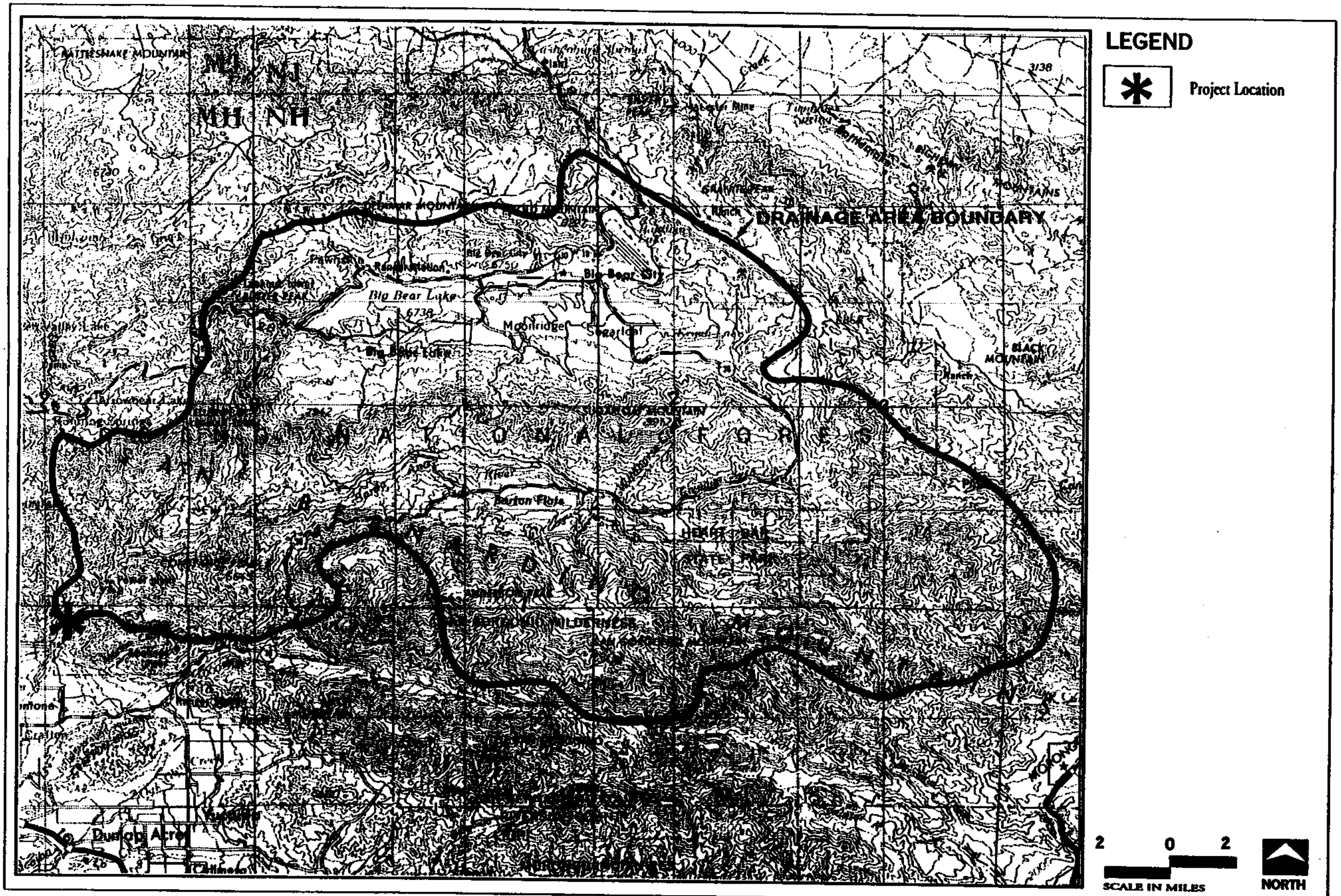
3.2.2.1 Designated Beneficial Water Uses and Water Quality Objectives

The Santa Ana River contributes to many beneficial water uses. Beneficial uses are the ways in which water can be used either directly by people or indirectly for their benefit. The Porter-Cologne Water Quality Act (California Water Code, Division 7) required the establishment of beneficial uses for all waters of the state, both surface and groundwater. In response to the Porter-Cologne Water Quality Act, the Regional Water Quality Control Board, Santa Ana (RWQCB) identified 21 beneficial uses for surface and groundwater within the Santa Ana River Basin. The primary beneficial uses of surface water within the Upper Santa Ana River (from the headwaters to Bear Creek, which includes the Seven Oaks Dam project site) include municipal and domestic supply, agricultural supply, groundwater recharge, water contact recreation, non-water contact recreation, cold freshwater habitat, wildlife habitat, and spawning, reproduction, and development. The primary beneficial uses of groundwater within the Upper Santa Ana River (San Timoteo, Bunker Hill I, Bunker Hill II, and Bunker Hill Pressure Subbasins) include municipal and domestic supply, agricultural supply, industrial service supply, and industrial process supply.

The Porter-Cologne Water Quality Act also defines water quality objectives for general water quality data, toxic substances, chemicals, pesticides, radioactive materials, organic compounds, and floatables that must be met in order to maintain the physical, chemical, and bacteriological character of both surface and recharged groundwater. This, in turn, protects the identified beneficial uses of the specific waterbody.

3.2.2.2 Surface Water Quality

As identified by Table 3.2-1, surface water in the San Bernardino segment of the upper Santa Ana River is of excellent quality, which is likely the result of the natural character of the watershed drainage area. There are low concentrations of total dissolved solids (TDS), nitrates, and other pollutants (USACE 1995). The TDS are composed of common materials of low toxicity such as calcium, sodium carbonates, chlorides, and sulfates. Dissolved oxygen is near, but not at, the saturation level. The only significant water quality parameters that exceed the RWQCB objectives are fecal coliforms and DDT; however, available data for these parameters are insufficient to form any definite conclusion. Total coliform counts of 24,000/100 ml have been reported after major storm events, which are probably due to surface runoff from agricultural and livestock grazing areas and/or the dislodging of bacterial



Michael Brandman Associates

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EXHIBIT 3.2-1
Seven Oaks Dam Drainage Area

colonies on the stream bottom. DDT was a common pesticide used in the 1970s and since it is a highly persistent chemical with bioaccumulative properties, it still shows up in present-day water analyses. Action by the Environmental Protection Agency (EPA) suspending the production and use of DDT should result in a gradual decline in concentration found in the environment. Nonetheless, waters in this reach are suitable for the beneficial uses identified by the RWQCB and, as previously mentioned, meet the State of California's water quality objectives outlined in the *California Inland Surface Waters Plan*.

TABLE 3.2-1

EXISTING RWQCB WATER QUALITY DATA AND OBJECTIVES FOR MUNICIPAL WATER SUPPLIES FOR SEVEN OAKS DAM (1980-1986)

Water Quality Parameter	Unit	Number of Samples	Mean Concentration	Range of Values	RWQCB Objective[a]
Arsenic[b]	ug/l	4	0	0	50
Barium	ug/l	4	0	0	1,000
Boron	ug/l	2	0	0	750
Cadmium	ug/l	4	2.5	10-0	10
Chlorine	ug/l	--	--	--	100
Chromium[c]	ug/l	4	0	0	50
Cobalt	ug/l	15	67	120-0	200
Copper	ug/l	4	0	0	20
Cyanide	ug/l	--	--	--	200
Fluoride	ug/l	1	500	500	1,000
Iron	ug/l	4	40	110-10	300
Lead[b]	ug/l	4	0	0	50
Manganese	ug/l	4	7.5	10-0	50
Mercury[c]	ug/l	14	1.2[d]	12-0[d]	2
Selenium	ug/l	4	0	0	10
Silver	ug/l	--	--	--	50
Zinc	ug/l	20	39[d]	280-0[d]	100
Fecal coliform	30-day	3	377	240-540	200/100 ml[e]
Ammonia[f]	ug/l	11	2.2	13.33.4-0[d]	25[g]
Nitrate (NO3)	mg/l	1	0.4	0.4	45
Methyl. blue	mg/l	1	0.12	0.12	0.5
DDT[c]	ug/l	17	0.084[d]	1.4-0[d]	0.001[h]
Dieldrin[b]	ug/l	17	0[d]	0[d]	0.0019[h]
Heptachor[b]	ug/l	17	0[d]	0[d]	0.0038[h]

TABLE 3.2-1 (continued)

Water Quality Parameter	Unit	Number of Samples	Mean Concentration	Range of Values	RWQCB Objective[a]
Parathion[b]	ug/1	16	0[d]	0[d]	0.04[h]
PCB[c]	ug/1	12	0[d]	0[d]	0.001[h]
Toxaphene[c]	ug/1	3	0[d]	0[d]	0.005[h]
2,4-D[b]	ug/1	17	0.049[d]	0.84-0[d]	None
Temperature	Deg. C	6	15	26-7.5	32.2/25.5[i]
DO	mg/1	70	9.9	12.5-8.2	≥6[g]
pH	--	71	8.13	8.7-6.7	8.5-6.5
TDS	mg/1	70	144	232-82	300
Hardness	mg/1	70	83	99-54	190
Sodium	mg/1	3	14.3	15-14	30
Chloride	mg/1	70	4.84	8-0	20
Nitrogen (N)	mg/1	1	1.80[j]	1.80[j]	5
Sulfate	mg/1	70	11.50	41-4	60
BOD-5 (filter)	mg/1	1	0.70	0.70	8
COD (filter)	mg/1	1	12.90	12.9	25

[a] Unless indicated otherwise, the RWQCB objective reflect a "to-exceed" objective.[b]Data compiled from USGS gauge 11051500 and RWQCB gauges Y517000 and Y5197800.
[c] Direct discharge is prohibited.
[d] Data 1971-1982.
[e] Fecal coliform: Log mean less than 200/100 ml based on five or more samples/30-day period, not more than 10 percent of the samples exceed 400/100 ml for any 30-day period.
[f] Un-ionized (UIA).
[g] Cold water objective.
[h] EPA standard for aquatic life.
[i] Period for June through October/rest of year–warm water objective.
[j] Data 1970-1980.

Source: U.S. Army Corps of Engineers 1988.

Because upstream urbanization is expected to be minimal as it is within the National Forest, the future water quality of the upper Santa Ana River will depend largely upon the extent of recreational uses in and adjacent to the river. No recreational uses are proposed as part of the project alternatives.

3.3 BIOLOGICAL RESOURCES

The biological resources for this project extend into two areas: the area upstream of the Seven Oaks Dam and the area located immediately downstream from the Seven Oaks Dam. The upstream area includes vegetation communities and habitat between the elevation of 2,200 feet and approximately 2,600 feet. Biological resources that will be affected by the construction of the Seven Oaks Dam are described in the 1988 *Phase II General Design Memorandum on the Santa Ana River Mainstem Including Santiago Creek, California: Main Report and Supplemental Environmental Impact Statement* (1988 SEIS) and the 1985 *Upper Santa Ana River Flood Storage Alternatives Study; Supplement to Phase I GDM on the Santa Ana River Mainstem, Including Santiago Creek*, Volume 2 (USACE 1985).

A reconnaissance-level survey was conducted by Michael Brandman Associates of the area upstream of Seven Oaks Dam on September 1, 1995, to assess biological conditions of the area.

3.3.1 VEGETATION/HABITAT

As depicted in Exhibit 3.3-1, the general habitat types identified in the project area in 1995 were chaparral on the canyon slopes, and alluvial scrub and alder woodland in the canyon floor. Much of the habitat in the vicinity of the dam was graded during dam construction. A list of plants observed in the project area is found in Appendix B of this report. Plants observed in the project vicinity are incorporated from several references for use in this document. Plant taxonomy follows Hickman (1993).

3.3.1.1 Chaparral

Chaparral is found on the steep canyon walls of upper Santa Ana Canyon. The chaparral found in Santa Ana Canyon corresponds to northern mixed chaparral as described by Holland (1986). Chaparral is a community of shrubs ranging from 2 to 4 meters in height. This community is typically found on steep and rocky slopes, and the vegetation is adapted to summer drought conditions. Chaparral often forms dense, impenetrable stands of vegetation. Chaparral is a common habitat in Southern California.

On the project site, the density of vegetation is variable, ranging from dense on most slopes to sparse on the steepest slopes. The chaparral is dominated by several species with species' dominance varying with slope and aspect. Common species in the chaparral include chamise (*Adenostoma fasciculatum*), mountain mahogany (*Cercocarpus betuloides*), hoary-leaf ceanothus (*Ceanothus crassifolius*), and holly-leaf redberry (*Rhamnus ilicifolia*). Understory species in the chaparral include black sage (*Salvia mellifera*), poison oak (*Toxicodendron diversilobum*), and southern honeysuckle (*Lonicera subspicata*). Interior live oak (*Quercus wislizenii*) and canyon live oak (*Quercus chrysolepis*) are found on some of the north-facing slopes and in shady side draws. Small patches of coastal sage scrub may be mixed in with the chaparral. Large areas of coastal sage scrub were not apparent during the reconnaissance-level survey of the canyon above the dams, and previously mapped coastal sage scrub (USACE 1988) may have matured into chaparral.

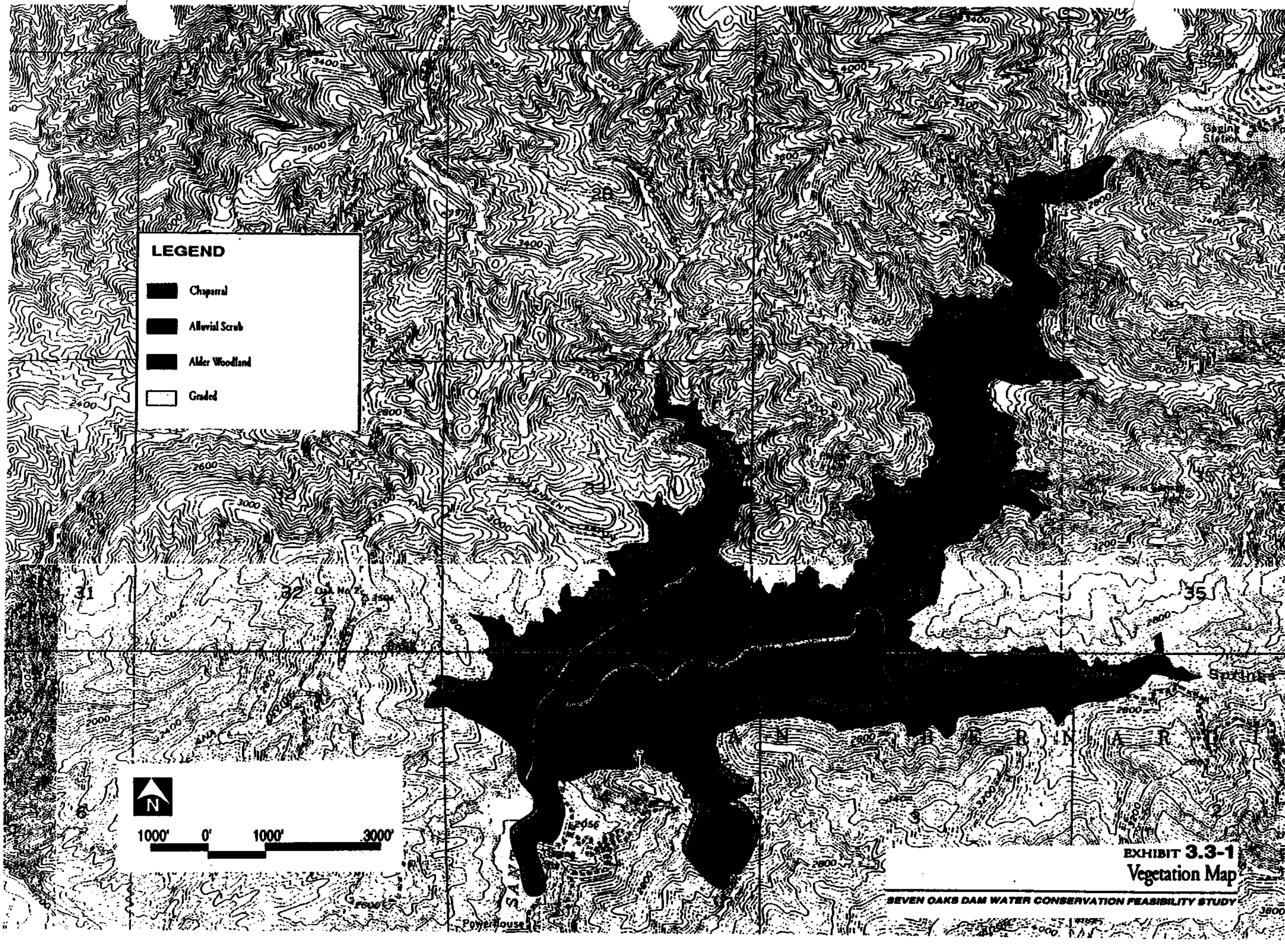


EXHIBIT 3.3-1
Vegetation Map

SEVEN OAKS DAM WATER CONSERVATION FEASIBILITY STUDY

3.3.1.2 Alluvial Scrub

Alluvial scrub vegetation is typically found in washes and streambeds that receive periodic flooding during the rainy season and which are often dry during summer months. Vegetation consists of widely scattered trees or tall shrubs with an understory of sparse shrubs. Plants typical of alluvial scrub, chaparral, and desert habitats are common in this community. Soil stratigraphy in this community consists of active channel, barren cobbles, and vegetated terraces of varying heights and ages (Hanes et al. 1989). Alluvial scrub corresponds with the undescribed Riversidean alluvial fan sage scrub in Holland (1986). Alluvial scrub is considered sensitive by resource agencies because of the scarcity of the habitat, its riparian nature, and its rare flora and fauna.

In upper Santa Ana Canyon, barren cobble occupies much of the canyon floor. The vegetation consists mainly of pioneer phase alluvial scrub and less commonly of intermediate phase alluvial scrub, as described by Hanes et al. (1989). Common plant species in this community include scale-broom (*Lepidospartum squamatum*) and California buckwheat (*Eriogonum fasciculatum*) with California sagebrush (*Artemisia californica*), deerweed (*Lotus scoparius*), and sweetbush (*Bebbia juncea*) among the other shrubs present. In more mature terraces, chamise and mountain mahogany are common. Trees are rare in this community, with Fremont's cottonwood (*Populus fremontii*) and western sycamore (*Platanus racemosa*) found in small numbers throughout the drainage. Herbaceous species present include forget-me-not (*Cryptantha intermedia*) and mustang mint (*Monardella lanceolata*). Wetter areas in the channel are sparsely vegetated by mulefat (*Baccharis salicifolia*), scarlet monkey-flower (*Mimulus cardinalis*), and other wetland species.

Alluvial scrub also exists downstream of the dam in the Santa Ana River Wash. The vegetation in the wash is more complex than that of the upper Santa Ana Canyon, containing pioneer, intermediate, and mature alluvial scrub phases. Plant species and composition of the alluvial scrub vegetation is similar to that of the canyon for the most part in the pioneer and intermediate phases. However, many areas of the wash are less frequently flooded and scoured than the canyon, allowing the vegetation to become more dense, or mature, than that of the canyon. California juniper (*Juniperus californicus*), holly-leaved cherry (*Prunus ilicifolia*), hairy yerba santa (*Eriodictyon trichocalyx*), and other shrubs are present in the mature phases of the wash.

3.3.1.3 Alder Woodland

An alder woodland is present in the upper reaches of Santa Ana Canyon at elevation 2,520 feet. This habitat corresponds to the southern sycamore-alder riparian woodland described in Holland (1986). Holland and resource agencies consider this habitat sensitive because of its riparian nature. Southern sycamore-alder woodlands are found in rocky streambeds that experience seasonal flooding and alders are the dominant tree in perennial streams (Holland 1986).

The alder woodland is small and narrow and is confined to the river channel. The woodland is approximately 1,000 feet in length and between 35 and 70 feet in canopy width. White alder (*Alnus rhombifolia*) is the most common tree, with willows (*Salix* spp.), western sycamore, and Fremont's cottonwood present in small numbers. Understory species present include mugwort (*Artemisia douglasiana*) and mulefat.

3.3.2 GENERAL WILDLIFE

A wide variety of wildlife species is expected to use the site because of the high quality of the habitat and the presence of both scrub (alluvial and chaparral) and riparian habitats. Riparian habitats typically have a high species' diversity because of the presence of water, which attracts wildlife. Riparian habitats typically have stratified vegetation that attracts a variety of birds during winter, migration, and breeding seasons. Reptiles, amphibians, and mammals also use woodlands. Scrub habitats are more xeric than riparian habitats but still support a rich fauna. Several species of reptiles, birds, and mammals are common in scrub communities. Information on wildlife species present at the project site is incorporated from several sources including USACE (1995) and USACE (1988). A list of species observed on the project site is contained in the Appendix D of this report.

3.3.2.1 Fish

Trout are believed to spawn in the Santa Ana River Canyon above the dam. Non-native brown trout (*Oncorhynchus trutta*) are believed to have a self-sustaining population within the canyon, which is rare in Southern California (USACE 1988). Rainbow trout *(Oncorhynchus mykiss)* has also been recorded from upper Santa Ana Canyon (USACE 1985).

3.3.2.2 Amphibians

Three species of amphibians have been observed in the upper Santa Ana River Canyon. The most common amphibian in this area is the California chorus frog (*Pseudacris cadaverina*). Pacific chorus frogs (*Pseudacris regilla*) and western toads (*Bufo boreas*) are also present. Other amphibians including the Pacific slender salamander (*Batrachoseps pacificus*) may be present.

3.3.2.3 Reptiles

Fifteen species of reptile have been observed in upper Santa Ana Canyon. The most common species are the western fence lizard (*Sceloporus occidentalis*) and the side-blotched lizard (*Uta stansburiana*). Coastal western whiptails (*Cnemidophorus tigris multiscutatus*), sagebrush lizards (*Sceloporus graciosus*), and southern alligator lizards (*Gerrhonotus multicarinatus*) are locally common. The western rattlesnake (*Crotalus viridis*), California whipsnake (*Masticophis lateralis*), and gopher snake (*Pituophis melanoleucus*) are the most common snakes within the project area.

3.3.2.4 Birds

Numerous species of birds have been observed in the Santa Ana River Canyon, and several additional species are expected to occur. Common breeding birds of the chaparral include Costa's hummingbird (*Calypte costae*), wrentit (*Chamaea fasciata*), western scrub-jay (*Aphelocoma californica*), lazuli bunting (*Passerina amoena*), and California towhee (*Pipilo crissalis*). Black phoebe (*Saya nigricans*) and rock wren (*Salpinctes obsoletus*) are common in the alluvial scrub. Common wintering species include ruby-crowned kinglet (*Regulus calendula*), yellow-rumped warbler (*Dendroica coronata*), and dark-eyed junco (*Junco hyemalis*). Several additional bird species are expected to use the site during migration.

Raptors observed on the project site include Cooper's hawk (*Accipiter cooperii*), red-tailed hawk (*Buteo jamaicensis*), golden eagle (*Aquila chrysaetos*), and American kestrel (*Falco sparverius*). Turkey vultures (*Cathartes aura*) have been observed foraging over the canyon.

3.3.2.5 Mammals

Over 30 species of mammal have been documented from the Santa Ana River Canyon. Small diurnal mammals noted in the area include California ground squirrel (*Spermophilus beecheyi*) and desert cottontail (*Sylvilagus audubonii*). Small nocturnal mammals present in the canyon include deer mouse (*Peromyscus maniculatus*), brush mouse (*Peromyscus boylii*), and Pacific kangaroo rat (*Dipodomys agilis*). Large mammals observed in the canyon include raccoon (*Procyon lotor*), coyote (*Canis latrans*), bobcat (*Felis rufus*), and mule deer (*Odocoileus hemionus*).

3.3.3 SPECIAL STATUS SPECIES

Special status species are those species listed or being considered for listing as threatened or endangered by the (USFWS, the CDFG, and additionally for plants, the California Native Plant Society (CNPS). Several special status species are known to occur in the project vicinity, including plants that have been listed as endangered. The status of some species has changed since the publication of the SEIS (USACE 1988). Species status was obtained from the following sources: wildlife–USFWS (1994, 1996), CDFG (1994, 1996b) and plants–USFWS (1993, 1996), CDFG (1996a), and Skinner and Pavlik (1994).

3.3.3.1 Special Status Plants

Two special status plants are located downstream from the Seven Oaks Dam site: Santa Ana River woollystar (*Eriastrum densifolium* ssp. *sanctorum*), and slender-horned spineflower (*Dodecahema leptoceras*). Information on their presence comes from the Santa Ana River Mainstem Project SEIS Environmental Appendix, Volume 8 (USACE 1988) and Sweetwater Environmental Biologists (1994, 1995). Table 3.3-1 identifies the status of these species.

During the preparation of the 1988 FSEIS, the USACE requested formal Section 7 consultation with the USFWS for several threatened/endangered species known to occur within the area affected by construction of the SARP. The USFWS, in their Final Biological Opinion, dated June 22, 1989, stated in part that the implementation of the mitigation plan detailed in the Opinion and subsequently integrated into the project design and currently in place, would not likely jeopardize the continued existence of the Santa Ana River woollystar. The mitigation plan developed for the Santa Ana River woollystar consisted of the acquisition and management of 760 acres of woollystar habitat downstream of the dam. (To date approximately 764 to 769 acres of land have been acquired as part of the woollystar mitigation area.) It was further determined in the Opinion that construction of the Seven Oaks Dam would not jeopardize the continued existence of the slender-horned spineflower.

In the 1985 botanical survey report (USACE 1985), Plummer's mariposa lily (*Calochortus plummerae*), Humboldt lily (*Lilium humboldtii* var. *ocellatum*), and Southern California black walnut (*Juglans californica* var. *californica*) are listed as being on the Seven Oaks Dam project site. These plants were not considered sensitive in 1988, but are considered sensitive in the 1994 CNPS Inventory (Skinner and Pavlik 1994). The exact location of these species, and whether or not they are still present or have been impacted by construction activities is unknown.

TABLE 3.3-1

SPECIAL STATUS PLANT SPECIES KNOWN TO OCCUR AT SEVEN OAKS

Plants	USFWS[a]	CDFG[b]	CNPS[c]	Habitat	Potential for Occurrence
Eriastrum densifolium ssp. *sanctorum* Santa Ana River woollystar	Endangered	Endangered	List 1B (endangered)	Alluvial scrub	Present downstream from dam site
Dodecahema leptoceras slender-horned spineflower	Endangered	Endangered	List 1B (endangered)	Alluvial scrub	Present downstream from dam site
Chorizanthe parryi var. *parryi* Parry's spineflower	Species of Concern	--	List 3 (more information needed)	Alluvial scrub, chaparral	Present downstream from dam site
Calochortus plummerae Plummer's mariposa lily	Species of Concern	--	List 1B (endangered)	Chaparral, coastal sage scrub, woodlands	Observed, location not recorded
Juglans californica var. *Californica* Southern California black walnut	--	--	List 4 (limited distribution)	Woodlands, alluvial scrub, chaparral, coastal sage scrub	Observed, location not recorded
Lillium humboldtii var. *ocellatum* Humboldt lily	--	--	List 4 (limited distribution)	Chaparral, forests, woodlands	Observed, location not recorded

[a] USFWS
Endangered. Taxa threatened throughout all or a significant portion of their range.
Species of Concern. Former Category 2 candidate for listing.

[b] CDFG
Endangered. Taxa which are in serious danger of becoming extinct throughout all, or a significant portion, of their range because of one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease.

[c] CNPS
1B Plants rare, threatened, or endangered in California and elsewhere.
3 Plants about which we need more information.
4 Plants of limited distribution.

No other listed or candidate plant species are noted as occurring in the vicinity of the project site in USACE (1985, 1988) documents and more recent studies conducted by Sweetwater Environmental Biologists (1994, 1995).

3.3.3.2 Special Status Wildlife Species

Several species of wildlife that are considered sensitive by USFWS and CDFG are known or believed to be present in the project area. These species are listed in Table 3.3-2. Information on habitat and locations of sensitive species is from the California Natural Diversity Data Base (CNDDB 1996), a letter from USFWS (1995b) pertaining to sensitive species in the vicinity of Seven Oaks Dam, *Amphibian and Reptile Species of Special Concern in California* (Jennings and Hayes 1994), *Drainages with Extant Arroyo Toad Populations-Draft January 5, 1995* (USFWS 1995a), *Fish Species of Special Concern of California* (Moyle, Williams, and Wikramanayake 1989), *California's Wildlife Vol 1, 2, and 3* (CDFG 1988, 1990), *Birds of Southern California: Status and Distribution* (Garrett and Dunn 1981), USACE (1985), the 1988 SEIS, field guides, and other pertinent sources. Some of these species are known to occur in the project vicinity, and suitable habitat is present for others. These species may be resident onsite, use the site for winter foraging, or use the site during the breeding season. Some of these species may not actually occur in the project area. Most of these species were not addressed in the 1988 SEIS because they were not considered sensitive at that time.

Biological surveys for the Arroyo Southwestern Toad, California Red-Legged Frog, and the Santa Ana Sucker have recently been conducted and completed within the project area both upstream and downstream of the dam. These surveys were conducted in response to concerns by the USFWS that the proposed water conservation project (and Mainstem flood control project) could have negative impacts on these listed species if they were present in the area. The results of these surveys was negative for the presence of these species.

TABLE 3.3-2

SPECIAL STATUS WILDLIFE SPECIES POTENTIALLY OCCURRING AT SEVEN OAKS

	Status			
	USFWS[a]	CDFG[b]	Habitat	Potential for Occurrence
Invertebrates				
Cicindela tranquebarica viridissima greenest tiger beetle	--	--	Sandy areas near and in streambeds	High; known from the Santa Ana River
Fish				
Catostomus santaanae Santa Ana sucker	--	Species of Special Concern	Streams with sand, rubble, or boulder substrates	High; known from the Santa Ana River
Gila orcutti arroyo chub	--	--	Slow moving streams with sand or mud substrates	High; known from the Santa Ana River

TABLE 3.3-2 (continued)

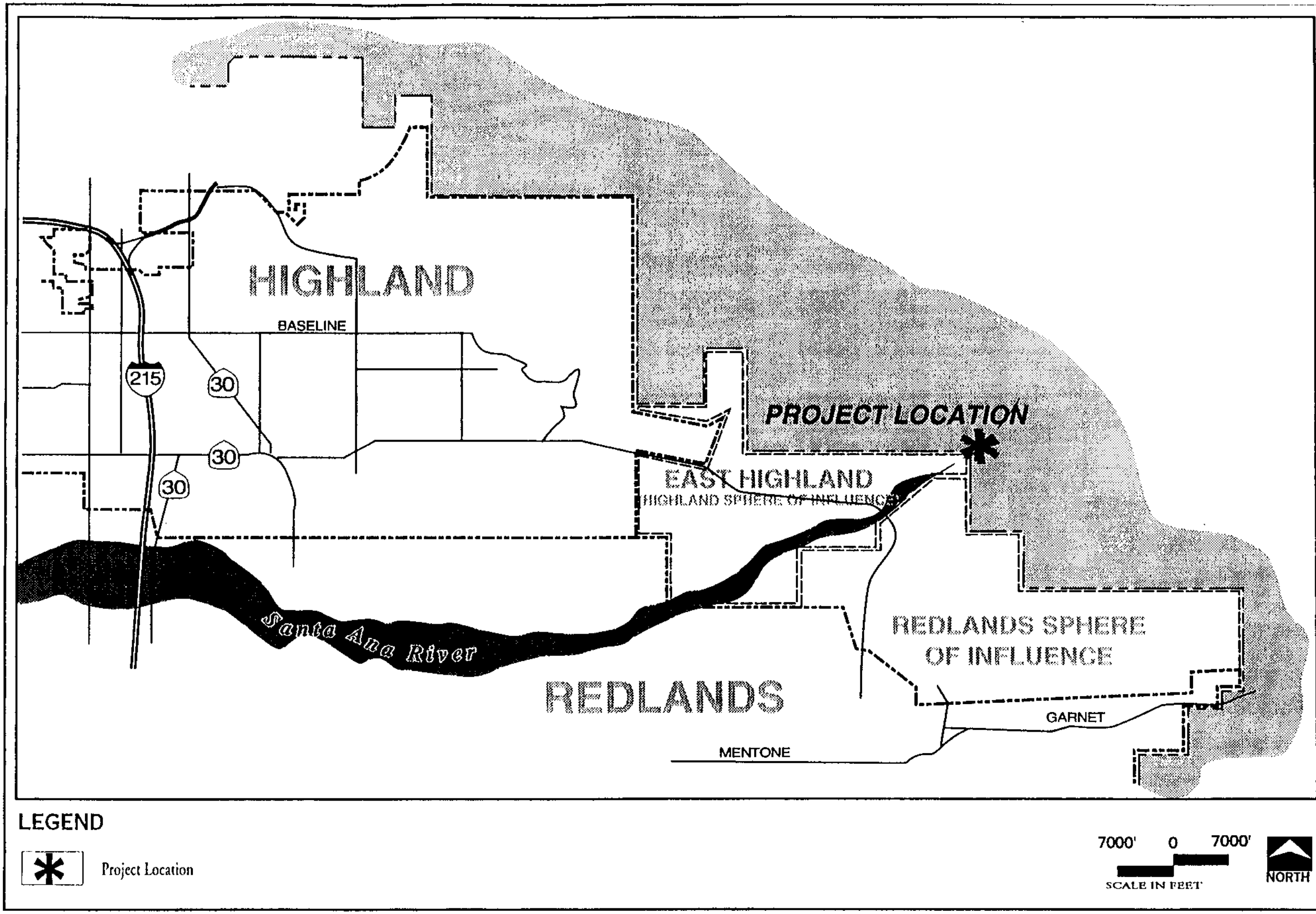
	Status			
	USFWS[a]	CDFG[b]	Habitat	Potential for Occurrence
Rhinichthys osculus ssp. Santa Ana speckled dace	--	Species of Special Concern	Streams with gravel and cobble substrates, prefers riffles	High; known from the Santa Ana River
Amphibians				
Scaphiopus hammondii western spadefoot toad	--	Species of Special Concern	Seasonal and perennial ponds, grassland and coastal sage scrub	Low; marginal habitat present; not recorded from Santa Ana River
Rana aurora draytonii California red-legged frog	Threatened	Species of Special Concern	Riparian vegetation with deep, still, or slow-moving water	Low; suitable habitat present; not recorded from Santa Ana River
Bufo microscaphus californicus southwestern arroyo toad	Endangered	Species of Special Concern	Overflow pools with sand or gravel substrates near sandbars	Moderate; suitable habitat present; not recorded from the Santa Ana River
Reptiles				
Clemmys marmorata pallida southwestern pond turtle	--	Species of Special Concern	Slow moving streams and ponds	Low; marginal habitat present; not recorded from Santa Ana River
Aniella pulchra pulchra silvery legless lizard	--	Species of Special Concern	Coastal dunes and beaches, washes, oak woodlands	High; wash habitat present
Cnemidophorus hyperythrus orange-throated whiptail	--	Species of Special Concern	Coastal sage scrub, washes	Observed
Cnemidophorus tigris multiscutatus coastal western whiptail	--	--	Coastal sage scrub, chaparral, grasslands, woodlands	Observed
Phrynosoma coronatum blainvillei San Diego horned lizard	--	Species of Special Concern	Coastal sage scrub, washes, open grasslands	Observed
Lichanura trivirgata rosefusca coastal rosy boa	--	--	Coastal sage scrub, chaparral, woodlands, rock outcrops	Observed
Lampropeltis zonata parvirubra San Bernardino mountain kingsnake	--	--	Rocky canyons with chaparral or forests	Observed

TABLE 3.3-2 (continued)

	Status			
	USFWS[a]	CDFG[b]	Habitat	Potential for Occurrence
Diadophus punctatus modestus San Bernardino ringneck snake	--	--	Woodlands, forest, chaparral, and grasslands	High; suitable habitat present
Thamnophis hammondii two-striped garter snake	--	--	Streams and ponds with riparian vegetation	High; known from Santa Ana River
Crotalus ruber ruber red-diamond rattlesnake	--	Species of Special Concern	Coastal sage scrub, chaparral, woodlands	Observed
Birds				
Empidonax traillii extimus southwestern willow flycatcher	Endangered	Endangered	Riparian woodlands with willows	Low; suitable habitat lacking
Polioptila californica californica coastal California gnatcatcher	Threatened	Species of Special Concern	Coastal sage scrub, alluvial fan sage scrub	Low due to range limits, but has been observed incidentally
Lanius ludovicianus loggerhead shrike	--	Species of Special Concern	Grasslands, coastal sage scrub, woodlands	High; suitable habitat present
Vireo bellii pusillus least Bell's vireo	Endangered	Endangered	Riparian woodlands with willows	Low; marginal habitat present; observed incidentally
Aimophila ruficeps canescens Southern California rufous-crowned sparrow	--	Species of Special Concern	Coastal sage scrub, chaparral	High; suitable habitat present
Amphispiza belli belli Bell's sage sparrow	--	Species of Special Concern	Coastal sage scrub chaparral	Moderate; moderate habitat present
Raptors				
Strix occidentalis occidentalis California spotted owl	--	Species of Special Concern	Old growth forest	Observed; may wander downslope during winter
Elanus leucurus white-tailed kite	--	Fully Protected	Grasslands, woodlands	Low; marginal foraging habitat present
Circus cyaneus northern harrier	--	Species of Special Concern	Grasslands, marshes, open scrub habitats	Observed; winter foraging habitat present

TABLE 3.3-2 (continued)

	Status			
	USFWS[a]	CDFG[b]	Habitat	Potential for Occurrence
Aquila chrysaetos golden eagle	--	Species of Special Concern, Fully Protected	Grasslands, woodlands, open scrub habitats	Observed; foraging habitat present
Accipiter cooperii Cooper's hawk	--	Species of Special Concern	Oak woodlands, riparian woodlands	Observed; foraging habitat present
Accipiter striatus sharp-shinned hawk	--	Species of Special Concern	Woodlands	High; winter foraging habitat present
Buteo regalis ferruginous hawk	--	Species of Special Concern	Grasslands	Low; no suitable winter foraging habitat present
Falco mexicanus prairie falcon	--	Species of Special Concern	Grasslands, open scrub habitats	Moderate; foraging habitat present
Mammals				
Euderma maculatum spotted bat	--	Species of Special Concern	Roosts in rock crevices, forages in many habitats	Low; suitable foraging habitat present, but species is very rare
Plecotus townsendii pallescens pale big-eared bat	--	Species of Special Concern	Roosts in rocky crevices, caves, mines, tunnels, and buildings; forages mainly in mesic habitats	Moderate; suitable foraging habitat present
Eumops perotis californicus California mastiff bat	--	Species of Special Concern	Roosts in steep rocky cliffs, trees, buildings; forages in several habitats	Moderate; suitable foraging habitat present
Antrozous pallidus pallid bat	--	Species of Special Concern	roosts in dry rocky habitats, mines, caves, and hollow trees; forages in several habitats	High; suitable foraging habitat present
Lepus californicus bennettii San Diego black-tailed jackrabbit	--	Species of Special Concern	Coastal sage scrub, chaparral, grasslands	Observed
Chaetodipus fallax fallax northwestern San Diego pocket mouse	--	Species of Special Concern	Chaparral, grasslands, desert scrub	Observed



SOURCE: U.S. Army Corps of Engineers, Los Angeles District.

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EXHIBIT **3.4-1**
Jurisdictional Boundaries

TABLE 3.3-2 (continued)

	Status			
	USFWS[a]	CDFG[b]	Habitat	Potential for Occurrence
Perognathus longimembris brevinasus Los Angeles little pocket mouse	--	Species of Special Concern	Coastal sage scrub, grasslands	Moderate; may occur in alluvial scrub
Onychomys torridus ramona southern grasshopper mouse	--	Species of Special Concern	Coastal sage scrub, chaparral	Moderate; suitable habitat present
Dipodomys merriami parvis San Bernardino kangaroo rat	Candidate	Species of Special Concern	Alluvial fan sage scrub	Known to occur downstream of dam site
Neotoma lepida intermedia San Diego desert woodrat	--	Species of Special Concern	Shrub habitat, rock outcrops	Observed
Taxidea taxus American badger	--	--	Grasslands, open coastal sage scrub and chaparral	Observed
Bassariscus astutus ringtail	--	Fully Protected	Rocky habitats	Observed
Ovis canadensis nelsoni Nelson's bighorn sheep	--	--	Many habitats in rugged mountain terrain	Observed

[a] USFWS
- Endangered. Taxa threatened throughout all or a significant portion of their range.
- Threatened. Taxa likely to become endangered in the foreseeable future.
- Candidate. Taxa for which the USFWS currently has on file substantial information on biological vulnerability and threat(s) to support the appropriateness of proposing to list them as endangered or threatened species.

[b] CDFG
- Endangered. Taxa which are in serious danger of becoming extinct throughout all, or a significant portion, of their range because of one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease.
- Species of Special Concern. Taxa which the Fish and Game Commission has formally noticed as being under review by the Department in addition to the list of threatened and endangered species.
- Fully Protected. A designation adopted by the state prior to creation of the state Endangered Species Act; protects from harassment or harm any species considered rare or endangered.

3.3.4 HABITAT FRAGMENTATION AND WILDLIFE MOVEMENT CORRIDORS

The basic function of wildlife movement corridors is to allow animals to travel, migrate, and meet mates; allow for genetic interchange; allow for wildlife movement in response to environmental changes and disasters; and allow for recolonization of habitats from which a species has been extirpated (Beier and Loe 1992). It has been suggested that wildlife movement corridors act to reduce the effects of habitat fragmentation and genetic isolation associated with urbanization and other land uses by connecting habitat patches and allowing movement between the patches.

The upper Santa Ana Canyon has been documented as being a migration route for mule deer. Mule deer use Santa Ana Canyon, Government Canyon, Warm Springs Canyon, Deep Creek, and Morton Canyon for foraging and during seasonal migration (USACE 1988). Other species, such as small mammals, birds, and reptiles, undoubtably also use the project area for the migratory purposes described above.

3.4 LAND USE AND RECREATION

This section addresses the existing land uses, land use controls, agricultural soils and agricultural land uses, and recreational uses within the project area The study area is within several governmental jurisdictions from the federal level (National Forest) to local level (City of Highland). Exhibit 3.4-1 depicts the jurisdictional boundaries in the study area.

3.4.1 EXISTING LAND USES

3.4.1.1 Onsite Land Uses

As noted in Section 2, the Seven Oaks Dam has a reservoir area of 780 acres. The 550-foot-high earth-rockfill dam provides a gross storage capacity of 145,600 acre-feet at the spillway crest elevation of 2,580 feet NGVD, with 113,600 acre-feet allocated to flood control and 32,000 acre-feet to sediment storage. The average annual inflow is 24,000 acre-feet per year.

3.4.1.2 Offsite Land Uses

The principal land use surrounding the Seven Oaks Dam site is open space within the National Forest. Recreational uses, such as hiking, camping, and hunting occur throughout the area. Several gauging stations consisting of small structures and powerhouses, operated under a Federal Energy Regulatory Commission license, are located along the Santa Ana River and its tributaries. The Bear Valley Aqueduct, which joins with the Redlands Aqueduct, south of Greenspot Road, travels northward towards Big Bear. Additional land uses include U.S. Forest Service roads; Southern California Edison (SCE) powerhouses Nos. 1, 2, and 3, flume system, and transmission lines. A well, formally owned by the Bear Mutual Water Company, has been purchased by the local sponsors of Seven Oaks Dam on June 14, 1994 and, under the terms of the purchase agreement, Bear Valley Mutual Water Company will be allowed to operate until the first inundation from ponding behind the dam. R

3.4.2 PLANNING AND POLICY DOCUMENTS

3.4.2.1 National Forest Service Management Plan

The United Stated Department of Agriculture, Forest Service, controls land in the San Bernardino National Forest. The San Bernardino National Forest Land and Resource Management Plan of 1988 (Forest Plan) is required by the Forest and Rangeland Renewable Resources Planning Act, as amended by the National Forest Management Act. The Forest Plan was developed to direct the management of the San Bernardino National Forest. The goal of the Forest Plan is to provide a management program that reflects a mix of activities which allows use and protection of forest resources, fulfills legislative requirements, and addresses local, regional, and national issues. The Plan:

- "Establishes the management direction and associated long-range goals and objectives for the San Bernardino National Forest;
- Specifies standards, guidelines, approximate timing and vicinity of the practices necessary to achieve that direction; and,
- Establishes monitoring and evaluation requirements and standards needed to ensure that direction is carried out to determine how well outputs and effects were predicted, and indicate need for Plan update or amendment."

The San Bernardino National Forest is divided into 15 management areas which are delineated based on combinations of watersheds with similar characteristics, wilderness areas, and potential wilderness areas. The Seven Oaks Dam is within the Santa Ana Management Area. The 94,350-acre Santa Ana Management Area is divided into three districts: Arrowhead, Big Bear, and San Gorgonio. The project site is located within the San Gorgonio District which is further subdivided into three sections: Headwaters, Southern, and Central. The Seven Oaks Dam is within the Central section.

Each management area contains one or more MEZs which are used to define areas that will receive particular management emphasis. The predominant emphasis is watershed/wildlife: "manage to maintain and enhance watershed integrity, to protect onsite and downstream values, and to sustain land productivity...." Non-motorized recreational activities are acceptable. Specific to the project area, the Forest Plan states that "non-motorized recreation will be emphasized in the area behind the Seven Oaks Dam."

The Forest Management Plan provides policy direction and planning through its "Forestwide Standards and Guidelines." These guidelines cover the following management activities: ecological minimums, air quality, cultural resources, energy, facilities, fire management, forest pests, geologic hazard areas, land ownership and use, law enforcement, legal agreements, minerals, planning, range, recreation, revegetation with native plants, riparian areas and wetlands, soil productivity, special interest areas, timber, transportation systems, visual resource management, water, wild and scenic rivers, wilderness, wildlife and fish, and threatened, endangered, and sensitive plants. Of these activities, air quality, energy, facilities, geologic hazard areas, recreation, riparian and wetlands, visual resources, water, and wild and scenic rivers are mostly or partly applicable to the proposed alternatives.

Wild Rivers Designation. Portions of the Santa Ana River have been designated as Wild and Scenic Rivers pursuant to the Wild and Scenic Rivers Act. The determination prepared by the Forest Service separates the Santa Ana River into seven segments. The Seven Oaks Dam is located within the "Santa Ana River between Bear Creek and the Forest Boundary" segment. This segment is not considered a scenic river because it is not free-flowing and diversions are present within this segment, and is, therefore, not considered eligible for designation.

3.4.2.2 County of San Bernardino General Plan

West of the Forest Service boundary, most land is located within the unincorporated area of the County of San Bernardino. The county's land use designation for the Seven Oaks Dam site specifies that the Forest Service controls the land use jurisdiction.

The San Bernardino County General Plan includes several elements that pertain to water resources (flooding and water conservation), open space, and recreation. County goals for water resources include providing a balanced hydrological system, implementation of water conservation measures, and improved water distribution systems. Flooding policies stress the importance of planning for floodways, limiting risks for dam failure, preserving the natural features of drainages, and continuing coordination on the Santa Ana River Mainstem. Open space policies cover a variety of topics including multi-use of open space areas, trails, preservation of natural resources, recreation, scenic resources, and public health and safety (including public access to dams).

3.4.2.3 City of Highland General Plan

The City of Highland is located directly west of the Seven Oaks Dam site. The corporate boundary for the City of Highland is several miles from the Seven Oaks Dam site, but the Planning Area designated in the Highland General Plan covers county lands along Greenspot Road to the National Forest boundary. This area includes the lower portion of the Seven Oaks Dam site where Santa Ana Canyon Road intersects with Greenspot Road. A portion of the Santa Ana River Wash is within also the Planning Area for the City of Highland.

The General Plan designation for the area along Greenspot Road–inclusive of the lower Seven Oaks Dam site–is Agricultural/Equestrian [0 to 2.0 dwelling units per acre (du/ac)]. This designation is defined as areas appropriate for rural and equestrian-oriented residential development. The maximum residential density within the Agricultural/Equestrian designation is up to 2 du/ac. The Agricultural/Equestrian land use category permits and protects the keeping of large animals, as well as the ability of landowners to carry on light agricultural activities.

The portion of the Santa Ana River Wash within the Highland Planning Area is designated as Open Space (OS). The primary purpose of areas designated Open Space is the provision of recreation facilities, preservation of environmental values, managed production of resources, and protection of public safety. Within Open Space areas, only uses consistent within the provision of recreation and community/cultural activities and which are consistent with the protection of the public health and safety and may be considered appropriate, are allowed, subject to applicable Highland General Plan provisions and city ordinances.

3.4.2.4 City of Redlands General Plan

The City of Redlands is located approximately 8 miles southwest of the Seven Oaks Dam site. The city's planning area boundaries extend to Greenspot Road which serves as an access road to the Seven Oaks Dam site. The city's planning area includes unincorporated San Bernardino County property that could be annexed into the city in the future. The City of Redlands planning boundaries are contiguous to the planning boundaries of the City of Highland.

Land in the city's planning area which is nearest to the project site is vacant and is designated Resource Conservation. Most of the Santa Ana River Wash within the Redlands Planning Area is designated Flood Control Conservation/Construction Aggregates/Habitat Preservation.

3.4.3 AGRICULTURAL SOILS

There are no farmlands within the Seven Oaks Dam site. Areas near the dam (along Greenspot Road) do support agricultural uses such as orchards, but are not expected to be negatively affected by the water conservation alternatives.

3.4.4 RECREATION

Recreational uses are an integral component of the National Forest, with an emphasis on passive recreation such as hiking, exploration, and equestrian uses. Portions of the forest are designated in the Forest Management Plan as being closed to motor vehicles year-round. As previously noted, National Forest Roads 1N13 and 1N16 lead from Greenspot Road into the forest and provide access for a variety of recreational uses. Access into the canyon was closed for construction of the Seven Oaks Dam. The closest developed recreational uses within the forest are camp sites within Mill Creek and upstream of the Seven Oaks Dam within Barton Flats. Two trails–the Santa Ana Divide Trail to the north and the Morton Ridge Trail to the south–are near Seven Oaks Dam.

Recreational uses are also prevalent downstream of the dam. The General Plans for the cities of Highland and Redlands both identify the Santa Ana River Wash as areas for recreational uses. Uses include hiking and equestrian.

3.5 TRANSPORTATION AND CIRCULATION

The following briefly describes the existing street system and known circulation conditions within the study area which is defined as the area bound by the San Bernardino Freeway (I-10) to the south, State Route 30 (SR-30) to the west, the San Bernardino Forest to the east, and Greenspot Road to the north.

3.5.1 ROAD SYSTEM

Roadways in the circulation study area are generally rural in character, although the western portion of the study area is subject to continued growth and urbanization pressures. The study area includes several different agencies that have control over traffic improvements and general circulation. The City of Highland is on the western side of the study area. The City of Redlands is to the south, which includes I-10 and is controlled by the California Department of Transportation (Caltrans). The County of San Bernardino and the National Forest Service control roads in the central and northeastern portions of the study area, respectively.

The following freeway, arterial, collector, and minor roads are in the study area and could be subject to traffic generated by the project:

Interstate 10 (San Bernardino Freeway). The segment of Interstate 10 (I-10) within the study area is located entirely within the City of Redlands. I-10 has interchanges at Yucaipa Boulevard, Wasbash Avenue, Ford Street, Cypress Avenue, University Street, Orange Street, and California Street. The I-10/SR-30 interchange is also within the City of Redlands. I-10 carries over 24,000 Average Daily Trips (ADT) and has a minimum of four travel lanes in each direction.

State Route 30. SR-30 is a north/south freeway that connects to I-10 and travels north to connect to Interstate 215 (I-215). In the City of Highland, SR-30 connects to SR-330 which travels into the San Bernardino National Forest and the Big Bear Lake area. SR-30 has interchanges at 5th Street (which turns into Greenspot Road) and at Base Line.

Greenspot Road. Greenspot Road is an east/west collector road that serves the City of Highland and the unincorporated area of San Bernardino County and extends south to the City of Redlands. In the study area, Greenspot Road is developed to rural standards: one lane in each direction, soft shoulders, and limited traffic controls. Most intersections are stop controlled; however, a few within the more urbanized area of the City of Highland are signalized. The most recent traffic counts for Greenspot Road were performed by the County of San Bernardino, Transportation and Flood Control Department. In September 1993, Greenspot Road south of the Santa Ana River bridge had a daily volume of 1,565 ADT. North of Florida Street, Greenspot Road had a volume of 1,708 ADT in the same year.

Santa Ana Canyon Road. Santa Ana Canyon Road intersects with Greenspot Road within the unincorporated area of San Bernardino County. Santa Ana Canyon Road is an unimproved access road that accesses the facilities within Santa Ana Canyon such as the SCE powerhouses and Seven Oaks Dam.

National Forest Roads 1N13 and 1N16. The National Forest Management Plan identifies two roads in the study area. One is designated as 1N13 and corresponds to Santa Ana Canyon Road; 1N13 travels up the Santa Ana River channel. According to the Management Plan, this collector road is currently used but is not proposed for long-time preservation. 1N16 intersects with Greenspot Road to the west of Santa Ana Canyon Road and is designated as a current and preferred collector road. These roads primarily provide access to the National Forest for recreation, forest service needs, and fire suppression.

3.5.2 OTHER TRANSPORTATION MODES

The Atchison, Topeka and Santa Fe (AT&SF) Railroad owns a railroad line to the west of the Seven Oaks Dam. The line travels in a north/south direction generally parallel to I-15. One loop of this line passes south through the City of Highland, crosses the Santa Ana River floodplain, and continues to Mentone. The AT&SF railroad sold this line to Metrolink, which provides commuter rail service to the region. It is anticipated that in the future this line will experience increased usage because of commuter rail use (City of Redlands 1995).

There are several airports in the region, including the San Bernardino International Airport approximately 6.5 miles to the west and the City of Redlands Municipal Airport located south of the Santa Ana Wash, between Judson Street and Wabash Avenue. In 1995, the Redlands Municipal Airport is projected to handle approximately 186 daily aircraft (City of Redlands 1995).

3.6 AIR QUALITY

This air quality analysis has been prepared in accordance with the methodologies provided by the (SCAQMD in its 1993 *CEQA Air Quality Handbook*. A discussion of the federal, state, and local air quality regulatory requirements is provided in Appendix C in this EIS/EIR.

3.6.1 REGIONAL AND LOCAL SETTING

The project site is located in the San Bernardino National Forest approximately 8 miles northeast of the City of Redlands in San Bernardino. The project site is located within the basin of California. The basin is a 6,600-square-mile area that encompasses all of Orange County and the nondesert portions of San Bernardino, Los Angeles, and Riverside counties. It is bounded by the Pacific Ocean to the west and the San Bernardino, San Gabriel, and San Jacinto mountains to the north and east. Its climate and topography, which are discussed below, make the basin highly conducive to the formation of air pollution.

3.6.1.1 Climate: Regional Conditions

Climate and air quality are determined by the location, topography, and urbanization of an area. Meteorological conditions in the basin, such as light winds and shallow vertical mixing, and topographical features, such as surrounding mountain ranges, hinder the dispersal of air pollutants. The strength and location of a semipermanent, subtropical high-pressure cell over the Pacific Ocean primarily controls the climate of the basin. Climate is also affected by the moderating effects of the nearby oceanic heat reservoir. Warm summers, mild winters, infrequent rainfall, moderate daytime onshore breezes, and moderate humidities characterize climatic conditions throughout most of the basin.

Differences in terrain cause a number of micro-climates within the basin's overall climate. The pattern of mountains and hills is primarily responsible for the wide variations of rainfall, temperatures, and localized winds that occur throughout the region. Temperature variations have an important influence on wind flow in the basin, dispersion along mountain ridges, vertical mixing, and photochemistry. The moderating marine influence decreases with distance from the ocean, resulting in monthly and annual temperature variations that are greatest inland and smallest at the coast. Precipitation is highly variable seasonally. Summers are often completely dry, resulting in periods of 4 to 5 months without rain. In winter, occasional storms sweep across the coast, bringing rain. Annual rainfall is lowest in the coastal plain and inland valleys, higher in the foothills, and highest in the mountains.

Frequent temperature inversions in the basin trap air pollutants in a limited atmospheric volume near the ground and hamper dispersion. In the month of January, a surface inversion exists on 70 percent of the mornings. Average wind speed in the basin is less than 5 miles per hour on 80 percent of the days during the summer smog season; this is a measure of daily air stagnation.

Southern California frequently experiences temperature inversions which inhibit pollutant dispersal. Inversions may be either ground-based or elevated. Ground-based inversions are most severe during clear, cold early winter mornings. At this time, the greatest pollution problems are from carbon monoxide (CO) and nitrogen oxides (NOx). High carbon monoxide concentrations occur on winter days with strong surface inversions and light winds. Carbon monoxide transport is extremely limited, and highest concentrations occur in close proximity to the source of emissions. Since carbon monoxide is produced almost entirely from automobiles, the highest concentrations are associated with areas of heavy traffic.

Elevated inversions act as a lid or upper boundary and restrict vertical mixing. Mixing heights for elevated inversions are lower in the summer and more persistent. The low summer inversions are partly responsible for the high levels of ozone experienced during the summer months.

During summer's longer daylight hours, sunshine provides the energy needed to fuel the photochemical reactions between NOx and reactive organic compounds (ROC) which form ozone (O_3). Formation of high levels of ozone requires ample sunlight, early morning stagnation in source areas, high surface temperatures, strong and low morning inversions, greatly restricted vertical mixing during the day, and daytime subsidence that strengthens the inversion layer. The most frequent ozone transport route is from source areas in coastal areas to receptor areas along the base of the San Gabriel and San

Bernardino mountains. On the rare days with offshore flows, ozone transport is more limited, and highest concentrations occur in the western portion of the basin.

High nitrogen dioxide (NO_2) levels usually occur during the autumn or winter on days with summerlike weather conditions. These conditions include low inversions, limited daytime mixing, and stagnant windflow. Although days are clear, sunlight is limited in duration and intensity. Photochemical reactions which would otherwise form ozone are incomplete.

Atmospheric particulates are made up of fine solids or liquids such as soot, dust, aerosols, fumes, and mists. A large portion (approximately 45 percent) of the total suspended particulate (TSP) matter in the atmosphere is finer than 10 microns (PM10) in size. As with ozone, a substantial fraction of PM10 forms in the atmosphere as a result of chemical reactions. Peak concentrations of both ozone and PM10 occur downwind of precursor emission sources.

3.6.1.2 Local Climate

Temperature

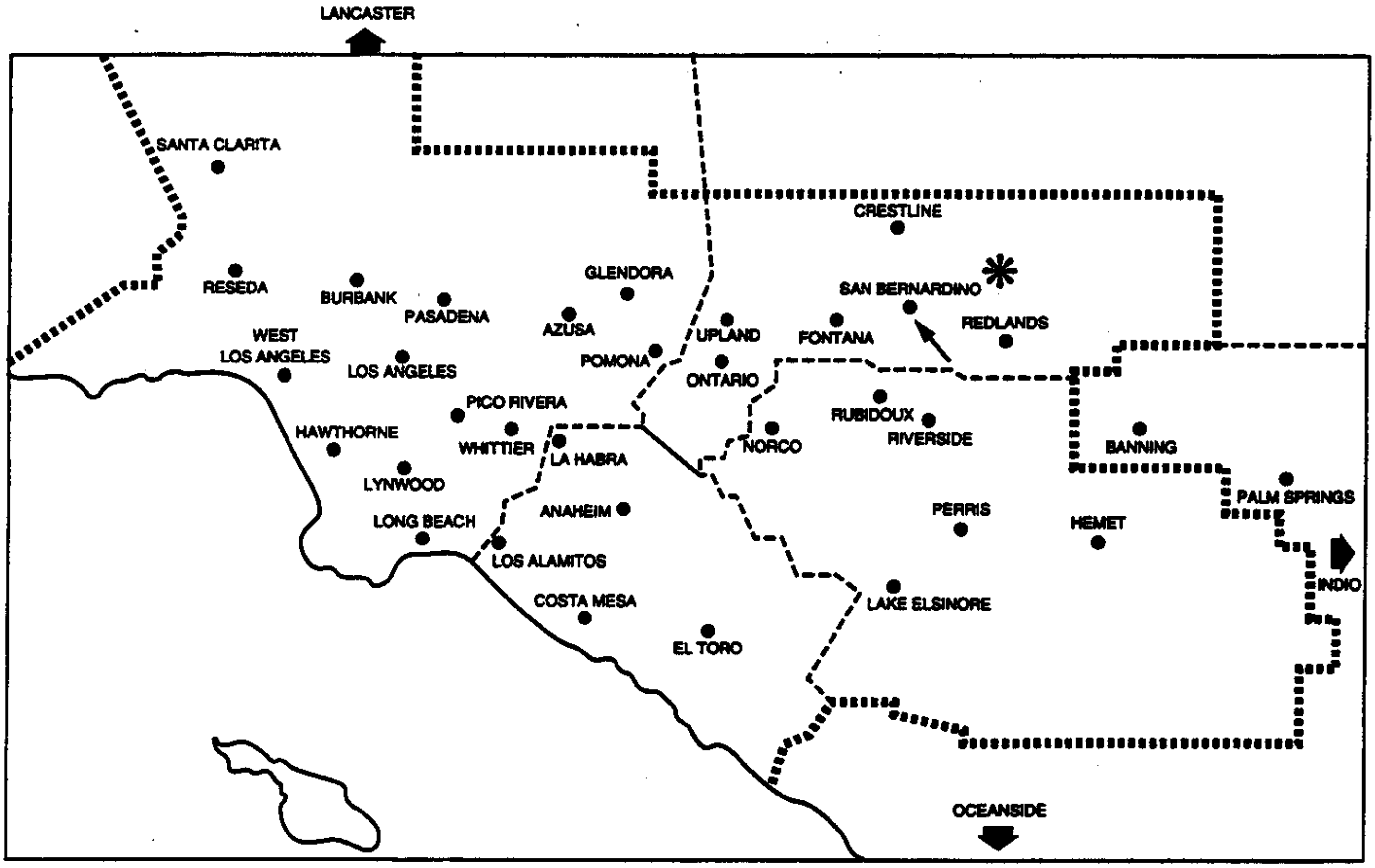
The project area experiences low to moderate temperatures and humidities. At the Redlands weather station, temperatures average 62.8 degrees Fahrenheit annually. Summer afternoon maximum temperatures are frequently in the low 90 degrees Fahrenheit, and winter morning minimum temperatures are typically in the high 30s. Because of the moderating marine influence that decreases with distance from the ocean, monthly and annual spreads between temperatures are greatest inland and least at the coast. Temperature has an important influence on basin wind flow, dispersion along mountain ridges, vertical mixing, and photochemistry.

Precipitation

Precipitation is highly variable seasonally. Rainfall in the project area (taken at the Redlands weather station) averages 14.5 inches annually and occurs almost exclusively from November to April. Summers are fairly dry, with rainfall in some summer months amounting to less than one-half inch. Annual rainfall is lowest in the coastal plain and inland valleys, higher in the foothills, and highest in the mountains.

Winds

Winds across the project area are an important meteorological parameter because they control both the initial rate of dilution of locally generated air pollutant emissions and their regional trajectory. Wind speeds tracked at Norton Air Force Base showed speeds averaging 4.1 miles per hour annually. Winds occur from all directions, with 29 percent coming from a west to southwest direction. At night, the wind flow pattern reverses, with an offshore flow.



LEGEND

- South Coast Air Basin
- Project Site
- Air Monitoring Station
- Stations Representative of Study Area's Air Quality

24 12 0 24 Miles

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EXHIBIT **3.6-1**

SCAQMD Air Monitoring Network

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SEVEN OAKS DAM WATER CONSERVATION FEASIBILITY STUDY

	California	National [b]	
Air Pollutant	**Concentration [a]**	**Primary(>)**	**Secondary(>)**
Ozone	0.09 ppm,1-hr. avg.	0.12 ppm, 1-hr. avg.	0.12 ppm, 1-hr. avg.
Carbon Monoxide	9.0 ppm, 8-hr. avg. 20 ppm, 1-hr. avg.	9.5 ppm, 8-hr. avg. 35 ppm, 1-hr. avg.	9.5 ppm, 8-hr. avg. 35 ppm, 1-hr. avg.
Nitrogen Dioxide	0.25 ppm, 1-hr. avg.	0.053 ppm, annual avg.	0.053 ppm, annual avg.
Sulfur Dioxide	0.05 ppm, 24-hr. avg.[c]	0.03 ppm, annual avg. 0.14 ppm, 24-hr. avg.	0.50 ppm, 3-hr. avg.
Suspended Particulate Matter (PM 10)	30 ug/m^3 annual geometric mean 50 ug/m^3, 24-hr. avg.	50 ug/m^3, annual arithmetic mean 150 ug/m^3, 24-hr. avg.	50 ug/m^3, annual arithmetic mean 150 ug/m^3, 24-hr. avg.
Sulfates	25 ug/m^3, 24-hr. avg.		
Lead	1.5 ug/m^3, 30-day avg.	1.5 ug/m^3, calendar quarter	1.5 ug/m^3, calendar quarter
Hydrogen Sulfide	0.03 ppm, 1-hr. avg.		
Vinyl Sulfide	0.010 ppm, 24-hr. avg.		
Visibility Reducing Particles	In sufficient amount to reduce the prevailing visibility to less than 10 miles at relative humidity less than 70%, 1 obs.		

a) California standards for ozone, carbon monoxide (exept Lake Tahoe), sulfur dioxide (1-hour), nitrogen dioxide, suspended particulate matter-PM_{10}, visibility reducing particles, are values that are not to be exceeded. The sulfur dioxide (24-hour), sulfates, Lake Tahoe carbon monoxide, lead, hydrogen sulfide, and vinyl chloride standards are not to be equaled or exceeded.

b) National standards, other than ozone and those based on annual averages or annual arithmetic means, are not to exceed more than once a year. The ozone standard is attained when the expected number of days per calander year with maximum hourly average concentrations above the standard is equal to or less than one.

c) At locations where the state standards for ozone and/or total suspended particulate matter are violated. National standards apply elsewhere.

Note: ppm = parts per million by volume.
ug/m^3 = micrograms per cubic meter.

SOURCE: California Air Resources Board, 1991.

Michael Brandman Associates

EXHIBIT **3.6-2**

Ambient Air Quality Standards

3.6.1.3 Regional Conditions

Monitoring in the South Coast Air Basin

Ambient air quality is described in terms of compliance with state and national standards. Ambient air quality standards (AAQS) are the levels of air pollutant concentration considered safe to protect the public health and welfare. They are designed to protect people most sensitive to respiratory distress, such as asthmatics, the elderly, very young children, people already weakened by other disease or illness, and persons engaged in strenuous work or exercise. The SCAQMD samples ambient air at 37 monitoring stations in the basin. Locations of these stations are shown on Exhibit 3.6-1. Ambient air quality standards are shown in Exhibit 3.6-2. To determine air quality, contaminant levels in air samples are compared to the national and state standards for which the basin is designated as a nonattainment area.

Attainment Status

The California Air Resources Board (ARB) is required to designate areas of the state as attainment, nonattainment, or unclassified for any state standard. An attainment designation for an area signifies that pollutant concentrations did not violate the standard for that pollutant in that area. A nonattainment designation indicates that a pollutant concentration violated the standard at least once, excluding those occasions when a violation(s) was caused by an exceptional event, as defined in the criteria.

Ozone, a colorless toxic gas formed by a chemical reaction of nitrogen oxides, hydrocarbons, and sunlight, irritates the lungs and damages materials and vegetation. The organic compounds that photochemically combine with NOx to form O_3 are described as reactive organic compounds (ROC). The entire basin is designated a nonattainment area for federal and state standards for O_3.

CO, a colorless gas that is a major component of mobile source emissions, interferes with the transfer of oxygen to the brain. Peak levels of carbon monoxide occur in winter throughout the basin and are highest where there is heavy traffic. The basin is classified as a nonattainment area for the national and state carbon monoxide standards. National and state standards for carbon monoxide are exceeded in the Los Angeles County, but generally not in other counties. San Bernardino and Riverside counties are in attainment of federal CO standards. The ARB reclassified Orange County as "attainment" for CO in 1994. However, until the SCAQMD requests a redesignation, these counties will still be included in the basinwide "severe" category for the federal CO standards.

NO_2, a reddish-brown gas formed in the atmosphere by a combination of oxygen and nitric oxide, is emitted as a result of combustion. At high concentrations, NO_2 can cause breathing difficulties. Peak readings of nitrogen dioxide occur in areas that have a high concentration of combustion sources (e.g., motor vehicle engines, power plants, refineries, and other industrial operations) in the vicinity. The state nitrogen dioxide standard was only exceeded once in 1993, and the federal standard was not exceeded on any occasion. However, until the SCAQMD requests redesignation, the basin is still the only area in nonattainment of the federal nitrogen dioxide air quality standard. The entire basin is designated as a nonattainment area for both state and national nitrogen dioxide standards.

PM10, which is fine particulate matter less than 10 microns in diameter, causes a greater health risk than larger-sized particles, since these fine particles can more easily penetrate the defenses of the human respiratory system and cause irritation by themselves and in combination with gases. PM10 levels regularly exceed the federal standard in San Bernardino, Los Angeles, and Riverside counties. In 1990, the federal PM10 standard was also exceeded in Orange County. The more stringent state PM10 standard is exceeded in all four counties. The entire basin is designated as nonattainment for PM10 standards.

SOx and lead (Pb) levels in all areas of the basin are below federal and state standard limits.

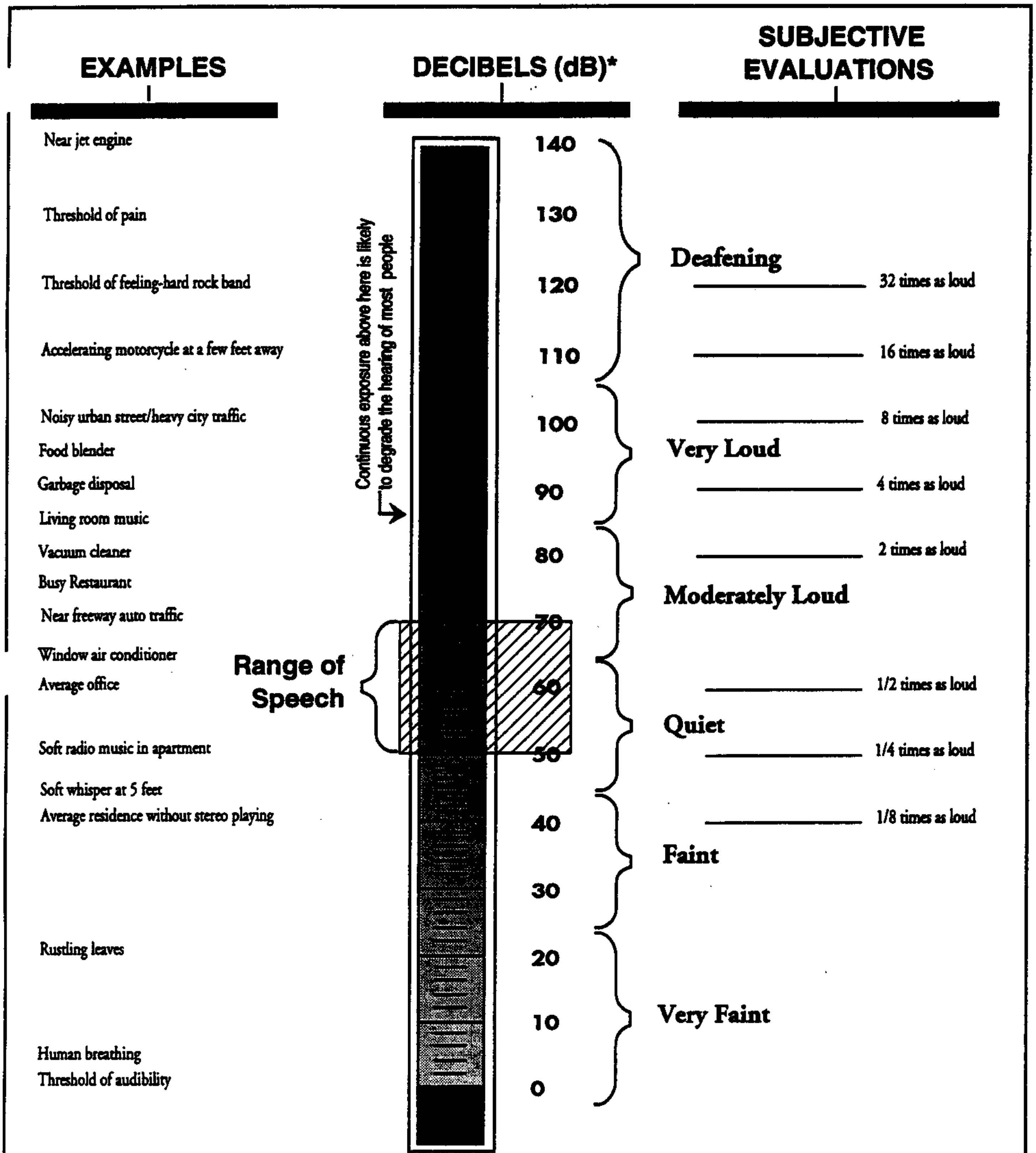
3.6.1.4 Local Air Quality

Baseline air quality in the project area can be inferred from ambient air quality measurements conducted by the SCAQMD at its San Bernardino monitoring station, which is the closest representative monitoring station in proximity to the site. The San Bernardino air monitoring station monitors CO, O_3, NOx, and PM10. Table 3.6-1 summarizes the last 5 years of published data from this monitoring station.

The information in Table 3.6-1 indicates that maximum ozone levels over the past 5 years frequently exceeded the national and state standards in the vicinity of the project site. CO levels were below the state and federal 1-hour and 8-hour standards every year. NO_2 levels were below the state and federal standards. Ambient levels of PM10 exceeded the state 24-hour standard in each of the past 5 years. However, no violations of the federal PM10 standard were recorded in 1992 and 1993, the latest years with data available.

3.6.1.5 Meteorological Influences on Air Quality

Meteorological conditions (such as light winds and shallow vertical mixing) and topographical features (such as surrounding mountain ranges) hinder the dispersal of air pollutants. The basin is an area of high air pollution potential because frequent temperature inversions tend to trap air pollutants in a limited atmospheric volume near the ground and hamper dispersion. In January, a surface inversion exists on 70 percent of the mornings. The average wind speed in the basin is less than 5 miles per hour on 80 percent of the days during the summer smog season. This is a measure of daily stagnation.



* dB are "average" values as measured on the A-scale of a sound-level meter.
(From Concepts in *Architectural Acoustics*: M. David Egan, McGraw Hill, 1972 and U.S. Department of Housing and Urban Development, Office of Community Planning and Development "The Noise Guidebook").

Michael Brandman Associates

EXHIBIT **3.7-1**
Common Sounds in Decibels

TABLE 3.6-1

SUMMARY OF AIR QUALITY DATA
SAN BERNARDINO AIR MONITORING STATION

	1989	1990	1991	1992	1993
Ozone (O_3)					
State standard (1-hr. avg. 0.09 ppm)					
Federal standard (1-hr. avg. 0.12 ppm)					
Maximum concentration	0.30	0.29	0.25	0.28	0.21
Number of days state standard exceeded	159	129	127	141	132
Number of days federal standard exceeded	115	78	79	85	65
Carbon Monoxide (CO)					
State standards (1-hr. avg. >20 ppm)					
Federal standards (1-hr. avg. >35 ppm)					
State standards (8-hr. avg. 9.0 ppm)					
Federal standards (8-hr. avg. 9.0 ppm)					
Maximum concentration (1-hr. period ppm)	11	9	8	7	7
Maximum concentration (8-hr. period ppm)	8.1	6.1	7.0	5.9	6.0
Number of days state 1-hr. standards exceeded	0	0	0	0	0
Number of days federal 1-hr. standards exceeded	0	0	0	0	0
Number of days state 8-hr. standards exceeded	0	0	0	0	0
Number of days federal 8-hr. standards exceeded	0	0	0	0	0
Nitrogen Dioxide (NO_2)					
State standard (1-hr. avg. >0.25 ppm)					
Federal standard (0.0534 AAM in ppm)					
Annual arithmetic mean	0.0409	0.0343	0.0355	0.0356	0.0376
Maximum 1-hr. concentration	0.18	0.20	0.16	0.13	0.15
Number of days state standard exceeded	0	0	0	0	0
Suspended Particulates (PM10)					
State standard (24-hr. avg. >50 ug/m3)					
Federal standard (24-hr. avg. >150 ug/m3)					
Maximum 24-hr. PM10 concentration	217	235	163	136	139
Percent samples exceeding state standard	74.6	58.3	68.3	60.0	62.7
Percent samples exceeding federal standard	5.1	3.3	3.3	0	0

Note: AAM = annual arithmetic mean; ug/m3 = micrograms per cubic meter; ppm = parts per million

Source: South Coast Air Quality Management District, Air Quality Data 1989 through 1993.

During summer's longer daylight hours, plentiful sunshine provides the energy needed to fuel photochemical reactions between NO_2 and volatile organic compounds that result in ozone formation. Pollutants that react to help form ozone are often termed "ozone precursor emissions." Ozone formation requires adequate sunshine, early morning stagnation in source areas, high surface temperatures, strong and low morning inversions, greatly restricted vertical mixing during the day, and daytime subsidence that strengthens the inversion layer. The most frequent ozone transport route is from source areas in coastal areas to receptor areas along the base of the San Gabriel and San Bernardino mountains. With offshore flows, ozone transport is more limited, and highest concentrations occur in the western portion of the basin.

In the winter, temperature inversions occur close to ground level during the night and early morning hours. At this time, the greatest pollution problems are from CO and NOx. High carbon monoxide concentrations occur on winter days with strong surface inversions and light winds. Carbon monoxide transport is extremely limited, and highest concentrations are associated with areas of highest traffic density.

High nitrogen dioxide levels usually occur during the autumn or winter on days with summer weather conditions. These conditions include low inversions, limited daytime mixing, and stagnant wind flow conditions. Although days are clear, sunlight is limited in duration and intensity, and photochemical reactions necessary to form ozone are incomplete.

As with ozone, a substantial fraction of PM10 forms in the atmosphere as a result of chemical reactions. Peak concentrations of both ozone and PM10 occur downwind of areas that emit high levels of nitrogen oxides, volatile organic compounds, and other precursor emissions.

3.7 NOISE

3.7.1 INTRODUCTION

The analysis of noise impacts consists of analyzing the potential short-term construction as well as long-term maintenance-related vehicular traffic noise impacts on sensitive receptors in the project vicinity.

3.7.2 NOISE SCALES

Sound level is the frequency-weighted sound pressure level obtained with the standardized dynamic characteristic "fast" or "slow" and weighted A or C. Community noise levels are measured in terms of the "A-weighted decibel" (dBA). A-weighting is a frequency correction that correlates sound pressure levels with the frequency response of the human ear. For noise-sensitive land uses (i.e., residences, schools, churches, and hospitals), 65 dBA Ldn (the day-night averaged noise level) has been selected as a general dividing line between an unacceptable and an acceptable environment. Typical indoor and outdoor noise levels generated by various activities and human reaction to are listed in Exhibit 3.7-1.

In California, the Community Noise Equivalent Level (CNEL) has been used as the noise metric. CNEL applies an additional 5 dBA adjustment to sounds occurring in the evening (7 p.m. to 10 p.m.). However, even with the additional CNEL adjustment for evening time periods, Ldn and CNEL are essentially equal to within 1 dBA (typically CNEL = Ldn + 0.6 dBA).

The County of San Bernardino uses noise criteria in terms of Ldn as long-term noise criteria for exterior and interior noise-sensitive areas.

3.7.3 CRITERIA

Federal, state, and local governments have established noise standards and guidelines to protect citizens from potential hearing damage and various other adverse physiological and social effects associated with noise. The federal government specifically preempts local control of noise emissions from aircraft, railroads, and interstate highways, so as not to impose undue burden on interstate or foreign commerce. There are no federal or state standards limiting construction noise. Many cities and counties have provisions in their noise ordinances that address construction noise levels and time of operation. The applicable standards and guidelines for this study area are discussed below.

3.7.3.1 State of California

The State Office of Noise Control in *Guidelines for the Preparation and Content of Noise Elements of the General Plan*, established in February 1976, provided guidance for the acceptability of projects within specific CNEL contours. Residences are normally unacceptable in areas exceeding 70 dBA CNEL, and conditionally acceptable between 60 and 70 dBA CNEL. However, the state stresses that these guidelines can be modified to reflect sensitivities of individual communities to noise.

In addition to the criteria discussed above, Caltrans has also defined impact criteria based on the degradation of the existing noise environment. In "Caltrans Noise Abatement Programs" from the *Highway Design Manual*, Chapter 1100, Highway Traffic Noise Abatement, published by Caltrans, a "substantial increase in noise levels" is 3 dBA from the reference (existing or no project) level for community and school noise abatement programs.

If the increase in noise exposure level is greater than 3 dB, the significance of impact will depend on the ambient noise level and the presence of noise-sensitive sites. Noise impacts can be considered to be "possibly significant" if increases in noise exposure levels are expected to be greater than 5 dB with implementation of the project. Noise impacts can be considered to be "generally significant" if the proposed project will cause noise standards or ordinances to be exceeded, or increases in the community noise levels by 6 to 10 dB in built-up areas, or increases by 10 dB or more in rural areas.

3.7.3.2 County of San Bernardino

The County of San Bernardino has an adopted Noise Element (July 1989) in its General Plan. One of the general goals of the San Bernardino County Noise Element is to develop and adopt specific policies and an effective implementation program to abate and avoid excessive noise exposures in the county by requiring that effective noise mitigation measures be incorporated into the design of new noise-generating and new noise-sensitive land uses.

Specific policies have been adopted by the county to accomplish the goals of the Noise Element that pertain to this project include the following:

1. Areas within San Bernardino County shall be designated as "noise-impacted" if exposed to existing or projected future exterior noise levels from mobile or stationary sources exceeding the standards listed in Tables 3.7-1 and 3.7-2.

2. Condition subdivision approval adjacent to any developed/occupied noise-sensitive land uses by requiring the developer to submit a construction-related noise mitigation

plan to the county for review and approval prior to issuance of grading permit. The plan must depict the location of construction equipment and how the noise from this equipment will be mitigated during construction of this project, through the use of such methods as:

- Temporary noise attenuation fences
- Preferential location of equipment
- Use of current technology and noise suppression equipment

TABLE 3.7-1

INTERIOR/EXTERIOR NOISE LEVEL STANDARDS: MOBILE NOISE SOURCES

Land Use		Ldn (or CNEL), dBA	
Categories	Uses	Interior	Exterior
Residential	Single and multi-family, duplex, mobile homes	45	60
Commercial	Hotel, motel, lodging Commercial retail, bank Office building Concert hall, auditorium	45 50 45 45	60 N/A 65 N/A
Institutional/Public	Hospital, school, church	45	65
Open Space	Park	N/A	65
Source: San Bernardino County Noise Element 1989.			

TABLE 3.7-2

HOURLY NOISE LEVEL PERFORMANCE STANDARDS: LOCALLY REGULATED SOURCES, dBA

	7 a.m. to 10 p.m.		10 p.m. to 7 a.m.	
Land Use Category	Leq	Lmax	Leq	Lmax
Residential or other noise-sensitive receivers	55	75	45	65
Source: San Bernardino County Noise Element 1989.				

Construction, repair, or demolition activities are limited to between the hours of 7 a.m. and 7 p.m. on any working day, except Sundays and federal holidays.

Based on the above exterior noise standards cited, noise levels in terms of Leq/Lmax are used in this noise study to assess noise impacts associated with construction activities.

3.7.4 EXISTING CONDITIONS

The Seven Oaks Dam is located in the steep-walled upper Santa River Canyon, approximately 8 miles northeast of the City of Redlands in San Bernardino County. Access to the project site is from Greenspot Road.

There are no existing residences located within a 1-mile radius of the proposed project site. No sensitive endangered species or wildlife habitats have been identified that would be affected by the project alternatives. Noise sources contributing to the ambient noise in the project area consist primarily of nature sounds such as wind and birds, with occasional high-altitude aircraft overflight and maintenance vehicles.

3.8 CULTURAL RESOURCES

The entire Area of Potential Effects (APE) for the proposed Seven Oaks Dam Water Conservation project has been previously surveyed by qualified archaeologists. The required archeological survey was completed in the 1980s for the Seven Oaks Dam project. Since the APE for the water conservation project is contained within the APE for the dam project, all cultural resources have been identified. The APE contains a hydroelectric system that is eligible for listing in the National Register of Historic Places. The Santa Ana River hydroelectric system was constructed circa 1900.

3.9 PUBLIC HEALTH AND SAFETY

The following section addresses the issues of public health and safety as they relate to the proposed alternatives and study area, including soil and/or groundwater contamination resulting from leaking underground storage tanks and/or the handling, disposal, and potential for upset associated with the transport, storage, and use of hazardous materials.

3.9.1 HAZARDOUS MATERIALS AND WASTE

Hazardous materials and the generation of hazardous waste generally raise an environmental concern when alternating, changing, or developing land (e.g., industrial or commercial uses such as automotive establishments). Hazardous materials can take the form of petroleum products (including oil and gasoline), automotive fluids (antifreeze, hydraulic fluid), paint, cleaners (dry cleaning solvents, cleaning fluids), and pesticides from agricultural uses, if in significant concentrations. Byproducts generated as a result of activities (industrial, manufacturing, etc.) using hazardous materials such as dry cleaning solvents, oils, and gasoline are considered to be hazardous waste.

To determine the presence of and potential for hazardous materials and/or waste contamination within the study area from existing onsite and surrounding uses, a hazardous materials and waste analysis was conducted. This analysis included a cursory review of existing onsite and surrounding land uses and their associated activities. The analysis also included a review of federal, state, and local agencies' databases for reported hazardous materials and waste contamination sites within a 1/8-mile radius of the site. The following is a discussion of the potential sources of hazardous materials and/or waste contaminants identified on and/or adjacent to the areas potentially affected by the project alternatives.

3.9.1.1 Sites Included on Agency Lists

As stated above, various federal, state, and local agencies complete lists of hazardous waste sites and sites that may contain hazardous wastes. These agencies retain records regarding each of these sites. A computerized search of these lists was completed in July 1995 by Vista Environmental Information, Inc. for all sites within a 1/8- to 1/2 mile radius of the site. A complete description of the assumptions and approach to the database search, as well as the results, is included in this EIR/EIS as Appendix D. The federal and state lists reviewed by Vista Environmental Information, Inc. included:

- U.S. Environmental Protection Agency. 1995 (Apr). *National Priorities List* (NPL).
- U.S. Environmental Protection Agency. 1995 (Mar). *Comprehensive Emergency Response, Compensation, and Liability Information System* (CERCLIS).
- U.S. Environmental Protection Agency. 1995 (Mar). *Resource Conservation and Recovery Information System* (RCRIS).
- U.S. Environmental Protection Agency. 1995 (Mar). *Emergency Response Notification System* (ERNS).
- California Department of Toxic Substances Control. 1995 (Apr). *State Priority List (SPL) and State Calsites List (SCL).*
- California Regional Water Quality Control Board, Region 6. 1995 (Apr). *Leaking Underground Storage Tank (LUST) List.*
- California Integrated Waste Management Board. 1995 (Mar). *Solid Waste Information System (SWIS).*
- California State Governor's Office. Office of Planning and Research. 1995 (Feb). *Hazardous Waste and Substances Sites List (Cortese).*
- California Regional Water Quality Control Board, Regional 6. 1995 (Feb). *Toxic Pits List.*

The environmental consultant conducted a subsequent review of the Vista Environmental Information, Inc.'s report. Based on a review of these lists, no potential and/or known hazardous materials, and/or waste sites (including generators, transporters, or sites with registered underground storage tanks), that have the potential to contribute to hazardous contamination within a 1/8- to 1/2-mile radius of the study area were identified.

SECTION 4
ENVIRONMENTAL CONSEQUENCES, MITIGATION MEASURES, AND LEVEL OF SIGNIFICANCE AFTER MITIGATION

4.1 INTRODUCTION

This section provides a description of the environmental consequences (herein referred to as "impacts" or "effects") of the alternatives described in Section 2, Description of Project Alternatives, for each environmental topic area discussed in Section 3, Affected Environment. For each topical area, an identification of the threshold of significance is provided for the reader to understand the basis upon which the level of impact was determined. Impacts are classified as "beneficial," "adverse, but less than significant," and "adverse significant." Impacts or effects can also be "direct" or "indirect." A direct impact is caused by the action and occurs at the same time and place. An indirect impact is caused by the action, but occurs later in time or is further removed in distance from the direct impacts but is reasonably foreseeable. Impacts are numbered in each section. As a result of this impact identification methodology, more than one alternative can have the same type/number of impact. Where impacts are similar between alternatives, a reference is made to that effect and only the differences are described under the impact discussion.

Mitigation measures have been provided for each alternative where significant impacts have been identified. Mitigation measures can "avoid" the impact by not taking certain actions or parts of an action, "minimize" impacts by limiting the degree or magnitude of the action, "rectify" the impact by repairing, rehabilitating, or restoring, "reduce" or eliminate the impact over time by preservation and maintenance, or "compensate" for the impact by replacing or providing substitute resources. Mitigation measures are numbered consecutively within each section.

As discussed in Section 3.1, Introduction, the existing conditions assume that the Seven Oaks Dam has been completed and is operating at an elevation of 2,200 NGVD. The identification of environmental consequences (or "impacts") for this project (that is, the Seven Oaks Dam Water Conservation Feasibility Study Project) are those that occur when the Seven Oaks Dam water elevation rises from 2,200 NGVD to the levels identified for each of the alternatives (No Project-2,200 NGVD; Alternative 1-2,300 NGVD; Alternative 2-2,375 NGVD; Alternative 3-2,418 NGVD; and Alternative 4-2,265 NGVD).

4.2 WATER RESOURCES

4.2.1 ENVIRONMENTAL CONSEQUENCES

Thresholds of Significance

An alternative is considered to have a significant impact if it would result in a:

- Substantial and adverse increase in inundation, sedimentation, or damage from water forces or construction improvements (such as grading, construction of barriers and structures, and impervious surfaces) that will increase or divert streamflow or rainfall collection or conveyance;

- Diversion or increase in sediments that cause a corresponding reduction in sensitive habitats;
- Cause or increase levels of contaminated water;
- Cause substantial and adverse increases in the frequency or severity of water quality contaminants.

4.2.1.1 Hydrology

No Action (No Project) Alternative

There would be no short- or long-term impacts associated with the No Action Alternative.

Alternative 1-Impound Plan 1: 2,300 feet

Short-term Construction Impacts

Impact 2-1: Increased Erosion and Sedimentation Caused by Construction Activities (Direct, Adverse Significant). Implementation of Alternative 1 includes the demolition and modification of the intake structure and drilling for additional anchors which would result in debris entering the base of the reservoir. These activities would occur during the dry summer months to reduce the potential for erosion and sedimentation. Furthermore, due to a constant surface water flow at the dam which resulted when the dam construction blocked the flow of groundwater, berms would be constructed to divert these water flows away from the construction activities. Debris from the demolition and drilling activities are unlikely to discharge into surface water flows; however, in the unlikely event that debris from these construction activities discharge into surface water flows, erosion and sedimentation impacts may occur. Implementation of Mitigation Measures 1 and 2 will reduce these impacts to a level that is considered less than significant. Additional construction activities may result from cut and fill grading operations associated with a new access road to facilities upstream of the dam; however, as stated previously, the option to provide this access is unknown and may require additional environmental documentation. Access to the upstream facilities using the existing streambed road would be restricted during periods when the conservation pool inundates the existing access road. As a worst-case assumption, this analysis assumes that a new access road as shown in Exhibit 2-3 would be required. Therefore, additional potential erosion and sedimentation may occur during grading activities associated with the new access road.

Long-term Operational Impacts

Impact 2-2: Accumulation of Sediment or Debris Within the Seven Oaks Dam (Direct, Adverse, But Less Than Significant). The Seven Oaks Dam will act as a barrier to fluvial sediment transport. This alternative would not significantly influence the estimated sediment deposition at the intake structure or the distribution of deposition within the reservoir throughout the project life.

Alternative 2–Impound Plan 2: 2,375 feet

Short-term Construction Impacts

The implementation of Alternative 2 would result in greater impacts than those identified by Impact 2-1 because more construction activities are associated with this alternative compared to Alternative 1.

Long-term Operational Impacts

Because the impound elevation level of Alternative 2 is substantially similar to Alternative 1 (difference of 75 feet), implementation of Alternative 2 would result in similar impacts as those identified by Impacts 2-1 and 2-2 for Alternative 1. However, it should be noted that the level adverse impact would be relatively greater based upon an increased impound elevation.

Alternative 3–Impound Plan 3: 2,418 feet

Short-term Construction Impacts

The implementation of Alternative 3 would result in greater impacts than those identified by Impact 2-1 because more construction activities are associated with this alternative compared to Alternative 1.

Long-term Operational Impacts

Because the impound elevation level of Alternative 3 is similar to Alternative 1 (difference of 118 feet), implementation of Alternative 3 would result in similar impacts as those identified by Impacts 2-1 and 2-2 for Alternative 1. However, it should be noted that the level of adverse impact would be relatively greater based upon the increased impound elevation.

Alternative 4–Impound Plan 4: 2,265 feet

Short-term Construction Impacts

No modifications to the intake structure or related dam structure would be required under this alternative. This alternative would, however, require selection of an option to provide access to the upstream facilities during periods when the conservation pool inundates the existing access road. As a worst-case assumption, this analysis assumes that a new access road as shown in Exhibit 2-3 would be required. Therefore, additional potential erosion and sedimentation may occur during grading activities associated with the new access road. Because less construction activities are associated with this alternative, less impacts than those identified by Impact 2-1 for Alternative 1 would occur.

Long-term Operational Impacts

This alternative would also result in a relatively less adverse impact from the long-term accumulation of sediment or debris due to a decreased impound elevation.

4.2.1.2 Water Quality

Following is an evaluation of potential water quality impacts associated with the project alternatives. A Clean Water Act Section 404(b)(1) evaluation is provided in Appendix E of this EIS/EIR.

No Action (No Project) Alternative

There are no short- or long-term impacts associated with the No Action Alternative.

Alternative 1–Impound Plan 1: 2,300 feet

Short-term Construction Impacts

Impact 2-3: Increased Turbidity Caused by Grading Activities (Direct, Adverse Significant). This alternative would result in the demolition and modification of the intake structure and drilling for additional anchors which would result in debris entering the base of the reservoir. These activities would occur during the dry season to reduce the potential for erosion and sedimentation. Furthermore, due to a constant surface water flow at the dam due to groundwater, diversion berms would be constructed to divert these water flows away from the construction activities. Debris from the demolition and drilling activities are unlikely to discharge into surface water flows; however, in the unlikely event that debris from these construction activities discharge into surface water flows, increases in turbid waters may occur. Turbidity may also occur during the short-term construction and use of diversion berms during the demolition and drilling at the intake structure and anchors.

This alternative would also include the provision of access to upstream facilities during periods when the conservation pool inundates the existing access road. The preferred option to provide access to upstream facilities is unknown and may require additional environmental documentation. As a worst-case assumption, this analysis assumes that a new access road as shown in Exhibit 2-3 would be provided. Therefore, additional turbidity during grading activities associated with the new access road may occur. The California Regional Water Quality Control Board (RWQCB), Santa Ana Region, has required that there be no greater than a 20 percent increase in the natural turbidity of the stream due to construction activities and, because the water is currently very low in turbidity, compliance with this objective will be required. Therefore, implementation of Mitigation Measures 1 and 2 were designed to ensure that this objective is adequately met.

Impact 2-4: Potential for the Release of Toxic Materials From Construction Equipment (Indirect, Adverse Significant). Since construction activities would occur during the dry season, the potential for the release of toxic materials, such as oil products, fuels, chemicals, and lime from construction equipment is unlikely to discharge into surface water flows. However, in the unlikely event that toxic materials are released into surface water flows, aquatic habitats and organisms may be significantly harmed. Implementation of Mitigation Measures 3 and 4 would reduce this potential impact to a level that is considered less than significant.

Long-term Operational Impacts

Impact 2-5: Decrease in Suspended Solids Downstream of the Seven Oaks Dam (Direct, Beneficial). The additional impoundment of water at the Seven Oaks Dam will allow the reservoir to further filter suspended solids, thus reducing the amount of debris and other potentially-harmful solids from entering the downstream reaches of the Santa Ana River. The reduction in the amount of debris is not expected to be significant. Although this beneficial impact cannot be quantified, it is expected to provide a minimal improvement over existing conditions.

Impact 2-6: Increased Groundwater Recharge (Direct, Beneficial). By strategically scheduling water releases at the Seven Oaks Dam, groundwater within the immediate vicinity of the dam site and in downstream areas will be forced to the surface to mix with surface water, thereby recharging the existing groundwater basin.

Impact 2-7: Increased Likelihood for Anaerobic Conditions (Direct, Adverse Significant). In general, water quality is degraded by an extended impoundment of water in long, deep storage pools, particularly during summer months when higher temperatures cause water column stratification and lowered levels of dissolved oxygen (cumulatively referred to as "anaerobic conditions"). Anaerobic conditions can also cause several other water quality parameters to be exceeded. For example, hydrogen sulfide can be generated in harmful quantities when materials containing sulphur, such as biological detritus and mineral sulfides, are available. In addition, ammonia can be generated from nitrogen-containing material; un-ionized ammonia, in particular, can be toxic to many aquatic organisms, and most significantly to trout. Anaerobic conditions can also lower the pH, which results in the release of trace metals found in bottom sediments, and local nuisance conditions, such as algal blooms and mosquito breeding, are also more likely to occur.

While implementation of this alternative would result in an impoundment of water during the warm summer months, the fact that the conservaton pool will not be deep, it will not be held for prolonged periods, and the water is very cold to begin with, will minimize the likelihood of anaerobic conditions forming. Nonetheless, implementation of Mitigation Measure 5 will allow parameters indicating anaerobic conditions to be monitored, measured, and remediated, thereby reducing potential impacts to a level that is considered less than significant. R

Alternative 2–Impound Plan 2: 2,375 feet

Short-term Construction I

The implementation of Alternative 2 would result in greater potential than those impacts identified for Impacts 2-3 and 2-4 for Alternative 1 because more construction activities are associated with this alternative compared to Alternative 1.

Long-term Operational Impacts

Because the impound elevation level of Alternative 2 is substantially similar to Alternative 1, implementation of Alternative 2 would result in similar impacts as those identified by Impacts 2-3 through 2-7 for Alternative 1. However, it should be noted that the level of impact, whether adverse or beneficial, would be relatively and minimally greater based upon an increased impound elevation.

Alternative 3–Impound Plan 3: 2,418 feet

Short-term Construction Impacts

The implementation of Alternative 3 would result in greater potential impacts than those impacts identified for Impacts 2-3 and 2-4 for Alternative 1 because more construction activities are associated with this alternative compared to Alternative 1.

Long-term Operational Impacts

Because the impound elevation level of Alternative 3 is substantially similar to Alternative 1, implementation of Alternative 3 would result in similar impacts as those identified by Impacts 2-3 through 2-7 for Alternative 1. However, it should be noted that the level of impact, whether adverse or beneficial, would be relatively and minimally greater based upon an increased impound elevation.

Alternative 4–Impound Plan 4: 2,265 feet

Short-term Construction Impacts

No modifications to the intake structure or related dam structure would be required under this alternative. This alternative would, however, require selection of an option to provide access to the upstream facilities during periods when the conservation pool inundates the existing access road. As a worst-case assumption, this analysis assumes that a new access road as shown in Exhibit 2-3 would be required. The construction of a new access road may result in increased turbidity and release of toxic materials. Because less construction activities would be associated with this alternative compared to Alternative 1, this alternative would result in less impacts than those identified by Impacts 2-3 and 2-4 for Alternative 1. This alternative would result in the same impacts than those identified by Impact 2-7 for Alternative 1. Furthermore, this alternative would result in less beneficial impacts than those identified by Impact 2-5 and 2-6 for Alternative 1.

4.2.2 MITIGATION MEASURES

4.2.2.1 Hydrology

No Action (No Project) Alternative

No mitigation is required.

Alternatives 1, 2, and 3

Impact 2-1: Increased Erosion and Sedimentation Caused by Construction Activities

1. All grading and construction activities associated with project implementation will adhere to the relevant conditions established by the San Bernardino County Grading Ordinance.

2. The contractor will implement the requirements of the National Pollutant Discharge Elimination System (NPDES) for erosion control caused by stormwater runoff during construction, as specified under the general permit to discharge stormwater associated with Construction Activity #92-08-DWQ. This general permit identifies several erosion control devices or methods, including the careful use of grading management techniques, drainage ditches, straw bale barriers, gravel filter berms, dikes, catch basin inlet protection, end-of-pipe filtering devices, silt fences, dams, sediment basins, netting, and slope drains.

Impact 2-2: Accumulation of Sediment or Debris Within the Seven Oaks Dam

No mitigation is required.

4.2.2.2 Water Quality

No Action (No Project) Alternative

No mitigation is required.

Alternatives 1, 2, 3, and 4

Impact 2-3: Increased Turbidity Caused by Grading Activities

Mitigation Measures 1 and 2 are applicable.

Impact 2-4: Potential for the Release of Toxic Materials From Construction Equipment

3. Construction vehicles will be serviced in a manner that contains fluids, such as lubricants, within an impervious area. Any water pollution permits, such as for dewatering discharges, will be acquired by the contractor(s).

4. The contractor will implement "good housekeeping" practices and requirements (Best Management Practices), including vehicle wash-down areas, onsite and offsite tracking control, protection of equipment storage and maintenance areas, and sweeping of highways and roadways related to hauling activities. Procedures for controlling surface fluids, such as water, oil, gasoline, asphalt, and wet concrete, may include the use of check dams for drainage control, collecting waste fluids in ponds or other retention structures, installing equipment to avoid spills, providing concrete or asphalt wash pads

for cleaning trucks and other construction equipment, and properly designing concrete equipment cleaning areas.

Impact 2-5: Decrease in Suspended Solids Downstream of the Seven Oaks Dam

No mitigation is required.

Impact 2-6: Increased Groundwater Recharge

No mitigation is required.

Impact 2-7: Increased Likelihood for Anaerobic Conditions

5. A Water Quality Monitoring Program will be implemented to establish a data base for those chemical, limnological, and bacteriological parameters that could adversely impact the water environment in the upper Santa Ana River. The parameters will be monitored during the months of January, April, May, and June when water is present in the reservoir pool. The results of the water quality monitoring program will be analyzed each year to determine necessary changes to the following year's monitoring program.

   a. Chemical Parameters. At a minimum, the chemical parameters that will be monitored are NH3 and NH4 (total ammonia), NO2, NO3, chlorophyll-a, pheophytin-a, chlorophyll-a/pheophytin-a ratio, and DDT. The parameters will be monitored at three levels, as follows: (a) on the surface near the dam intake structure; (b) near the thermocline (either immediately above or immediately below); and (c) at the bottom of the reservoir pool. If no distinct thermocline exists, the depth will be halfway between the surface and bottom depths.

   b. Limnological Parameters. The limnological parameters that will be measured are temperature, pH, dissolved oxygen, and specific conductivity. They will be monitored on the surface near the dam intake structure and at 15-foot depth increments to a depth of 190 feet.

   c. Bacteriological Parameters. The bacteriological parameters that will be measured are total coliform, fecal coliform, and fecal streptococci. They will be monitored at the same levels as identified for the chemical parameters.

   d. Downstream Water Quality Measurements. Water quality measurements will be taken at the United States Geological Survey (USGS) Gauge No. 11051500, located approximately 1 mile downstream of the dam site. Measurements will include all of the limnological and bacteriological parameters listed in the sections above, and all of the chemical parameters with the exception of the chlorophyll-a, pheophytin-a, and the chlorophyll-a/pheophytin-a ratio. Each parameter will be measured at only one depth, since downstream Santa Ana River flows will normally be fairly shallow. It should be noted that these water quality measurements exceed the normal stream gauge data collected by the USGS. Therefore, collection of this data is the responsibility of the local sponsors (San Bernardino County, Riverside County, and Orange County Flood Control Districts).

4.2.3 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Implementation of mitigation can mitigate all impacts to a level that is considered less than significant.

4.3 BIOLOGICAL RESOURCES

Currently, USACE and USFWS are conducting meetings to resolve differences in opinion relative to environmental impacts at Seven Oaks Dam. The USFWS believes that environmental conditions and habitat in the vicinity of the dam have changed significantly since the publication of the 1988 Final Supplemental EIS (FSEIS) for the Santa Ana River Mainstem Project. As a result of these changes, USFWS believes the evaluation of environmental impacts as described in the 1988 FSEIS is incomplete.

The USFWS believes that adverse impacts resulting from the construction of the Seven Oaks Dam and the proposed water conservation project should be adequately addressed and mitigated within this EIS/EIR. However, the USACE has identified that the adverse impacts resulting from the two projects need to be clearly separated. The project's individual effects on biological resources are addressed in this section and the proposed project's contribution to cumulative adverse impacts are addressed in Section 5 of this EIS/EIR.

4.3.1 ENVIRONMENTAL CONSEQUENCES

Due to the uncertainty of the option to be selected to provide access to facilities upstream of the dam during periods when the conservation pool inundates the existing access road, this EIS/EIR assumes the worst-case option which is to construct a new access road as shown in Exhibit 2-3. As stated previously, depending on the option selected, additional environmental documentation may be required.

Thresholds of Significance

Impacts to biological resources are considered significant if one or more of the following conditions would result from implementation of one of the project alternatives:

- Loss of a critical, yet limited, resource used by a federal or state threatened or endangered species.
- Substantial loss of species diversity in natural vegetation and wildlife habitat.
- Loss of individuals or populations of a federal- or state-listed threatened or endangered species or their habitat.
- Substantial loss of individuals or populations of a species proposed for listing, federal candidates for listing, or species that are regionally rare or otherwise sensitive species.

- Loss of habitat that is regionally unique, declining, or designated sensitive by resource agencies.
- Disturbances to populations or breeding areas of listed threatened or endangered species or reductions in the foraging habitat for threatened or endangered species.
- Loss of individuals of endangered, rare, endemic, or otherwise sensitive species dependent on the study area.
- Interference with or prevention of movement and dispersal of fish or wildlife (e.g., wildlife movement corridors).

An evaluation of whether an impact on biological resources would be substantial must consider the resource and how that resource fits into a regional or ecological context.

The definition of "substantial" depends on the species in question. Substantial impacts would be those that would diminish, or result in the loss of, an important biological resources or those that would obviously conflict with local, state, or federal resource conservation plans, goals, or regulations. Impacts are sometimes locally important but not significant because, although they would result in an adverse alteration of existing conditions, they would not substantially diminish, or result in the permanent loss of an important resource on a populationwide or regionwide basis.

Background

The following discussion describes the sensitive biological resources that were previously identified as part of the Santa Ana River Mainstem Project with respect to the Seven Oaks Dam. The impacts that were identified and the mitigation program that was required to allow for the construction of the dam are not a part of the currently proposed water conservation program at Seven Oaks Dam. As previously discussed, implementation of water conservation at Seven Oaks Dam would only occur after completion of the dam.

The following information is, therefore, provided to the reader to understand the types of biological resources that have occurred in the project study area and the approved programs to fully mitigate those impacts.

Impacts Associated With The Construction and Operation of Seven Oaks Dam (Santa Ana River Mainstem Project)

The water conservation project would not commence until after the Seven Oaks Dam is completed (year 2000). The currently proposed water conservation project differs from the dam construction in that the water conservation project will retain more water behind the dam for longer periods. Construction activities for the dam and their impacts are not associated with the water conservation project as the Seven Oaks Dam must be operational prior to the initiation of the water conservation project. Impacts to the habitat above the dam are addressed in the 1988 FSEIS. The FSEIS states:

> "Because of expected sedimentation conditions, it is anticipated that all of the floodplain (including riparian) vegetation upstream from the proposed dam to the 50-year floodline (258 acres) would be lost. Approximately 50 percent of the floodplain vegetation beyond the 50-year line to the maximum flood boundary (an additional 163 acres) would be similarly lost."

The 1988 FSEIS states that these losses are significant. The 50-year floodline is at a surface elevation of 2,425 feet (the No Action [No Project] Alternative). Under the 1988 FSEIS, no sensitive vegetation, wildlife habitat, sensitive plant or wildlife species, or spawning grounds, and migration routes up to the 50-year floodline (2,425 feet in elevation) are expected to remain with the implementation of the Seven Oaks Dam as a flood control facility. Therefore, the 1988 FSEIS included 100 percent mitigation for these losses of sensitive biological resources. In addition, the 1988 FSEIS stated that 50 percent of the biological resources located between the 50-year flood level elevation and 100-year flood level elevation from the construction of the Seven Oaks Dam would be lost. The 1988 FSEIS included mitigation to reduce all of the biological impacts above the 50-year flood level elevation to a level that is considered less than significant. Impacts to sensitive species that were newly listed or raised in status after the publication of the 1988 FSEIS and that were located between the proposed dam and the 50-year floodline (surface elevation 2,425 feet) would be significantly affected by the Santa Ana River Mainstem Project. Since no sensitive biological resources are expected to remain between the dam and elevation 2,425 NAVD, the impoundment of water up to a maximum of 2,418 feet would not affect any sensitive biological resources (construction of Seven Oaks Dam). Therefore, the Water Conservation Project would not result in any additional impacts to sensitive species.

Approximately 300 acres of chaparral (upland habitat) are expected to be directly impacted by the construction of Seven Oaks Dam, as well as 90 acres of upland habitat would be lost due to flooding within the footprint of the dam. The FEIS further states that "The shoreline excursion during the rainy season would result in erosion and flooding which would damage all plants within the 10-year floodline and most of those present within the 10- to 50-year boundary." The 10-year floodline is at a surface elevation of 2,300 feet and the 50-year floodline is at a surface elevation of 2,425 feet.

The 1988 FSEIS also states that significant wildlife habitat will be lost as a result of building the dam. Significant losses to wildlife habitat include the loss of herpetofauna, including sensitive species, due to drowning and habitat alteration; the loss of mule deer habitat and habitat for other mammals; the loss of breeding bird habitat; the loss of trout spawning habitat; and the creation of a barrier that would prohibit the movement of mule deer during migration. Downstream areas may be used as borrow sites to build the dam. The SEIS recognizes that sensitive species may be impacted by this activity.

It was also noted that the cessation of regular flooding in areas downstream of the dam would impact the endangered Santa Ana River woollystar. Impacts to a maximum of 750 acres of woollystar habitat may occur following construction of the dam.

Mitigation Associated With The Construction and Operation of The Seven Oaks Dam (Santa Ana River Mainstem Project)

During the planning process leading to the preparation of the 1988 FSEIS for the SARP, the USACE requested formal consultation with the USFWS as stipulated under Section 7(c) of the ESA for the following federal endangered and/or threatened species: least Bell's vireo (*Vireo bellii pusillus*), peregrine falcon (*Falco peregrinus anatum*), bald eagle (*Haliaeetus leucocephalus*), Santa Ana River woollystar (*Eriastrum densifolium* ssp. *sanctorum*), and the slender-horned spineflower (*Dodecahema leptoceras*).

Based on analysis of field and scientific data documented in the USACE's Phase II GDM Biological Assessment for the SARP, the USACE concluded and the USFWS concurred that the SARP was not likely to affect the peregrine falcon, the bald eagle, or the slender-horned spineflower; therefore, these species were not given further consideration in the USFWS Opinion, dated June 22, 1989. Furthermore, the Opinion concluded that the SARP, together with inclusion of the proposed mitigation/compensation plan included as part of the project design (and as detailed in the Opinion) would not likely jeopardize the continued existence of the least Bell's vireo or the Santa Ana River woollystar.

As mitigation for the woollystar, the USACE and the USFWS agreed that 760 acres of woollystar habitat would be preserved in the Santa Ana River Wash.

As mitigation for loss of vegetation, riparian habitat, upland habitat, wildlife habitat, mule deer migration routes, and trout spawning habitat; two parcels of land–Filaree Flats (139 acres) and Section 5 (649 acres)–were to be acquired and turned over to the U.S. Forest Service (USFS). In addition, 60 acres of the Santa Ana River Wash between Greenspot Road and Seven Oaks Dam were to be acquired and improved after completion of the dam as compensation for riparian habitat losses (USACE 1988). This commitment has subsequently been eliminated at the request of the USFWS in exchange for providing funding for Arundo removal in the upper watershed.

4.3.1.1 Vegetation

No Action (No Project) Alternative

Implementation of the No Action Alternative will have no impact on vegetation, including vegetation considered sensitive by resource agencies, on the project site as there will be no changes in the project from the 1988 FSEIS project plan.

Alternatives 1, 2, 3, and 4

Loss of Alluvial Scrub, Alder Woodland, and Chaparral Habitat. Alternative 1 would allow for the impounding of water up to 2,300 feet. Alternative 2 would impound water up to 2,375 feet; Alternative 3 would impound water up to 2,418 feet; and Alternative 4 would impound water up to 2,265 feet. Biological impacts addressed in the 1988 SEIS include effects on vegetation in upper Santa Ana Canyon up to the 50-year flood line. The 50-year flood line is at a surface elevation of approximately 2,425 feet. Therefore, all vegetation impacts at the 2,300-, 2,375-, 2,418-, and 2,265-foot water levels were previously addressed and mitigated as part of the *Phase II General Design Memorandum on the Santa Ana River Mainstem Including Santiago Creek, California Supplemental Environmental Impact Statement* project (USACE 1988). Furthermore, according to the USACE, no increases in the duration of flood flows extending beyond the 50-year flood line is expected to occur under the project alternatives compared to the Seven Oaks Dam project. Therefore, no impacts to habitat above the 50-year flood line elevation would occur with the implementation of the alternatives.

4.3.1.2 Wildlife

No Action (No Project) Alternative

Implementation of this alternative would have no additional impacts on wildlife because there will be no changes from the previously approved Seven Oaks Dam project.

Alternatives 1, 2, 3, and 4

There are no additional wildlife impacts associated with raising the water level to 2,300, 2,375, 2,418, or 2,265 feet for Alternatives 1, 2, 3, and 4, respectively. The FSEIS (USACE 1988) addresses and mitigates all impacts to wildlife, including trout spawning habitat and mule deer migration routes, below the 50-year flood line (2,425 feet).

Concerns have been raised regarding potential illegal recreational activities (i.e., fishing) in the impounded water behind the dam and these potential illegal activities resulting in impacts on wildlife species. The proposed water conservation alternatives are projected to result in one additional month of water impoundment behind the dam compared to the Seven Oaks Dam project. The increase in one more month of impounded water is not expected to result in significant increases in illegal recreational activities, and, therefore, will not result in significantly different impacts on wildlife species compared to those impacts addressed and fully mitigated as part of the Seven Oaks Dam project.

4.3.1.3 Sensitive Plant Species

No Action (No Project) Alternative

There will be no additional impacts on special status plant species because there are no changes proposed from the previously approved Seven Oaks Dam project.

Alternatives 1, 2, 3, and 4

Between June and September, Alternatives 1, 2, 3, and 4 would increase the downsrtream release rate of water under water conservation conditions into the Santa Ana Wash, where there are populations of two endangered plants–the Santa Ana River woollystar and the slender-horned spineflower–and the sensitive Parry's spineflower. As previously indicated in Table 2-2 (see Section 2, page 2-7), Alternative 1's water flows (when compared to the No Action Alternative) will increase by 55 cfs and 19 cfs in June (present and future conditions, respectively), by 50 cfs and 17 cfs in July and August (present and future conditions, respectively), and by 70 cfs and 32 cfs in September (present and future conditions, respectively). For the No Action Alternative (ongoing operation of the Seven Oaks Dam), there are no discernible water releases in September.

For Alternative 2, water flows will increase by 135 cfs and 79 cfs in June (present and future conditions, respectively), by 125 cfs and 78 cfs in July and August (present and future conditions, respectively), and by 145 cfs in September (present and future conditions). For Alternative 3, the water flows will increase (when compared to the operational characteristics of the Seven Oaks Dam) by 198 cfs and 129 cfs in June (present and future conditions, respectively), by 188 cfs and 140 cfs in July and August (present and future conditions, respectively), and 208 cfs and 155 cfs in September (present and future conditions, respectively). And for Alternative 4, water flows will increase by 32 cfs and 5 cfs in June (present and future conditions, respectively), by 22 cfs and 0 cfs in July and August (present and future conditions, respectively), and by 42 cfs and 15 cfs in September (present and future conditions, respectively).

According to the USACE, the changes in water flow under water conservation conditions that are described above for each of the alternatives are expected to be nominal compared to the water flow under the Seven Oaks Dam project. The base line peak water release flow during flood control conditions under the Seven Oaks Dam project is up to 500 cfs (USACE 1995). The base line peak water release during flood control conditions would remain the same under the water conservation alternatives. Since the water conservation alternatives would nominally change downstream water flows and the peak water release during flood control conditions would remain the same, no adverse impacts to downstream sensitive plants are expected to occur.

Impacts to the four plant species considered sensitive after the publication of the 1988 SEIS; Parry's spineflower, Plummer's mariposa lily, Humbolt lily, and southern California black walnut; would occur under the operation of the Santa Ana Mainstem Project. According to USFS definition of a sensitive plant, the Parry's spineflower, Plummer's mariposa lily, and Humboldt lily are not considered sensitive; however, they are considered watch list species. The southern California black walnut is not considered sensitive or a watch list species according to USFS terminology. According to the USACE, the water conservation alternatives would nominally change downstream water flows and the peak water release during flood control conditions would remain the same compared to the Seven Oaks Dam project. Therefore, no additional impacts on these plant species would occur with the water conservation project.

4.3.1.4 Sensitive Wildlife Species

No Action (No Project) Alternative

There will be no impacts to special status wildlife species because there will be no changes from the previously approved Seven Oaks Dam project.

Alternatives 1, 2, 3, and 4

No additional impacts to sensitive wildlife species or habitats are anticipated because any known species and habitats were identified and fully mitigated as part of the construction of the Seven Oaks Dam project. Other wildlife species considered sensitive or listed following completion of the 1988 SEIS fall under the jurisdiction of the Santa Ana River Mainstem Project.

Sensitive wildlife species located downstream of the dam will not be additionally impacted because according to the USACE, the water conservation alternatives would nominally change downstream water flows and the peak water release during flood control conditions would remain the same compared to the Seven Oaks Dam project.

4.3.1.5 Wildlife Movement Corridors

No Action (No Project) Alternative

There will be no impacts to wildlife movement corridors because there are no changes in the project.

Alternatives 1, 2, 3, and 4

No additional impacts to wildlife movement corridors are anticipated because this impact was identified and fully mitigated as part of the construction of the Seven Oaks Dam project.

4.3.2 MITIGATION MEASURES

4.3.2.1 Vegetation

No Action (No Project) Alternative and Alternatives 1, 2, 3, and 4

No mitigation is required.

4.3.2.2 Wildlife

No Action (No Project) Alternative and Alternatives 1, 2, 3, and 4

No mitigation is required.

4.3.2.3 Sensitive Plant Species

No Action (No Project) Alternative and Alternative 1, 2, 3, and 4

No mitigation is required.

4.3.2.4 Sensitive Wildlife Species

No Action (No Project) Alternative and Alternatives 1, 2, 3, and 4

No mitigation is required.

4.3.2.5 Wildlife Movement Corridors

No Action (No Project) Alternative and Alternatives 1, 2, 3, and 4

No mitigation is required.

4.3.3 LEVEL OF SIGNIFICANCE AFTER MITIGATION

All impacts are considered less than significant and no mitigation is required.

4.4 LAND USE AND RECREATION

4.4.1 ENVIRONMENTAL CONSEQUENCES

Thresholds of Significance

An alternative would have a significant impact if it would cause:

- Incompatibilities with surrounding or onsite uses
- Inconsistencies with plans or policies
- Affect the provision of, or access to, recreational uses within the area

4.4.1.1 Existing Land Uses

No Action (No Project) Alternative

Alternative 1 (continuation of the Seven Oaks Dam for flood control purposes) would not affect the existing land uses present at the site. The water levels and duration of impounded water would not change. No impacts are anticipated.

Alternatives 1, 2, 3, and 4

Alternatives 1, 2, 3, and 4 would increase the inundation area and period of inundation from the existing operations of the Seven Oaks Dam. However, the impoundment of runoff would not increase inundation beyond that considered in the 1988 FSEIS. As discussed in Section 2, access to the upper canyon using the existing streambed road for Southern California Edison Company (SCE), the U.S. Forest Service, and the local water district would be impeded more frequently because of the impoundment of the conservation pool. Various options to maintain access to upstream areas are being considered. The worst-case environmental option includes elevating and relocating portions of the existing unpaved road in the streambed above the conservation pool (Exhibit 2-3). Another option includes automating SCE equipment for the upstream gates. Still another option is to designate existing fire access roads as secondary (alternative) routes to upstream areas during the inundation of the primary access road. At this time, the option to be selected is unknown. Additional environmental documentation may be required depending on the selected option. For the purpose of this EIS/EIR, the worst-case option which is to construct a new access road as depicted in Exhibit 2-3, is assumed. The provision of a new access road would result in no impacts on access to upstream facilities.

4.4.1.2 Planning and Policy Documents

National Forest Service Management Plan

No Action (No Project) Alternative

The No Action Alternative would not alter the uses or operations of the Seven Oaks Dam. Therefore, no impacts are anticipated.

Alternatives 1, 2, 3, and 4

Alternatives 1, 2, 3, and 4 would provide for additional water for replenishment of the groundwater basin. This expansion to the operations of the Seven Oaks Dam to also allow for water conservation would not adversely affect the management activities of the Forest Service. No impacts are anticipated.

County of San Bernardino General Plan

No Action (No Project) Alternative

The No Action Alternative would not change the land use characteristics or operation of the Seven Oaks Dam. Consequently, no adverse impacts would occur in relation to the plans and policies to the County General Plan. However, policies seeking to further water conservation within the County would not be attained.

Alternatives 1, 2, 3, and 4

Alternatives 1, 2, 3, and 4 would increase the inundation area and period of inundation of the Seven Oaks Dam. This water conservation project would be consistent with many of the policies, goals, and objectives of the County General Plan that relate to water conservation, and improved water distribution. No impacts are anticipated.

City of Highland General Plan

No Action (No Project) Alternative

The No Action Alternative would not change or affect land uses within or adjacent to the Seven Oaks Dam. Therefore, no inconsistencies with local plans or policies are expected under this alternative.

Alternatives 1, 2, 3, and 4

Alternatives 1, 2, 3, and 4 would allow for additional impound capacity at the Seven Oaks Dam for water conservation purposes. This alternative would not change the land uses present at the site. The dam and its operational characteristics are considered consistent with local plans and policies. The proposed operational changes and physical modifications to allow for water conservation activities is not expected to result in any significant impacts to the City of Highland General Plan.

City of Redlands General Plan

No Action (No Project) Alternative

The No Action Alternative would not change or affect land uses within or adjacent to the Seven Oaks Dam. Therefore, no inconsistencies with local plans or policies are expected.

Alternatives 1, 2, 3, and 4

As with the City of Highland General Plan, the proposed project alternatives are not anticipated to have any adverse affect on the existing and proposed land uses and the policies and programs of the City of Redlands General Plan.

4.4.1.3 Agricultural Soils

No Action (No Project) Alternative and Alternatives 1, 2, 3, and 4

None of the alternatives would affect agricultural soils. Inundation of areas within the Seven Oaks Dam site have been previously addressed with respect to agricultural soils. No impacts are anticipated.

4.4.1.4 Recreation

No Action (No Project) Alternative

Alternative 1 would not result in any changes in operation to the Seven Oaks Dam site. As a result, no significant effects to recreation would occur.

Alternatives 1, 2, 3, and 4

Implementation of these alternatives are not expected to impede the use of existing limited recreational opportunities in the project vicinity.

No recreational uses are proposed as a part of Alternatives 1, 2, 3, or 4. The proposed water conservation project is not requiring the acquisition of additional rights/easements above and beyond the acquisition of lands required for the SARP Mainstem project. Therefore, the USACE has no authority to cost-share in recreational facilities. Additionally, none of the local sponsors of the project have made commitments regarding the provision and maintenance of recreational facilities.

Furthermore, there have been concerns raised regarding potential illegal recreational activities (i.e., fishing) in the impounded water behind the dam. The proposed water conservation alternatives are projected to result in one additional month of water impoundment behind the dam compared to the Seven Oaks Dam project. The increase in one more month of impounded water is not expected to result in significant increases in illegal recreational activities.

4.4.2 MITIGATION MEASURES

No mitigation is required.

4.4.3 LEVEL OF SIGNIFICANCE AFTER MITIGATION

No significant impacts are anticipated.

4.5 TRANSPORTATION

4.5.1 ENVIRONMENTAL CONSEQUENCES

Thresholds of Significance

An alternative is considered to have a significant effect if it would:

- Contribute significant traffic to deficient area roadways
- Remove access from an area currently used by the public for recreation, travel, etc.

4.5.1.1 Road System

No Action (No Project) Alternative

The No Action Alternative would not generate any additional traffic or further restrict access. Because no additional development would occur at the Seven Oaks Dam site as a part of this alternative, no significant impacts would result.

Alternatives 1, 2, 3, and 4

Implementation of Alternatives 1, 2, 3, and 4 will result in short-term construction-related vehicular traffic at the project site and on the surrounding roadway system. Structural modifications to the intake structure will be required for Alternatives 1, 2, and 3 and modifications to bridges and bulkheads will be required for Alternatives 2 and 3. As a worst-case assumption, Alternatives 1, 2, 3, and 4 would require a new access road to upstream facilities. During construction activities, construction workers are expected to travel to/from the site on a daily basis; construction equipment is expected to be maintained on the site during the construction period. Additional vehicular trips on the surrounding roadway system including 5th Street/Greenspot Road is expected to result in short-term increase (during the construction period) in traffic on roadways. Although the short-term increase in construction traffic, including large trucks, may be an inconvenience to motorists, the local roadways are projected to continue to operate at acceptable levels of service.

The project alternatives would not result in an increase in the number of long-term (post-construction period) vehicles on local roadways. Therefore, no long-term impacts are anticipated.

4.5.1.2 Other Transportation Modes

No Action (No Project) Alternative and Alternatives 1, 2, 3, and 4

The project alternatives would have no impact on the other transportation modes described in Section 3.5.2 of this EIS/EIR.

4.5.2 MITIGATION MEASURES

No mitigation is required.

4.5.3 LEVEL OF SIGNIFICANCE AFTER MITIGATION

No significant impacts are anticipated.

4.6 AIR QUALITY

4.6.1 ENVIRONMENTAL CONSEQUENCES

Potential air quality impacts associated with the proposed Seven Oaks Dam Project have been assessed using approved SCAQMD, ARB, and EPA air quality assessment methodologies. Potential impacts of the project alternatives fall into three major categories:

- Construction Impacts: Airborne dust and emissions from construction employee vehicles and heavy equipment used during construction of the project.
- Operational Impacts: Emissions resulting from vehicle travel–both local and regional–that may be associated with roadway travel of maintenance vehicles and/or recreational activities.

The following discusses short-term and long-term air quality impacts for each project alternative.

Thresholds of Significance

Appendix G of the California Environmental Quality Act (CEQA) Guidelines indicates that a project would normally be considered to have a significant effect on air quality if the project would violate any ambient air quality standard, contribute substantially to an existing air quality violation, expose sensitive receptors to substantial pollutant concentrations, or conflict with adopted environmental plans and goals of the community where it is located. This threshold is also considered applicable for NEPA compliance purposes.

Thresholds for Construction Emissions

The following significance thresholds for construction emissions have been established by the SCAQMD:

- 2.5 tons per quarter of ROC
- 2.5 tons per quarter of NOx
- 24.75 tons per quarter of CO
- 6.75 tons per quarter of PM10
- 6.75 tons per quarter of SOx

However, if the daily construction emissions exceed 75 lb/day for ROC, or 100 lb/day for NOx, or 550 lb/day for CO, or 150 lb/day for PM10 and SOx, the SCAQMD 1993 *CEQA Air Quality Handbook* indicates that impacts should also be considered significant. Projects in the South Coast Air Basin (basin) with construction-related emissions in a quarterly period that exceed any of the emission thresholds should be considered to be significant.

Thresholds for Operational Emissions

Specific criteria for determining whether the potential air quality impacts of a project are significant are set forth in the SCAQMD's 1993 *CEQA Air Quality Handbook*. The criteria include emissions thresholds, compliance with State and National air quality standards and conformity with the existing AQMP. The daily operational emissions "significance" thresholds are:

a. Regional Emissions

- 550 pounds per day of CO
- 150 pounds per day of SOx
- 55 pounds per day of NOx
- 150 pounds per day of PM10
- 55 pounds per day of ROC

b. Local Emissions

California State 1-hour CO standard of 20.0 ppm
California State 8-hour CO standard of 9.0 ppm

The significance of localized project impacts depends on whether ambient CO levels in the vicinity of the project are above or below state and federal CO standards. If ambient levels are below the standards, a project is considered to have significant impacts if project emissions result in an exceedance of one or more of these standards. If ambient levels already exceed a state or federal standard, then project emissions are considered significant if they increase 1-hour CO concentrations by 1.0 ppm or more or 8-hour CO concentrations by 0.45 ppm or more.

Potential air quality impacts of the project alternatives were assessed using guidelines developed by the SCAQMD 1993 *CEQA Air Quality Handbook*, the CALINE4 and URBEMIS5 air quality models, and emission factors developed by the EPA and ARB. In this analysis, carbon monoxide concentrations at intersections have been modified using ARB's EMFAC7EP emission factors which are contained in Table A9-5-J-10 of the SCAQMD 1993 *CEQA Air Quality Handbook*.

4.6.1.1 Construction Impacts

No Action (No Project) Alternative

There would be no construction emissions under this alternative. The Seven Oaks Dam is considered to be operational for flood control purposes. No change in its operational characteristics would occur.

Alternative 1-Impound Plan 1: 2,300 Feet

Impact 6-1: Construction Emissions During Grading (Direct, Adverse Significant). Construction emissions associated with this project alternative have been estimated using methodologies and worst-case assumptions outlined in the SCAQMD 1993 *CEQA Air Quality Handbook*.

Under this project alternative, the entire area to be disturbed for the construction of an access road would be approximately 5.12 acres. Therefore, for purposes of this analysis, it is assumed that 5.12 acres would be the largest amount of land disturbed at one time. This alternative would also include emissions associated with the construction of a diversion berm to divert surface water flows away from construction activities associated with the intake structure and anchors.

Site preparation of roadway alignment would produce two types of air contaminants: exhaust emissions from construction equipment and employee vehicles, and 2 generated as a result of earthwork and soil movement, and from construction vehicles and equipment travel over exposed surfaces. Impacts can be expected throughout construction period for the access road.

Impact 6-2: Exhaust Emissions From Construction Equipment and Vehicles (Direct, Adverse Significant). Exhaust emissions from construction activities include those associated with the transport of workers, machinery, and supplies to the site; those produced onsite as the equipment is used; and emissions from trucks transporting export materials from the site. Exhaust emissions vary substantially from day to day, depending on the level of activity and the type of land use. Based on the methodology outlined in the SCAQMD 1993 *CEQA Air Quality Handbook*, and analysis of similar projects, construction emissions associated with the proposed project have been estimated and are shown in Table 4.6-1. It is anticipated that emissions of CO and NOx would exceed the SCAQMD daily thresholds for construction activity, and would potentially be significant without any mitigation.

Impact 6-3: Fugitive Dust Emissions (Direct, Adverse Significant). Construction emissions are associated with demolition, land clearing, exposure, and cut and fill operations. Road and building construction are the activities with the highest emissions potential. As a worst-case assumption, a new access road would be constructed with the implementation of the proposed project. Construction activities associated with modifications to the intake structure, additional anchors, and diversion berms would also be associated with this alternative. Dust emissions vary substantially from day to day, depending on the level of activity, the specific operations, and weather conditions. Onsite construction workers may be exposed to blowing dust, depending upon prevailing wind conditions. However, because there are no existing residences within 1 mile of the project site, no fugitive dust impacts are anticipated to offsite sensitive receptors.

The SCAQMD estimates that each acre of soil disturbed creates about 26.4 pounds of PM10 per workday during the construction life of any project, and 21.8 pounds of PM10 per hour from dirt/debris pushing per dozer. Assuming that the entire 5.12 acres were exposed on any one day, and two dozers operating 8 hours per day, 484 lbs of PM10 per day would be generated from soil disturbance. The SCAQMD thresholds for daily emissions of PM10 is 150 lbs/day. Therefore, this impact would be considered significant without mitigation.

TABLE 4.6-1
PEAK CONSTRUCTION EQUIPMENT EMISSIONS
(lbs/day)

Equipment	CO	ROC	NOx	SOx	PM10
1 fork lift	115	4	0.108	--	0.248
2 off-highway trucks	28.8	3.1	66.72	7.2	4.16
1 tracked tractor	2.8	0.96	10.08	1.12	0.896
1 scraper	4.68	2.16	30.72	3.68	3.28
2 dozers	--	--	--	5.6	2.64
1 wheeled loader	124.56	4.12	15.2	1.456	1.36
1 roller	359.7	4.72	2.89	0.536	0.4
1 motor grader	96.8	3.2	5.70	0.688	0.49
1 miscellaneous	136.16	4.34	3.30	0.184	1.12
Total	868.5	26.60	134.7	20.46	14.6

[a] Assumes operation 8 hours per day and worst-case fuel type (i.e., gasoline or diesel) based on SCAQMD 1993 *CEQA Air Quality Handbook* Table A9-8-A.

-- Negligible generation of emissions.

Source: SCAQMD 1993 *CEQA Air Quality Handbook* and Michael Brandman Associates 1995.

Fugitive dust would be reduced by implementation of mitigation measures designed to comply with SCAQMD Rules 402 and 403 which limit concentrations of dust and specify operational measures to avoid creating a nuisance offsite. However, even with implementation of the SCAQMD recommended mitigation measures described below (which can reduce PM10 emissions by 50 to 75 percent), particulate emissions of these magnitudes would be significant during the maximum construction activity of the proposed project.

Fugitive dust would be reduced by implementation of mitigation measures designed to comply with SCAQMD Rules 402 and 403 which limit concentrations of dust and specify operational measures to avoid creating a nuisance offsite. It should be noted that unless 70 percent of the PM10 emissions are mitigated by the SCAQMD recommended measures described below, particulate emissions of these magnitudes would be significant during maximum construction activities associated with Alternative 1.

Table 4.6-2 provides information on the total daily construction emissions associated with Alternative 1. Emissions of CO, NOx, and PM10 would be significant during the construction phases of this project alternative without mitigation. Therefore, SCAQMD recommended mitigation measures which would minimize construction-related impacts have been proposed to reduce all construction equipment emissions to the maximum extent possible.

TABLE 4.6-2
SEVEN OAKS DAM PROJECT CONSTRUCTION EMISSIONS[a]
BEFORE MITIGATION (lbs/day)

Source/Land Use	Pollutant				
	CO	NOx	SOx	PM10[b]	ROC
Dirt/debris pushing	--	--	--	484	--
Employee vehicle trips[c]	217	15	--	2	19
Equipment	869	135	20	15	27
Total construction emissions	1,086	150	20	501	46
SCAQMD thresholds	550	55	150	150	55
Significant Impact	**Yes**	**Yes**	**No**	**Yes**	**No**

-- Negligible generation of emissions

a Assumes operation of mobile equipment for 8 hours per day. Equipment emissions based on factors provided by SCAQMD *CEQA Air Quality Handbook* Table A9-8-A.

b PM10 generated at a rate of 26.4 pounds per day per acre exposed for passive graded surfaces and 21.8 pounds per hour, per bulldozer for a total of two bulldozers, for dirt/debris moving operations.

c Based on emission factors assumptions contained in Tables 9-2 and 9-3 of the SCAQMD *CEQA Air Quality Handbook*.

Source: Michael Brandman Associates 1995.

Alternative 2–Impound Plan 2: 2,375 Feet

Daily total worst-case construction emissions for this alternative would be higher than under Alternative 1 conditions because a larger area (approximately 12.53 acres versus 5.12 acres) could be disturbed at any one time.

Alternative 3–Impound Plan 3: 2,418 Feet

Daily total worst-case construction emissions for this alternative would be higher than under Alternative 1 conditions because a larger area (approximately 13.88 acres versus 5.12 acres) could be disturbed at any one time.

Alternative 4–Impound Plan 4: 2,265 Feet

Daily worst-case construction emissions are expected to be the same as Alternative 1 (approximately 5.12 acres) to allow for grading and construction of the access road.

4.6.1.2 Operational Impacts

Operational impacts could result from local and regional vehicular emissions associated with vehicles trips. There would be little regional air quality effect directly associated with the proposed project, except potentially increased emissions from maintenance activities associated with the proposed project. Local CO hot spot potential would be very small considering the limited amount of the vehicular traffic in the project area.

No Action (No Project) Alternative

No new traffic trips are expected to be associated with this project alternative because no changes to the Seven Oaks Dam would occur. No new long-term operational air quality impacts would occur.

Alternative 1–Impound Plan 1: 2,300 Feet

Long-term operational air quality impacts would be associated with maintenance activities associated with Alternative 1. Up to 10 maintenance vehicles a day are anticipated to be traveling on access roads, which would not be paved. Therefore, in addition to the vehicular exhaust emissions, there would be fugitive dust generated by vehicles traveling on unpaved roads. However, because of the small volume of daily maintenance vehicles, and no existing residences are within 1 mile of the project site, no significant long-term air quality impacts are anticipated.

Alternative 2–Impound Plan 2: 2,375 Feet

Long-term air quality impacts associated with this alternative are similar to those for Alternative 1.

Alternative 3–Impound Plan 3: 2,418 Feet

Long-term air quality impacts associated with this alternative are similar to those for Alternative 1.

Alternative 4-Impound Plan 4: 2,265 Feet

Long-term air quality impacts associated with this alternative would be the same as those for Alternative 1.

4.6.1.3 Consistency With the Air Quality Management Plan (AQMP)

Section 15125 of the State CEQA Guidelines requires that an environmental study analyzes and discusses any inconsistencies between a proposed project and applicable General Plans and regional plans. Specifically, the environmental study should discuss the project's consistency with the current AQMP. In addition, several of the underlying key assumptions for both the air quality plans should be included in the analysis as well:

- Assumptions such as the number and location of population, housing units, and employment from the Growth Management Chapter (1994 GMC) in Southern California Association of Government's (SCAG) 1994 Regional Comprehensive Plan and Guide (RCP&G).
- Assumptions concerning type, size, and location of transportation infrastructure from the Regional Mobility Chapter (1994 RMC) in SCAG's 1994 RCP&G.
- Consistency with a local government's Air Quality Element or air quality related policies in other General Plan Elements, if the local government has adopted such policies.

The purpose of the consistency finding is to determine if a project is inconsistent with the assumptions and objectives of the regional air quality standards.

The SCAQMD adopted the 1994 Air Quality Management Plan (1994 AQMP) on September 9, 1994. The 1994 AQMP is the regionally approved air quality plan used to meet California Environmental Quality Act (CEQA) Guidelines determinations that a project may have significant environmental effects if it is not consistent with locally adopted environmental plans. However, guidelines for the 1994 AQMP continued requirements for project conformity to the policies and measures contained in the 1989 and 1991 AQMPs.

The project would not negatively affect any local sensitive receptor or exceed applicable state or federal air quality standards. The project has also incorporated mitigation measures to reduce construction and operational emissions to the greatest extent feasible. Therefore, the proposed project would be consistent with the approved AQMP.

4.6.2 MITIGATION MEASURES

4.6.2.1 Construction Emissions

No Action (No Project) Alternative

No mitigation is required.

Alternatives 1, 2, 3, and 4

Impact 6-1: Construction Emissions During Grading; Impact 6-2: Exhaust Emissions from Construction Equipment and Vehicles; and Impact 6-3: Fugitive Dust Emissions.

Construction of project alternatives 1, 2, 3, or 4 would produce emissions of criteria pollutants during, grading, site preparation, and physical construction. Emissions of CO, NOx, and PM10 would be significant during the construction phases of the project. The following mitigation measures apply to construction activities and would reduce construction-related emissions to the maximum extent feasible.

1. Prior to the issuance of construction bid documents to contractors, the USACE shall verify that the following mitigation measures are included in the construction specifications to reduce construction-related emissions to the maximum extent feasible in compliance with SCAQMD Rule 403.

   a. During clearing, grading, earthmoving, or excavation operations, fugitive dust emissions shall be controlled by regular watering, paving of construction roads, or other dust-preventive measures using the following procedures:

      - All material excavated or graded shall be sufficiently watered to prevent excessive amounts of dust. Watering, with complete coverage, shall occur at least twice daily, preferably in the late morning and after work is done for the day.

      - All clearing, grading, earthmoving, or excavation activities shall cease during periods of high winds (i.e., greater than 25 mph averaged over 1 hour) or during Stage 1 or Stage 2 episodes.

      - All material transported offsite shall be either sufficiently watered or securely covered to prevent excessive amounts of dust.

      - The area disturbed by demolition, clearing, grading, earthmoving, or excavation operations shall be minimized at all times.

   b. After clearing, grading, earthmoving, or excavation operations and during construction activities, fugitive dust emissions shall be controlled using the following measures:

      - All active portions of the construction site shall be watered to prevent excessive amounts of dust.

   c. At all times, fugitive dust emissions shall be controlled using the following procedures:

- Onsite vehicle speed shall be limited to 15 mph.

d. At all times during the construction phase, ozone precursor emissions from construction equipment shall be controlled using the following procedures:

- Equipment engines shall be maintained in good condition and in proper tune according to manufacturer's specifications.

- During smog season (May through October), the overall length of the construction period should be extended, thereby decreasing the size of the area prepared each day, to minimize vehicles and equipment operating at the same time.

4.6.3 LEVEL OF SIGNIFICANCE AFTER MITIGATION

After implementation of the above mitigation measures, construction emissions would remain significant. Long-term regional and local air quality impacts would be less than significant.

4.7 NOISE

4.7.1 ENVIRONMENTAL CONSEQUENCES

The potential noise impacts of the proposed Seven Oaks Dam water conservation alternatives (1, 2, 3, and 4) include short-term construction noise impacts and long-term noise impacts associated with maintenance vehicles. Baseline conditions assume that the Seven Oaks Dam is operational for flood control purposes.

Thresholds of Significance

For short-term construction noise impacts, the County of San Bernardino specifies that all construction, repair, or demolition activities are limited to between the hours of 7 a.m. and 7 p.m. of any working day, except Sundays and federal holidays. Noise-sensitive land uses shall not be exposed to exterior noise levels exceeding 55 dBA Leq/75 dBA Lmax between the hours of 7 a.m. and 10 p.m., and shall not be exposed to noise levels exceeding 45 dBA Leq/65 dBA Lmax between the hours of 10 p.m. and 7 a.m. the next morning, from locally regulated mobile and stationary sources, such as construction activities.

For long-term vehicular traffic noise impacts, the noise standard for outdoor living areas is 60 dBA Ldn.

In addition to the criteria discussed above, another consideration in defining impact criteria is based on the degradation of the existing noise environment. Supplementary Document G (Significant Effects) of the CEQA Guidelines states that a project would normally have a significant effect on the environment if it increases substantially the ambient noise levels for adjoining areas. Based on Caltrans' definitions in community assessments, it can be considered as "generally not significant" if no noise-sensitive sites are affected by the project-related noise or if increases in community noise level with the implementation of the project are expected to be 3 dBA or less at noise-sensitive locations, and the proposed project will not result in violations of local ordinances or standards. In areas with noise levels already exceeding the noise standard, in this case, the 60 dBA Ldn, impacts from noise level increase less than 3 dBA would be considered less than significant.

4.7.1.1 No Action (No Project) Alternative

No noise impacts would be generated from this alternative because no changes would occur.

4.7.1.2 Alternatives 1, 2, 3, and 4

Short-term Construction Impacts

Construction noise sources are not strictly relatable to a 24-hour community noise standard because they occur only during selected times and the source noise level varies sharply with time. Construction activities are also treated separately in various community noise ordinances because they do not represent a chronic, permanent noise source.

Construction noise represents a short-term impact on ambient noise levels on and around the project area over the period of project construction. Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. The U.S. Environmental Protection Agency (EPA) has found that the noisiest equipment types operating at construction sites typically range from 88 dBA to 91 dBA at 50 feet. Typical operating cycles may involve 2 minutes of full power, followed by 3 or 4 minutes at lower settings. Pile driving typically generates noise levels up to 97 dBA when measured at 50 feet, before mitigation is implemented. Table 4.7-1 lists typical construction equipment and corresponding noise levels.

Since noise from localized sources (such as construction activities) typically falls off by about 6 dBA with each doubling of distance from source to receptor, outdoor receptors at 1,000 feet from the construction site that have an uninterrupted view of the construction site would experience noise no greater than 65 dBA when noise on the construction site is 91 dBA. Because of the isolated location of the site, there are no receptors adjacent or in the near vicinity of the site. All existing residences are located more than 1,000 feet from the project study area and would, therefore, be exposed to construction noise levels lower than 65 dBA (the strictest maximum noise level allowed by the County of San Bernardino). Natural and manmade structures would provide additional shielding for the construction noise at the site. The actual noise impact "envelope" would thus be smaller than 1,000 feet in many areas.

Additional construction noise may result from blasting in certain areas of the proposed project (e.g., access road construction). Based on noise measurement data, the maximum noise level at 50 feet from blasting is about 94 dBA. Assuming point radiation of sound and no atmospheric or ground absorption (a worst-case estimate), this sound level will attenuate at a rate of 6 dBA per doubling of distance. At a distance of 1,000 feet from the blasting site, noise level will reduce to 68 dBA. Assuming that blasting would be limited to daytime hours, an instantaneous peak level of 75 dBA would be noticeable, but not be considered excessive by most listeners. Depending on a receiver's proximity to roadways or other noise sources, a peak noise level of 65 dBA may not be noticeable. As a rough assessment, blasting impact would be limited to receivers located within about 300 feet of the blasting area. Because there are no existing residences or sensitive receptors located within 1 mile of the project site, noise generated by blasting activity would not result in any significant impacts.

TABLE 4.7-1

TYPICAL CONSTRUCTION EQUIPMENT NOISE BEFORE AND AFTER MITIGATION

Equipment	Mitigation Measures	Noise Level (dBA)		Distance (feet)
		Before	After	
Pile Driver	Muffler on exhaust and sound barrier	103	95	25
Pavement Breaker	Muffled	105	100	3
Diesel Driven Electric Welder	Mufflers plus acoustical enclosure	93	76	23
Air Compressor (Diesel Driven)	Muffled	105	85	3
Air Tracked Drill	Acoustical enclosure	104	83	23
Chain Saw				
Gasoline	None	113	113	3
Electric	None	86	86	3
Sinker Drill	Acoustical enclosure	95	78	3
Earth Movers				
Front Loader	Muffler	79	75	50
Back Hoe	Muffler	85	75	50
Dozer	Muffler	80	75	50
Grader	Muffler	91	75	50
Truck	Muffler	91	75	50
Paver	Muffler	89	80	50
Material Handlers				
Concrete Mixer	Muffler	85	75	50
Crane	Muffler	83	75	50
Jack Hammer	Muffler or acoustical enclosure	88	75	50
Source: Urban Mass Transportation Administration 1974; EPA 1971.				

Long-term Maintenance Activities

The only long-term activity that would be considered a noise source is associated with maintenance operations, which includes up to a maximum of 10 maintenance vehicles a day traveling on the onsite access road, and minor maintenance activities on the project site. Because there are no existing residences within 1 mile of the project site or along the access road, no noise impacts are anticipated from implementation of the proposed project.

4.7.2 MITIGATION MEASURES

No mitigation is required.

4.7.3 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Implementation of the proposed project would not result in any significant short-term or long-term noise impacts.

4.8 CULTURAL RESOURCES

4.8.1 ENVIRONMENTAL CONSEQUENCES

Thresholds of Significance

Appendix G of the CEQA Guidelines indicates that a project would normally be considered to have a significant effect on cultural resources if the project would disrupt or adversely affect a prehistoric or historical archaeological site or a property of historic or cultural significance to a community or ethnic or social group; or a paleontological site except as a part of a scientific study.

4.8.1.1 No Action (No Project) Alternative and Alternatives 1, 2, 3, and 4

The construction of Seven Oaks Dam will have an adverse effect on the National Register-eligible Santa Ana River hydroelectric system. The USACE has completed the necessary mitigation involving archival studies and photographic documentation of the hydroelectric system prior to the construction of the dam. The water conservation project APE is contained within the Seven Oaks Dam APE and based on the completion of the mitigation measures; the water conservation project will have no effect on National Register-listed or eligible properties. This will be the same for all project alternatives.

4.8.2 MITIGATION MEASURES

No mitigation is required.

4.8.3 LEVEL OF SIGNIFICANCE AFTER MITIGATION

No significant impacts are anticipated.

4.9 PUBLIC HEALTH AND SAFETY

4.9.1 ENVIRONMENTAL CONSEQUENCES

Thresholds of Significance

An alternative is considered to have a significant effect if an unauthorized release of a hazardous material and/or waste results in the exposure of people to a risk of contamination beyond acceptable levels or exposure to public safety threats. Such levels are defined by applicable laws and regulations (hazardous waste action levels, etc.) and relevant planning documents. This would include such things as the exposure of construction workers to hazardous materials and/or waste encountered during construction.

4.9.1.1 Hazardous Materials and Waste

No Action (No Project) Alternative

There are no known hazardous materials and/or waste contamination sites located on or adjacent to the study area. Because no changes would occur, no impacts are anticipated.

Alternatives 1, 2, 3, and 4

As previously noted, there are no known hazardous materials and/or waste contamination sites located on or adjacent to the study area. The implementation of Alternatives 1, 2, 3, or 4 would not be affected by hazardous materials and/or waste contamination.

4.9.2 MITIGATION MEASURES

Hazardous Materials and Waste

No mitigation is required.

4.9.3 LEVEL OF SIGNIFICANCE AFTER MITIGATION

No impacts are anticipated.

SECTION 5
CUMULATIVE IMPACTS

Section 15310 of the CEQA Guidelines requires the consideration of cumulative impacts within an EIR. Cumulative impacts are defined as two or more individual effects which, when considered together, are considerable or which compound or increase other environmental effects. The individual effects may be changes resulting from a single project or a number of separate projects. The cumulative impact from several projects is the change in the environment which results from the cumulative impact of the project when added to other closely related future projects.

The cumulative analysis for each of the environmental issues is based on the development of Seven Oaks Dam, which is currently under construction, and the modifications of upstream Southern California Edison (SCE) facilities (i.e., powerhouse and flowline). The Seven Oaks Dam is a 550-foot-high earth-rockfill dam that provides a gross storage capacity of 146,500 acre-feet at the spillway crest. During the beginning of November to the end of May, all inflows would be stored until the target debris pool elevation of 2,200 feet NAVD for present conditions (year 2000) and 2,250 feet for future conditions (year 2050) is reached. The SCE Powerhouse #2 is proposed to be relocated from above the Seven Oaks Dam to below the dam. In addition, the flowline between the current location of Powerhouse #2 and the proposed location of Powerhouse #2 is proposed to be modified from an open aqueduct to an enclosed aquaduct. The completion of the Seven Oaks Dam and the modifications to the SCE facilities are expected to occur prior to the implementation of the proposed water conservation project.

Water Resources

Since the proposed water conservation project would not begin until after the completion of the Seven Oaks Dam (projected for the year 2000) and the modifications to the SCE facilities, no simultaneous construction effects on water resources would occur; however, there would be cumulative long-term effects on water resources. The implementation of the water conservation project would contribute to the long-term accumulation of sediment and debris behind the Seven Oaks Dam. The proposed water conservation project is not expected to significantly influence the estimated sediment deposition at the dam or within the reservoir throughout the project life.

The proposed project will also beneficially contribute to the long-term cumulative increase in groundwater recharge and improve surface water quality. The construction of the Seven Oaks Dam would allowed the flow of stormwater to be controlled so that the potential for increased groundwater recharge and improved downstream water quality could occur. The implementation of the proposed water conservation project will further increase the potential for groundwater recharge and improve surface water quality downstream because solids could settle to the bottom of the impoundment area prior to being released downstream.

Biological Resources

The implementation of the proposed water conservation project is not expected to contribute to the cumulative effects on biological resources in the project area because the project would not affect any biological resources in addition to those addressed and fully mitigated as part of the Seven Oaks Dam project. The Seven Oaks Dam project assumed that all of the floodplain vegetation and habitat upstream of Seven Oaks Dam to the 50-year floodline (elevation 2,425 feet NAVD) would be lost and 50 percent of the floodplain vegetation beyond the 50-year line to the maximum flood boundary would be similarly lost. The addition of the proposed water conservation project includes the impoundment of stormwater below the 50-year floodline, and therefore, the proposed water conservation project would not result in additional effects on biological resources upstream of the Seven Oaks Dam in addition to those addressed and fully mitigated for as part of the Seven Oaks Dam project. Therefore, the project would not cumulatively add to additional effects on biological resources upstream of the Seven Oaks Dam.

The Seven Oaks Dam also significantly affected biological resources downstream of the dam. Mitigation measures were recommended and approved to reduce the dam's effect on the biological resources. The implementation of the proposed water conservation project would reduce downstream stormwater flows between March and May and increase downstream stormwater flows between June and September compared to the Seven Oaks Dam project. These modifications to the downstream stormwater flows are expected to be nominal and not result in any effects on biological resources in addition to those addressed and fully mitigated as part of the Seven Oaks Dam project.

Land Use and Recreation

The existing access road that leads to the upper canyon from the dam is the only existing use that the proposed water conservation project would contribute to a cumulative effect. The existing access road would be periodically inundated under the Seven Oaks Dam project and more frequently under the proposed water conservation project. Various options to maintain access to upstream areas are being considered under the proposed project. The worst-case environmental option includes elevating and relocating portions of the existing unpaved road. The provision of a new access road would eliminate any land use impacts.

The proposed water conservation project is consistent with various plans and respective policies (i.e., National Forest Service Management Plan, County of San Bernardino General Plan, City of Highland General Plan, and City of Redlands General Plan). Since the project would be consistent with these plans and policies, the project would not contribute to cumulative effects on these plans and policies.

The proposed project is not expected to impede the use of existing limited recreational opportunities in the project vicinity or include any recreational uses as part of the project. Therefore, the project would not contribute to any potential cumulative effects on recreation.

Transportation and Circulation

As described above, the proposed water conservation project would contribute to the cumulative inundation of an existing access road that leads to the upper canyon from the dam. Various options to maintain access to upstream areas are being considered. The worst-case environmental option includes elevating and relocating portions of the existing unpaved road. The provision of a new access road would eliminate the potential access impact.

Air Quality

The proposed water conservation project is expected to be under construction after the completion of the Seven Oaks Dam and the modifications to the SCE facilities. Even though the project would be constructed after the related projects are constructed, the project would still contribute significant short-term air emissions within the South Coast Basin during the peak construction activities. This contribution to cumulative emissions is considered significant. The operation activities of the water conservation project is expected to contribute nominal long-term air emissions with a maximum of 10 maintenance vehicle a day traveling on access roads, therefore, the project would not significantly contribute to cumulative long-term emissions in the project area.

Noise

Since the proposed water conservation project would be implemented after the completion of the Seven Oaks Dam project and the modifications to the SCE facilities, construction noise levels associated with these two projects would not occur simultaneously. Therefore, noise levels would not be cumulative. In addition, since there are no sensitive noise receptors (i.e., residences) in the project area (at least within one mile), the noise levels associated with project construction would not be discerable at the nearest residences.

Cultural Resources

Since the proposed water conservation project would not affect any cultural resources, the project would not contribute to any cumulative impact on cultural resources.

Public Health and Safety

Since the proposed water conservation project would not result in any public health and safety effects, the project would not contribute to any cumulative impact on public health and

SECTION 6
LONG-TERM IMPLICATIONS OF THE PROJECT

6.1 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES THAT WOULD BE INVOLVED IF THE PROPOSED ACTION SHOULD BE IMPLEMENTED

The environmental impacts of the project alternatives are discussed in Section 4 of the draft EIS/EIR. As discussed in Section 2 of this EIS/EIR, implementation of the approved, and currently under construction, Seven Oaks Dam will result in significant environmental impacts that will be mitigated as part of the Santa Ana River Mainstem Project. Project Alternatives 1, 2, 3, and 4 would allow for additional impoundment of water behind the Seven Oaks Dam for water conservation purposes; the No Action (No Project) Alternative would involve no changes at the dam.

To broaden the functions of the Seven Oaks Dam to allow for water conservation, minimal physical improvements will be required. These improvements are related to infrastructure modifications in the dam structure to accommodate the additional impoundment and relocated onsite access roads because the increased water level will inundate the existing access roads behind the dam. The infrastructure modifications to the dam will occur in areas that will be disturbed as part of dam construction. Construction of the access roads will result in new areas of disturbance that may not occur with the Seven Oaks Dam.

Approval and implementation of the project would continue to, but not significantly, increase the irretrievable commitment of nonrenewable resources such as energy supplies and other construction-related resources required for the construction and ongoing operation of the Seven Oaks Dam. These energy resources will be used for the construction and temperature regulation of structures; transportation of employees and goods to and from the site; as well as lighting and other associated energy needs.

Implementation of the project and other related projects in the area will require the commitment and reduction of other nonrenewable and slowly renewable resources. These resources include, but are not limited to, petrochemical construction materials; lumber and other forest products; sand and gravel; asphalt; steel, copper, lead, and other metals; water, etc. An increased commitment of public maintenance services (waste disposal and treatment, etc.) will also occur.

6.2 GROWTH-INDUCING IMPACTS OF THE PROPOSED ACTIONS

This section of the EIS/EIR analyzes the potential environmental consequences of the foreseeable growth and development in the area surrounding the Seven Oaks Dam that could be induced by implementation of the proposed project. This section addresses the potential for the proposed project to affect economic or population growth, or the construction of additional developments, either directly or indirectly, in the surrounding environment.

To assess the potential for growth-inducing impacts, the project characteristics that may encourage and facilitate activities that individually or cumulatively may affect the environment must be evaluated. There are two types of growth-inducing impacts that a potential project may have: direct and indirect.

Direct growth-inducing impacts occur when the development of a project directly induces population growth or the construction of additional developments in the same area. Direct growth-inducing impacts also occur when a project might impose new burdens on a community or might induce new development in the area, thereby triggering related growth-associated impacts. Examples are projects which would remove physical obstacles to population growth (such as a new road into an undeveloped area or expansion of a wastewater treatment plant which could serve additional population in the service area). Construction of these types of infrastructure cannot be considered in isolation from the development they trigger. In contrast with projects that physically remove obstacles to growth are those which may provide a catalyst for future unrelated development in an area. The purpose of this project is to impound water behind the Seven Oaks Dam for water conservation. Based on projected population growth for the project service area and the region's dependency on imported water, additional actions are required to provide additional sources of water to serve the existing and project population. Providing an additional source for water would be provided through the implementation of this project.

To the extent that providing an additional future source of water is a factor as to where and when future development projects will be constructed in the region, the implementation of this project may be considered growth-inducing. However, the rapid growth within this region of southern California that is projected to continue well into the future is driven primarily by social and economic forces unrelated to water supplies. And, while the presence of adequate water suplies is essential to maintain the current and projected future population of the region, the fact that Southern California has already developed a complex and far-reaching water delivery system effectively minimizes the importance of local water supplies as a control on growth. If water is needed it will be available from this system even if it has to be transported from other regions many hundreds of miles away and at a much higher cost. Moreover, since implementation of water conservation will provide an additional source of local water to an existing urbanized area, it will minimize the need for new growth-inducing and habitat-fragmenting infrastructure construction.

Implementation of Alternatives 1, 2, 3, or 4 may result in additional employment opportunities. It is anticipated that the majority would be short-term construction jobs. The incremental increase in employment which would be related to the project, in comparison to total employment opportunities available in the region, is small. Therefore, implementation of the proposed project would not directly or indirectly induce growth in the region.

SECTION 7
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Kim Adams Wilson, Associate Planner . . . . Land Use

SECTION 9
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APPENDIX A

NOTICE OF INTENT
NOTICE OF PREPARATION
DISTRIBUTION LISTS
CORRESPONDENCE
PUBLIC SCOPING MEETING REPORT
NOTICE OF PUBLIC REVIEW AND PUBLIC MEETING
NOTICE OF AVAILABILITY
NOTICE OF AVAILABILITY OF WEEKLY RECEIPTS OF EIS'S (NWR)
MINUTES OF PUBLIC MEETING HELD ON WEDNESDAY, APRIL 30, 1997

:earch of the Federal Register to Find 1 Document...

In FR vol. 60, 1995
Issued by the United States Army Corps of Engineers
ıND Published on 04/20/95

)4/20/95 [L-S document 522366, 60 FR 19744, 90 lines]

Corps of Engineers

Intent To Prepare a Draft Environmental Impact Statement/Environmental Impact Report (DEIS/EIR) for the Seven Oaks Dam Water Conservation and Supply Study, San Bernardino, CA

AGENCY: U.S. Army Corps of Engineers, DoD.

ACTION: Notice of Intent.

SUMMARY: The Los Angeles District will prepare a EIS/EIR to evaluate the feasibility of establishing a seasonal water conservation and supply pool at Seven Oaks Dam. The dam, which is currently under construction, is the upstream component of the Santa Ana River Mainstem Project (SARP), and is located in the San Bernardino National Forest along the upper Santa Ana River at the base of the San Bernardino Mountains. The study was developed in response to local concerns regarding future water supply sources, given continued regional population growth, dwindling imported water supplies, and continued increases in the cost of water. Establishment of a seasonal water conservation and supply pool at Seven Oaks would increase groundwater reserves by extending the period water is available for release to downstream spreading grounds. Additionally, the feasibility of developing dispersed, non-motorized recreational facilities will be investigated in cooperation with staff from the San Bernardino National Forest.

FOR FURTHER INFORMATION CONTACT:
Questions about the proposed action and EIS/EIR can be answered by: Mr. Gary Gunther, Study Manager, CESPL-PD-WA, P.O. Box 2711, Los Angeles, California 90053-22325, (213) 894-3825.

SUPPLEMENTARY INFORMATION:

a. Authority

The authority to study the feasibility of water conservation and supply storage at Seven Oaks Dam is contained in the Resolution of the Committee on Public Works of the U.S. House of Representatives, dated May 8, 1964.

b. Proposed Action/Alternatives

The proposed action for Seven Oaks Dam would investigate the feasibility of impounding natural flows during the months of March through May, with releases being made from June through September. Three alternative pool elevations and release rates are currently under consideration:

(1) Impounding water up to elevation 2,300 NGVD in the 100-year debris pool (16,000 acre-feet) with releases at the approximate rate of 67 cubic feet per second (CFS) beginning in June.

(2) Impounding water up to elevation 2,375 NGVD (35,000 acre-feet) with releases of approximately 84 cfs beginning in June, and

(3) Impounding water up to elevation 2,418 NGVD (50,000 acre-feet) with releases at the approximate rate of 208 cfs beginning in June.

c. Scoping

An extensive mailing list has been developed which includes Federal, State and local agencies and other interested public and private organizations and parties. Individuals on the mailing list will be sent a copy of each notice announcing a public scoping meeting. An initial public scoping meeting will be scheduled in the near future. Additional public meetings will be scheduled during the review period for the draft EIS/EIR. Specific meeting dates, times, and places will be published in local newspapers. Formal coordination with the appropriate Federal, State and local agencies has begun.

d. Potentially Significant Issues

Potentially significant issues identified include impacts to land and water use, water quality and circulation, recreation resources, and biological resources including endangered species and riparian habitat.

e. Availability of the Draft EIS/EIR

The draft EIS/EIR is expected to be available to the public for review and comment beginning in August of 1996.

f. Comments

Comments and questions regarding the project may be addressed to: U. S. Army Corps of Engineers, Los Angeles District, ATTN: Mr. Gary Gunther, CESPL-PD-WA, P.O. Box 2711, Los Angeles, California 90053-2325.

Dated March 27, 1995.

Jerome J. Dittman,

Lieutenant Colonel, Corps of Engineers, Acting Commander.

[FR Doc. 95-9746 Filed 4-19-95; 8:45 am]

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Report is Completed

Turn off your software print command

Notice of Preparation

TO See Distribution

FROM County of San Bernardino
Flood Control District
825 East Third Street
San Bernardino, CA 92415-0835

SUBJECT: Notice of Preparation of a Draft Environmental Impact Statement/Environmental Impact Report/ (DEIS/EIR)

The County of San Bernardino Flood Control District, as the Local Sponsor, will be the Lead Agency under California Environmental Quality Act (CEQA) for an DEIS/EIR being prepared by the U.S. Army Corp of Engineers for the project identified below. We need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the DEIS/EIR prepared by the U.S. Army Corp of Engineers when considering your permit or other approval for the project. The project description, location, and the potential environmental effects are contained in the attached materials.

Due to the time limits mandated by State law, your response must be sent at the earliest date but *no later than 30 days* after receipt of this notice. Previous Environmental Impact Statements prepared by the U. S. Army Corp of Engineers in 1980, 1985, and 1988 have addressed all other environmental concerns associated with the construction of the Seven Oaks Project. The analysis presented in the previous environmental documents have been utilized to narrow the scope for this joint DEIS/EIR. These documents were adopted by the County and are available for review at the Flood Control District.

Please send your response to Mina Ghaly, P.E. at the address shown above. We will need the name for a contact person in your agency.

Project Title: Seven Oaks Dam Water Conservation Feasibility Study

Project Location: San Bernardino County (Santa Ana River at the San Bernardino Mountains)

Project Applicant, If Any: U. S. Army Corp of Engineers - (Local Sponsor - San Bernardino County)

Date: 9-11-95

Signature: Mina Ghaly
Title: Chief Environmental Projects / F.C. Engineering
Telephone: (909) 387-2571

SEVEN OAKS DAM WATER CONSERVATION AND SUPPLY STUDY

A Draft Environmental Impact Statement/Environmental Impact Report (DEIS/EIR) is proposed for the Seven Oaks Dam Water Conservation Feasibility Study, San Bernardino, CA

Summary: The Los Angeles District of the Army Corp of Engineers in conjunction with San Bernardino County Flood Control District as the Local Lead Agency under California Environmental Quality Act (CEQA) will prepare a DEIS/EIR to evaluate the feasibility of establishing a seasonal water conservation pool at Seven Oaks Dam. The dam, which is currently under construction, is the upstream component of the Santa Ana River Mainstem Project (SARP), and is located in the San Bernardino Forest along the Upper Santa Ana River located in the San Bernardino National Forest at the base of the San Bernardino Mountains (See Figure 1). The study was developed in response to local concerns regarding future water supply sources, given continued regional population growth, dwindling imported water supplies, and continued increases in the cost of water. Establishment of a seasonal water conservation and supply pool at Seven Oaks would increase groundwater reserves by extending the period water is available for release to downstream spreading grounds. Additionally, the feasibility of developing dispersed, non-motorized recreational facilities will be investigated in cooperation with staff from the San Bernardino National Forest.

Supplemental Information:

a. Authority

The authority to study the feasibility of water conservation and supply storage at Seven Oaks dam is contained in the Resolution of the Committee on Public Works of the U.S. House of Representatives, dated May 8, 1964.

b. Proposed Action/Alternatives

The proposed action for Seven Oaks Dam would investigate the feasibility of impounding natural flows during the months of March through May, with releases being made from June through September. Three alternative pool elevations and release rates are currently under consideration (See Figure 2)

(1) Impounding water up to elevation 2,300 NGVD in the 100-year debris pool (16,000 acre-feet) with releases at the approximate rate of 67 cubic feet per second (CFS) beginning in June.

(2) Impounding water up to elevation 2,375 NGVD (35,000 acre-feet) with release of approximately 84 cfs beginning in June, and

(3) Impounding water up to elevation 2,418 NGVD (50,000 acre-feet) with releases at the approximate rate of 208 cfs beginning in June.

c. Scoping

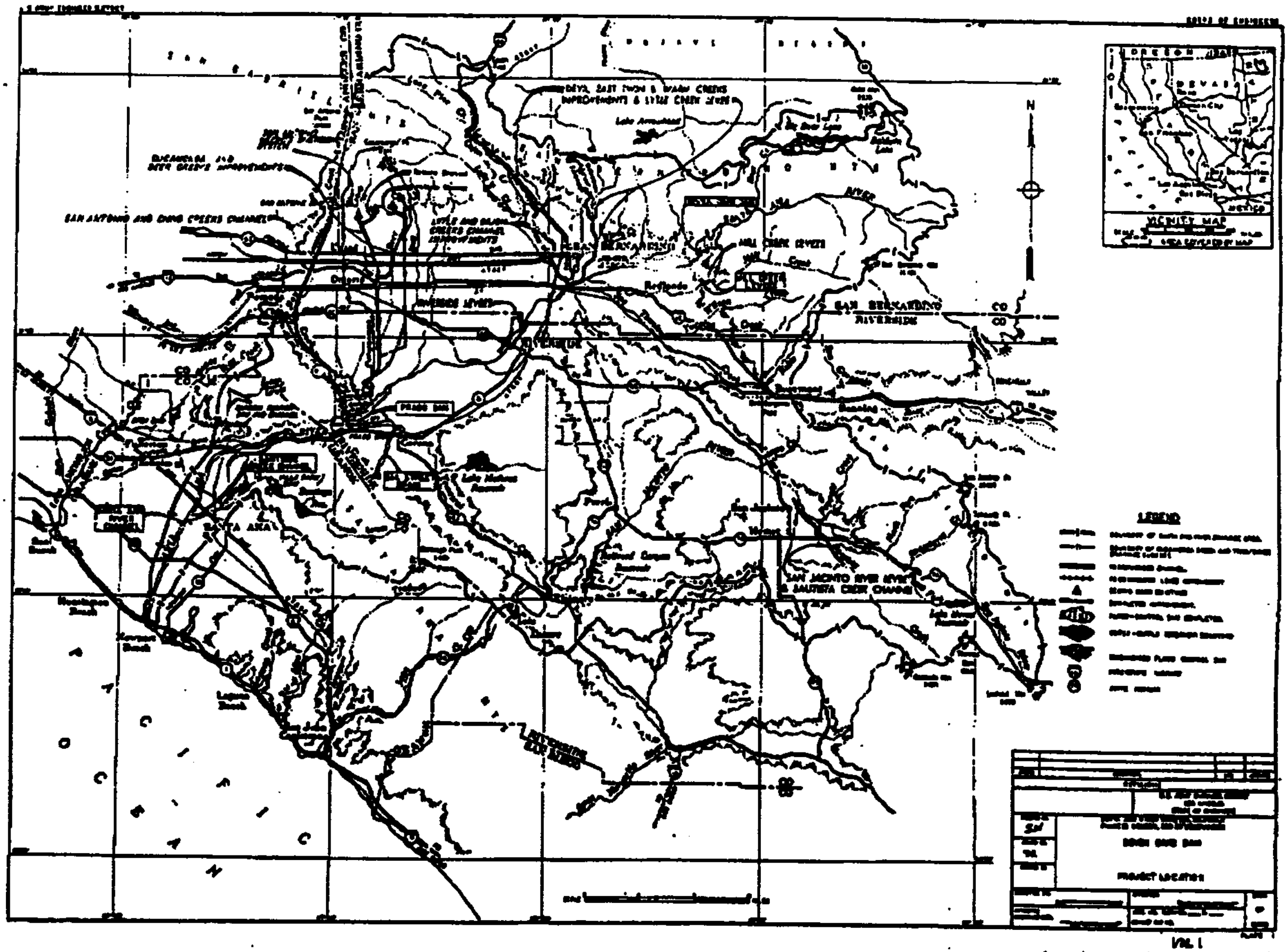
An extensive mailing list has been developed which includes Federal, State, and Local agencies and other interested public and private organizations and parties. Individuals on the mailing list will be sent a copy of each notice announcing a public scoping meeting. An initial public scoping meeting is scheduled on September 14, 1995 at 7:00 p.m., 202 Brookside Avenue, Redlands, at the Old City Council Chambers (Police Dept.) on the corner of Eureka and Brookside southwest of the Redlands Mall. Additional public meetings will be scheduled during the review period for the DEIS/EIR. Specific meeting dates, times, places will be published in the local news papers. Formal coordination with the appropriate Federal, State and local agencies has begun.

d. Potentially Significant Issues

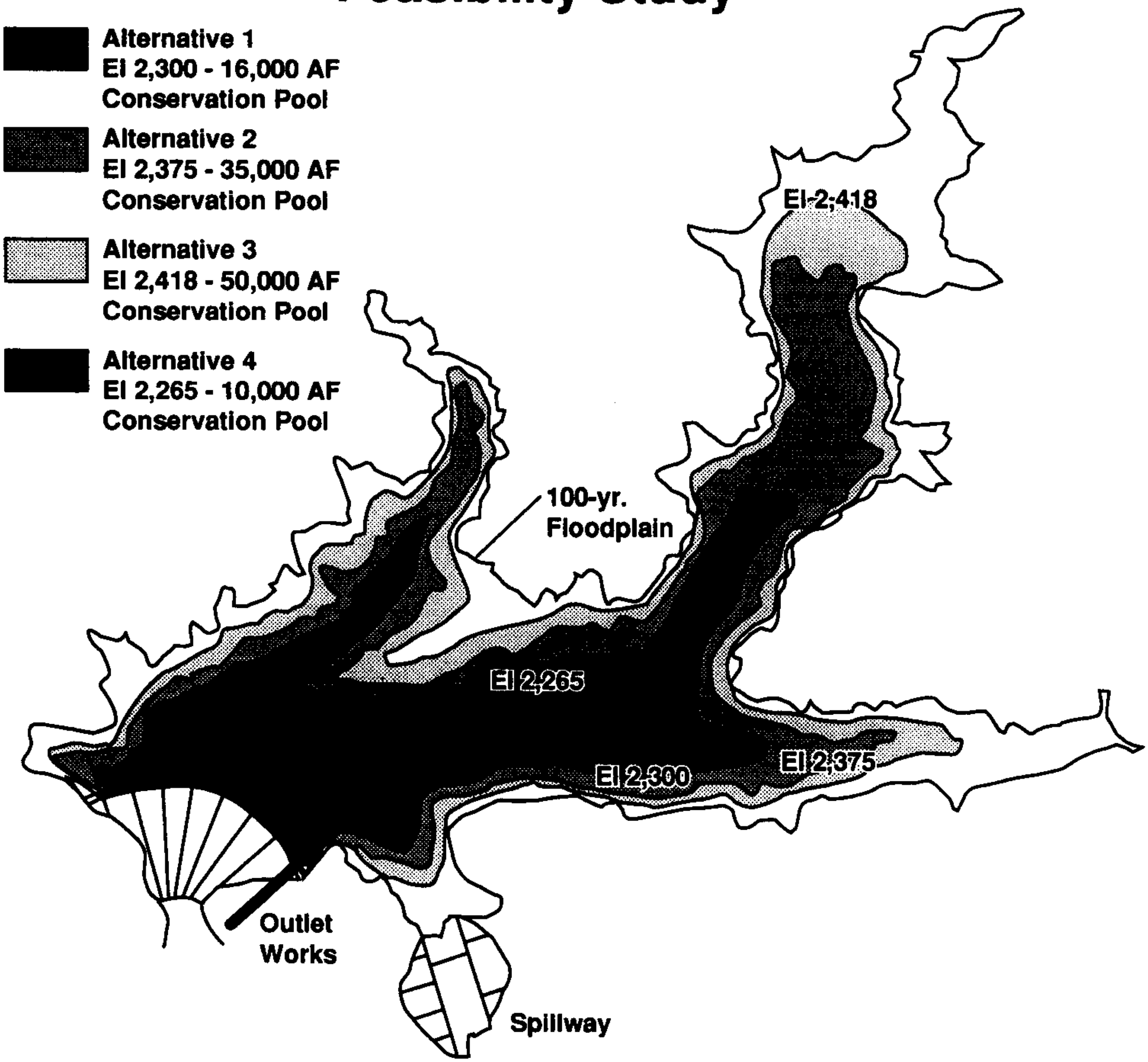
Potentially significant issues identified include impacts to land and water use, water quality and circulation, recreation resources, and biological resources including endangered species and riparian habitat.

Comments and questions regarding the project may be addressed to : San Bernardino County Flood Control District, 825 E Third Street, San Bernardino, CA 92415-0835. Contact Person Mina Ghaly, Division Chief, Federal Projects Division.

FIGURE 1


SAN BERNARDINO
RIVERSIDE
SANTA ANA
PRADO DAM
LEGEND
VICINITY MAP
PROJECT LOCATION
PACIFIC OCEAN
SAN JACINTO RIVER LEVEE & BAUTISTA CREEK CHANNEL
SAN ANTONIO AND CHINO CREEKS CHANNELS
MILL CREEK LEVEE
DEVIL, EAST TWIN & WARM CREEKS IMPROVEMENTS & LYTLE CREEK LEVEE
LYTLE AND CAJON CREEKS CHANNEL IMPROVEMENTS
CUCAMONGA AND DEER CREEKS IMPROVEMENTS
Lake Arrowhead
Redlands
Huntington Beach
Newport Beach
Laguna Beach
Lake Mathews Reservoir
Railroad Canyon Reservoir
Lake Elsinore
Lake Hemet Reservoir
RIVERSIDE SAN DIEGO
VOL. I

Alternative Plans
Seven Oaks Dam Water Conservation Feasibility Study



8/24/95
Official
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8/24/95

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City of Redlands

October 10, 1995

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FEDERAL PROJECT
FLOOD CONTROL
ENGINEERING

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Mina Ghaly, Division Chief
Federal Projects Division
San Bernardino County
Flood Control District
825 East Third Street
San Bernardino, CA 92415-0835

Re: Comments on Notice of Preparation of a Draft Environmental Impact Statement/Environmental Impact Report (DEIS/DIR) for the Seven Oaks Dam Water Conservation Feasibility Study

Dear Mr. Ghaly:

The following comments are submitted in behalf of the City of Redlands in response to the Notice of Preparation ("NOP") of a Draft Environmental Impact Statement/Environmental Impact Report ("EIS/EIR") on the Seven Oaks Dam Water Conservation Feasibility Study.

As discussed below, the project summary in the NOP is misleading and fails to comply with the requirements of Section 15082 of the California Environmental Quality Act ("CEQA") Guidelines (14 California Code Regs Section 15000, et. seq.) and Section 1508.22 of the National Environmental Protection Act ("NEPA") Regulations (40 C.F.R. Section 1500, et. seq.).

The NOP describes the project to be analyzed in the EIS/EIR as the evaluation of the feasibility of establishing a seasonal water conservation program at Seven Oaks Dam. The NOP misleads the Responsible Agencies, Trustee Agencies and other interested individuals and organizations by failing to include within the project summary the petition to revise the State's declaration that waters of the Santa Ana River are not subject to appropriation (the "Petition") and the water appropriation application filed by the San Bernardino Valley Municipal Water District and Western Municipal Water District (the "Water Districts"). As evidenced by the Water Districts' Petition and application for water appropriation, the purpose of the conservation program is to make water available for the Water Districts to divert. Copies of the Water Districts' Petition and application are enclosed for your consideration.

DJM707LE

The EIS/EIR should analyze and mitigate the impacts of the Water Districts' proposed diversions on existing water supplies and water production facilities. The City of Redlands' engineer has advised the City that among the diversion points listed in the application is a diversion point at a location from which the City of Redlands' water supply is produced. The City therefore anticipates that the proposed diversion may adversely impact Redlands' water supply.

Both CEQA and NEPA require that the EIS/EIR analyze the ultimate project proposed, including the currently proposed diversion of conserved water by the Water Districts. By failing to include the Water Districts' Petition and water appropriation application in the project description, the NOP signals the Lead Agency's intent to unlawfully segment the environmental analysis of the ultimate project's impacts.

The CEQA Guidelines define a project as

> the whole of an action, which has the potential for resulting in a physical change in the environment, directly or ultimately. . . . The term "project" refers to the activity which is being approved and which may be subject to several discretionary approvals by governmental agencies. <u>The term "project" does not mean each separate governmental approval.</u> CEQA Guidelines Section 15378 (a) and (c). <u>See also</u> NEPA Regulations Section 1508.25.

Both CEQA and NEPA also require an EIS/EIR to consider the cumulative effects of a proposal with other foreseeable actions. 40 C.F.R. Section 1508.7, CEQA Guidelines Section 15130. This requirement prevents any action from escaping serious environmental review by piece-mealing projects or by considering them in a vacuum. <u>Whiteman v. Board of Supervisors</u> (1979) 88 Cal. App. 3d. 377, 408 (citing <u>Natural Resources Defense Counsel, Inc. v. Calloway</u> (2d Cir. 1975) 524 F. Id. 79); <u>Las Virgenes Homeowners Fed'n v. County of Los Angeles</u> (1986) 177 Cal. App. 3d. 300, 306.

The project analyzed in the EIS/EIR must include the Petition and water appropriation application, and an analysis of the Water Districts' diversions of water under any permit issued pursuant to the application. The water diversions have already been proposed by the Water Districts and are therefore reasonably foreseeable. The proposed water diversions are directly dependent upon the water conservation project that is the subject of the NOP. The water conservation project and the water appropriation proposal are part and parcel of one ultimate project, and their cumulative impacts must therefore be analyzed in one EIS/EIR.

The flawed project description deprives Responsible Agencies, Trustee Agencies and interested individuals and organizations of the opportunity to identify the significant effects that should be analyzed in depth in the EIS/EIR.

DJM707LE

We therefore request that the Lead Agency correct the project description in the NOP to include the Water Districts' Petition and proposed water diversions, and recirculate the NOP to each Responsible Agency as required under CEQA Guidelines Section 15082 (a) and NEPA Regulations Section 1501.7. Failure to provide the Responsible Agencies with a corrected project description will deprive them of an opportunity to meaningfully respond to the NOP as the result of insufficient information describing the project and its potential environmental effects.

The NOP also fails to include information about the cost and responsibility for funding the proposed water conservation project. Only by disclosing the cost and projected funding for the project can the EIS/EIR properly analyze the relative feasibility of the different alternatives and their respective economic impacts.

Perhaps most curiously, the NOP does not specify the County Flood Control District's participation in the project. It appears unlikely that the County Flood Control District will approve any permit for the project or implement the project because the project is a water supply project – not a flood control project. The NOP does not specify what entity or entities will permit and implement the project. Without such information, the Responsible Agencies, Trustee Agencies, and other interested parties are not able to evaluate whether the County Flood Control District has properly assumed the rule of Lead Agency under the criteria set forth in CEQA Guidelines Section 15051, or whether or different agency must assume the lead agency role.

We appreciate the opportunity to comment on the NOP.

Sincerely,

Michael L. Huffstutler

Michael L. Huffstutler
Assistant Utilities Director

cc: Mayor and City Councilmembers
City Attorney
City Manager
Edward C. Anton, State Water Resources Control Board
General Manager, Bear Valley Mutual Water Company
General Manager, Lugonia Mutual Water Company
General Manager, Redlands Water Company
General Manager, North Fork Mutual Water Company
State Department of Fish and Game

DJM707LE

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SANTA ANA REGION
2010 IOWA AVENUE, SUITE 100
RIVERSIDE, CA 92507-2409
PHONE: (909) 782-4130
FAX: (909) 781-6288

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October 10, 1995

Mina Ghaly
County of San Bernardino Flood Control District
825 E. Third St.
San Bernardino, CA 92415-0835

NOTICE OF PREPARATION (NOP) OF DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE SEVEN OAKS DAM WATER CONSERVATION FEASIBILITY STUDY

Dear Ms. Ghaly:

We have reviewed the NOP for this project. In response to the statutory concerns of this office, the Draft EIR should address the following:

I. Water Quality and Beneficial Uses

A. Potential impacts of the proposed project on surface and groundwater quality.

- Construction activities (including grading) that could result in water quality impacts.

- Soil characteristics related to water quality (potential for erosion and subsequent siltation, increase or decrease in percolation).

- Impacts of toxic substances handling and/or disposal (if appropriate).

B. Potential impacts of the proposed project on surface and groundwater beneficial uses.

C. Mitigation of adverse impacts.

II. Water, Wastewater and Solid Waste Service

A. Water

- Availability of water for the proposed project.

- Existing infrastructure: location of water supply lines, tie-ins.

- Applications or permits required for water acquisition.

- Impact or calculated project demand on water supply.

B. Waste Disposal/Treatment

- Types and amounts of waste materials generated by project.

- Proposed waste treatment and disposal methods. Existing infrastructure:

  * treatment facilities: location, current capacity, treatment standards, master treatment facilities expansion plan (if appropriate)

  * treatment plant collection system: location of major trunk lines and tie-ins, current capacity

  * disposal facilities: location, capacity

- Applications or permits required to implement waste disposal.

- Impact of calculated project waste volume on capacity of existing and proposed treatment and disposal facilities.

III Permits

- The stormwater runoff from the proposed project will probably be regulated by an areawide stormwater discharge permit under the National Pollutant Discharge Elimination System (NPDES) if no new direct discharges are created. A permit for San Bernardino County has been granted to the San Bernardino County Transportation and Flood Control Department, San Bernardino County and several co-permittees by the Regional Board.

- A notice of intent (NOI) with the appropriate fees for coverage of the project under the General Construction Activity Storm Water Runoff Permit must be submitted to the State Water Resources Control Board at least 30-days prior to initiation of construction activity at the site. This is required for any construction activity over five acres in area.

- If a Section 404 permit from the Army Corp of Engineers is required for this project, a Section 401 Water Quality Certification is also required from the Regional Board. This certification verifies that the federal 404 permit complies with the state's water quality standards. Please note that the time frame for the issuance of a permit can be as long as 180 days from the time the permit application is accepted as complete.

- A National Pollutant Discharge Elimination System (NPDES) permit for any discharge of wastes to surface waters or a Waste Discharge Requirements for any discharge of wastes to land is required by the Regional Board.

- If reclaimed water is to be used in the proposed project, Water Reclamation Requirements will have to issued by the Regional Board.

The DEIR should include a detailed analysis of the "no action" alternative in addition to the three alternatives outlined in the NOP.

We look forward to reviewing the Draft EIR when it becomes available. If you have any questions, please call me at (909) 782-4241.

Sincerely,

Scott A. Dawson

Scott A. Dawson
Environmental Specialist
Planning Section

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Palm Springs — South Coast Resource Area
63-500 Garnet Avenue
Post Office Box 2000
North Palm Springs, CA 92258-2000

IN REPLY REFER TO:
CA-066.31

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OCT 11 1995

Mr. Mina Ghaly, P.E.
County of San Bernardino
Flood Control District
825 East Third Street
San Bernardino, CA 92415-0835

Dear Mr. Ghaly:

Thank you for the opportunity to comment on the Notice of Preparation for the Seven Oaks Dam Water Conservation Feasibility Study. We offer the following comments for your consideration:

1. The Army Corps of Engineers will need to consider impacts to downstream flow. Will downstream flow (cfs) be reduced with the construction of the supply pool? If so, what are the predicted impacts on downstream processes, plants and animals? If not, how do they intend to maintain cfs at pre-construction levels?

2. This EIS/EIR will need to include a cumulative impacts analysis of the entire Seven Oaks Project.

If you have any questions, please contact Elena Misquez of my staff at (619) 251-4826.

Sincerely,

Julia Dougan

Julia Dougan
Area Manager

East Valley Water District

1155 Del Rosa Ave., P.O. Box 3427
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Kip E. Sturgeon
Vice-President
Glenn R. Lightfoot
Director
Donald D. Goodin
Director
Edward S. Negrete
Director
Robert E. Martin
General Manager/Bd. Secretary
Alberta M. Hess
Auditor/Controller

October 11, 1995

Mr. Mina Ghaly
Chief of Federal Projects
County of San Bernardino Flood Control District
825 East Third Street
San Bernardino, CA 92415-0835

Subject: Notice of Preparation of DEIS/EIR for Seven Oaks Dam Water Conservation Feasibility Study

Dear Mr. Ghaly:

East Valley Water District received the Notice of Preparation dated September 11, 1995, for a DEIS/EIR being prepared by the US Army Corps of Engineers for a project identified as "Seven Oaks Dam Water Conservation Feasibility Study" and requests that you consider our comments as outlined below.

The District is aware that the San Bernardino Valley Municipal Water District (SBVMWD) and Western Municipal Water District (WMWD) have petitioned the State Water Resources Control Board (SWRCB) to hold a hearing to reconsider the fully appropriated status of the Santa Ana River. The District is also aware of a document having been prepared in January 1995 entitled "Santa Ana River Basin, Seven Oaks and Prado Dams, Water Conservation Study". We are not aware however, that any feasibility study on the potential water conservation aspects of the Seven Oaks Dam has been completed. The District is concerned that, if a feasibility study has yet to be undertaken and completed, the Notice of Preparation is premature since no project exists.

The January 1995 Water Conservation Study identifies four alternatives, each of which would expand the Seven Oaks project to include seasonal storage in various amounts. Even the no action alternative refers to "releases of the conservation pool by the end of August". If Seven Oaks is a flood control project without conservation, we would not expect there to be any conservation pool to be released.

The Application to Appropriate Water and the Petition to revise the fully appropriated status of the Santa Ana submitted in support of the application clearly indicates that the water to be impounded as part of the Seven Oaks Water Conservation Project is flood water of the Santa Ana River. The petitioners have stated that the water sought by the Water Right Application to SWRCB will pose no interference to prior rights. In this regard, the District is concerned about several issues.

First, the water conservation project will store flood water of the Santa Ana during periods when such flows exceed the existing water rights and the in-basin demands of the Santa Ana River Watershed. Groundwater storage during these events and immediately thereafter might already be maximized, thereby precluding any additional recharge during the summer from conservation pool releases.

Second, the application submitted to SWRCB requests 50,000 acre-feet of storage in Seven Oaks and 100,000 acre-feet by direct diversion and 100,000 acre-feet by diversion to underground storage during the season October 1 to September 30 (total amount not to exceed 100,000 acre-feet per annum). The January 1995 study identifies a maximum water conservation pool of 50,000 acre-feet. This would seem to be inconsistent with the amounts requested by SBVMWD and WMWD in their petition to the SWRCB. One obvious inconsistency is that the water right application requests a year round diversion season for water that is supposed to be flood waters resulting from seasonal storm events. Any feasibility study should include an analysis of the potential for groundwater recharge in the SBVMWD service area and the availability and timing of flood flows to accommodate this potential. The District is concerned that water which may be held in conservation storage would recharge the basin in any event. partially in satisfaction of the prior rights of the District, Conservation of flood flows of the Santa Ana may be unnecessary as there may be no beneficiary of the project. The feasibility study should address the issue of who may benefit and how these benefits will be manifested and shared within Muni's service area.

Third, the Water Right Application requests that water be taken by direct diversion and identifies several points of diversion from which flood waters are to be collected, which are upstream from the dam. The nature of a direct diversion right is such that water is collected and put immediately to use without being stored. Flood waters from the conservation project would exceed the flow necessary to satisfy prior rights and in-basin demand, consequently it seems there would be no place of use for water directly diverted, when flow exists. Also, the Seven Oaks Dam as a flood control dam would seem to be the only necessary point of diversion for conservation storage. The feasibility study should address the hydrologic situation of the Santa Ana River as a whole, and include all potential uses and issues, including those raised by the Petition before the SWRCB.

Since a feasibility study has not been completed, there is little potential for input on the part of interested parties at this time. However, this District is very interested in participating in the process of identifying issues associated with the water conservation aspects of the Seven Oaks project and ensuring that in-basin needs and prior water rights are addressed and respected, and that any benefits that should accrue to the basin as a result of the project are shared proportionately by the entities within the SBVMWD service area. Given the potential that the water conservation aspect of the project will result in development of water resources in excess of the basin demands during times when there is water available for storage in Seven Oaks, this District would like to be certain that any alternatives for use of this water, including export, be fully identified in the planning phase of the project.

If you have any questions with regard to the foregoing please contact me.

Very truly yours,

Robert E. Martin

Robert E. Martin
General Manager

REM:mew

CITY OF RIVERSIDE

"People Serving People"

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October 13, 1995

Mina Ghaly
Division Chief, Federal Projects Division
San Bernardino County Flood Control District
825 E Third St.
San Bernardino, CA 92415-0835

Subject: NOP - Seven Oaks Dam Water Conservation Feasibility Study

Dear Mr. Ghaly:

Thank you for providing the City of Riverside an opportunity to review and comment on the above-referenced Notice of Preparation. City staff has reviewed your identification of potentially significant issues and generally concurs with the scope of the proposed EIR.

We look forward to reviewing the draft EIR/EIS when available. Please contact John Swiecki, Senior Planner, at 782-5931 should you have any questions regarding this matter.

Sincerely,

Robert C. Mease

Robert C. Mease
Principal Planner

PLANNING DEPARTMENT
3900 MAIN STREET • RIVERSIDE, CALIFORNIA 92522 • (909) 782-5371
FAX: (909) 782-5622

San Bernardino Valley Municipal Water District

1350 SOUTH "E" STREET - P. O. BOX 5906 - SAN BERNARDINO, CALIFORNIA 92412-5906 -(909) 387-9200
FAX (909) 387-9247

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October 13, 1995

Mina Ghaly, P.E.
County of San Bernardino
Flood Control District
825 East Third Street
an Bernardino CA 92415-0835

Dear Mina -

District staff have reviewed the Notice of Preparation of a Draft Environmental Impact Statement/Environmental Impact Report/(DEIS/EIR) for the Seven Oaks Dam Water Conservation Feasibility Study which San Bernardino County Flood Control District has prepared as the Local Sponsor of the Santa Ana River Mainstem Project.

San Bernardino Valley Municipal Water District and Western Municipal Water District of Riverside County are funding the Conservation Study pursuant to requirements in the 1969 Judgment in "Western Municipal Water District et al. v. East San Bernardino County Water District et al.", Riverside Superior Court Case Number 78426. The Judgment allows the parties to receive credit for new conservation provided they fund their respective shares of the costs related to such new conservation. This study is one of those related costs.

To comply with State Law, San Bernardino Valley and Western have also filed an Application to Appropriate Water with the State Water Resources Control Board. That application requests a permit which will allow diversion of water from the Santa Ana River after all existing rights have been satisfied. To allow maximum flexibility and benefit from such diversions the application includes direct use in addition to groundwater storage.

Directors and Officers

EDWARD B. KILLGORE Division I | GEORGE A. AGUILAR Division II | C. PATRICK MILLIGAN Division III | JOAN DOTSON Division IV | MARGARET C. WRIGHT Division V | G. LOUIS FLETCHER General Manager and Chief Engineer

All that said, the District suggests that the next to last sentence in the Summary section be modified to read as follows:

> "Establishment of a ~~seasonal~~ water conservation and supply pool at Seven Oaks would increase groundwater reserves by extending the period water is available for release to ~~downstream spreading grounds~~ <u>beneficial uses</u>."

This suggested change would allow a program which is consistent with the Corps current plan to study year-round storage and maximizes the benefit to downstream users pursuant to the provisions of the 1969 Western Judgment.

Thank you for this opportunity to comment on Draft Environmental Impact Statement/Environmental Impact Report/(DEIS/EIR) for the Seven Oaks Water Conservation Feasibility Study.

Very truly yours,

Bob

Robert L. Reiter
Assistant General Manager
and Assistant Chief Engineer

cc: Don Harriger, Western MWD

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY

PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 8, P.O. BOX 231
SAN BERNARDINO, CALIFORNIA 92402
(909) 383-5959

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October 18, 1995

08-SBd-Var-Var

Mr. Mina Ghaly
San Bernardino County
Flood Control District
825 East Third Street
San Bernardino, CA 92415-0835

Dear Mr. Ghaly:

Seven Oaks Dam Water Conservation Study

We have reviewed the above-referenced document and request consideration of the following comment:

- The Draft Environmental Impact Report being prepared for this project should address the impact of increased/decreased flow on highway structures downstream.

If you have any questions, please contact Diane Keel at (909) 383-6908 or FAX (909) 383-7934.

Sincerely,

Harvey J. Sawyer

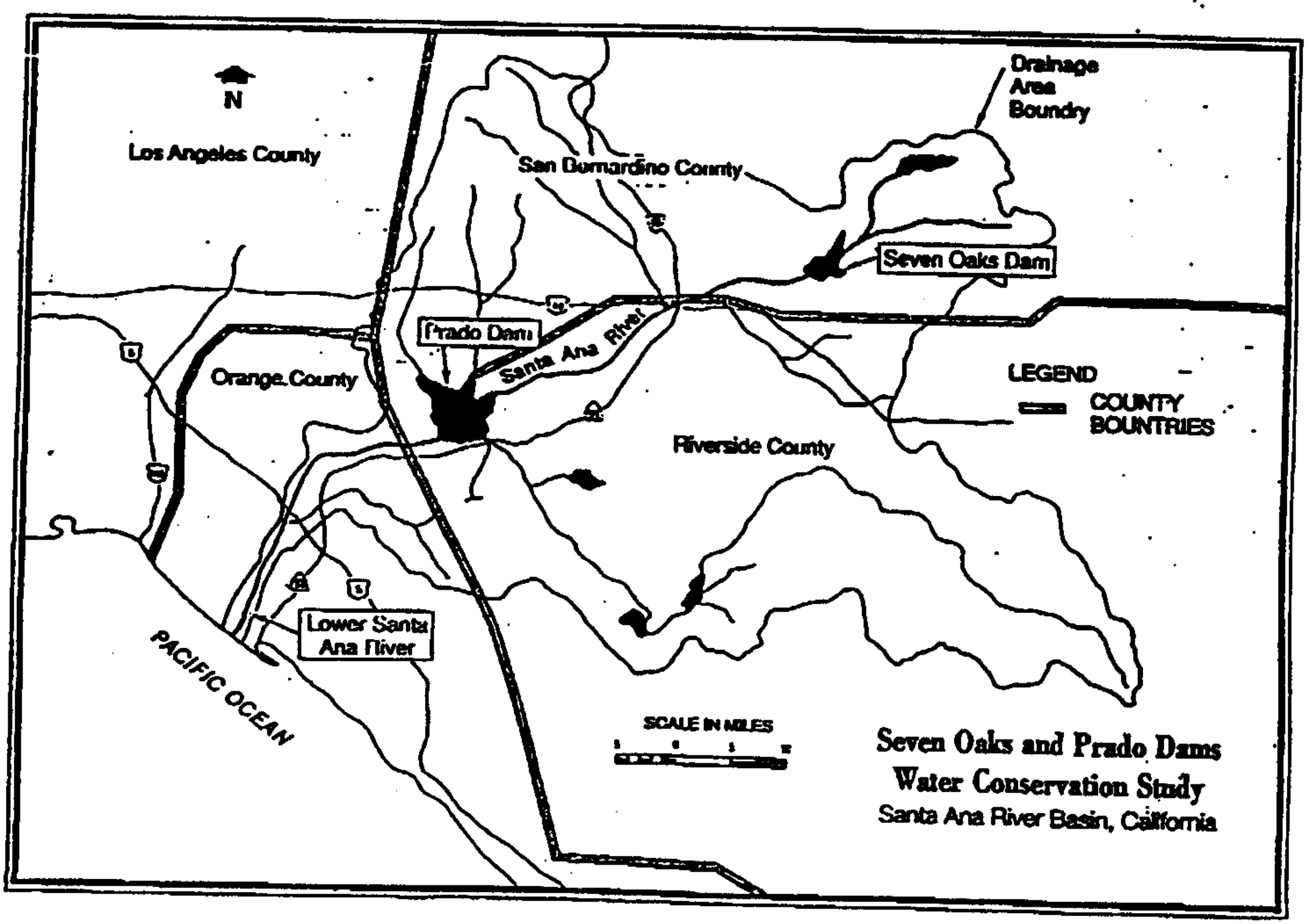
HARVEY J. SAWYER, Chief
Office of San Bernardino
County Regional Planning

Attend a Public Scoping Meeting
for the
Seven Oaks and Prado Drainage Area Water Conservation and Supply Feasibility Study of
THE SEVEN OAKS DAM

San Bernardino County Flood Control District and the U.S. Army Corps of Engineers, at the direction of the United States Congress, have completed the Seven Oaks and Prado Dam Reconnaissance Study. The Reconnaissance Study identified potential modifications to the planned operation of Seven Oaks Dam that would capture storm water runoff and increase the water supplied for Southern California. A feasibility study will be conducted in order to better serve the needs of the people in the service area.

Learn more about this study by attending an important public meeting!

Seven Oaks Dam Water Conservation Feasibility Study Meeting
THURSDAY, SEPTEMBER 14, 1995 • 7:00 pm
REDLANDS POLICE STATION PUBLIC MEETING ROOM
212 Brookside Avenue, Redlands, CA



Why is this feasibility study being conducted?

Because of increasing competition for the limited water available to the region, the study will seek to identify ways to enhance water conservation in San Bernardino County. Water management agency coordination, as well as water policy and management standards, will be reviewed. The study is being conducted by the Corps of Engineers and the San Bernardino County Flood Control District as cost share partners.

The feasability study will consider:

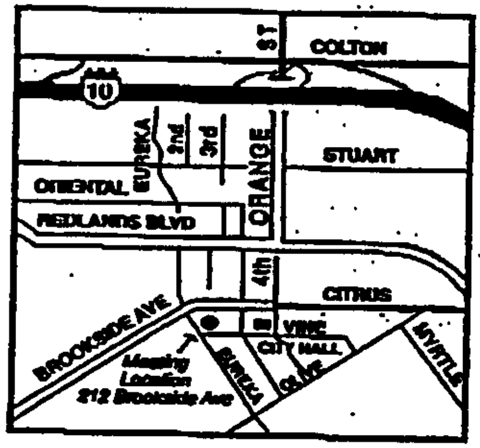
- *Using the Seven Oaks flood control basin to maintain seasonal water conservation pools of varying size*
- *Impacts the proposed changes might have on the area, including impacts on existing service road alignment*

Any water conservation options cannot in any way adversely affect the adjudicated water rights in the study area or the flood control capability of the Santa Ana River.

Following these investigations, a recommendation will be made to Congress for implementing a project to conserve storm water flows within the Santa Ana River Drainage Area. Concurrent with the feasibility study, the Corps will prepare a joint Environmental Impact Statement / Environmental Impact Report (EIS/EIR) to evaluate the positive and negative impacts associated with the alternatives. The EIS will satisfy requirements of the National Environmental Policy Act. The EIR will satisfy the requirements of the California Environmental Quality Act.

Contribute your suggestions or discuss your concerns.

The public scoping meeting is an opportunity for people interested in the project to voice their comments. You can help shape this important document by attending the meeting on Thursday, Sept. 14 at 7:00 pm in the Redlands Police Station Public Meeting Room, 212 Brookside Ave., Redlands, CA.



For more information please phone or write:

Gary Gunther, Study Manager
(213) 894-3825
U.S. Army Corps of Engineers
P.O. Box 2711

US Army Corps of Engineers
Los Angeles District

P.O. Box 2711
CESPL - PD - WA
Los Angeles, CA 90053-2352
OFFICIAL BUSINESS

SEVEN OAKS DAM WATER CONSERVATION FEASIBILITY STUDY
THURSDAY, SEPTEMBER 14, 1995
REDLANDS, CALIFORNIA

AGENDA

7:00	Welcome	Ken Miller, Director San Bernardino County Transportation/Flood Control
	Introductions Feasibility Study Perspectives	Gary Gunther Study Manager U.S. Army Corps of Engineers
	CEQA, NEPA and the EIS Process	Dana Privitt-Arita EIS/EIR Project Manager Michael Brandman Associates
	Public Comments, Concerns and Suggestions	Sharon Clark Public Involvement Specialist Sharon Clark Associates, Inc.
	Closing Remarks	Gary Gunther

Please direct written comments to:
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PO Box 2711
Los Angeles, Ca 90053-2325
Attn: Gary Gunther (213) 894-3825
Seven Oaks Study Manager

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Charles Laird, Asst Dir/Fin
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Mina Ghaly, Chief Fd Proj.
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FINAL REPORT OF THE PUBLIC SCOPING MEETING FOR THE SEVEN OAKS DAM WATER CONSERVATION FEASIBILITY STUDY

Prepared for:

USACOE
LOS ANGELES DISTRICT
WATER RESOURCES BRANCH

Prepared by:

Sharon Clark Associates, Inc.
Pasadena, CA 91109
October, 1995

**FINAL REPORT OF THE
PUBLIC SCOPING MEETING
FOR THE
SEVEN OAKS DAM
WATER CONSERVATION FEASIBILITY STUDY**

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Final Report of the
Public Scoping Meeting Report
for the Seven Oaks Dam
Water Conservation Feasibility Study
September 14, 1995

Introduction

The Public Scoping Meeting for the Seven Oaks and Prado Dams Water Conservation Feasibility Study, San Bernardino County, California, (hereinafter referred to as the Feasibility Study), was held at the Redlands Police Station Public Meeting Room, 212 Brookside Avenue in Redlands, California on September 14, 1995. Thirty-seven people attended the meeting, including project staff.

Dr. Sharon Clark, the Public Involvement contractor for the USACOE, opened the meeting at 7:12 PM. She welcomed meeting attendees and introduced Mina Ghaly, Chief of Federal Programs at the San Bernardino County Transportation and Flood Control District.

Mr. Ghaly introduced local elected officials as well as representatives of the flood control districts and water companies sponsoring this project. He noted that Congress authorized Seven Oaks Dam in 1986 as part of the Santa Ana River Mainstem Project (SARP). Initially, Seven Oaks Dam was planned for flood control protection only. However, as dam construction was begun, local water companies requested that water conservation measures be incorporated into the dam design. Given the importance of water in Southern California, the idea was considered sound and the Corps of Engineers undertook a Reconnaissance Study. Based on positive information from the reconnaissance investigation, this present Feasibility Study was begun.

While the Reconnaissance Study was funded completely by the Federal Government, the 2.2 million dollar cost for the feasibility study phase is cost-shared fifty-fifty between the Federal Government/Corps and the local flood control districts and water company sponsors. Any additional costs for constructing water conservation measures will be funded by the water companies.

The Feasibility Study

The Feasibility Study Manager, Gary Gunther, reported that the Corps is in the 20th month of the 3-year Feasibility Study to investigate seasonal (March - September) water conservation measures. Three seasonal pools are planned: a 16,000 acre-foot pool, a 35,000 acre foot pool and a 50,000 acre-foot pool. The hydrological studies indicate that the additional water conservation yield will be 4,600 acre feet for the small pool, 7,780 acre feet for the middle pool, and 9,260 acre feet for the large pool.

Seven Oaks Public Scoping Meeting, Cont'd

Mr. Gunther emphasized that water conservation measures, such as modifying the Intake Tower of the Outlet Works, presently under consideration, will in no way impinge on the main purpose of the dam - flood control protection. He also noted that water conservation measures must meet the demanding seismic and dam safety standards of the California Department of Water Resources, Division of Safety of Dams, as well as special permits required by the U.S. Forest Service because the dam location is on Forest Service land. Water conservation measures are expected to be integrated into the dam construction, and both will be completed by the year 2000. A slide presentation helped clarify the area to be studied and the proposed changes.

The Environmental Studies

Dana Privitt-Arita and Joan Kelly from Michael Brandman Associates, the consultants conducting the environmental studies for the Feasibility Study, briefly discussed the California Environmental Quality Act (CEQA) and the National Environmental Quality Act (NEPA) procedures for preparing the Environmental Impact Statement and the Environmental Impact Report (EIS/EIR). The Notice of Preparation (NOP) has already been distributed to agencies and interested parties. The importance of public participation was emphasized, and this public meeting was cited as providing a significant avenue for public input into the EIS/EIR process.

The draft EIS/EIR will contain reports of technical investigations and field studies conducted as part of the Feasibility Study. Following internal review, these documents then go out to all agencies and interested parties for a 45-day public review period. Comments on the documents will then be integrated into the Final EIR/EIS. The final step is the preparation and signing of the Record of Decision (ROD).

Public Comments

Prior to opening the meeting to public comment, Dr. Clark stressed the importance of public involvement in the project. She requested those persons making comments to state their name, agency or group affiliation, and to speak clearly as the microphone was not working. Queries and comments fell into three main areas: the potential for recreation at the dam site; interest in the project site and operation of the water conservation measures; and questions about dissemination of information and notification about the project. These are summarized as follows:

Public Comment: Request by a recreational rafter that the Corps build a Class 1/Class 2/2+ whitewater park below the dam similar to those built by the Corps on the Kern River and in Indianapolis and Delaware. The proposed park would serve the large number of

	San-Diego-to-Santa Barbara whitewater rafters, canoers and kyakers who currently have only the Kern River.
Response:	That will be looked at as a part of the environmental studies.
Public Comment:	What are present and future recreation plans?
Response:	This study deals only with water conservation. There are no plans presently for recreation use at the dam, and for reasons of dam safety and operations, it is expected that recreation use, if any, will be very limited. In addition, the dam is located on U. S. Forest Service property and should any recreation activities be determined possible, they will be managed by that agency.
Public Comment:	A retired civil engineer cautioned that while recreation is important, the dam's primary purpose is flood control, the secondary purpose is water conservation to enhance domestic, industrial and irrigation users. Only after construction is complete and the dam is in operation should recreation possibilities, if any, be considered.
Public Comment:	Given the historic runoff data, how often will the three proposed pools reach their runoff level?
Response:	The largest pool is expected to reach the runoff level about seven percent of the time, the middle pool about twelve percent of the time. More complete data is part of this study.
Public Comment:	Will water released out of the conservation pool in the summer months be put back into the free stream below the dam or into a pipeline to be transported elsewhere?
Response:	Released water will go to the stream, not into a pipeline.
Public Comment:	Will the economic analysis that is part of the Feasibility Study justify the water conservation measures?
Response:	It is expected to.
Public Comment:	When are water conservation measures expected to go into effect?

Response: After the Feasibility Study is complete and approved, and the dam is in operation in early 1997, then a Water Control Plan must be developed and approved at the Washington level, and water quality studies undertaken. Water conservation measures will go into effect sometime after these tasks are completed.

Public Comments: How will the EIS/EIR reports be distributed? Will the public be notified about meetings and availability of documents?

Response: Reports will be distributed to interested parties, agencies, and those requesting them. Copies will also be sent to local libraries. Those on the mailing list will receive notification as to the location of these libraries. Those attending this meeting will be added to the project mailing list. To facilitate project communications, the name, address and telephone number of the Corps Feasibility Study Manager (Gary Gunther) is printed on the Meeting Agenda handed out at the door.

Public Comment: Can the dam site be visited?

Response: The San Bernardino County Flood Control Agency conducts a slide presentation and tour of the dam site upon request. There is a minimum requirement of seven persons per tour. Persons wishing to tour the site may call the agency and be added to an already-scheduled tour.

There being no further comments, the meeting was adjourned at 8:15 PM.

APPENDIX I

PUBLIC SCOPING MEETING ATTENDEES
SEVEN OAKS DAM WATER CONSERVATION FEASIBILITY STUDY
THURSDAY, SEPTEMBER 14, 1995
REDLANDS, CALIFORNIA

M/M *Richard Bledsoe, 9390 Cedar Drive, Forrest Falls, Ca 92339
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William Butler, USACOE Seven Oaks Dam EIS/EIR Study Manager
Sharon Clark, President, Sharon Clark Associates Public Involvement
*Bill Cunningham, Redlands City Council Member
Susan DeSaddi, USACOE
Girish Desai, USACOE
Ernie Dierking, USFS, San Bernardino National Forest
Sam Forcer, San Bernardino Valley Mutual Water District
*David Garcia, 1530 Helena Lane, Redlands, CA 92373
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Barbara Jensen, Univ of Redlands, Whitehead College
Art Jung, USACOE
Joan Kelly, Michael Brandman Associates
Bill Kerrick, Riverside Highland Water Company
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Gary Phelps, City of Redlands
Dana Privitt-Arita, Michael Brandman Associates
Elayne Rail, Project Manager for Prado/Seven Oaks, Orange County EMA
Bob Reiter, San Bernardino Valley Mutual Water District
Richard Runge, Chief of Federal Projects, Orange County EMA
Charles R. White, California DEA Water Resources, Southern District

* Spoke during the public comment period.

SEVEN OAKS DAM WATER CONSERVATION
FEASIBILITY STUDY
THURSDAY, SEPTEMBER 14, 1995
REDLANDS, CALIFORNIA

AGENDA

7:00 Welcome	**Ken Miller, Director** **San Bernardino County** **Transportation/Flood Control**
Introductions **Feasibility Study Perspectives**	**Gary Gunther** **Study Manager** **U.S. Army Corps of Engineers**
CEQA, NEPA and the EIS Process	**Dana Privitt-Arita** **EIS/EIR Project Manager** **Michael Brandman Associates**
Public Comments, Concerns and Suggestions	**Sharon Clark** **Public Involvement Specialist** **Sharon Clark Associates, Inc.**
Closing Remarks	**Gary Gunther**

Please direct written comments to:
U.S. Army Corps of Engineers
PO Box 2711
Los Angeles, Ca 90053-2325
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Seven Oaks Study Manager

SEVEN OAKS DAM WATER CONSERVATION FEASIBILITY STUDY
THURSDAY, SEPTEMBER 14, 1995 - REDLANDS, CALIFORNIA
PUBLIC MEETING SPEAKER FORM

Name: ____

Address: ____ **State:** ___ **Zip:** ____

Group or Affiliation: ____________________________________ **Phone:** (__) ___ - ___

_____ **I wish to speak tonight.**
_____ **I do not wish to comment at this meeting.**
I wish to submit the following written comment for consideration: ________________

____

____

If you wish make additional comments after tonight's meeting, please direct them to:
U.S. Army Corps of Engineers PO Box 2711 Los Angeles, Ca 90053-2325
Attn: Gary Gunther (213) 894-3825

SEVEN OAKS DAM WATER CONSERVATION FEASIBILITY STUDY
THURSDAY, SEPTEMBER 14, 1995 - REDLANDS, CALIFORNIA

REGISTRATION FORM

NAME	ADDRESS	CITY/STATE/ZIP	AFFILIATION

APPENDIX II

7 Oaks Dam Mailing List
Public Scoping Meeting
21 September, 1995
Post meeting update

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Cal Poly Pomona
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Pomona CA 91768

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San Bernardino Central Library
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Notice of Public Review and Public Meeting

Seven Oaks Dam

Water Conservation Feasibility Report

To All Interested Parties:

This is an open invitation to all interested parties to provide views and comments on the U.S. Army Corps of Engineers' Seven Oaks Dam Water Conservation Draft Feasibility Report and the Draft Environmental Impact Statement/Environmental Impact Report (DEIS/EIR). The report presents the findings of the study of the potential modification of the operation of Seven Oaks Dam to provide for seasonal water conservation. Seven Oaks Dam is the upstream component of the Santa Ana River Mainstem Flood Control Project. It is currently under construction in the San Bernardino National Forest in the steep-walled Santa Ana River Canyon at the base of the San Bernardino Mountains in San Bernardino County, California. The Draft Report concludes that the seasonal storage of water behind Seven Oaks Dam to 2,300 feet (NGVD) from March to May for the purpose of supplementing regional water supplies, appears to be feasible and may be implemented by the Santa Ana River Mainstem Flood Control Sponsors, subject to certain conditions.

A public meeting is scheduled for 7:00 p.m., Wednesday, April 30, 1997 at the San Bernardino Valley Municipal Water District, 1350 South "E" Street, San Bernardino, California. At the public meeting, we will review the Draft Report findings and the DEIS/EIR. A summary of the selected plan, its environmental impacts, and the feasibility study are included in this notice. The public review period will be open until May 16, 1997. All comments and other information received will be carefully reviewed and considered fully in preparing the Final Feasibility Report and a Final EIS/EIR, scheduled for completion by the end of June 1997.

Copies of the Seven Oaks Dam Water Conservation Draft Feasibility Report and the DEIS/EIR are available for public review at the following locations: Feldheym Central Library, 555 West Sixth Street, San Bernardino; San Bernardino County Flood Control District, Room 140, 825 East Third Street, San Bernardino; San Bernardino Valley Municipal Water District Library, 1350 South "E" Street, San Bernardino; and the Coastal Resources Branch, U.S. Army Corps of Engineers, Suite 1420, 911 Wilshire Boulevard, Los Angeles.

The DEIS/EIR was prepared in compliance with both the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The NEPA lead agency is the U.S. Army Corps of Engineers, and the U.S. Forest Service is a cooperating agency. The CEQA lead agency, and the Non-Federal Sponsor, is the San Bernardino County Flood Control District.

All interested parties are urged to be present or represented at the public meeting. All attendees will be afforded the opportunity to express their views on matters pertinent to water conservation at Seven Oaks Dam, and its potential environmental effects. Oral statements will be heard during the meeting. It is strongly recommended that, for the accuracy of the record, that all statements and other information be submitted in writing. Written statements may be submitted at the meeting, or by mail to the Corps of Engineers. All statements, written or oral, will become part of the official public record, and appropriate comments or recommendations will be incorporated into the Final Feasibility Report and Final EIS/EIR. If you know of anyone who may have an interest in water conservation at Seven Oak Dam, and has not been contacted by us, please bring this invitation to their attention.

Written comments on the Seven Oaks Dam Water Conservation Draft Feasibility Report and the DEIS/EIR should be forwarded by May 16, 1997 to Jared Miller, the Study Manager, at Suite 1420, P.O. Box 532711, Los Angeles, CA 90053-2325. He can be reached by telephone at 213/452-3837.

US Army Corps of Engineers
Los Angeles District

SEVEN OAKS DAM WATER CONSERVATION STUDY
FEASIBILITY REPORT SUMMARY

The Seven Oaks Dam Water Conservation Feasibility Study is being conducted in response to a May 8, 1964 Resolution of the House of Representatives' Committee on Public Works. This cost-shared feasibility study is the product of a Corps of Engineers reconnaissance study of water conservation along the Santa Ana River at Seven Oaks and Prado Dams, which recommended a feasibility-phase study of the Federal interest in providing water conservation at Seven Oaks Dam, a flood control project being constructed as authorized in the Water Resources Development Act of 1986. Seven Oaks Dam is an element of the Santa Ana River Flood Control Project.

The Corps of Engineers' non-Federal Planning Partner in the feasibility study is the San Bernardino County Flood Control District, which is representing local water district, including the San Bernardino Valley Municipal Water District and the Western Municipal Water District.

THE STUDY

The study is investigating the feasibility of water conservation at Seven Oaks Dam, an element of the Santa Ana River Project (SARP). The study area encompasses the Seven Oaks Dam drainage area and the service area of the San Bernardino Valley Municipal Water District. Seven Oaks Dam is being constructed at elevation 2,100 feet in a narrowing of the Upper Santa Ana Canyon in the San Bernardino Mountains. The construction of Seven Oaks Dam is scheduled for completion in 1999, when it will be turned over to the SARP's Non-Federal Sponsors for Operation, Maintenance, Replacement and Rehabilitation (OMRR).

The study analyzed the area's water demands, water supplies, and the potential for seasonal water conservation to meet supply deficiencies for both the existing and future demands on water. Since Seven Oaks Dam is under construction, existing, or "base year" conditions occur in the year 1999 with Seven Oaks Dam in place and future conditions occur in the year 2050. Based on a supply and demand analyses conducted as part of this feasibility study, available normal-year supplies for the study area will become inadequate to meet demands sometime between 2010 to 2020; thereafter, additional water supplies will be needed to meet demands during the peak summer water use period. Re-operation of Seven Oaks Dam to maintain a water conservation pool during the non-flood season would provide additional local water supplies.

STUDY ALTERNATIVES

The plan formulation process investigated four alternatives plus a no-action plan. The no-action plan represents the condition that would be expected to occur during the project life (50 years) in lieu of project implementation, and it constitutes the basis against which all alternative plans are evaluated. The alternatives consist of maintaining seasonal water conservation pools from the beginning of March to the end of September; these conservation pools range in their maximum storage volume from 10,270 acre-feet to 50,000 acre-feet.

Alternative 1: Seasonal Storage of 16,000 acre-feet at Elevation 2,300 feet

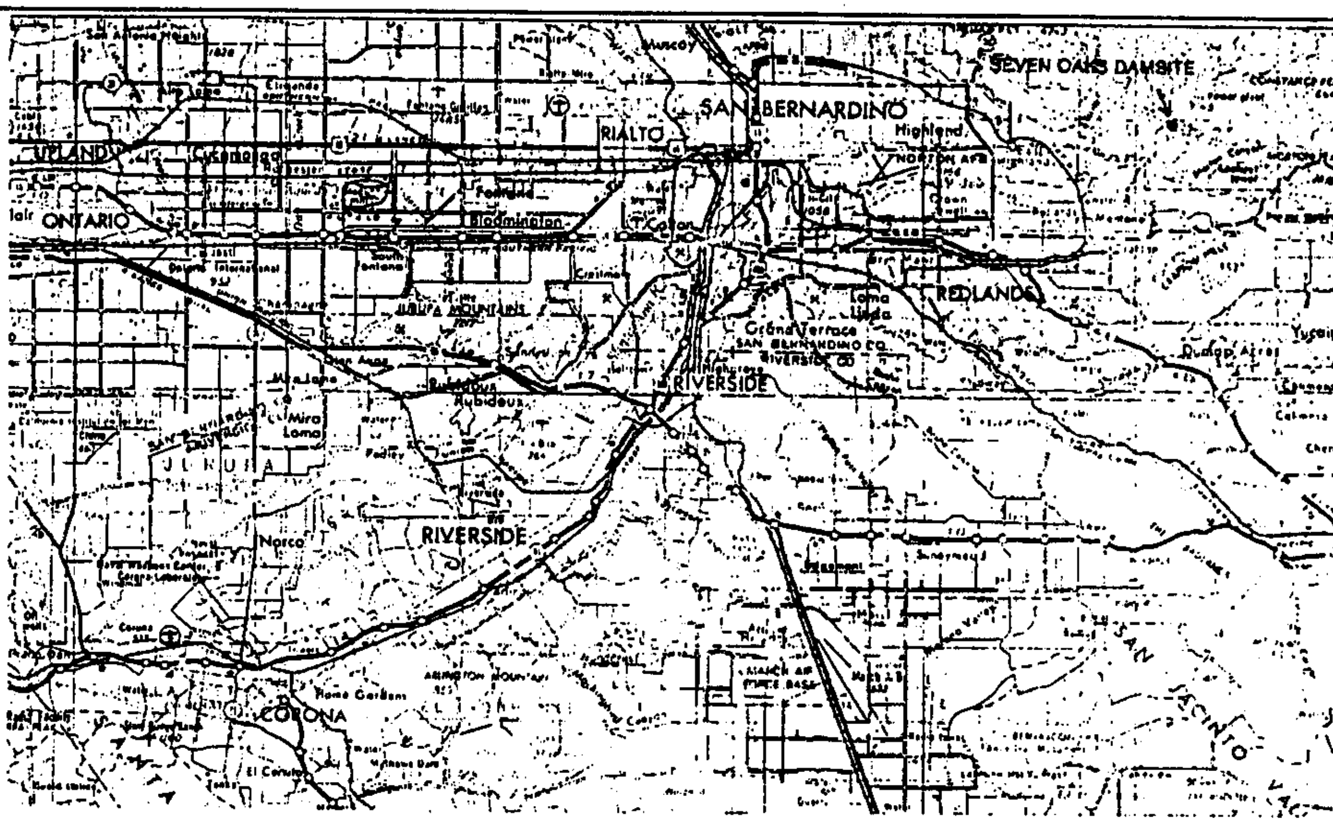
The Locally-Preferred Plan (LPP) is Alternative 1, which would have a seasonal storage pool of approximately 16,300 acre-feet in the year 2000 and approximately 7,200 acre-feet in the year 2050. It would impound water at elevation 2300 feet NGVD. Describe feature modifications. The plan would increase average annual water conservation by 4,120 acre-feet (170%) under present conditions (year 2000) and by 2,140 acre-feet (113%) under future conditions (year 2050). Average annual economic benefits associated with these increases amount to $868,000, with annual costs of $675,000, yielding a benefit-cost (B/C) ratio of 1.29.

Alternative 2: Seasonal Storage of 35,000 acre-feet at Elevation 2,375 feet

This operation involves normal flood operations in the winter months, then at the beginning of March, the seasonal conservation pool is expanded linearly over 10 days to a target conservation level of elevation 2,375 feet NGVD. This provides a storage volume of 35,000 acre-feet for present conditions (year 2000) and 22,050 acre-feet for future conditions (year 2050). This alternative would increase average annual water conservation by 7,475 acre-feet under present conditions (year 2000) and by 5,915 acre-feet under future conditions (year 2050). Average annual economic benefits associated with these increases amount to $1,773,000, with annual costs of $1,774,000, yielding a benefit-cost (B/C) ratio of 1.00.

Alternative 3: Seasonal Storage of 50,000 acre-feet at Elevation 2,418 feet

This operation involves normal flood operations in the winter months, then at the beginning of March, the seasonal conservation pool is expanded linearly over 10 days to a target conservation level of elevation 2,418 feet NGVD. This provides a storage volume of 50,000



SEVEN OAKS DAM
WATER CONSERVATION STUDY

Regional Map

acre-feet for present conditions (year 2000) and 35,600 acre-feet for future conditions (year 2050). This alternative would increase average annual water conservation by 9,260 acre-feet under present conditions (year 2000) and by 8,015 acre-feet under future conditions (year 2050). Average annual economic benefits associated with these increases amount to $2,235,000, with annual costs of $2,364,000, yielding a benefit-cost (B/C) ratio of 0.95.

Alternative 4: Seasonal Storage of 10,270 acre-feet at Elevation 2,265 feet

The National Economic Development (NED) Plan is Alternative 4, which would have a seasonal storage pool of 10,270 acre-feet in the year 2000 and approximately 3,400 acre-feet in the year 2050. It would impound water at elevation 2265 feet NGVD. The plan would increase average annual water conservation by 2,510 acre-feet (103%) under present conditions (year 2000) and by 640 acre-feet (34%) under future conditions (year 2050). Average annual economic benefits associated with these increases amount to $499,000, with annual costs of $203,000, yielding a benefit-cost ratio of 2.46.

SELECTED ALTERNATIVE

The Locally-Preferred Plan is being selected for implementation because (1) it provides the local sponsor with a significant increase in the realizable water conservation yield compared to the NED Plan and (2) the local sponsor would be paying all of the construction and operation and maintenance (O&M) costs associated with any alternative since costs for water supply projects are 100% non-Federally funded.

PLAN IMPLEMENTATION REQUIREMENTS

The implementation of the selected plan will be the responsibility of the SARP Non-Federal Sponsors subject to the approval of the U.S. Army Corps of Engineers, in accordance with the Local Cooperation Agreement. For the Santa Ana River Project. When the Corps of Engineers approves a request, the SARP Sponsors will be required to complete the final design, plans and specifications, and construction of modifying the Seven Oaks facilities for water conservation. The SARP Sponsors will be required to provide 100% of all separable costs for water conservation, including the $8,334,000 first cost, and $42,000 annual OMRR cost. The SARP Sponsors will also be responsible for acquiring a special use permit or other interest from the U.S. Forest Service, as well as other items mentioned in the Draft Feasibility Report.

ENVIRONMENTAL ISSUES

A Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) has been prepared in accordance with the requirement of the National Environmental Policy Act of 1969 (NEPA) and the California Environmental Quality Act (CEQA), and is included as part of the Draft Feasibility Report. The U.S. Forest Service has been designated as a cooperating agency in the preparation of the EIS/EIR. A summary of this document follows.

ACCESS IMPACTS. The alternative plans would periodically inundate the reservoir access road to the upstream electrical power plant. This would increase the time it takes Southern California Edison crews to reach the plant by one-to two hours, using other available roads. Relocation of the basin road has been identified as a potential for mitigation, if required. This will be analyzed further by Edison and the SARP Sponsors, and if it is determined that relocation is necessary, a supplemental NEPA/CEQA document will be prepared.

TRANSPORTATION IMPACTS. Each alternative will result in construction-related vehicular traffic at the project site and on the surrounding roadway system. However, the local roadways are projected to continue to operate at acceptable levels of service.

AIR QUALITY IMPACTS. Air quality impacts associated with construction include: (1) construction emission during grading, (2) exhaust emissions from construction equipment, and (3) fugitive dust emissions. All air quality impacts are associated with each alternative and have an adverse significant rating. Mitigation includes, but is not limited to: watering, paving, setting a speed limit, maintaining vehicles in good condition, and keeping idle time for construction equipment under 60 seconds.

HYDROLOGIC IMPACTS. Hydrologic impacts include: (1) increased localized erosion and sedimentation caused by construction activities, (2) accumulation of sediment or debris within Seven Oaks Dam, and (3) decreased downstream sedimentation rates due to construction of Seven Oaks Dam. Impacts 1 and 2 are both classified as adverse significant. Impact 3 is considered beneficial. All three impacts are associated with each alternative. Mitigation for Impact 1 requires the adherence to the San Bernardino County Grading Ordinance as well as implementing the requirements for the National Pollutant Discharge Elimination System (NPDES). Mitigation for Impact 2 requires that the deposited sediment be removed every 5 years and after every major flood event. No mitigation is required for Impact 3.

WATER QUALITY IMPACTS. Water Quality impacts include: (1) increased turbidity caused by grading activities, (2) potential for the release of toxic materials from construction equipment, (3) decrease in suspended solids downstream of the Seven Oaks Dam, (4) increased groundwater recharge, and (5) increased likelihood for anaerobic conditions. Impacts 1, 2 and 5 are considered adverse significant, while Impacts 3 and 4 are considered beneficial. Mitigation for Impact 1 is the same as those listed for Impact 1 under Hydrologic Impacts, above. Mitigation for Impact 2 requires that construction vehicles contain fluids in an impervious area, and that the contractor carefully monitor and clean all equipment and affected areas. Mitigation for Impact 5 requires that a Water Quality Monitoring Program be implemented.

BIOLOGICAL IMPACTS. Construction activities for the Seven Oaks Dam and associated impacts are not related to the water conservation project since the dam must be built and be operational for its flood control purpose prior to the initiation of the water conservation project. The reservoir's 50-year flood line is at an elevation of approximately 2,425 feet NGVD. Therefore, since all vegetation impacted within the 2,300-, 2,375-, 2,418-, and 2,265-foot water levels was previously addressed and mitigated as part of the dam's original environmental document, the 1988 Phase II General Design Memorandum on the Santa Ana River Mainstem including Santiago Creek, California Supplemental Environmental Impact Statement (SEIS), no additional impacts are anticipated.

NOISE IMPACTS. Short term noise impacts are associated with construction impact ambient noise levels. Because of the location of the site, there are no receptors adjacent to or in the near vicinity of the site. Other environmental areas assessed by the EIR/EIS include Land Use, Cultural Resources and Hazardous and Toxic Waste.

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Permit No. 4474

[Federal Register: April 9, 1997 (Volume 62, Number 68)]
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DEPARTMENT OF DEFENSE

Department of the Army
Corps of Engineers

Draft Environmental Impact Statement/Environmental Impact Report (DEIS/EIR) for the Seven Oaks Dam Water Conservation Feasibility Study, San Bernardino County, California

AGENCY: Army Corps of Engineers, Los Angeles District, DoD.

ACTION: Notice of Availability.

SUMMARY: The Los Angeles District Corps of Engineers and San Bernardino County Flood Control District propose establishing a seasonal water conservation and supply pool at Seven Oaks Dam. The study was developed in response to local concerns regarding future water supply sources, given continued regional population growth, dwindling imported water supplies, and continued increases in the cost of water. As proposed the project would retain water behind Seven Oaks Dam beginning in March through May until the target conservation pool elevation is reached, with releases to the downstream spreading grounds from June through September. Releases would be made to ensure the conservation pool is drained each year by September 30, prior to the winter flood control season.

FOR FURTHER INFORMATION CONTACT:
For a copy of the draft EIS/EIR, or for additional information, please contact Mr. William O. Butler at (213) 452-3845 or Mr. Jared Miller at (213) 452-3837, or by writing to the U.S. Army Corps of Engineers, Los Angeles District (Attn: Mr. William O. Butler, CESPL-PD-RN, Room 14005 or Attn: Mr. Jared Miller, CESPL-PD-CN, Room 14082), P.O. Box 532711, Los Angeles, California 90053-2352.

SUPPLEMENTARY INFORMATION: No significant short or long-term adverse environmental effects were identified in the draft EIS/EIR as a result of implementing or operating the Seven Oaks facility for water conservation purposes.

The public review period for the draft EIS/EIR will be for 45 days, from April 15 to May 29, 1997.

Scoping: A public scoping meeting was held in Redlands, California on Thursday, September 14, 1995. The date, time and location of this scoping meeting was announced in the local news media and with separate notification to all parties on the project mailing list.

A public scoping meeting will be held to give individuals and groups the opportunity to comment, either orally and/or in writing on the environmental, social and economic impacts of the proposed action as presented in the draft EIS/EIR. A public meeting is scheduled for April 30, 1997 at 7:00 p.m. at the San Bernardino Valley Municipal Water District, 1350 South ``E'' Street, San Bernardino, California. At the public meeting, the report findings and DEIS/EIR will be reviewed. Separate notification of the meeting will also be sent to all parties on the project mailing list.

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Written public comments and suggestions received by May 29, 1997 will be addressed in the final EIS/EIR.

Gregory D. Showalter,
Army Federal Register Liaison Officer.
[FR Doc. 97-9039 Filed 4-8-97; 8:45 am]
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ENVIRONMENTAL PROTECTION AGENCY

[ER-FRL-5479-1]

Environmental Impact Statements; Notice of Availability

Responsible Agency: Office of Federal Activities, General Information (202) 564-7167 OR (202) 564-7153. Weekly receipt of Environmental Impact Statements Filed March 31, 1997 Through April 4, 1997 Pursuant to 40 CFR 1506.9.

EIS No. 970119, Draft Supplement EIS, AFS, ID, Katka Peak Timber Sale and Road Construction, Implementation, New Information from Interior Columbia Basin Ecosystem Management Project, to implement Ecosystem Restoration Treatment, Bonners Ferry Ranger District, Idaho Panhandle National Forests, Boundary County, ID, Due: May 12, 1997, Contact: Barry Wynsma (208) 267-5561.
EIS No. 970120, Draft EIS, AFS, OR, Little River (DEMO) Demonstration of Ecosystem Management Options Timber Sale, Implementation, Umpqua National Forest, North Umpqua Ranger District, Douglas County, OR, Due: May 27, 1997, Contact: Debbie Anderson (541) 496-3532.
EIS No. 970121, Draft EIS, AFS, ID, Deadwood Ecosystem Analysis '96 Project, Implementation, Boise National Forest, Lowman Ranger District, Boise and Valley Counties, ID, Due: May 27, 1997, Contact: David D. Rittenhouse (208) 364-4100.
EIS No. 970122, Final EIS, NOA, OH, Ohio Combined Coastal Management Program, Implementation, Special Management Areas (SMAs), Lake Erie, OH, Due: May 12, 1997, Contact: Diana Olinger (301) 713-3113.
EIS No. 970123, Final EIS, AFS, CA, Jaybird Multi-Resource Project, Implementation, Downieville Ranger District, Yuba County, CA, Due: May 12, 1997, Contact: Gary Fildes (916) 288-3231.
EIS No. 970124, Legislative Draft EIS, AFS, CO, North Fork of the South Platte and the South Platte Rivers, Wild and Scenic River Study, To Determine their Suitability for Inclusion into the National Wild and Scenic Rivers System, Pike and San Isabel National Forests, Comache and Cimarron National Grasslands, Douglas, Jefferson, Park and Teller Counties, CO, Due: July 10, 1997, Contact: Lance Tyler (719) 585-3720.
EIS No. 970125, Draft EIS, FHW, MD, InterCounty Connector (ICC) Transportation Improvements, between I-270 Corridor near Rockville/ Gaithersburg, Montgomery County and I-95 Corridor near Laurel in Prince George's County, Funding, COE Section 404 Permit and Right-of-Way Permit, Montgomery and Prince George's County, MD, Due: June 23, 1997, Contact: Renee Sigel (410) 962-4440.
EIS No. 970126, Final Supplement EIS, FHW, VT, Burlington Southern Connector, I-189 to Battery Street, Additional Information, Funding, Burlington , Chittenden, County, VT, Due: May 12, 1997, Contact: Frederick Downs (802) 828-4423.
EIS No. 970127, Draft EIS, COE, CA, Seven Oaks Dam Water Conservation Feasibility Study, Establishing a Seasonal Water Conservation and Supply Pool, Flood Control and Flood Protection, Santa Ana River Basin, San Bernardino County, CA, Due: May 27, 1997, Contact: William O. Butler (213) 452-3845.
EIS No. 970128, Draft EIS, BLM, AZ, Cyprus Miami Mining Leach Facility Expansion Project, Construction and Operation, Plan of Operations Approval and COE Section 404 Permit, Gila County, AZ, Due: June 10, 1997, Contact: Shela McFarlin (602) 417-9568. The US Department of the Interior and the US Department of Agriculture are Joint Lead Agencies on the above project.
EIS No. 970129, Final EIS, COE, NY, NJ, Newark Bay Confined Disposal Facility (NBCDF), Construction, Dredged Material Disposal Site, NY and

NJ, Due: May 12, 1997, Contact: Marc Helman (212) 264-3912.
EIS No. 970130, Draft Supplement EIS, NAS, Cassini Spacecraft Exploration Mission to Explore the Planet Saturn and its Moons, Implementation, Due: May 27, 1997, Contact: Mark R. Dahl (202) 358-1544.
EIS No. 970131, Draft Supplement EIS, COE, PA, Lower Monongahela River Navigation System, Locks and Dam Nos. 2, 3, and 4 Improvements, Updated Information for Disposal of Dredge and Excavated Material, Funding, Allegheny, Washington and Westmoreland Counties, PA, Due: May 27, 1997, Contact: James A. Purdy (412) 644-6844.

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Amended Notices

EIS No. 970084, Draft EIS, COE, CA, Morrison Creek Mining Reach Downstream (South) of Jackson Highway, Mining and Reclamation Project, COE Section 404 Permit Issuance, Sacramento County, CA, Due: May 05, 1997, Contact: Larry Vinzant (916) 557-5263. Published FR 03-21-97 Correction to Telephone Number.
EIS No. 970101, Draft EIS, UAF, CA, Programmatic EIS--McClellan Air Force Base (AFB) Disposal and Reuse Including Rezoning of the Main Base, Implementation, Federal Permits, Licenses or Entitlements, Sacramento County, CA, Due: May 12, 1997, Contact: Rick Solander (916) 643-0830 (Ext. 126). Published FR-03-28-97--Correction to Telephone Number.
EIS No. 970116, Final EIS, USA, MO, US Army Chemical School and US Army Military Police School Relocation to Fort Leonard Wood (FWL) from Fort McClellan, Alabama, Implementation, Cities of St. Robert, Waynesville, Richland, Dixon, Crocker, Rolla, Houston and Lebanon; Pulaski, Texas, Phelps and Laclede Counties, MO, Due: May 05, 1997, Contact: Alan Gehrt (816) 983-3142. Published FR-04-04-97--Correction to Telephone Number.

Dated: April 8, 1997.
William D. Dickerson,
Director, NEPA Compliance Division, Office of Federal Activities.
[FR Doc. 97-9419 Filed 4-10-97; 8:45 am]
BILLING CODE 6560-50-U

UNITED STATES CORPS OF ENGINEERS
SEVEN OAKS DAM WATER CONSERVATION
FEASIBILITY REPORT

PUBLIC MEETING HELD ON
WEDNESDAY, APRIL 30, 1997
AT 7:10 P.M.

JACQUELINE M. HARRIS, R.P.R.
C.S.R. #7459

APPEARANCES AND SPEAKERS:

LIEUTENANT COLONEL WYLIE K. BEARUP - U.S. ARMY CORPS OF ENGINEERS

STEPHEN FINE - COASTAL RESOURCES

DENNIS MARFICE - HYDRAULICS ENGINEERING

ROBERT KWAN - CIVIL DESIGN

PAM CASTENS - ENVIRONMENTAL RESOURCES

MIKE ROBERTS - PUBLIC INVOLVEMENT

MONA LEE GOSS - PUBLIC AFFAIRS OFFICE

GIRISH DESAI - SEVEN OAKS DAM WATER CONSERVATION PROJECT MANAGER

JARED MILLER - FEASIBILITY STUDY MANAGER

KEN MILLER - DIRECTOR OF TRANSPORTATION AND FLOOD CONTROL

ROBERT JOE - CHIEF OF PLANNING DIVISION

ROBERT L. REITER - SAN BERNARDINO VALLEY MWD

JEFF L. CAUFIELD
PAUL R. DOLTER
MICHAEL A. DOWNS
SAMUEL H. FULLER
DONALD D. GOODIN
DONALD L. HARRIGER
DOUGLAS D. HEADRICK
JOHN E. HOAGLAND
MICHAEL HUFFSTUHLER
VANH R. OLSON
ZAHRA PANAHI
EVA PLASZER
MICHAEL T. SAVAGE
RANDY L. SCOTT
JOHN SHONE
CHARLES WHITE
DIETER P. WIRTZFELD

SAN BERNARDINO, CALIFORNIA

WEDNESDAY, APRIL 30, 1997

AT 7:10 P.M.

-oo0oo-

MR. MILLER: Good evening, everyone. I would like to introduce myself. I'm Ken Miller. I'm Director of Transportation and Flood Control for San Bernardino County. I want to welcome all of you here tonight for this public meeting.

The purpose of the public meeting is to discuss the Seven Oaks Dam Water Conservation Study that's been underway for a couple of years.

As most of you probably know, the Seven Oaks Dam began construction in our county here about 1990 and has been designed as a flood control dam. It's well underway on its construction.

If any of you have been out to the dam site, you know that. Those of you who that haven't been out there, probably -- if you can get an opportunity, the Corps of Engineers does provide tours out at the site. I heard this morning they are booked up for a couple of months already ahead of time.

But it's a wonderful project that's going on in our county here just inside the Santa Ana Canyon east of Green Spot Road. I think at the present time, the dam is up about 150 to 200 feet above the streambed. And it's a substantial structure today, but by the time it's completed, it will be a pretty impressive structure that we don't often get to see in our local area.

The dam itself is one that has been designed as a flood control dam. And even though that design was basically for flood control purposes, even without any changes, it provides, I think, a real opportunity for water conservation in our valley.

I know our host here San Bernardino Valley Municipal Water District and the other water agencies are here and those that aren't here are always striving to see what can we do to improve water resources in our San Bernardino Valley, and this project is surely one that is going to make a major impact on water resources.

Our flood control district and our host, San Bernardino Valley, have been working jointly now for a couple of years as partners along with the U.S. Army Corps of Engineers. We've had a very fine relationship over the years, and I think this is one more project that's in the works now that can be of good benefit here in our community.

As you'll hear in a few moments, the study that's been taking place for two years has addressed a number of alternatives. I won't go into those, but Colonel Bearup here will do that. And out of those studies have come some good alternatives on what can be done behind this dam and what can be done to improve water conservation for the community.

There are four plans I think that will be previewed tonight. Each one of those has different elevations for conservation. Each one of them has different costs and different problems which you'll hear in a few minutes.

Our district has supported one of the alternatives which is called the Locally Preferred Plan. I think the purpose of tonight's meeting is to bring this plan to the public, allow you as public members to comment on the plan. We're interested in hearing those comments. I know the Corps. is interested in hearing those comments.

Tonight is an appropriate time if you have anything that you would like to bring up, to bring it up verbally before the meeting here or during the meeting. But if you want to contemplate some things and furnish some comments in writing, there's a comment period that's open now and it will be open now until about mid May and surely would encourage any of you that have comments to bring those forward either verbally or in writing.

With those preliminary remarks, I would like to now introduce Lieutenant Colonel Wylie Bearup. The Colonel Bearup is the Deputy District Engineer for the Los Angeles District of the Corps. of Engineers. And Colonel Bearup tonight is going to present the plans that were identified in the feasibility study report, report the results of the study to you, and conduct the public meeting.

So at this time, I would like to turn the meeting over the Colonel Bearup.

LT. COL. BEARUP: Thank you, Ken. Good evening, ladies and gentlemen. Thank you very much for joining us tonight to consider the proposed plan for water conservation at Seven Oaks Dam in San Bernardino County.

First of all, I would like to express my thanks to the San Bernardino County Flood Control District and the San Bernardino Valley Municipal

Water District for arranging tonight's meeting.

The flood control district and the water district are full partners in this study, and we have enjoyed a very successful working relationship with them and their representatives.

Just to let you know that I'm not the only one here from the Corps tonight, I brought a lot of my staff to help answer the questions. Joining me tonight is Mr. Bob Joe, my Chief of Planning Division. Mr. Steve Fine, Coastal Resources Branch. Mr. Dennis Marfice, in the back, Hydraulics Engineering. And Robert Kwan, Civil Design Section. Pam Castens, Environmental Resources. Mona Lee Goss of our Public Affairs Office. Girish Desai, Project Manager for this project. And Jared Miller, the Feasibility Study Manager.

We are here to discuss the findings of the Seven Oaks Dam Water Conservation Feasibility Study. The study was conducted to determine if an opportunity exists to operate the Seven Oaks Dam for seasonal water conservation. The additional water supplies would be used to help meet increasing water demands in the surrounding region.

Let me give you an idea of how tonight's proceeding should go. First, I'll give a short status report on the Seven Oaks Dam Project, then summarize the water conservation study findings, and describe the selected plan and its environmental impacts. I will then cover the remaining study schedule, and close with a summary of the actions required to put the project in place.

After my presentation, we will get to the most important item on the public meeting agenda -- the public comment session. It's the reason we are here tonight, to hear from you. Your participation in the process is vital to the successful completion of the study.

We will use the registration forms that you filled out as you entered to conduct the public session. The first to speak will be those who have indicated that they want to make a statement. When all of these persons have spoken, the meeting will be opened up for any and all questions and comments. Please feel free to speak out during the public session. I ask you to hold your questions until then. All interested parties will be afforded the opportunity to present any pertinent data and express their views concerning this important matter. All we ask is that your comments relate to the Seven Oaks Dam Water Conversation Feasibility Report.

As you can see, we are recording tonight's proceedings to provide a record for those parties who must make the decisions on whether to approve the selected plan. If you are interested in a copy of the meeting transcript, please contact Jared Miller, the Study Manager.

Now, let's get started.

The Water Resources Act of 1986 authorized the construction of Seven Oaks Dam and Reservoir as part of the Santa Ana River Flood Control Project. The flood control project is presently under construction by the Corps of Engineers in cooperation with our non-federal sponsors including San Bernardino, Riverside, and Orange Counties. The purpose of the Seven Oaks Dam, as authorized by Congress, is to provide flood control along the Santa Ana River.

Seven Oaks Dam is a 550 foot high, earth and rockfill structure, with a maximum embankment length of 2,980 feet. The stream bed elevation at the embankment is about 2,060 feet, and the debris pool basin elevation is at 2,298 feet. The spillway elevation is 2,580 feet and the top of the embankment is at 2,610 feet. The reservoir area comprises 780 acres of National Forrest Service lands. The dam and reservoir will provide 113,600 acre-feet of storage for flood waters, and 32,000 acre-feet for sediment storage.

The construction of the Seven Oaks Dam is ongoing with completion scheduled for sometime Summer of 1999. When completed, the dam will be turned over to the Santa Ana River Project non-federal sponsors for operation, maintenance, replacement and rehabilitation.

As Ken mentioned, and I will second that, I encourage you to visit the dam site. It's truly a remarkable engineering and construction project.

This is an artist rendition of the dam at its full elevation. And if you would like to visit the site, as Ken said, we do arrange tours and I have the number here if you would like to call our Visitors Center. I can give that out to you later if you are interested.

The Seven Oaks Dam Water Conservation Feasibility Study was conducted in response to interest by the areas water districts as a way to increase available water sources to meet increasing area water demands.

The area investigated during this study includes the Seven Oaks Dam drainage area and the service area of the San Bernardino Municipal Water District and the City of Riverside, which is included in the Western Municipal Water District. This study analyzed the areas water demands, and alternative water supplies, and evaluated the potential for developing seasonal water conservation at Seven Oaks Dam to help meet supply deficiencies.

Our analyses of information provided by the area water districts indicate that local water supply sources will be inadequate to meet demands sometime during the decade 2000 to 2010. Thereafter, additional water supplies will be needed to meet demands during peak summer water use periods. These deficits are expected to be made up by importing water from the State Water Project and from reclaimed water projects at considerably higher costs -- as shown here. The development of water conservation at Seven Oaks was evaluated as a possible less costly and, perhaps, more environmentally acceptable way of increasing area supplies as compared to obtaining water from the other sources.

I would like to emphasize again that the authorized purpose of the Seven Oaks Dam is flood control. Accordingly, the development of plans for water conservation was first based on assuring that the flood control purpose of the dam and reservoir would not be impacted in any way.

Therefore, the no-action plan or without-project condition, for evaluating water conservation alternative plans, involves operating the dam only for flood control. On the average these operations will be as follows:

From October to November, all inflow will be held in the reservoir to reach the target pool level of 2,200 feet. From November until the end of May, the dam is designed to control the reservoir design flood of 85,000 CFS, or cubic feet per second, by making 50 CFS releases between elevations 2,200 feet to 2,298 feet. Above 2,298, the outflow is increased to 500 CFS, until the peak flood of Prado Dam has passed. Then releases would be increased up to 7,000 CFS in order to drain the flood control pool beginning in June. Releases then will include all inflows plus a release of about 10 to 20 CFS, to empty the pool by the end of August.

Since the entire storage area of the reservoir is needed for flood control and sediment storage, the development of plans for water supply was limited to looking at alternatives for seasonal water conservation. Seasonal water conservation involves the capturing of additional flows only during the non-flood season.

Therefore, the alternative plans developed during this study were based on modifying the operation of Seven Oaks Dam only during the non-flood season. These modifications involve storing water to various water pool levels and adjusting reservoir releases to supplement groundwater recharge.

The four alternatives identified in the Feasibility Report follow the procedures I have just described for flood control operations from October until the beginning of March. What distinguishes each of the alternatives is the target water conservation pool elevation to be reached from March 1st to the end of May, and downstream releases from May to September.

The first alternative would impound

conservation water at elevation 2,300 feet, which would increase annual water conservation by 4,120 acre-feet in the year 2000. Reservoir releases would increase from the inflow plus 20 CFS under flood control baseline to the inflow plus 70 CFS from June to the end of September. As sediment builds up in the debris pool over time, the storage available for water conservation would be reduced to 2,140 acre-feet in the year 2050 with releases reduced to the inflow plus about 32 CFS.

The second alternative would impound conservation water at elevation 2,375 feet, which would increase annual water conservation by 7,475 acre-feet in the year 2000. Reservoir releases would increase to inflow plus 145 CFS from June to September. By the year 2050, storage would be reduced to 5,915 acre-feet and releases reduced to about 90 CFS.

The third alternative would impound conservation water at elevation 2,418 feet, increasing annual water conservation by 9,260 acre-feet in the year 2000, with downstream releases estimated at inflow plus 208 CFS from June to September. The storage would be reduced to 8,015 acre-feet in the year 2050, with releases at inflow plus 155 CFS.

The fourth alternative would impound conservation water at elevation 2,265 feet, increasing annual water conservation by 2,510 acre-feet in the year 2000. Reservoir releases would include inflow plus 42 CFS from June to September. The storage would be reduced to 640 acre-feet in the year 2050, with releases at inflow plus 15 CFS.

To reach the water conservation pool elevations, modifications to Seven Oaks Dam would be required for several of the alternatives. As shown here, these modifications involve measures needed to strengthen and raise the dam's intake structure and maintenance bridge. Relocation of the existing access road located within the reservoir has also been developed for each alternative to maintain access to the upstream Edison power plant. The first costs for constructing each alternative are also shown.

The benefits of each of the alternatives are based on increases in the average annual water supply yields that would result from water conservation at Seven Oaks Dam. These yields are shown here. The slide also presents the percentage of years that there would be sufficient rainfall and runoff to reach the water conservation pool elevation during the March to May period. As an example, for Alternate 1, it can be expected that the water conservation pool can reach the 2,300 foot level about 25 percent of the time under present conditions; or about once every four years. And 36 percent of the time when the debris pool is filled.

The economic value of the increased yield is based on an analysis of the least costly alternative method of obtaining the same yield. These alternative methods would involve importing water from the State Water Project and constructing water reclamation projects. This analysis considered water distribution and costs to the San Bernardino Valley Municipal Water District and the Western Municipal Water District.

An economic analysis was performed comparing the cost of each of the alternative plans to the expected benefits. This slide includes interest during construction, which is based on an interest rate of 7 and 3/8 percent and a 50-year project life. The plan that maximizes national economic development benefits, or the NED Plan, is

Plan 4. Plans 1 and 2 were also found to be economically justified.

We also examined the environmental impacts associated with each alternative. In general, we found that none of the alternatives are expected to cause any significant adverse impacts to the environment. I will cover the potential impacts of the selected plan in more detail in a few moments.

Based on economic and environmental considerations, the plan selected for implementation is Alternative 1, which is the Locally-Preferred Alternative. This plan would allow for seasonal conservation of water up to elevation 2,300 feet from March to September. Modifications would be required to strengthen the anchoring support for intake tower. And relocation of the access road in the reservoir area may be needed, if it is determined that other Forest Service Roads cannot meet emergency requirements to access the Edison plant.

The estimated first cost of the selected plan is $8,110,000. A considerable portion of these costs are associated with the relocation of the access road -- which if found unnecessary, would reduce the total cost considerably. There would not be any new real estate required for the project except for staging areas, which are expected to be within the flood control lands. A special use permit may be required from the US Forest Service to allow for more frequent and longer duration of inundation up to the 2,300 foot level.

A draft environmental impact statement and draft environmental impact report has been prepared and is part of this public review of the proposed selected plan. The US Forest Service is a cooperating agency on the environmental impact statement. They will use the document in decision-making on any real estate or other project requirements that may have -- they may have to make in regard to implementing water conservation.

The draft environmental document indicates that the proposed plan would not cause any significant increase in impacts on the environment, or the quality of the human environment, beyond what has been addressed for the Seven Oaks Dam Flood Control Project. The impacts associated with the flood control project were addressed in the 1988 Final Supplemental

Environmental Impact Statement and supplemental documents.

The draft EIS/EIR notes that the water conservation pool for the Selected Plan is about the same level as the flood control debris pool, and that this area is well within the area that was mitigated for -- at 100 percent loss by the flood control project.

The draft EIS/EIR also notes that the changes in downstream outflows, as compared to flood control operations, are minor and would not cause any significant downstream impacts. Therefore, the draft EIS/EIR concludes there are no additional impacts on vegetation, wildlife, endangered species, cultural resources, or aesthetics caused by water conservation at Seven Oaks Dam.

There are, however, some temporary adverse impacts on water quality, air quality, and noise conditions caused by construction required to reinforce the intake tower. These impacts are also not considered to be significant.

It should be noted that if it is necessary to relocate the access road, a supplemental NEPA and CEQUA document will be required to address impacts associated with the final siting of the road. It is anticipated that the final siting, if needed, will avoid any significant adverse impacts to the environment.

I will now talk about both federal and non-federal responsibilities in the implementation of the Selected Plan, and mention the steps necessary for implementation. As indicated earlier, following construction of the dam, the operation and maintenance of the Seven Oaks Dam Flood Control Project feature will be turned over to the Santa Ana River Project non-federal sponsors, who will also be responsible for 100 percent of the O&M cost. The Water Resources Development Acts of 1986 and 1996 also require a non-federal sponsor to provide 100 percent of the separable costs for constructing, operating and maintaining the Seven Oaks Dam for water conservation.

The Local Cooperation Agreement for the flood control project -- executed in December 1988 between the federal government and the counties of San Bernardino, Riverside and Orange -- stipulates that the non-federal sponsors can request Corps of Engineers approval of any modifications to be made to the Seven Oaks Dam and to any O&M procedures associated with the flood control project.

Therefore, the non-federal sponsors may request that the selected water conservation plan be implemented as a modification to the Seven Oaks Dam Flood Control Project. The water supply districts, who will ultimately benefit from water conservation at Seven Oaks Dam, will be required to make arrangements with the non-federal flood control sponsors to acquire the conserved water, including providing the cost required for implementation and operations and maintenance.

There are a number of required non-federal responsibilities for implementing the recommended plan. Some of the major items include:

Providing 100 percent of all first costs for design, plans, specifications and construction.

Providing 100 percent of all costs for operation, maintenance, replacement and rehabilitation.

Providing funds to the Corps of Engineers for review and approval of required Corps inspections during and after construction.

Obtaining any additional easements or

special use permits required from the US Forest Service.

Another important item that should be mentioned here is that all matters regarding water rights are non-federal responsibilities.

This leads me to the final presentation item -- the schedule. We expect to complete the review period on the draft report and draft EIS/EIR by May 16, 1997, and we will need your comments on the proposed action. We are scheduled to complete the Feasibility Report by the end of June. The report will then be reviewed by our South Pacific Division in San Francisco and by the headquarters of the Corps of Engineers in Washington DC. When approved, the report will provide the basis for any future decision to proceed with water conservation at Seven Oaks Dam.

We anticipate that if the Santa Ana River Project sponsors decide to implement the plan, it would take about two years to complete final design and plans and specifications and then another year to complete the construction of any modifications. It may be possible to begin operating the Seven Oaks Dam for water conservation about the same time the dam is completed and turned over to the non-federal sponsors.

That completes my presentation.

We have now arrived at the most important part of our meeting, the public comment session. There are several guidelines that we ask for you to follow when you come forward to speak.

To make the public stenographer's task easier and to assure the completeness of the record, please identify yourself clearly and state the interest or organization that you represent.

Once again, we ask that you confine your participation to the meeting subject -- water conservation study at Seven Oaks Dam. And keep your statements brief and to the point. Written statements will be appreciated.

First speaker, Mr. Paul R. Dolter.

MR. PAUL DOLTER: Dolter, yes. Yes. I'm Paul Dolter representing East Valley Water District. My boss, Bob Martin, asked me to come by tonight and give you some comments that we think are significant to your report.

East Valley Water District provides water to the Highland area, eastern San Bernardino and county pockets in between. Also a major shareholder in the North Fork Water Company and the

City Creek Water Company.

We would like to go on record as a proponent to any projects of this nature which would enhance the water supply to the basin. We also would like to go on record saying to make sure that the projects are sound, cost effective and won't hinder the water supplies that we enjoy today.

As Bob was reading the report and showed it to me, we saw something that threw up a red flag in our minds. We thought it would be significant and reflect upon your conclusions. It's apparent that the expected water available for conservation was gleaned from the data from the USGS Stream Gauge at the Mentone Gauging Station on the Santa Ana River, which we don't have any difficulty with this data whatsoever. But there are two significant things about that streamflow that you should be aware of.

One, Bear Valley Water Company has been taking water from -- in this vicinity for many years, sometimes above and below this point diverting it across river and into their system.

But more significantly, the San Bernardino Water Conservation District also takes water just below this point which takes a significant amount of the streamflow, which taking a look at your data, and if you compare their historical data, there may be a significant change in your conclusions.

Our concern in this matter is that we enjoy the benefits from the water conservation districts efforts. They spread water near our facilities and the recharge helps us significantly, and pump our water. And Bear Valley provides water through their facilities for the North Fork Water Company.

We just wanted to bring this to your attention. I believe representatives from the Water Conservation District will be able to give you some more details on this. We also plan to make a more comprehensive report before the May 15th cut-off date.

We just hope that you would take these comments into consideration so that your report can be adjusted accordingly and your opinions, if necessary.

Thank you.

LT. COL. BEARUP: I think as a general practice -- Bob can correct me if I'm wrong -- we will try to address administrative or procedural source of questions tonight. Any technical sort of questions as you just brought up, sir, we would take offline and answer them in our written report.

Good. Thanks.

Next speaker, Douglas D. Headrick.

MR. DOUGLAS HEADRICK: My name is Douglas Headrick and I'm representing the San Bernardino Valley Water Conservation District. And initially, it should be obvious from our name that we would support any program or project building, maintaining or operating facilities for retention of flood flows.

Further, if it's deemed appropriate, we would support storage of conservation water behind the Seven Oaks Dam.

I have three comments I would like to make this evening based on the report.

The first one has to do with the draft EIR/EIS and how it addresses water rights or beneficial uses of the water as it is occurring today.

There's one point on page 6 in the Hydrology Appendix that we would like to address specifically, but there are other sections also that I would like to quote. The amount of water in storage above the debris pool elevation at the end of May before any releases were made from the conservation pool was considered the additional yield because this is the volume that would otherwise have flowed downstream and been lost without the alternative operation.

And we feel that is not correct.

Second item is -- has to do with the No-action Plan on page 73 of the Volume I. It states that the No-action Plan must be analyzed as required by US Water Resources Council, system of accounts. And we don't see that in the document.

We feel that the operation of the dam alone is going to provide low or no-cost benefits that need to be included in this sort of analysis.

For instance, it is going to be taking a lot of energy out of the water, dropping a lot of sediments out, and making more water available for other spreadings to take place.

The third -- last item I have has to do with the costs. We feel that all the costs for the conservation pool should be included. The item that we see missing is the covering or the new pipe that will have to be laid to meet the Southern California Edison requirements for the flume that they are putting down the riverbed.

We have heard those costs are between 1 and 2 million. And that is due to the fact that there's a possibility that water will be stored -- water will be stored more often covering this pipe and it's a thin wall design and it would crush any time that that flume is empty.

Thank you.

LT. COL. BEARUP: Okay. Thank you.

Next speaker is Mr. John Shone.

MR. ROBERT JOE: I think we can bring the mic there.

LT. COL. BEARUP: We can take the mic to him.

MR. JOHN SHONE: It will take me a little time, that's all.

LT. COL. BEARUP: That's fine.

MR. JOHN SHONE: Yes, I'm John Shone, the manager of Bear Valley Mutual Water Company. Is this mic on?

LT. COL. BEARUP: Yes.

MR. JOHN SHONE: Okay. Last week I sent you folks a letter requesting that you respond to one question tonight. It hasn't been answered. And if you are not able to answer it tonight, I would appreciate a comment and your written record of the meeting.

Basically -- and I'll repeat this for the record tonight. Your Volume I in your report, it says that the water right holders of the Santa Ana River are Bear Valley Mutual Water Company, North Fork, Lagonia, and the Water Conservation District. But nothing is ever mentioned in the rest of the report about how, when and under what conditions our water will pass through the dam. It's very important to us.

You people will put us out of business if you close those gates without some provision to run that water through there, either through the low profile gates or something. Nobody seems to want to talk about it. And we would appreciate your comments as to how this is going to happen.

Back in 1883 when our company built the first dam at Big Bear, we had to make an arrangement with North Fork and Lagonia because they were prior right water holders. And in hindsight, it was probably a bad deal because we agreed to give them free water. For 116 years we have been giving them free water.

Not only that, but they stuck us with all the liability for the legal defense of their water rights. So we have a vital interest in what happens to this. And we would appreciate your comments on that.

Thank you.

LT. COL. BEARUP: Okay.

MR. ROBERT JOE: Sir, what we'll do -- have we received his letter yet that you are aware? When and if we -- when we receive it, and we probably have it somewhere in our office, we will write a response to you directly.

MR. JOHN SHONE: Yes. There are several ways you could accomplish that. We were just wondering how you will do that?

MR. ROBERT JOE: We will write to you directly back.

MR. JOHN SHONE: Thank you.

MR. ROBERT JOE: Okay.

LT. COL. BEARUP: Thank you. Next speaker is Samuel H. Fuller.

MR. SAMUEL FULLER: Thank you. My name is Samuel H. Fuller. I'm the Operations Manager here at San Bernardino Valley Municipal Water District. The district would like to thank you, Colonel, and the county and the Corps for all of your work in completing this report. I have just a few brief comments.

On the subject of conservation, we were pleased that your study has found that there is water available for conservation. Our district believes that having this water available will increase total supply available to the district with or without State Project water, which we think is not as dependable as the local supplies.

Further, it will increase greatly the water quality available to all the constituents of the district. The district serves some 600 people throughout the area, and this conservation storage will extend on down to the Riverside area, which I think numbers probably as much as a million people, if I'm not mistaken.

In any event, a lot of people benefit from this conservation storage and we would really like to see it go forward.

The comment on the water right issues, I note that on the couple of pages you have indicated that there are prior rights to the water and those agencies deserve that water. They would be -- that water will be delivered to them. Water rights is an issue more properly handled by the State Water Resource Control Board Division of Water Rights than the Corps. And I understood from your comments that you believe that as well. And that's how you intend to cover that issue.

The district, as you pointed out -- Well, a permit is required for the conservation storage from the State Water Resource Control Board Division of Water Rights. And the district, in conjunction with Western Municipal Water District, has filed an application for such a permit.

And it's our belief that that permit might help resolve some of these water right issues as they become -- as the process of the application process and then subsequent issuance of a permit moves along. Any permit that the district receives we anticipate would be conditioned upon releases to all the prior right companies and agencies, whoever they may be, and would allow storage of water only to the extent that it is not previously appropriated by someone and it would be the district's water and available for use within the district and to Western, who is our joint partner on this joint application.

A brief comment on the Hydrology. I

haven't studied it carefully, but I see what you have used as the US Geological Survey Gauging Station near Mentone -- Santa Ana River and Mentone, which is the information that's readily and publicly available.

And I appreciate the Corps wasn't able to go to the all of the agencies and ask them for their information and what the diversions from the river have been. And that record is probably as good as any for the kind of work that you are doing to determine if water might be available.

The records of various diversions of the various agencies are retained by these various agencies and occasionally filed with the State Waters Resources Control Board. And then properly so. That's where these issues should be brought up when we get that far.

That pretty much concludes what I had prepared. I wish to reserve the opportunity to comment as questions come up as well.

Thank you.

LT. COL. BEARUP: Sure. Jared, do we have any more comment cards?

MR. JARED MILLER: That's it.

LT. COL. BEARUP: Okay. So we will go ahead and open it up now for just general questions.

Again, if you could follow the same procedure and identify yourself and who you represent for the stenographer.

Yes, sir?

MR. DIETER WIRTZFELD: My name is Dieter Wirtzfeld. I'm with the City of Riverside. I'm just wondering about the -- I think it was Alternative 1, the Locally Preferred Alternative. I want to know what the significance of that is. Is that the one that's being proposed? Is there still chances towards the others available? And why was that one the Locally Preferred alternative.

MR. FINE: The Locally Preferred Plan is that alternative that was chosen by the local sponsor. We had to at least identify what we call the NED Plan, as it was presented, saying at least water conservation was justified behind the dam, and then there were several other alternatives that we looked at. And Alternative 1 was the one selected at this point in time as the Locally Preferred Plan by the local sponsor.

In this case, it was worked out with the county and with the water district.

Now, what happens, though, is that that plan is recommended. It becomes a recommended plan and goes up to Congress -- sorry. Goes up to the Corps of Engineers and it is then approved as a water conservation. That alternative would be approved by the Corps to have water conservation behind the dam.

MR. DIETER WIRTZFELD: Not that I'm proposing anything different, but is there -- would there be a process if somebody were to pursue 2 or 3 or Alternative 4? Or is that pretty well now decided.

MR. ROBERT JOE: No. At this point, all this has informed our higher authorities is that water conservation is justified to be stored behind the dam.

As you have probably heard several times tonight, that the implementation is 100 percent local responsibility. If there is a change, they want to go to a different alternative or different elevation, that will probably have to be worked out with the local sponsors and have to be coordinated again with the Corps.

But, you know, right now, all we are trying to say is that water conservation is justified behind the dam. And then no matter what alternative that the locals choose, they sure can work it out. But it still needs to be, then, approved by the Corps later. Just making sure, you know, it's consistent with the flood control purposes.

MR. DIETER WIRTZFELD: Again, I assume that then another EIR, et cetera, would not be necessary for one of the other alternatives?

MR. ROBERT JOE: Really don't know. It depends on the impact.

Now, when I say it has to be implemented by locals, I would think at that point you would have to look it from a CEQUA document and if it needs an environmental impact report.

MR. DIETER WIRTZFELD: So this EIR basically is for Alternative 1?

MR. ROBERT JOE: Yes.

MR. DIETER WIRTZFELD: Is there -- another related question. As far as the benefit cost, is that a restriction as to which alternative can be put in place? Does it have to show a greater than 1 cost ratio? Just kind of a procedural question.

MR. ROBERT JOE: That's a procedural question. The question is that I guess you are saying is that are we -- do we decide that an

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MR. ROBERT JOE: That's a procedural question. The question is that I guess you are saying is that are we -- do we decide that an alternative has to be justified?

MR. DIETER WIRTZFELD: Does an alternative have to have a benefit cost ratio greater than 1.

MR. ROBERT JOE: Not as a Locally Preferred Plan. All we need to show is that there is a NED Plan. It does meet that requirement.

And after that, the Locally Preferred Plan could be one that is not -- does not meet the benefit cost ratio.

MR. KEN MILLER: I would like to add on to the response a little bit. I think from the local perspective, we were very much concerned, of course, with what is the cost of doing any water conservation element. But also we wanted to look very hard at are there things that might have to be done that could impact the schedule for construction of Seven Oaks Dam. And that's also a factor that entered into making a decision on alternatives.

However, we have recently -- working with San Bernardino Valley Municipal Water District and the Corps, made some provisions in the dam construction as it gets above the reservoir elevation that would be specified in Alternate 1.

We've made provisions now in the

construction by adding a filter blanket material that does enable some of the other alternatives still to take place in the future without some exorbitant dam modification costs.

So it's been a lot to think about as far as the flood control dam itself. And we have been very cognizant about how do these alternatives fit with that element and what do we need to do in the future if we want to go to hire elevations of water conservation pools as well as are there things that would have to be done today at the dam to enable that to happen.

So some of those other factors have entered into this and hopefully the door has been left open that future plans could still be looked at.

But we are still at this time recommending the Locally Preferred Plan. But, you know, the comments that are taken here tonight will help address that as well.

MR. DIETER WIRTZFELD: And again, please excuse me. Some of my questions I am interested in trying to figure out how this all fits together. I'm not that familiar with it.

On the Alternative Number 1, the local

plan, is the elevation of that screen -- that drain necessary?

MR. KEN MILLER: I'm not understanding your question.

MR. STEVE FINE: Which drain are you talking about?

MR. DIETER WIRTZFELD: The added costs that are being paid for right now to increase the -- I forgot the exact name. The blanket drain?

MR. STEVE FINE: No, that is not required for Alternative 1.

MR. DIETER WIRTZFELD: But that's the one the EIR's for?

MR. STEVE FINE: Right.

MR. DIETER WIRTZFELD: I think the decision has already been made to go ahead with the blanket drain.

MR. STEVE FINE: Right.

MR. DIETER WIRTZFELD: Are we at odds here? Do we have to start a new EIR?

MR. STEVE FINE: No. As Ken indicated, that the blanket drain is being put in in case in the future local people wouldn't want to go to a plan that would store at a higher elevation.

Right now we are looking at going forward with Plan 1 as the plan, the immediate plan. But as the debris pool fills and starts losing water conservation, they may want to stop storing water at a higher elevation. And putting a blanket drain in will allow that to happen.

MR. DIETER WIRTZFELD: Do these costs here, these construction costs, do they include the blanket drain?

MR. STEVE FINE: For Plan 4. I'm sorry, Plan 3, it does include the blanket drain.

LT. COL. BEARUP: Okay. Thank you. Any other comments, questions?

Okay. Well, again, that will conclude our presentation tonight. Thank you very much for coming.

Again, if you would like to provide written comments, as we said earlier, that written comment period is through the 16th of May?

MR. STEVE FINE: 16th of May is when they are due. If you want additional time, just send us a letter.

LT. COL. BEARUP: Thank you very much.

(Whereupon the proceedings adjourned at 7:55 o'clock p.m.)

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STATE OF CALIFORNIA)
) ss.
COUNTY OF SAN BERNARDINO)

I, JACQUELINE M. HARRIS, certified shorthand reporter, license No. 7459, do hereby certify:

That said meeting was taken down by me in shorthand at the time and place therein named and thereafter reduced to computer-aided transcription under my direction.

I further certify that I am not interested in the event of the action.

WITNESS my hand this 7th day of May, 1997.

Jacqueline M. Harris

JACQUELINE M. HARRIS, CSR NO. 7459

APPENDIX B

BIOLOGICAL APPENDICES

FLORAL AND FAUNAL COMPENDIA

INTRODUCTION TO FLORAL AND FAUNAL SURVEY

The flora of the Santa Ana Canyon (area of dam construction and area upstream of the dam) was taken from a plant study included in the appendices of the 1985 project report (USACE 1985). Some species on the floral compendium may no longer occur in the area because of dam construction activity. Species observed in September 1995 were added to the compendium, but field verification of plants was not attempted during this survey because many plants such as annuals and buliferous species are not detectable at this date.

Wildlife occurring in Santa Ana Canyon was taken from wildlife studies included in the appendices of the 1985 study (USACE 1985). As with the plants, habitat for some wildlife may no longer be present because of dam construction activities.

Floral taxonomy used in this report follows the Jepson Manual (Hickman 1993) and, for sensitive species, the California Native Plant Society's Rare Plant Inventory (5th Edition) (Skinner and Pavlik 1994). Additional common plant names are taken from Munz (1974), Beauchamp (1986), Roberts (1989), Abrams (1923, 1944), and Abrams and Ferris (1951, 1960). Vertebrates identified in the field by sight, calls, tracks, scat, or other signs are cited according to the nomenclature of Collins (1990) for amphibians and reptiles, American Ornithological Union (1983 and supplemental) for birds, and Jones et al. (1991) for mammals.

TABLE 1

FLORAL COMPENDIUM[1]

LEGEND

STATUS

*	Non-native

[1] This is not intended as an exhaustive listing of the vegetation occurring on the site; some annual herbs or very uncommon species may not have been detected by the field survey.

VASCULAR PLANTS

FERNS AND FERN ALLIES

EQUISETACEAE - HORSETAIL FAMILY

Equisetum hymale var. *affine*
scouring-rush

PTERIDACEAE - BRAKE FAMILY

Adiantum capillus-veneris
southern maiden-hair
Pellaea andromedifolia
coffee fern
Pellaea mucronata
bird's-foot fern
Pentagramma triangularis
goldenback fern

GYMNOSPERMS

CUPRESSACEAE - CYPRESS FAMILY

Juniperus californica
California juniper

PINACEAE - PINE FAMILY

* *Pinus canariensis*
Canary Island pine
Pinus coulteri
Coulter pine
* *Pinus radiata*
Monterey pine
Pseudotsuga macrocarpa
bigcone douglas-fir

ANGIOSPERMS (DICOTYLEDONS)

AMARANTHACEAE - AMARANTH FAMILY

* *Amaranthus albus*
tumbling pigweed

ANACARDIACEAE - SUMAC OR CASHEW FAMILY

Rhus ovata
sugar bush
Rhus trilobata
skunkbrush
* *Schinus molle*
Peruvian pepper tree
Toxicodendron diversilobum
poison oak

APIACEAE - CARROT FAMILY

* *Anthriscus scandiciha*
bur-chervil
Taushia argata
taushia

ASTERACEAE - SUNFLOWER FAMILY

Achillea millefolium
California yarrow
Acourtia microcephala
sacapellote
Ambrosia acanthicarpa
annual bur-sage
Ambrosia psilostachya
western ragweed
Artemisia californica
California sagebrush
Artemisia douglasiana
mugwort
Artemisia dracunculus
tarragon
Baccharis salicifolia
mulefat
Bebbia juncea
sweet bush
Brickellia desertorum
brickellia
* *Centaurea melitensis*
tocalote
Chaenactis glabriuscula
yellow pincushion
Cirsium occidentale var. *californicum*
California thistle
* *Cirsium vulgare*
bull thistle

ASTERACEAE - SUNFLOWER FAMILY (continued)

* *Cnicus benedictus*
blessed thistle
* *Conyza canadensis*
horseweed
Encelia farinosa
brittlebush
Ericameria linearifolia
interior goldenbush
Ericameria pinifolia
pinebush
Erigeron foliosus
leafy daisy
Eriophyllum confertiflorum
golden yarrow
Filago californica
California fluffweed
Gnaphalium californicum
California everlasting
Gnaphalium canescens var. *microcephalum*
white everlasting
Gnaphalium stramineum
cotton-batting plant
Hazardia squarrosa
saw-toothed goldenbush
Helianthus annuus
common sunflower
Heterotheca grandiflora
telegraph weed
Heterotheca sessiliflora
hairy golden-aster
* *Hypochaeris glabra*
smooth cat's-ear
* *Lactuca serriola*
prickly lettuce
Lepidospartum squamatum
scale-broom
Lessingia filaginifolia
cudweed aster
Malacothrix saxatilis
cliff malacothrix
Rafinesquia californica
California chicory
Senecio flaccidus
shrubby butterweed
* *Senecio vulgaris*
common groundsel

ASTERACEAE - SUNFLOWER FAMILY (continued)

Solidago californica
California goldenrod
* *Sonchus oleraceus*
common sow thistle
Stephanomeria pauciflora
wire lettuce
Stephanomeria virgata
twiggy wreathplant
Xanthium strumarium
cocklebur

BERBERIDACEAE - BARBERRY FAMILY

Berberis aquifolium var. *dictyota*
barberry

BETULACEAE - BIRCH FAMILY

Alnus rhombifolia
white alder

BORAGINACEAE - BORAGE FAMILY

Amsinckia menziesii
common fiddleneck
Cryptantha flaccida
popcorn flower
Cryptantha intermedia
common forget-me-not
Cryptantha micrantha
popcorn flower
Cryptantha muricata
prickly cryptantha
Pectocarya linearis ssp. *ferocula*
slender pectocarya

BRASSICACEAE - MUSTARD FAMILY

Arabis sparsiflora
rock-cress
* *Brassica nigra*
black mustard
Erysimum capitatum
western wallflower
Lepidium lasiocarpum
peppergrass

BRASSICACEAE - MUSTARD FAMILY (continued)

* *Lepidium virginicum*
wild peppergrass
Rorippa palustris ssp. *occidentalis*
Pacific yellow cress
* *Sisymbrium irio*
London rocket
* *Sisymbrium officinale*
hedge mustard
* *Sisymbrium orientale*
Oriental mustard
Thysanocarpus laciniatus
narrow-leaved fringe pod

CACTACEAE - CACTUS FAMILY

Opuntia parryi
valley cholla

CAMPANULACEAE - BELLFLOWER FAMILY

Nemacladus longiflorus
nemacladus
Nemacladus ramossisima
Nuttall's nemacladus

CAPRIFOLIACEAE - HONEYSUCKLE FAMILY

Lonicera subspicata
southern honeysuckle
Sambucus mexicana
Mexican elderberry

CARYOPHYLLACEAE - PINK FAMILY

\+ *Cerastium fontanum*
mouse-eared chickweed
Loeflingia squarrosa
California loeflingia
Minuartina douglasii
sandwort
Silene antirrhina
catchfly
Silene laciniata ssp. *major*
fringed Indian pink
* *Stellaria media*
common chickweed

CHENOPODIACEAE - GOOSEFOOT FAMILY

* *Chenopodium botrys*
Jerusalem oak
* *Chenopodium ambrosioides*
Mexican tea
Chenopodium berlandieri
pitseed goosefoot
* *Chenopodium murale*
nettle-leaved goosefoot
* *Salsola tragus*
Russian thistle

CONVOLVULACEAE - MORNING-GLORY FAMILY

Calystegia macrostegia
western bindweed
Calystegia occidentalis ssp. *fulcrata*
morning-glory

CRASSULACEAE - STONECROP FAMILY

Crassula connata
pygmy-weed
Dudleya lanceolata
lance-leaved dudleya

CUCURBITACEAE - GOURD FAMILY

Cucurbita foetidissima
calabazilla
Marah macrocarpus
wild cucumber

CUSCUTACEAE - DODDER FAMILY

Cuscuta californica
California dodder

DATISCACEAE - DATISCA FAMILY

Datisca glomerata
durango root

ERICACEAE - HEATH FAMILY

Arctostaphylos glandulosa
Eastwood's manzanita
Arctostaphylos glauca
bigberry manzanita

EUPHORBIACEAE - SPURGE FAMILY

Croton californicus
California croton
Eremocarpus setigerus
dove weed

FABACEAE - LEGUME FAMILY

Amorpha californica
California false indigo
Lathyrus vestitus
wild sweet pea
Lotus argophyllus
silver leaf lotus
Lotus heermannii
woolly lotus
Lotus scoparius
deerweed
Lotus strigosus
strigose lotus
Lupinus concinnus
bajada lupine
Lupinus excubitus var. *hallii*
grape soda lupine
Lupinus hirsutissimus
stinging lupine
Lupinus latifolius
broad-leaved lupine
Lupinus sparsiflorus
Coulter's lupine
Lupinus truncatus
collar lupine
* *Medicago polymorpha*
bur clover
* *Melilotus alba*
white sweetclover
* *Melilotus indica*
sourclover
Trifolium ciliolatum
tree clover
Trifolium willdenovii
tomcat clover
* *Vicia americana*
wild pea

FAGACEAE - OAK FAMILY

Quercus chrysolepis
canyon live oak
Quercus dumosa
coastal scrub oak
Quercus berberidifolia
scrub oak
Quercus wislizenii
interior live oak

GARRYACEAE - SILT-TASSEL FAMILY

Garrya veatchii
silk-tassle

GERANIACEAE - GERANIUM FAMILY

* *Erodium cicutarium*
red-stemmed filaree

GROSSULARIACEAE - GOOSEBERRY FAMILY

Ribes malvaceum
chaparral currant

HYDROPHYLLACEAE - WATERLEAF FAMILY

Emmenanthe penduliflora
whispering bells
Eriodictyon trichocalyx
hairy yerba santa
Eucrypta chrysanthemifolia
common eucrypta
Nemophila menziesii
baby blue-eyes
Phacelia brachyloba
short-lobed phacelia
Phacelia cicutaria
caterpillar phacelia
Phacelia distans
wild heliotrope
Phacelia minor
wild canterbury-bell
Phacelia ramosissima
branching phacelia

JUGLANDACEAE - WALNUT FAMILY

Juglans californica var. *californica*
Southern California black walnut

LAMIACEAE - MINT FAMILY

* *Marrubium vulgare*
horehound
Monardella lanceolata
mustang mint
Salvia apiana
white sage
Salvia columbariae
chia
Salvia mellifera
black sage
Stachys albens
white hedge-nettle
Trichostema parishii
Parish's blue-curls

LAURACEAE - LAUREL FAMILY

Umbellularia californica
California laurel

LOASACEAE - LOASA FAMILY

Mentzelia micrantha
small-flowered stick-leaf

MALVACEAE - MALLOW FAMILY

Malacothamnus fasciculatus
mesa bushmallow
* *Malva nicaeensis*
cheeseweed

MELIACEAE - MAHOGANY FAMILY

* *Melia azedarach*
china-berry

NYCTAGINACEAE - FOUR O'CLOCK FAMILY

Mirabilis californica
California wishbone bush

OLEACEAE - OLIVE FAMILY

Fraxinus dipetala
California ash

ONAGRACEAE - EVENING PRIMROSE FAMILY

Camissonia bistorta
California sun cup
Camissonia californica
California evening primrose
Camissonia hirtella
camissonia
Camissonia pusilla
slender camissonic
Clarkia purpurea ssp. *quadrivulnera*
winecup clarkia
Clarkia dudleyana
farewell-to-spring
Epilobium canum
California fuchsia
Epilobium ciliatum
California cottonweed
Oenothera elata
evening primrose

OROBANCHACEAE - OROBANCHE FAMILY

Orbanche uniflora
broom-rape

PAPAVERACEAE - POPPY FAMILY

Argemone munita
prickly poppy
Dendromecon rigida
bush poppy
Dicentra chrysantha
golden ear-drops
Eschscholzia caespitosa
poppy
Eschscholzia californica
California poppy
Meconella heterophyllyum
slender meconella

PLANTAGINACEAE - PLANTAIN FAMILY

Plantago ovata
plantain

PLATANACEAE - SYCAMORE FAMILY

Platanus racemosa
western sycamore

POLEMONIACEAE - PHLOX FAMILY

Eriastrum densifolium ssp. *sanctorum*
Santa Ana River woollystar
Eriastrum sapphirinum
sapphire eriastrum
Gilia australis
gilia
Gilia capitata
blue field gilia
Leptodactylon californicum
prickly phlox

POLYGONACEAE - BUCKWHEAT FAMILY

Eriogonum elongatum var. *elongatum*
long-stemmed buckwheat
Eriogonum fasciculatum
California buckwheat
Eriogonum thurberi
Thurber's buckwheat
* *Polygonum arenastrum*
common knotweed
Polygonum lapathifolium
willow-weed
Pterostegia drymarioides
California thread-stem
* *Rumex crispus*
curly dock

PORTULACACEAE - PURSLANE FAMILY

Calyptridium monandrum
common calyptridium
Claytonia perfoliata
miner's lettuce

RANUNCULACEAE - BUTTERCUP FAMILY

Clematis lasiantha
pipestems
Delphinium cardinale
scarlet larkspur
Delphinium parryi
Parry's larkspur

RHAMNACEAE - BUCKTHORN FAMILY

Ceanothus crassifolius
hoary leaf ceanothus
Ceanothus integerrimus
deer brush
Ceanothus leucodermis
chaparral whitethorn
Rhamnus californica
California coffeeberry
Rhamnus ilicifolia
holly-leaf redberry

ROSACEAE - ROSE FAMILY

Adenostoma fasciculatum
chamise
Cercocarpus betuloides
birch-leaf mountain-mahogany
Heteromeles arbutifolia
toyon
* *Malus sylvestris*
apple
Prunus ilicifolia
holly-leaved cherry
* *Rosa domestica*
rose
Rosa californica
California wild rose
Rubus ursinus
California blackberry

RUBIACEAE - MADDER FAMILY

Galium angustifolium
narrow-leaved bedstraw
* *Galium aparine*
goose grass
Galium nuttallii
San Diego bedstraw

SALICACEAE - WILLOW FAMILY

Populus balsamifera ssp. *trichocarpa*
black cottonwood
Populus fremontii ssp. *fremontii*
Fremont's cottonwood
Salix exigua
sandbar willow
Salix gooddingii
black willow
Salix laevigata
red willow

SAXIFRAGACEAE - SAXIFRAGE FAMILY

Boykinia rotundifolia
boykinia

SCROPHULARIACEAE - FIGWORT FAMILY

Antirrhinum coulterianum
white snapdragon
Castilleja angustifolia
paintbrush
Castilleja minor
paintbrush
Collinsia heterophylla
Chinese houses
Keckiella cordifolia
heart-leaved penstemon
Keckiella ternata
bush snapdragon
Mimulus aurantiacus
orange bush monkey-flower
Mimulus brevipes
wide-throated monkey-flower
Mimulus cardinalis
scarlet monkey-flower
Mimulus guttatus
common monkey-flower
Mimulus moschatus
slimy monkey-flower
Penstemon grinnellii
penstemon
Penstemon spectabilis
royal penstemon
Scrophularia californica
California figwort

SCROPHULARIACEAE - FIGWORT FAMILY (continued)

* *Verbascum thapsus*
woolly mullein
Veronica americana
speedwell
* *Veronica anagallis-aquatica*
water speedwell

SOLANACEAE - NIGHTSHADE FAMILY

Datura wrightii
jimson weed
Nicotiana attenuata
coyote tobacco
* *Nicotiana glauca*
tree tobacco
Solanum douglasii
Douglas' nightshade
Solanum xanti
chaparral nightshade

STYRACACEAE - STYRAX FAMILY

Styrax officinalis
snowdrop bush

TAMARICACEAE - TAMARISK FAMILY

* *Tamarix ramosissima*
Mediterranean tamarisk

URTICACEAE - NETTLE FAMILY

Hesperocnide tenella
western nettle
Urtica dioica ssp. *holosericea*
giant creek nettle

VERBENACEAE - VERVAIN FAMILY

Verbena lasiostachys
western verbena

VISCACEAE - MISTLETOE FAMILY

Phoradendron tomentosum
mistletoe

VITACEAE - GRAPE FAMILY

Vitis girdiana
desert wild grape

ANGIOSPERMS (MONOCOTYLEDONS)

CYPERACEAE - SEDGE FAMILY

Carex fracta
sedge
Carex subfusca
sedge
Cyperus eragrostis
tall cyperus
Eleocharis parishii
spike-rush
Scirpus microcarpus
small-fruited bulrush

IRIDACEAE - IRIS FAMILY

* *Iris germanica*
bearded iris

JUNCACEAE - RUSH FAMILY

Juncus bufonius
toad rush
Juncus effusus
bog rush
Juncus macrophyllus
long-leaved rush
Juncus xiphioides
iris-leaved rush

LILIACEAE - LILY FAMILY

Bloomeria crocea
common goldenstar
Calochortus plummerae
Plummer's mariposa lily
Dichelostemma capitatum
blue dicks
Lilium humboldtii var. *ocellatum*
Humboldt lily
Muilla maritima
muilla
Yucca whipplei
Our Lord's candle

ORCHIDACEAE - ORCHID FAMILY

Epipactis giganteus
stream orchid

POACEAE - GRASS FAMILY

Achnatherum coronatum
giant needlegrass
Achnatherum hymenoides
rice-grass
* *Agrostis viridis*
water bentgrass
Andropogon glomeratus
beardgrass
* *Avena barbata*
slender wild oat
* *Bromus diandrus*
ripgut grass
Bromus grandis
large brome
* *Bromus hordeaceus*
soft chess
* *Bromus madritensis* ssp. *rubens*
foxtail chess
* *Bromus tectorum*
cheat grass
* *Cortaderia selloana*
pampas grass
* *Cynodon dactylon*
Bermuda grass
Elymus glaucus
blue wildrye
Elytrigia elongata
tall wheatgrass
Festuca arundinacea
reed fescue
* *Holcus lanatus*
velvet grass
* *Hordeum murinum*
glaucous foxtail barley
* *Lamarckia aurea*
goldentop
Leymus triticoides
beardless wild rye
* *Lolium perenne*
perennial ryegrass
* *Lolium temulentum*
darnel

POACEAE - GRASS FAMILY (continued)

Melica imperfecta
coast range melic
Muhlenbergia californica
muhly grass
Muhlenbergia rigens
deergrass
* *Pennisetum setaceum*
fountain grass
Poa secunda
Malpais bluegrass
* *Polypogon australis*
tall polypogon
* *Schismus barbatus*
Mediterranean schismus
* *Vulpia myuros*
fescue

POTAMOGETONACEAE - PONDWEED FAMILY

Potamogeton crispus
pondweed

TYPHACEAE - CATTAIL FAMILY

Typha latifolia
broad-leaved cattail

TABLE 2

FAUNAL COMPENDIUM[1]

LEGEND

STATUS

* Non-native

[1] List includes species observed or expected to occur on or in the immediate vicinity of the site.

TERRESTRIAL VERTEBRATES

FISHES

SALMONIDAE - TROUT AND SALMON

Salmo trutta
brown trout
Salmo gairdneri
rainbow trout

AMPHIBIANS

BUFONIDAE - TRUE TOADS

Bufo boreas
western toad

HYLIDAE - TREEFROGS

Pseudacris cadaverina
California chorus frog
Pseudacris regilla
Pacific chorus frog

REPTILES

IGUANIDAE - IGUANID LIZARDS

Sceloporus occidentalis
western fence lizard
Sceloporus graciosus
sagebrush lizard
Uta stansburiana
side-blotched lizard
Phrynosoma coronatum blainvillei
San Diego horned lizard

TEIIDAE - WHIPTAIL LIZARDS

Cnemidophorus hyperythrus
orange-throated whiptail
Cnemidophorus tigris multiscutatus
coastal western whiptail

ANGUIDAE - ALLIGATOR LIZARDS

Gerrhonotus multicarinatus
southern alligator lizard

BOIDAE - BOAS

Lichanura trivirgata rosefusca
coastal rosy boa

COLUBRIDAE - COLUBRID SNAKES

Masticophis lateralis
California whipsnake
Pituophis melanoleucus
gopher snake
Lampropeltis getulus
common kingsnake
Lampropeltis zonata parvirubra
San Bernardino mountain kingsnake
Thamnophis elegans
garter snake

VIPERIDAE - VIPERS

Crotalus ruber ruber
red diamond rattlesnake
Crotalus mitchellii
speckled rattlesnake
Crotalus viridis
western rattlesnake

BIRDS

ANATIDAE - WATERFOWL

Anas platyrhynchos
mallard

CATHARTIDAE - NEW WORLD VULTURES

Cathartes aura
turkey vulture

ACCIPITRIDAE - HAWKS

Circus cyaneus
northern harrier
Accipiter striatus
sharp-shinned hawk
Accipiter cooperii
Cooper's hawk
Buteo lineatus
red-shouldered hawk
Buteo jamaicensis
red-tailed hawk
Aquila chrysaetos
golden eagle

FALCONIDAE - FALCONS

Falco sparverius
American kestrel

PHASIANIDAE - PHEASANTS & QUAILS

Callipepla californica
California quail
Oreortyx pictus
mountain quail

CHARADRIIDAE - PLOVERS

Charadrius vociferus
killdeer

SCOLOPACIDAE - SANDPIPERS

Gallinago gallinago
common snipe

COLUMBIDAE - PIGEONS & DOVES

Columba fasciata pigeon
band-tailed
Zenaida macroura
mourning dove

CUCULIDAE - CUCKOOS & ROADRUNNERS

Geococcyx californianus
greater roadrunner

TYTONIDAE - BARN OWLS

Tyto alba
barn owl

STRIGIDAE - TRUE OWLS

Otus kennicottii
western screech-owl
Bubo virginianus
great horned owl
Strix occidentalis occidentalis
California spotted owl

CAPRIMULGIDAE - GOATSUCKERS

Phalaenoptilus nuttallii
common poorwill

APODIDAE - SWIFTS

Chaetura vauxi
Vaux's swift
Aeronautes saxatalis
white-throated swift

TROCHILIDAE - HUMMINGBIRDS

Archilochus alexandri
black-chinned hummingbird
Calypte anna
Anna's hummingbird
Calypte costae
Costa's hummingbird
Selasphorus rufus
rufous hummingbird

ALCEDINIDAE - KINGFISHERS

Ceryle alcyon
belted kingfisher

PICIDAE - WOODPECKERS

Melanerpes formicivorus
acorn woodpecker
Sphyrapicus ruber
red-breasted sapsucker

PICIDAE - WOODPECKERS (continued)

Picoides pubescens
downy woodpecker
Picoides villosus
hairy woodpecker
Colaptes auratus
northern flicker

TYRANNIDAE - TYRANT FLYCATCHERS

Contopus sordidulus
western wood-pewee
Empidonax difficilis
Pacific-slope flycatcher
Sayornis nigricans
black phoebe
Sayornis saya
Say's phoebe
Myiarchus cinerascens
ash-throated flycatcher

HIRUNDINIDAE - SWALLOWS

Tachycineta thalassina
violet-green swallow
Stelgidopteryx serripennis
northern rough-winged swallow
Hirundo pyrrhonota
cliff swallow
Hirundo rustica
barn swallow

CORVIDAE - JAYS & CROWS

Cyanocitta stelleri
Steller's jay
Aphelocoma californica
western scrub-jay
Corvus brachyrhynchos
American crow
Corvus corax
common raven

PARIDAE - TITMICE

Parus gambeli
mountain chickadee
Parus inornatus
plain titmouse

AEGITHALIDAE - BUSHTITS

Psaltriparus minimus
bushtit

CINCIDAE - DIPPERS

Cinclus mexicanus
American dipper

SITTIDAE - NUTHATCHES

Sitta carolinensis
white-breasted nuthatch

TROGLODYTIDAE - WRENS

Salpinctes obsoletus
rock wren
Catherpes mexicanus
canyon wren
Thryomanes bewickii
Bewick's wren
Troglodytes aedon
house wren

MUSCICAPIDAE - KINGLETS, GNATCATCHERS, THRUSHES & BABBLERS

Regulus satrapa
golden-crowned kinglet
Regulus calendula
ruby-crowned kinglet
Polioptila caerulea
blue-gray gnatcatcher
Polioptila californica california
coastal California gnatcatcher
Sialia mexicana
western bluebird
Sialia currucoides
mountain bluebird
Myadestes townsendi
Townsend's solitaire
Catharus ustulatus
Swainson's thrush
Catharus guttatus
hermit thrush
Turdus migratorius
American robin

MUSCICAPIDAE - KINGLETS, GNATCATCHERS, THRUSHES & BABBLERS (continued)

Ixorus naevius
varied thrush
Chamaea fasciata
wrentit

MIMIDAE - THRASHERS

Mimus polyglottos
northern mockingbird
Toxostoma redivivum
California thrasher

MOTACILLIDAE - PIPITS

Anthus rufescens
American pipit

PTILOGONATIDAE - SILKY-FLYCATCHERS

Phainopepla nitens
phainopepla

LANIIDAE - SHRIKES

Lanius ludovicianus
loggerhead shrike

STURNIDAE - STARLINGS

* *Sturnus vulgaris*
European starling

VIREONIDAE - VIREOS

Vireo bellii pusillus
least Bell's vireo
Vireo huttoni
Hutton's vireo
Vireo gilvus
warbling vireo

EMBERIZIDAE - WOOD WARBLERS, TANAGERS, BUNTINGS & BLACKBIRDS

Vermivora celata
orange-crowned warbler
Dendroica petechia
yellow warbler

EMBERIZIDAE - WOOD WARBLERS, TANAGERS, BUNTINGS & BLACKBIRDS (continued)

Dendroica coronata
yellow-rumped warbler
Dendroica nigrescens
black-throated gray warbler
Oporornis tolmiei
MacGillivray's warbler
Geothlypis trichas
common yellowthroat
Wilsonia pusilla
Wilson's warbler
Icteria virens
yellow-breasted chat
Pheucticus melanocephalus
black-headed grosbeak
Pipilo maculatus
spotted towhee
Pipilo crissalis
California towhee
Aimophila ruficeps canescens
southern California rufous-crowned sparrow
Spizella atrogularis
black-chinned sparrow
Passerella iliaca
fox sparrow
Melospiza melodia
song sparrow
Melospiza lincolnii
Lincoln's sparrow
Zonotrichia atricapilla
golden-crowned sparrow
Zonotrichia leucophrys
white-crowned sparrow
Junco hyemalis
dark-eyed junco
Agelaius phoeniceus
red-winged blackbird
Euphagus cyanocephalus
Brewer's blackbird
Molothrus ater
brown-headed cowbird
Icterus bullockii
Bullock's oriole

FRINGILLIDAE - FINCHES

Carpodacus mexicanus
house finch
Carduelis pinus
pine siskin
Carduelis psaltria
lesser goldfinch
Carduelis tristis
American goldfinch

MAMMALS

DIDELPHIDAE - NEW WORLD OPOSSUMS

* *Didelphis virginiana*
Virginia opossum

LEPORIDAE - HARES & RABBITS

Sylvilagus audubonii
desert cottontail
Sylvilagus bachmani
brush rabbit
Lepus californicus bennettii
San Diego black-tailed jackrabbit

SCIURIDAE - SQUIRRELS

Spermophilus beecheyi
California ground squirrel

GEOMYIDAE - POCKET GOPHERS

Thomomys bottae
Botta's pocket gopher

HETEROMYIDAE - POCKET MICE & KANGAROO RATS

Chaetodipus californicus
California pocket mouse
Chaetodipus fallax fallax
San Diego pocket mouse
Dipodomys agilis
Pacific kangaroo rat

MURIDAE - MICE, RATS, AND VOLES

Reithrodontomys megalotis
western harvest mouse
Peromyscus boylii
brush mouse
Peromyscus eremicus
cactus mouse
Peromyscus maniculatus
deer mouse
Neotoma fuscipes
dusky-footed woodrat
Neotoma lepida
desert woodrat

CANIDAE - WOLVES & FOXES

Canis latrans
coyote
Urocyon cinereoargenteus
gray fox

PROCYONIDAE - RACCOONS

Bassariscus astutus
ringtail
Procyon lotor
raccoon

MUSTELIDAE - WEASELS, SKUNKS & OTTERS

Taxidea taxus
American badger

CASTORIDAE - BEAVER

Castor canadensis
beaver

FELIDAE - CATS

Felis concolor
mountain lion
Lynx rufus
bobcat

CERVIDAE - DEERS

Odocoileus hemionus
mule deer

BOVIDAE - BISON, GOATS & SHEEP

Ovis canadensis nelsoni
Nelson's bighorn sheep

USFWS COORDINATION ACT REPORT

FISH AND WILDLIFE COORDINATION ACT REPORT

Seven Oaks Dam Water Conservation Feasibility Study, Santa Ana River, San Bernardino County, California

Prepared for
U.S. Army Corps of Engineers,
Los Angeles District
Los Angeles, California

Prepared by
U.S. Department of Interior
Fish and Wildlife Service
Region 1, Carlsbad Field Office
Carlsbad, California

U.S.
FISH & WILDLIFE
SERVICE
DEPARTMENT OF THE INTERIOR

Field Supervisor
Gail C. Kobetich

Chief, Branch of Federal Projects
John Hanlon

Author, Project Biologist
Mark Pavelka

June 1997

It is the mission of the U.S. Fish and Wildlife Service to conserve, protect, and enhance the Nation's fish and wildlife and their habitats for the continuing benefit of people. The Service provides the Federal leadership to achieving a national net gain of fish and wildlife and the natural systems which support them. Central to this mission is an abundance and diversity of fish and wildlife and their habitats which will (1) maintain the basic web of life that sustains all living things, (2) provide for the enjoyment of natural values, (3) promote free-ranging and naturally sustaining populations of native species, and (4) sustain reasonable levels of public use and economic benefits.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Field Office
2730 Loker Avenue West
Carlsbad, California 92008

June 18, 1997

Colonel Robert L. Davis
District Engineer
Los Angeles District
U.S. Army Corps of Engineers
P.O. Box 2711
Los Angeles, California 90053-2325

Attn: Mr. William Butler, Environmental Planning Division

Re: Fish and Wildlife Coordination Act Report for the Seven Oaks Dam Water Conservation Feasibility Study, Santa Ana River, San Bernardino County, California.

Dear Colonel Davis:

Enclosed is the U.S. Fish and Wildlife Service's (Service) Fish and Wildlife Coordination Act Report (Report) for the Army Corps of Engineer's (Corps) Seven Oaks Dam Water Conservation Feasibility Study, Santa Ana River, San Bernardino County, California. This Report is provided in fulfillment of the Scope of Work (No. E86-95-0076) between our respective agencies.

This Report constitutes the report of the Secretary of the Interior pursuant to section 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). The development of this Report has been coordinated with the Corps and the California Department of Fish and Game.

If you have any questions, please feel free to contact Mark Pavelka, Project Biologist, or John Hanlon, Chief, Branch of Federal Projects, at (619)431-9440.

Sincerely,

Gail C. Kobetich
Field Supervisor

cc: CDFG, Region 5, Long Beach, CA (Attn: M. Meyer, B. Jones, D. Sudduth)
RWQCB, Riverside, CA (Attn: H. Smythe)
SWRCB, Sacramento, CA (Attn: M. Collins)
USFS, Sacramento, CA (Attn: S. Lowe)
EPA, San Francisco, CA (Attn: J. Romero)

FISH AND WILDLIFE COORDINATION ACT REPORT

Seven Oaks Dam Water Conservation Feasibility Study, Santa Ana River, San Bernardino County, California

Prepared for
U.S. Army Corps of Engineers,
Los Angeles District
Los Angeles, California

Prepared by
U.S. Department of Interior
Fish and Wildlife Service
Region 1, Carlsbad Field Office
Carlsbad, California

Field Supervisor
Gail C. Kobetich

Chief, Branch of Federal Projects
John Hanlon

Author, Project Biologist
Mark Pavelka

June 1997

It is the mission of the U.S. Fish and Wildlife Service to conserve, protect, and enhance the Nation's fish and wildlife and their habitats for the continuing benefit of people. The Service provides the Federal leadership to achieving a national net gain of fish and wildlife and the natural systems which support them. Central to this mission is an abundance and diversity of fish and wildlife and their habitats which will (1) maintain the basic web of life that sustains all living things, (2) provide for the enjoyment of natural values, (3) promote free-ranging and naturally sustaining populations of native species, and (4) sustain reasonable levels of public use and economic benefits.

EXECUTIVE SUMMARY

The Corps has proposed to operate the Seven Oaks Dam (Dam) for water conservation purposes. The proposed project is dependent upon the completion of the Dam. The proposed project would impound water up to an elevation of 2,300 feet behind the Dam between March 1 and May 30 each year. The impounded water would be released at a rate commensurate with the needs of downstream users between June 1 and September 30. The exact dates and duration of impoundment would be determined each year as the result of several factors including the amount of water flowing into the reservoir behind the Dam, the amount of water entering the Santa Ana River from anthropogenic sources, and the level of water in the Prado Dam Basin. Additional access roads may be built as part of this project but the specifics have not been resolved. Therefore, the Corps has requested that the Service assume that no new roads would be constructed for the purposes of this report.

Implementation of the proposed project will impact both the upstream and downstream biological communities, including sensitive habitats and federally sensitive and listed endangered species. Many of these species are obligates to alluvial scrub habitat, a habitat type that is rapidly disappearing in southern California. The alluvial scrub habitat below the Dam and within the area that would be impacted by the proposed project harbors several sensitive and listed species of plants and animals. Federally listed endangered species may be impacted upstream of the Dam but surveys to determine the presence/absence of those species have not been completed.

The magnitude of the impacts associated with the proposed water conservation project is much smaller than the magnitude of impacts associated with the construction of the Dam. However, the significance of any project related impacts is based on a comparison between the without-project and estimated with project conditions. The without-project condition for the proposed water conservation project is the same as the estimated with project condition for the Dam construction project as it appears in the 1988 Phase II GDM. This is a projected condition for the year 2000, after the Dam is completed and functional. However, the Corps and the Service are currently conducting studies and meetings to evaluate the impacts of the Dam on species that were not considered sensitive in 1988. In addition, new information on the hydrology of the Santa Ana River, proposed non-Federal activities in the area downstream of the Dam, and on the resource needs of some sensitive species, may lead the Service to change it's assessment of the without-project condition for the proposed water conservation project from that which appeared in the 1988 Phase II GDM. As these evaluations are not yet complete, the Service is compelled to err on the side of resource protection in its estimate of the without-project condition for the proposed water conservation project.

PREFACE

This document constitutes the Fish and Wildlife Coordination Act Report (Report) in fulfillment of the Scope of Work (SOW)(No. E86-95-0076) between the U.S. Fish and Wildlife Service (Service) and the Army Corps of Engineers (Corps) regarding the potential effects of the implementation of the Seven Oaks Dam Water Conservation Feasibility Study, Santa Ana River, San Bernardino County, California, on fish and wildlife resources. This Report has been prepared pursuant to section 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) and in keeping with the spirit and intent of the National Environmental Policy Act (P.L. 91-190). This Report supercedes all of the Service's previous planning input regarding this project.

The Service's analysis of this project and the recommendations provided herein are based on information in: 1) the SOW; 2) the Draft EIS/EIR for Seven Oaks and Prado Dam Water Conservation Study, March 1997; 3) the Hydrologic Feasibility Report for Seven Oaks Dam Water Conservation Study; 4) the Draft and Final Biological Assessments for the Seven Oaks Dam/San Timoteo Creek Flood Control Projects, San Bernardino County, California; 5) draft and final reports on biological resources in the study area; 6) the California Natural Diversity Database; 7) several field visits by Service personnel; and 8) the Service's best collective professional judgement. The goals of the Service in this analysis were to identify and evaluate the impacts of the proposed project on fish and wildlife resources and habitat in the immediate vicinity of the project area, to determine the value of the study area from a local and regional perspective, and to recommend methods for avoiding and/or offsetting these impacts.

Letters of Comments

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

May 22, 1997

Office of the Chief
Environmental Resources Branch

Mr. Gail Kobetich
Field Supervisor
U.S. Fish and Wildlife Service
2730 Loker Avenue West
Carlsbad, California 92008

Dear Mr. Kobetich:

Enclosed you will find our comments on your draft Fish and Wildlife Coordination Act Report (CAR), dated March 1997, for the Seven Oaks Dam Water Conservation Feasibility Study, San Bernardino County, California.

We appreciate working with your staff in the preparation of the draft CAR and hope our comments will be of assistance in clarifying some of the issues related to the study. The public review period for the draft EIS/EIR closes May 26, 1997 with preparation of the final EIS/EIR scheduled for completion by the end of June. We require submission of the final CAR by June 20 in order to insure its publication in the final EIS/EIR. Should you have any questions on the enclosed material please contact Mr. William O. Butler, Social Sciences Environmental Manager, at (213) 452-3845 or Ms. Susan DeSaddi, Biological Sciences Environmental Manager at (213) 452-3848.

Sincerely,

Robert S. Joe
Chief, Planning Division

Enclosure

RECEIVED
MAY 30 1997
US FWS
CARLSBAD FIELD OFF

ENCLOSURE

Consolidated Review Comments
on the
Draft Fish & Wildlife Coordination Act Report
Dated March 1997

Seven Oaks Dam Water Conservation Feasibility Study
San Bernardino County, California

CESPL-PD-RN (200) 21 May 1997

MEMORANDUM FOR U.S. Fish and Wildlife Service, Attn: Mr. John Hanlon, Chief, Federal Projects

SUBJECT: Seven Oaks Dam Water Conservation Feasibility Study, San Bernardino County, California. Review Comments on the Draft FWCA Report, dated March 1997.

1. Page i, Executive Summary, last paragraph: "The baseline condition upon which the impacts of the proposed water conservation project will be evaluated is unclear because the proposed project will not be implemented until after the Dam is completed in the year 2000."

Comment: The baseline condition is the with-project condition under the SARP Mainstem, i.e. with Seven Oaks Dam in place and as described in the 1988 Phase II GDM and FSEIS. If the Service has additional or new information that would affect this baseline condition it should be formally transmitted to the Corps for review.

2. Page 1, Introduction (and page 4, Project Description). "The objective of the proposed project is to add water conservation as an authorized purpose of the Seven Oaks Dam (Dam)."

Comment: Seven Oaks Dam was authorized by Congress as a flood control dam. There is no direction to seek Congressional approval to add water conservation as an additional authorized project purpose. However, it is the Corps' policy to balance the use of reservoir resources by conserving as much water as possible consistent with other constraints (i.e. not affecting the project's primary flood control ability). The policy section [33 CFR 222.7 (6)(d)] of the Corp's regulation entitled Water Control Management states that the development and execution of water control plans will include appropriate consideration for efficient water management with emphasis on water conservation as a national priority.

The primary objective for preparing this EIS/EIR was to determine the feasibility of establishing water conservation at the project. As stated in section 1.5, page 1-3 of the draft EIS/EIR: "This EIS/EIR is intended to serve as the baseline environmental document to determine the feasibility of implementing water conservation at Seven Oaks Dam. The actual implementation of water conservation at Seven Oaks Dam would not occur until sometime after construction of the dam was complete and the facility had been turned over to the San Bernardino County Flood Control District for operation..."

Implementation of water conservation at the project would require several steps: 1) a formal request from a willing sponsor to the San Bernardino County Flood Control District to implement water conservation; 2) the completion of any supplementary environmental NEPA/CEQA documentation that may be required; 3) application for and approval for any permits that may be required.

3. Page 1, Introduction. "The local sponsors for the proposed water conservation project are the San Bernardino Municipal Water District and the Western Municipal Water District."

Comment: The official local sponsor is the San Bernardino County Flood Control District, who is acting on behalf of the above-referenced water districts. In order to minimize confusion and assure that references to the local sponsor(s) are consistent throughout the project documents, we suggest you revise your statement to reflect the project's official local sponsor.

4. Page 5, Impound Plan, third sentence: "The acreage associated with the proposed impound area for the water conservation project is approximately 182 acres."

Comment: Suggest revising this sentence to read: " The water surface acreage associated with the proposed impound area (target elevation 2300 feet) for the water conservation project's recommended or locally-preferred plan is 182 acres."

5. Page 5, last sentence: "If the water released is not diverted, it may create surface flows for up to 7 miles downstream."

Comment: Please reference the source(s) of this statement. The actual distance water released from Seven Oaks Dam would travel downstream as surface flow is highly variable, being dependent on a wide range of factors, including the infiltration rate, the depth to groundwater, the amount of water being released and the time of year, among others.

6. Page 6, Description of Biological Resources, second paragraph; "It is important to understand...impacts of the Dam and other activities ... have not been fully evaluated or realized.."

Comment: Disagree that impacts have not been fully evaluated. As stated in comment number one, above, unless specific new or additional information is formally transmitted by the Service to the Corps for review, it is the Corps position that the baseline conditions have been established in the 1988 Phase II GDM, FSEIS and other supporting documents.

7. Page 8, first sentence: "Much of this riparian habitat will be lost to inundation or removal for flood control purposes

following the completion of the dam."

Comment: The alder woodland riparian belt referred to in this paragraph has a total length of approximately 1,000 feet and is located near the top of the flood control pool (spillway crest elevation 2580) at an elevation of approximately 2,520. Based on the Elevation-Duration-Frequency Curves for Present and Future Conditions, Plates 7-28 and 7-29, contained in Volume Seven of the Phase II GDM, inundation of this area under present conditions would occur once every 250 years with a duration of approximately 24 hours; under future conditions the frequency of inundation would rise to once every 85 years with duration remaining at approximately 24 hours. Such infrequent and short-lived periods of inundation would not likely have a significant adverse impact on the health or viability of the riparian habitat located at elevation 2520.

8. Page 10, third paragraph, third sentence: "Altered flood flows below the Dam, and the urban growth that could occur as a result of the flood protection provided by the Dam, will impact significant amounts of the remaining alluvial scrub in the Santa Ana River."

Comment: Suggest that the clauses "and urban growth that could occur" and "will impact significant amounts of the remaining..." be revised to complement one another.

The cumulative effects of the Mainstem project were dealt with on pages SEIS-V-91-93 of the 1988 FSEIS. Without a more specific and complete narrative it is not clear how the proposed water conservation plan would foster additional urban growth and consequent alluvial scrub impacts beyond those discussed in the 1988 FSEIS. Water, either from the State water project or from other sources will be imported into the area if conservation of local supplies is not implemented. Modifications to existing water delivery systems or the construction of new delivery systems, similar possibly to the MWD's Inland Feeder Project for example, might become necessary in order to convey this additional imported water into the area. It is likely that the environmental impacts associated with such water importation would be significant.

9. Page 10, fourth paragraph, first sentence: "In a small portion the upper canyon, barren cobble occup much of the canyon floor."

Comment: Suggest revising sentence to read: In a small portion of the upper canyon, barren cobble occupy or occupies much of the canyon floor.

10. Page 22, paragraph 4:

Comment: Please include "management" as a component of the Corps' woolly star mitigation program. "...impacts from the Dam on the Santa Ana River woolly star were to be primarily mitigated through the establishment and management of a preserve."

11. Page 23, entire discussion on slender-horned spineflower habitat requirements and potential impacts.

Comment: The environmental conditions affecting the spineflower and the impact the construction and operation of Seven Oaks Dam would likely have on this species was evaluated by the Corps and presented in their Biological Assessment that was part of the Phase II GDM and FSEIS preparation. This Biological Assessment was forwarded to your office for review. The Service's Biological Opinion was finalized on June 22, 1989, wherein it states, in part:

> "...Because the proposed project is not likely to affect the peregrine falcon, bald eagle, or slender-horned spineflower based upon the analysis presented in your Biological Assessment, these three species are not considered further in this Opinion..."

Although the Corps is aware of the Service's concerns relative to the spineflower, partnering efforts to date between the Corps and the Service regarding these concerns have not surfaced any new information that would seem to affect the Service's original position as stated in the Biological Opinion. The Corps will consider any new information that is formally transmitted to us regarding this subject.

12. Page 46, Impacts..., first paragraph, second sentence, items two and three:"...2) extending the period of inundation of habitats upstream of the Seven Oaks Dam and flooding potential habitat for federally listed endangered species, and 3) releasing non-sediment laden waters during the normally dry late summer months thereby changing the dynamics of downstream ecosystems."

Comment: While the frequency of inundation of a portion of the lower reservoir pool area will increase under water conservation, the inundation of potential habitat for federal endangered species is not at all certain. Until surveys are completed for these species it is not known whether they inhabit the area potentially affected by the proposed water conservation plan or not. Such surveys are currently underway and if these species are found to inhabit the area the Corps will enter into consultation with the Service, pursuant to Section 7 of the Endangered Species Act, to define and develop appropriate mitigation measures. These measures, however, are likely to be the responsibility of the SARP Mainstem and not Water Conservation.

Water conservation releases would be on a demand basis, and would either be diverted into the water conservation districts existing distribution system or into their spreading basins for groundwater recharge.

13. Page 46, Direct Impacts, first paragraph, first sentence: "Implementation...will cause 182 acres...to become submerged for an extended period of time each year."

Comment: See page 5, wherein it states that the target pool elevation for the recommended plan would be reached before the end of May only 20% of the time and would only be maintained until June. The statement that submergence for "... an extended period of time each year." is not accurate. Suggest modifying this discussion to reflect that the target elevation will not be reached annually, nor will it be maintained for extended periods.

14. Page 47, top of page: "The proposed water conservation project would cause up to 5,500 feet of potential habitat for these two species will be flooded each year with still, non-flowing waters of the conservation pool."

Comment: Refer to comment number 12, above.

15. Page 47, second paragraph: "The restriction of flows during the spring and early summer months will cause small pools of water downstream of the Dam to dry up prematurely due to the lack of inflow."

Comment: The Seven Oaks Dam Water Control Operation Schedule (for flood control operation) for both present and future conditions is presented in Volume Seven of the 1988 GDM (Tables 1 and 2). Under present conditions, the release rate at Seven Oaks would range from 100 to 5,000 cfs at elevation 2300; under future conditions the release rate would range from 859 to 2,000 cfs at elevation 2300. The actual release rate would depend on the downstream conditions at Prado Dam. In general, when water levels are rising at Prado, releases at Seven Oaks are reduced, and when water levels are falling at Prado, releases at Seven Oaks are increased. Under both present and future conditions, when maintenance of the debris pool is required (present elevation 2200, future elevation 2300) outflow from the dam would equal inflow into the dam. Additionally, the Santa Ana River is a fully appropriated stream and there are long-standing permitted rights to much of the water flowing out of the canyon.

Given the above conditions, the without-project (i.e. no water conservation) outflow from the dam during late spring and early summer would likely be on the order of several hundred cfs. Outflows of this magnitude will be restricted to the low flow channels of the wash system which are generally devoid of vegetation and far too porous to allow the formation of the referenced small pools. Additionally, the increasing temperatures and decreasing moisture conditions that begin to become established at this time of year create conditions such that surface flows steadily diminish as they move downstream and are absorbed into the underlying alluvium.

The referenced small pools of water that may have been formed during the transition wet and dry season, if present, will not be located in the low flow channels but rather on transitional terraces abutting the low flow areas. Since releases of several hundred cfs will not reach these areas, temporary interruption of these releases will not impact such pools. And, since the low flow channels are generally devoid of vegetation, restriction of releases will not impact any plant communities along the wash.

16. Page 48, Indirect Impacts, second paragraph: "... thereby preventing any water from being released during the growing season of most vegetative communities (the months of March, April and May)."

Comment: Refer to comment number 15, above.

17. Page 48, last paragraph:"...lead to stratification in the water column...subsequent release of non-sediment laden water could exacerbate downstream scouring and erosion problems...will be downcut... armored..."

Comment: Please provide the hydraulic reference for this statement. Releases from the dam and their associated velocities

will not be high enough to cause significant scouring. Also, the year-round low temperatures of the source waters feeding the system will likely prevent stratification from developing.
18. Page 49, second paragraph: "The proposed water conservation project will further reduce spring flows, thereby causing the animals to move even closer into the active channel as the habitat degrades on the terraces."

Comment: As proposed, water conservation will not alter the release schedule for the Mainstem project, either in the spring or the summer. The primary elements affecting spring flow are seasonal rainfall amount, melting snowpack, and percolating groundwater and these elements do not vary with project implementation.

19. Page 49, first paragraph: "The relative contribution of the proposed water conservation project to the downstream erosion problem is rather small... Downstream erosion impacts will be most pronounced in the reach between the Dam and the confluence of the Santa Ana River with Mill Creek."

Comment: Please see comment number 17 relative to water conservation and increased scour potential. Also, water conservation releases will not enter the main channel of the Santa Ana River, they will either enter the existing delivery system or be diverted to the downstream spreading grounds for recharge purposes. Suggest modifying this section to reflect these facts.

20. Page 49, first paragraph: "The relatively small surface flows of water that will result from the water releases associated with the proposed project are not expected to reach more than a few miles beyond this confluence (D. Marface, Corps, pes.com.)."

Comment: Please correct spelling of "Marface" to "Marfice". As stated in comment number 12, above, releases associated with water conservation would be on a demand basis, and would either be diverted into the water conservation districts existing distribution system or into their spreading basins for groundwater recharge purposes. As such, water releases associated with water conservation will not enter the main channel. There appears to have been some confusion regarding discussions on releases in general and how far they are likely to travel as surface flow and releases specifically associated with water conservation.

21. Page 49-50, Growth Inducement: "The water conservation

project is growth-inducing... The proposed project will recharge the local aquifer, thereby providing more water to local communities for growth and expansion....Improved water supplies will facilitate urban growth and expansion in water service areas. In turn, there could be impacts to listed species throughout the water service area."

Comment: Please see comment number 8.

22. Page 51, second paragraph, item 3): "...3) releasing non-sediment laden waters during the normally dry late summer months thereby changing the dynamics and hydraulics of downstream ecosystems."

Comment: Please see comment number 12 and comment number 17, above.

23. Page 52, paragraphs 2 and 5:

Comment: We acknowledge that potential habitat for arroyo southwestern toad (*Bufo microscaphus californicus*) and California red-legged frog (*Rana aurora draytonii*) may exist in areas upstream of the dam based on the professional/technical opinions of Dr. Robert Fischer and Mr. Robert McKernan, coupled with Southern California Edison's (SCE) 1996 surveys along the Santa Ana River from Warm Springs confluence upstream to Powerhouse #1. The Corps is currently conducting surveys for both species, in addition to surveys for the presence/absence of sensitive fish species. These surveys are being conducted in accordance with the recommendations (#1 and #4) set forth in the draft CAR. Findings and results from the surveys will be transmitted to your office and incorporated into our final EIS/EIR or supplementary NEPA documentation, as appropriate. Should arroyo southwestern toad or California red-legged frog be found within the Seven Oaks Dam Water Conservation (SODWC) project area, the Corps will initiate formal consultation pursuant to Section 7 of the Endangered Species Act of 1973, as amended. However, should either of the species be found in areas influenced predominantly by flood control practices, rather than Water Conservation, the Corps will pursue such matters under the auspices of the Seven Oaks Dam Mainstem project.

24. Page 52, paragraph 3:

Comment: With respect to your draft CAR recommendation (#2) for the Corps to undertake studies of the hydraulic and fluvial processes believed to be modified by SODWC practices within the woolly star preserve area. Hydraulic information provided in the SODWC Feasibility Report (March 1997) and the CESPL-ED-HH memorandum dated April 1997 substantiates our professional opinion that the proposed Water Conservation practices will not significantly alter the fluvial processes to any extent that would adversely affect sensitive plant species, such as the Santa Ana River woolly star. The proposed water conservation project is incrementally insignificant relative to the Mainstem project.

25. Page 52, paragraph 4:

Comment: The draft CAR recommends the Corps develop and implement a plan for restoring the sediment loads of waters released from the water conservation pool below the Dam to reduce channel degradation and the associated impacts to sensitive and listed species. Based on the findings in the CESPL-ED-HH memorandum dated April 1997, the 1997 draft SODWC Feasibility Report and Draft EIS/EIR, and the 1990 Sediment Transport Study contained in the *Design Memorandum No. 1, Phase II GDM on the Santa Ana River Mainstem, Including Santiago Creek, Volume I, Seven Oaks Dam, Appendix G) Sediment Transport Study*, we believe that sediment associated with Mill Creek flows are a significant contributor to the Santa Ana River channel downstream of Seven Oaks Dam. As these flows are not affected by the project, geomorphic channel changes will continue to reflect cyclic variations in the future.

26. This concludes our consolidated review of the draft CAR. We anticipate forwarding the results from our biological field surveys to your office in June 1997. Should you have questions regarding these comments or inquiries on the surveys, please do not hesitate to contact either Ms. Pamela G. Castens, Chief, Environmental Planning Section at (213) 452-3851, Ms. Susan A. DeSaddi, Biological Sciences Environmental Manager at (213) 452-3848, or Mr. William O. Butler, Social Sciences Environmental Manager at (213) 452-3845.

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DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

March 12, 1997

Office of the Chief
Environmental Resources Branch

Mr. Gail Kobetich
Field Supervisor
U.S. Fish and Wildlife Service
2730 Loker Avenue West
Carlsbad, California 92008

Dear Mr. Kobetich:

Enclosed you will find our consolidated comments on the draft Coordination Act Report (CAR) for the Seven Oaks Dam Water Conservation Feasibility Study, San Bernardino County, California (CESPL-PD-RN Memorandum dated March 6, 1997). We have recently met with your staff to discuss these comments, and believe we have reached agreement on several of the issues raised during our review. However, there remains some disagreement on items relating to study assumptions for baseline conditions (i.e., "without project" conditions) which will require further coordination between our offices.

We hope our comments will be of assistance in revising the draft CAR. The next feasibility study milestone is our field-level coordination and public review, currently scheduled for the end of March 1997. It is our preference that a revised draft CAR accompany the Feasibility Report and draft Environmental Impact Statement (DEIS). Should you have any questions or concerns, please do not hesitate to contact Ms. Susan A. DeSaddi, Biological Sciences Environmental Manager, at (213) 452-3848 or Mr. William O. Butler, Social Sciences Biological Manager, at (213) 452-3845.

Sincerely,

Robert. S. Joe
Chief, Planning Division

Enclosure

ENCLOSURE

Consolidated Review Comments
Draft Fish & Wildlife Coordination Act Report (CAR)
Seven Oaks Dam Water Conservation Feasibility Study
San Bernardino County, California

CESPL-PD-RN (200) March 6, 1997

MEMORANDUM FOR U.S. Fish and Wildlife Service, Attn: Mr. John Hanlon, Federal Projects

SUBJECT: Seven Oaks Dam Water Conservation Feasibility Study, Review Comments on the Draft Fish and Wildlife Coordination Act Report (CAR), dated September 1996

1. Executive Summary; paragraph 2: "...but surveys to determine the presence/absence of those species were not conducted."

Comment: Suggest word change "~~were not conducted~~" to "have not been conducted". The Corps expects to initiate surveys for the presence/absence of the arroyo southwestern toad and California red-legged frog in Spring 1997.

2. Executive Summary; paragraph 3: "'Existing condition' for the proposed water conservation project...'future condition'...".

Comment: "Existing condition" should be referred to as "without-project condition" and/or "baseline condition"; whereas, "future condition" should be referred to as "with-project condition".

3. Executive Summary: General. "These differences have arisen primarily because the Service's understanding of, as well as the biological significance of the habitat in the vicinity of the Dam have changed significantly since 1988 when the impacts of the Dam were initially evaluated. Without resolution or agreement on the 'existing condition' for the proposed project, the Service is compelled to err on the side of resource protection, and use a worse case scenario in its analysis of impacts for the proposed water conservation project."

Comment: Do not concur that the biological significance of alluvial fan sage scrub (AFSS) has changed *significantly* since 1988. Even prior to 1988, the biological sensitivity of the habitat was recognized by the State, Federal agencies, local municipalities/special interest groups, and biologists as a regionally important and increasingly scarce resource. Indeed, efforts to protect AFSS may have intensified in recent years, but the significance of the habitat has not increased dramatically enough to warrant re-evaluation of the Seven Oaks Dam (SOD) Mainstem project impacts under the auspices of "new information".

Of more global concern is the assumption that a 'worse case' scenario for baseline conditions is applied when evaluating the proposed study's impacts, particularly perceived indirect impacts associated with the downstream floodplain. The impact analysis for the Water Conservation study must be predicated upon the baseline conditions, which, in effect, are those expected to occur subsequent to the construction of the Seven Oaks Dam (SOD). When viewing the environmental conditions after the SOD is constructed, it is reasonable to infer implementation of water conservation and associated releases will not result in incrementally significant, i.e., additive, impacts to the downstream biological resources. Moreover, to portray the baseline conditions as "worse case", may render erroneous conclusions and may unfairly burden both the

SOD Mainstem project as well as the proposed Water Conservation study with direct and indirect floodplain impacts. Other major activities such as sand and gravel mining, off-road vehicular use, illegal dumping, development, and groundwater recharge should be identified as additional sources potentially impacting the floodplain hydrology. Direct and indirect impacts (vegetative responses) associated with these activities need to be recognized and proportionately quantified.

4. Preface; paragraph 2: "... 5) draft and final reports on biological resources in the study area..."

Comment: Specify (either by reference or title) which draft and final reports on biological resources.

5. Introduction; paragraph 1: "The objective of the proposed project is to modify the flood protection operation of the Seven Oaks Dam to include water conservation purposes."

Comment: The objective of this study is to add an authorized project purpose. Flood protection will remain as the primary project purpose.

6. Page 2; paragraph 2: "The study area includes the project area, the surrounding hillsides, and approximately 7 miles of downstream floodplain that would receive altered hydrology as a result of the proposed project."

Comment: Disagree that the downstream seven miles of floodplain will be adversely affected by the implementation of water conservation. Inclusion of the downstream seven miles as part of the Water Conservation study area needs to be substantiated. In the absence of any hydraulic/hydrologic data to numerically depict far-reaching downstream flows as a result of water conservation releases, the designation of the downstream seven miles appears somewhat arbitrary. Also, suggest "surrounding hillsides" be more accurately/specifically identified.

7. Page 5; paragraph 2: Insert "U.S." before the phrase "Forest Service".

8. Page 5; paragraph 4: "Four ~~action~~ study alternatives were initially identified by the Corps for the Seven Oaks Dam Water Conservation Feasibility Study. The proposed alternatives, which were not mutually exclusive, were really variations of the same alternative, differing only in water impound levels and release rates."

Comment: Suggest text be revised to indicate a range of alternatives, including the No Action alternative, were considered during the Feasibility Study. The Corps believes the alternatives analysis presented in the draft EIS (MBA, 1996) to be consistent with the procedures promulgated by NEPA, and therefore, any verbiage to the contrary, would unjustly infer noncompliance with the Act.

9. Page 6; paragraph 2: Spelling error. "~~Elevaton~~" should be corrected to "Elevation"

10. Page 6; paragraph 2: "Conservation pool release rates projected for the year 2050 are: June = 25 cfs, July = 32 cfs, August = 32 cfs, and September = 32 cfs. If the water released is not diverted, it is projected to create surface flows for approximately 7 miles downstream."

Comment: Do not concur that water conservation releases made from June through September (a period typical of naturally declining surface flows), under release rates for the preferred alternative, would create or provide for surface flows seven (7) miles downstream. Twenty-five (25) to thirty-two (32) cfs is relatively minimal flow for this section of the Santa Ana River (given its sandy, larger-sized particles, and cobbly channel bed surface), and would likely be diverted and/or evaporated before reaching downstream areas, particularly seven miles downstream. Suggest that documentation or field evidence be included for substantiating this projection that the proposed water conservation releases will create surface flows for approximately seven miles downstream.

11. Page 7; paragraph 3: "It is important to understand that because the Dam has not been completed and the impacts of the Dam have not been fully evaluated nor realized, ..."

Comment: The Corps views this statement as not being entirely accurate nor appropriate in light of recent interagency discussions pertaining to indirect impacts from the Seven Oaks Dam Mainstem Project. Without empirical data and further study, it may be premature to conclude that the Seven Oaks Dam Mainstem Project has not fully evaluated nor realized impacts to the downstream floodplain. For the evaluation of Water Conservation impacts, the 1988 Seven Oaks Dam Mainstem "with-project" (i.e., post-construction) conditions need to serve as this study's "without project" conditions. Suggest this statement be modified, relocated to the Executive Summary, or deleted.

12. Page 9; paragraph 2: "In 1988, total plant cover in these areas varied from 41 to 95 percent and averaged 65 percent (USFWS, 1988)."

Comment: Since this draft CAR emphasizes "significant new information" has been obtained since 1988, and recent (1995, 1996) field visits were conducted by Service personnel, suggest recent references be cited when describing existing conditions, especially riparian plant cover, given the magnitude of construction activities at the Dam site and surrounding reservoir area in recent years.

13. Page 12; paragraph 2: "With completion of the Dam, over 1,000 additional acres will be lost either directly or due to altered hydrology [e.g., removed from the 100-year floodplain (Sweetwater Environmental Biologists, Inc., 1996)]."

Comment: The statement that over 1,000 "additional" acres will be lost as a result of the Dam (indirectly and/or directly) is misleading and not entirely accurate. The Biological Assessment (Corps, 1996) from where this reference is taken had been prepared to address potential impacts to Merriam's San Bernardino kangaroo rat (SBKR). The BA for SBKR looked at the difference in area between the 100-year with- and without-project floodplain overflow boundaries, which theoretically encompasses the 50-year with- and without-project overflows. The 50-year with- and without-project overflow boundaries were generated and used to determine hydrological impacts from the SOD on the woolly star during the preparation of the 1988-89 SEIS and Section 7 Consultation. This approximate area (1,000 acres) represents the "*total*" floodplain area potentially removed from future flooding, plus direct construction impacts; not "*additional*" floodplain area. Suggest clarification to this statement be added to the text.

Furthermore, as with comment #9, this information is more appropriately addressed under SOD Mainstem issues, rather than the Water Conservation study, due to the fact that post-project hydrology in the floodplain is mostly influenced by the construction and operation of the SOD Mainstem project.

14. Page 17-31: Table 1. Species Known or Reasonably Expected to Occur within the Seven Oaks Dam Water Conservation Study Area, San Bernardino County, California.

Comment: Was the California Natural Diversity Database consulted for recent species observations? If not, suggest a search of the database be performed and included in this CAR.

15. Page 17; paragraph 2: "At least eleven species of amphibians are known or reasonably expected to occur in the study area based on literature and comparisons of known range, distribution, and apparent suitable habitat."

Comment: Results of Southern California Edison's (SCE) 1996 survey for arroyo southwestern toad and California red-legged frog should be summarized and referenced herein. The results from the SCE survey are germane to both the Seven Oaks Dam Mainstem Project and the Water Conservation study.

16. Page 33; paragraph 2: "The preserve was placed along those sections of the wash that, based on the best information available at that time, would most likely maintain the hydrology necessary for habitat revitalization."

Comment: Suggest adding text from the 1988 Supplemental Environmental Impact Statement (SEIS), which explains a second criterion considered during the selection process for the location of the woolly star preserve.

> "The specific areas targeted for preservation where chosen on the basis of complementing existing protected lands either already in Federal ownership or under Federal permit jurisdiction, and if they met the criteria of remaining subject to periodic flooding with the project in place." (Corps, SEIS, p. V-15, 1988)

17. Page 33; paragraph 2: "However, even with the mitigation lands, threats from alternatives of the fluvial dynamics still remain."

Comment: This comment is not germane to the Seven Oaks Dam Water Conservation Study and would be more appropriately addressed in separate correspondence on the SOD Mainstem project.

18. Page 34; paragraph 2: "In 1989, when the consultation for the Dam was completed, it was believed that the fluvial process was not critical to the long-term survival of the spineflower."

Comment: Do not concur with the statement that the 1989 Section 7 consultation did not recognize the importance of fluvial processes to the long-term survival of the spineflower. By virtue of the species limited range and distribution, and known occurrence in only a few remaining AFSS floodplains, a relationship between the fluvial processes of the floodplain and the life requisites of the species had been acknowledged. The fluvial succession and maturation of terraces were identified, mapped, and related to the occurrence of woolly star and spineflower (SBVWCD, unpublished, 1989; Corps, 1988-89; 1993). However, if and when "key elements" of this relationship become evident or known, the Corps would review and consider such information as appropriate. As with previous comments, such discussion is most relevant to the SOD Mainstem project and not the Water Conservation study.

19. Page 58; paragraph 1: "The conditions following the completion of the Dam form the basis for the '~~existing conditions~~' 'baseline conditions' or without-project conditions' for the Water Conservation project."

Comment: Change "existing conditions" to either "baseline conditions" or "without-project conditions".

20. Page 64; paragraph 2: "Implementation of the preferred alternative will cause up to 182 acres of habitat upstream of the Seven Oaks Dam to become submerged for an extended period of time each year. Most of the terrestrial vegetation upstream of the Dam and below 2,300 feet in elevation will be lost or significantly degraded due to prolonged submersion. This is a new impact not applicable to the flood protection aspect of the Seven Oaks Dam component of the Santa Ana River Mainstem project."

Comment: Direct impacts to biological resources as a result of prolonged inundation (i.e., submersion of vegetation) have been accounted for in the mitigation program for the SOD Mainstem project. Specifically, 596 acres in Section 5 (upland habitat) and 139 acres at Filaree Flats (including upland, riparian, and aquatic habitats) have been acquired to compensate for impacts to both flora and fauna as a result of prolonged inundation and edaphic soil conditions within the Seven Oaks Dam reservoir. Impacts were assessed from the damsite up to the 50-year floodline (assumed to be 100% loss; 258 acres), and from the 50-year floodline up to the SPF line (assumed to be 50% loss; 163 acres). Since all proposed Water Conservation study alternatives involve impounding water up to target elevations which are proposed *below* the 50-year floodline, inundation impacts behind the dam have been accounted and mitigated for. Therefore, the calculated "182 acres of habitat upstream of the SOD to become submerged for an extended period of time each year" are not additive acres (i.e., they are not new impacts apart from those previously considered to be lost by prolonged submersion) and should be eliminated from further discussion within this report.

21. Page 65; paragraph 3: "Fish breeding downstream of the Dam will be impacted by the same factors as the arroyo southwestern toad. Furthermore, drying of the small pools would not only reduce the reproductive success of the fish but also kill any adults in the temporal pools as well. Again, no recent surveys have been conducted for fish species in the area and therefore the direct impacts of the proposed project on fish species cannot be quantified."

Comment: Suggest inserting the following revisions to the text "Fish potentially breeding downstream of the Dam ~~will~~ may be impacted by the same factors as the arroyo southwestern toad."

Data collected in 1988 suggest trout spawn throughout the SOD Mainstem project area. The Corps' 1988 SEIS states, in part, "...Construction and operation of the dam would permanently eliminate the self-sustaining capacity...[within the project area]...Trout reproduction from the dam, upstream to the 100-year floodline and adult trout range from the dam, upstream to the 50-year floodline would be significantly reduced" (Corps, 1989, p. SEIS-V-11). Because conditions favoring fish breeding and reproduction upstream and downstream of the damsite have either worsened, will worsen or will be permanently lost as a result of the SOD Mainstem project construction and operation, it is reasonable to assume that the likelihood of fish species breeding downstream of the damsite is/will be low. That being the case, the baseline conditions for the Water Conservation study should reflect these anticipated worsening conditions (i.e., SO D Mainstem post-project conditions) and assess impacts accordingly. Any "new" impacts to aquatic resources expected to occur under the implementation of water conservation would be deemed negligible. Aquatic impacts to fish species are primarily associated with the SOD Mainstem project, not the Water Conservation study, and consequently, are inappropriately addressed in this report

22. Page 67; paragraph 2: "If the Seven Oaks Dam is additionally operated for water conservation purposes, flows will be further restricted and impounded for an extended period of time. The longer periods for water storage will lead to stratification in the water column as sediments rain out and fill the debris pool. The water would therefore be "hungry" for sediment when released and exacerbate downstream scouring and erosion problems. Over the course of the 50-year lifespan of the project, the channel will be down-cut, become narrower, and become amored, further reducing it's ability to support vegetative communities on the adjacent benches and terraces and within the channel."

Comment: This hypothesis about "hungry" water being created as a direct result of water conservation is merely speculative at this point. Further study may be required to substantiate this theory. Furthermore, under the proposed water conservation alternatives, the additional incoming flows held behind the dam and the proposed release rates are so relatively small that their significance to exacerbating scouring, streambank erosion, downcutting, and armoring is highly debatable.

23. Page ii, second para, last sentence: "The goals of the Service...to determine the value of the study area from a local and regional perspective..."

Comment: From the standpoint that a value determination would be required in order to perform some kind of quantitative analysis, the Corps agrees this is a valid objective. However, the Service has communicated and documented that this area is considered as some of the most valuable and endangered in Southern California. From that perspective, it is clear the determination of value has already been made.

24. Page 2, first sentence: "The Corps does not have water control operation plans for the flood protection or the water con operations of the dam."

Comment: The release schedule contained in the 1988 Phase II GDM for the SARP flood control operations and the description of the water conservation alternatives in and of themselves contained all pertinent water control operational information. Although no formal Water Control Manuals have been prepared to date, the operational release information is available (as documented in the 1988 Phase II GDM) and, consequently, has been subject to public review. Additionally, when appropriate, the necessary Water Control Manual would be prepared by the Corps.

25. Page 8, first paragraph: "Since 1988...the Service's understanding of, as well as the biological significance of the habitat in the vicinity of the Dam have changed significantly."

Comment: While the Service may have modified their perception of the significance of habitat in the vicinity of the Dam since 1988, the specific reasons why the surrounding habitat is considered more significant now than it was in 1988 need to be clearly stated. Many of the pressures acting on the resources along the wash that may have contributed to this increased sense of significance have no connection with the Corps' actions. The rapid development and urbanization of the region has been occurring for decades and the fundamental social and economic forces fueling this regional urbanization are completely beyond the Corps' control or responsibility. However, to the extent construction and operation of Seven Oaks Dam affects habitat and development the Corps' will, if we have not already done so, address such impacts.

26. Page 13, paragraph two, last sentence: "...the urban growth that will occur as a result of the flood protection provided by the Dam, will impact significant amounts of the remaining alluvial scrub in the Santa Ana River."

Comment: The degree to which the Corps' construction of Seven Oaks Dam would likely affect urbanization and development in the area was dealt with in the 1988 FSEIS. This was an issue addressed under the Seven Oaks Dam Mainstem and has no connection with the Corps proposed Water Conservation plan. Moreover, the fundamental social and economic forces fueling development in the region are not properly part of, connected to, under the control of, or the responsibility of the Corps.

27. Page 33, second paragraph, third sentence: correct spelling of "completed"

28. Page 33, second paragraph, last two sentences: "However, even with the mitigation lands, threats from alterations of the fluvial dynamics still remain. For example, a loss in sediment load will likely result in a pattern of degradation of channelbed sediments and may cause fluvial removal of portions of the Santa Ana River woolly star mitigation lands..."

Comment: We believe this not to be an impact associated with water conservation activities. However, while the loss in sediment load associated with Mainstem construction could potentially contribute to channel degradation and subsequent land removal, the dynamic nature of the Santa Ana River watershed during without-project flooding conditions would have posed a far greater threat to land within the mitigation area being removed by the erosive action associated such without-project flooding conditions.

29. Page 34, second paragraph, "In 1989, when the consultation for the Dam was completed, it was believed that the fluvial process was not critical to the long-term survival of the spineflower. However, it is now apparent that there is a relationship between the fluvial process and the slender-horned spineflower's life requirements.

Comment: This potential impact has no clear or direct association with water conservation. Second, if new information has been developed that identifies elements of the fluvial process that are critical to the long-term survival of the spineflower, they need to be identified as to what those elements are and what their specific connection and relationship is in regard to the life requirements of the spineflower.

30. The first paragraph on page 34 makes the following statement: "Unlike the Santa Ana River woolly-star that is primarily associated with the pioneer seral stage of the alluvial fan scrub, the slender-horned spineflower is generally associated with the intermediate, and occasionally the mature, seral stages of that successional continuum." While the third paragraph on the same page states the following: "The Seven Oaks Dam will eliminate opportunities for major overwash events and the creation of pioneer phase alluvial scrub. The Service has concluded elsewhere that these factors would incur severe adverse impacts on slender-horned spineflower survival (USFWS 1994a)."

Comment: There seems to be some inconsistency between the statements regarding slender-horned spineflower and its associated habitat.

31. The following excerpts are referring to the arroyo southwestern toad. Page 44, first paragraph: "Juveniles and adults forage for insects on sandy stream terraces that have nearly complete closure of cottonwoods, oaks, or willows, and almost no grass and herbaceous cover."; and page 45, last paragraph: "Suitable habitat for this species can be found both upstream and downstream of the Dam (Jigour and McKernan 1992, Dr. R. Fisher, UCSD, pers.com.)."

Comment: Given the fact that no riparian habitat as described on page 44 exists downstream of the dam, it is not clear that the statement on page 45 regarding suitable habitat being located downstream of the dam is accurate.

32. Page 46, third paragraph, in reference to the California red-legged frog: " The adults require dense riparian vegetation associated with deep, still, or slowly moving water (Jennings et al. 1992)."

Comment: Given the distinct habitat requirements of the California red-legged frog and the absence of such habitat within the area potentially affected by water conservation, it is not clear why surveys for this species are necessary. Please clarify.

33. Page 63, last paragraph: "Specifically, the aspects of the preferred alternative that will impact biological resources in the study area are: 1) impounding water behind the Seven Oaks Dam for a period of time thereby diminishing and/or preventing natural spring flows from reaching the alluvial scrub downstream, 2) extending the period of inundation of habitats upstream of the Seven Oaks Dam and flooding habitat for federally listed endangered species, and 3) releasing non-sediment laden waters during the normally dry late summer months thereby changing the dynamics of downstream ecosystems."

Comment: Any impact to natural spring flows within the reservoir area or the movement of such water downstream is not an impact caused by water conservation activities. Impounding water behind Seven Oaks Dam will not diminish or prevent natural spring flows from reaching the alluvial scrub downstream. It is the dam itself that presents a barrier to the natural movement of water downstream. Nonetheless, downstream releases were determined as part of the Mainstem project and are discussed in the Phase II GDM. As part of the mitigation for Mainstem impacts, the Corps considered the habitat between the dam and the 50-year flood line to be a complete loss (258 acres) and provided mitigation for this loss. Since the maximum pool elevations being considered under the water conservation alternatives are all below the 50-year flood line, impacts within this area have already been mitigated for and are not properly a topic for discussion within this report.

The releases proposed during the summer months, whether sediment-laden or not, are not of sufficient volume to impact or change the dynamics of downstream ecosystems. Indeed, these releases will rapidly infiltrate the alluvium and disappear underground.

34. Page 65, second paragraph: "Although suitable habitat for the arroyo southwestern toad exists both upstream and downstream of the Dam,... Until targeted surveys are conducted for arroyo southwestern toads, it is impossible to estimate the direct, or indirect impacts that could result from this project."

Comment: The statement on page 44, first paragraph that "Juveniles and adults forage for insects on sandy stream terraces that have nearly complete closure of cottonwoods, oaks, or willows, and almost no grass or herbaceous cover." is a clear reference to dense riparian vegetation. Given the fact that no habitat approaching this description occurs downstream of the dam, it is not likely that there is suitable habitat downstream that warrants survey work. And, while there are several small riparian zones in some of the ancillary drainages upstream of the dam, the only riparian habitat within the main channel occurs only near the extreme upstream limits of the 100-year flood line, which is located outside of the area of potential impacts associated with the water conservation project.

35. Page 65, last paragraph: " Fish breeding downstream of the Dam will be impacted by the same factors as the arroyo southwestern toad. Furthermore, drying of the small pools would not only reduce the reproductive success of the fish but also kill any adults in the temporal pools as well. Again, no recent surveys have been conducted for fish species in the area and therefore direct impacts of the proposed project on fish species cannot be quantified."

Comment: Clarification is needed between previous statements and this one. It appears that one claim is that there are negative impacts associated with releases being made during the normally dry summer months, in contrast to the claim that there are negative impacts associated with the drying up of small pools. With respect to fish species, we believe subsequent to the construction of Seven Oaks Dam, the presence of suitable habitat for fish will be unlikely; therefore, any impacts would be deemed negligible.

36. Page 66, paragraph 2: "The loss of habitat upstream will affect species of all taxonomic groups..."

Comment: The loss of habitat within the reservoir pool and below elevation 2425 has already been completely mitigated for as part of the Mainstem project and its associated impacts.

37. Page 67, first paragraph: "In most years, it will take several months before the target elevation is reached, if ever, thereby preventing any water from being released during the growing season of most vegetative communities (the months of March, April, and May). Preventing flows, even small flows, from reaching the floodplain downstream of Seven Oaks Dam during these months would have adverse impacts on biological resources that have adapted to the presence of spring runoff."

Comment: This statement is not accurate. The recommended without-project operation of Seven Oaks Dam for flood control purposes consists of the following: From the beginning of November to the end of May, the target pool elevation is 2200 feet (2,968 acre-feet). During this time, all inflow is stored until the target storage is attained, after which releases from the dam are adjusted to equal inflow. Beginning in June, releases from the dam include all inflows plus a release to empty the debris pool by the end of August. The debris pool releases for present conditions are as follow: June, 10 cfs; July, 20 cfs; and August, 20 cfs. Recommended operational criteria also stipulate that from November through February, when no major flood events occur, release of outflow equals inflow up to 500 cfs. The releases are made from inflow that raises the pool above the designated target debris pool elevation of 2200 feet.

The proposed water conservation storage and release schedule is *in addition* to the above operational plan for flood control purposes which will always be in place and which will always have priority. In other words, releases as part of flood control operations will continue unabated even while storage to reach the water conservation target pool elevation is occurring.

38. Page 67, second paragraph through end of first paragraph on page 69: "Flood control management at the Seven Oaks Dam will... and cause the extirpation of the SBKR from the study area."

Comment: This discussion lacks a clear or relevant association with impacts attributable to the proposed water conservation project and should therefore be eliminated from this report.

39. Page 69, second paragraph: "The water conservation project is growth inducing. The proposed project will recharge the local aquifer, thereby providing more water to local communities for growth and expansion... Improved water supplies will facilitate urban growth and expansion in water service areas."

Comment: The historical development of water resources in the West and particularly in California and its association with the growth of population and urbanization provide clear overwhelming evidence that the proposed water conservation project will have at best a minuscule and likely unmeasurable impact on growth within the area. The social and economic forces powering growth within the region are far-ranging and while the presence of adequate water supplies is essential to maintain the current population and accommodate anticipated future growth, the fact that California has already developed the most complex and far-reaching water delivery system the world has ever seen effectively minimizes the importance of local water conservation as a growth inducer, since water will be available from this system even if it has to be transported from other regions many hundreds of miles away.

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INTRODUCTION

The objective of the proposed project is to add water conservation as an authorized purpose of the Seven Oaks Dam (Dam). The Dam, currently under construction, is located approximately eight miles northeast of Redlands in San Bernardino County, California, and is entirely within the boundaries of the San Bernardino National Forest (Figure 1). The Dam is located at the confluence of the Santa Ana River and Government Canyon, approximately one mile upstream from the mouth of the Santa Ana River Canyon. The currently authorized purpose of the Dam is to augment the flood protection provided to Orange County by the Prado Dam located 38 miles downstream. The local sponsors of the Dam are the counties of San Bernardino, Riverside, and Orange. The local sponsor for the proposed water conservation project is the San Bernardino County Flood Control District.

The abundance and distribution of vegetation and terrestrial vertebrates in the study area downstream of the Dam have been thoroughly described in recent reports. The invertebrates, fish, and amphibians downstream of the Dam and the resources upstream of the Dam are less well known. The Service summarized the available data in its previously issued Planning Aid Report (USFWS 1996a) for this project.

The Corps requested that the Service use the predicted with project condition for the Dam, that is the predicted condition of the biological resources in the study area after the Dam is completed as described in the 1988 Phase II General Design Memorandum for the Dam (GDM)(USACE 1988), as the baseline condition for our analysis of the proposed water conservation project. However, new information on the hydrology of the Santa Ana River, current and proposed non-Federal activities in the area downstream of the Dam, and the recent listings of some federally sensitive species, may lead the Service to change it's assessment of the baseline condition from that which appeared in the 1988 GDM. The Corps and the Service are currently conducting studies and meetings to evaluate the impacts of the Dam and other activities on species that were not considered sensitive in 1988. In addition, the Corps, the Service, and other agencies are working together to develop long term management strategies for two federally listed endangered species that are currently being impacted by altered hydrology in the study area.

DESCRIPTION OF PROJECT AREA

The Dam is in the upper Santa Ana River Canyon, approximately one mile upstream from the mouth of the canyon. The project area extends from the Dam upstream to an elevation of 2,300 feet above mean sea level. This area includes the maximum footprint that could experience extended inundation as a result of implementing the preferred alternative. The study area includes the project area, the slopes surrounding the reservoir behind the Dam, and approximately 7 miles of downstream floodplain that could receive altered hydrology as a result of the proposed project.

The Santa Ana River Canyon is a steep-walled canyon that originates high in the San Bernardino Mountains. Many of the steep slopes within the watershed are covered with moderate to dense

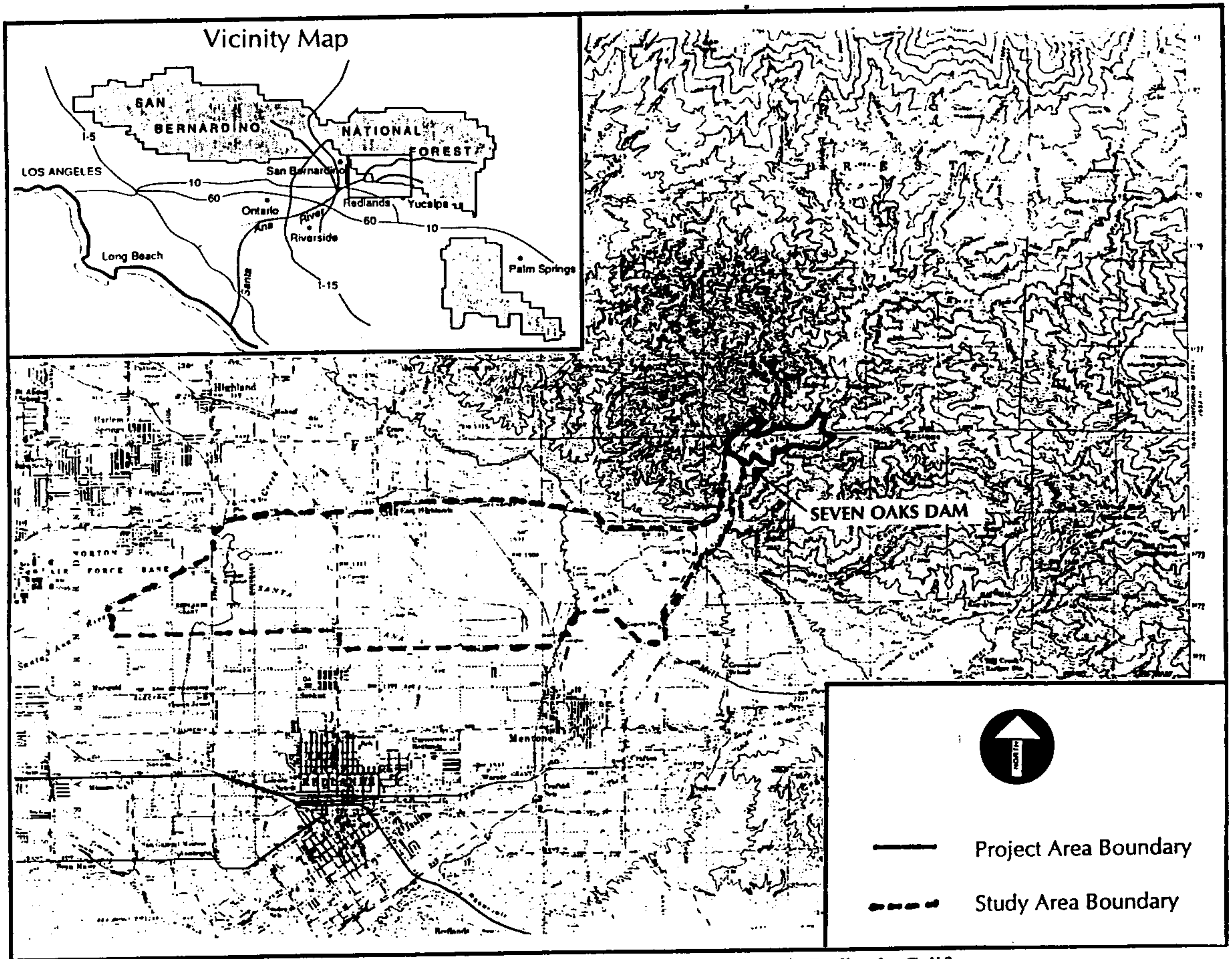

Figure 1. Seven Oaks Dam and vicinity. Adapted from U.S.G.S. 15 minute quadrangle Redlands, Calif.

growths of chaparral and sage scrub. Grasses and forbes heavily cover the lower slopes. Although a narrow belt of riparian habitat meanders along the bottom of the canyon, most of the floodplain vegetation is open shrub scrub and alluvial scrub. On a few small terraces there are vestiges of more densely vegetated shrublands that closely resemble the sage scrub or chaparral habitats of the canyon slopes.

Below the Dam, the habitat is typically alluvial sage scrub. Holland (1986) categorized the habitat in this area as "Riversidean alluvial fan sage scrub". This habitat supports an unique assemblage of plant and animal species that have adapted to the dynamic alluvial floodplain of the Santa Ana River. In this landscape of periodic disturbance, the biological communities which have arisen are successional in nature (Smith 1980). For example, if left undisturbed, open areas with sparse vegetative cover will mature over time and become dense stands of sage scrub or chaparral habitat. Major storm events that result in extreme water flows that break out of the existing scour channel return the mature communities to an earlier successional stage by scouring the densely vegetated areas and depositing alluvial sediments. These flooding events also create new channels and/or braided streams throughout the alluvium. Some scoured channels may not experience flood flows for decades, allowing the vegetation to begin its successional progression toward maturity. Therefore, the habitat on the alluvial floodplain could best be described as a dynamic mosaic of different successional stages of alluvial sage scrub.

The Dam itself, designed and being constructed to augment Prado Dam's ability to protect Orange County from major flood events, is approximately 500 feet high. The drainage area at the Dam, including the Santa Ana River and it's major tributaries, is about 177 square miles. A projected 100-year flood event would fill the reservoir behind the Dam to an elevation of 2,580 feet above mean sea level, just 5 feet below the crest of the spillway. Under flood protection operations of the Dam, the water behind the Dam would be released as soon as possible, a determination that would be based on pool levels and water release rates downstream at the Prado Dam. These releases cannot exceed 8,000 cubic feet per second (cfs) because this is the current design capacity for the outlet works. Most of the time, releases for flood protection purposes would be less than 500 cfs.

There are existing roads above and below the Dam that are used by the Corps to construct (and eventually operate and maintain) the Dam, by the U.S. Forest Service to manage land resources and perform fire prevention activities, and by local hydropower and water companies to operate and maintain their facilities on the upper Santa Ana River. After the Dam is completed, some of the road segments above the Dam will experience temporary inundation following major storm events.

DESCRIPTION OF THE PROPOSED PROJECT

The Corps is proposing to add water conservation to the currently authorized flood protection purpose of the Dam. Water conservation is typically accomplished by using the water retention space behind a dam to conserve runoff and groundwater brought to the surface by the dam after the flood season has passed. The primary purpose of water conservation is to provide water to downstream users at a rate more commensurate with their diversion and groundwater recharge requirements throughout the dry summer months without conflicting with the flood protection purpose (USACE 1995).

Six action alternatives and a No Action alternative were initially identified by the Corps for the Seven Oaks Dam Water Conservation Reconnaissance Study. Four of the action alternatives and the No Action alternative were advanced into the Feasibility Study. The alternatives differ from one another only in water impound levels and release rates. In addition to the impound alternatives, there were several alternatives for relocating two access roads. One of the access roads leads to the Dam's intake structure and the other provides access to upstream hydroelectric facilities.

The Corps' preferred alternative is as follows:

Impound Plan: The Dam would be operated normally for flood control operations during winter months. Then, beginning March 1 of each year, the seasonal conservation pool would be expanded linearly for 10 days or until the target conservation storage elevation of 2,300 feet, or 16,293 acre-feet for present conditions (year 2000) and 7,194 acre-feet for future conditions (year 2050) is reached. The water surface acreage associated with the proposed impound area for the water conservation project is approximately 182 acres. From March 10 through May 31, inflow would be released from the Dam only after the target elevation is reached. The target elevation will be reached before the end of May approximately once every five years (20 percent). Then from June through September, all inflow plus a conservation pool release would be made to ensure that the conservation pool is drained by the end of September. Under this plan, conservation pool release rates projected for the year 2000 are: June = 65 cfs, July = 70 cfs, August = 70 cfs, and September = 70 cfs. Conservation pool release rates projected for the year 2050 are: June = 25 cfs, July = 32 cfs, August = 32 cfs, and September = 32 cfs. If the water released is not diverted, it may create surface flows for up to 7 miles downstream (Dennis Marfice, Corps, pers. comm.).

Road Relocation: Portions of the existing unpaved roads upstream of the reservoir may need to be elevated or relocated above the conservation pool elevation of 2,300 feet. At the time this report was written, the Corps had not resolved whether or not new roads would be constructed as part of this project. For the discussion and analysis in this document, the Corps requested that the Service assume that no new roads would be constructed. In honoring this request, the Service would like to point out that any modifications to the existing road system that are nessecitated by the water conservation project will be considered as part of the proposed water conservation project and evaluated in that context.

DESCRIPTION OF BIOLOGICAL RESOURCES

Biological resources located both upstream and downstream of the Seven Oaks Dam would be affected by this project. Within the study area, these resources include an unique assemblage of plant and animal species that are adapted to the naturally dynamic environment of the alluvial floodplain of the Santa Ana River. Other habitats within the study area include willow riparian, sage scrub, chaparral, aquatic, and ruderal.

It is important to understand that because the Dam has not been completed and the impacts of the Dam and other activities in the study area have not been fully evaluated or realized, the conditions of the project and study areas may change significantly before the water conservation project is implemented. The with project condition for the Dam as described in the GDM, combined with changes in the wash due to other Federal and non-Federal activities, forms the without project condition for the proposed water conservation project. The without project condition is, therefore, the Service's best estimation of what the conditions will be after the Dam is completed in the year 2000.

Terrestrial Habitats

Terrestrial habitats within the study area can be divided into two distinct categories: those upstream of the Dam and those downstream of the Dam. The upstream area includes habitats and vegetative communities between the elevations of 2,200 and 2,300 feet above mean sea level. This area will hereafter be referred to as the "upper canyon". Habitats below the Dam, and generally below the mouth of the Santa Ana River Canyon, are dominated by alluvial scrub. This area will hereafter be referred to as the alluvial floodplain. At least 290 species of vascular plants have been documented from the study area (Feldmeth *et al.* 1985). Of these, 4 were cultivated species and 48, or 16.8 percent, were non-natives.

The upper canyon comprises a steep-walled canyon and a sandy and boulder-strewn floodplain with a 15 to 20 foot wide stream coursing through it. The canyon walls and ridges rise abruptly 1,500 to 2,000 feet above the canyon floor (USFWS 1988). Except for a narrow belt of shrubby riparian growth along the bottom of the drainage, most of the floodplain vegetation is an open shrub scrub. There are vestiges of more densely vegetated shrublands on a few small terraces that more closely resemble the coastal sage scrub and chaparral habitats of the canyon slopes.

The plant associations of the upland slopes are ascribable to coastal sage scrub and chaparral. The coastal sage scrub is a more open, shorter-stature shrubland that occurs mostly on drier slopes, particularly those with a southern exposure. Common species of the open shrublands include California sagebrush (*Artemesia californica*), California buckwheat (*Eriogonum fasciculatum*), brittle bush (*Encelia farinosa*), deerweed (*Lotus scoparius*), croton (*Croton californicus*), and white sage (*Salvia apiana*). In 1988, total plant cover in these areas varied from 41 to 95 percent and averaged 65 percent (USFWS 1988).

Currently riparian thickets in the upper canyon are mostly of shrubby to sub-arborescent plants with widely spaced stands of older tall trees. The habitats vary from herbaceous to sub-shrubby species in and along the immediate water course to very small patches and occasional stands of woodland along smaller side channels. Overstory is contributed mostly by mule fat (*Baccharis salicifolia*) and young willows (*Salix* sp.). Taller trees are intermixed and include three species of willow, scattered cottonwoods (mostly *Populus fremontii*), white alder (*Alnus rhombifolia*), infrequent sycamores (*Platanus racemosa*), and occasional tamarisk (*Tamarix pentandra*). Total plant cover in the riparian belt is generally greater than 80 percent (USFWS 1988). Much of this riparian habitat will be lost to inundation or removal for flood control purposes following the completion of the Dam.

The alluvial floodplain below the Dam, and a small portion of the river bottom above the Dam, are dominated by alluvial scrub vegetation. Alluvial scrub vegetation is typically found in washes and streambeds that receive periodic flooding during winter and spring but are often dry during the summer months. Soil stratigraphy in this community consists of an active channel, barren cobbles, and vegetated terraces of varying heights and ages.

Alluvial scrub is an unique plant association composed of shrubs and subshrubs characteristic primarily of coastal sage but including numerous chaparral species. This plant community has only recently been described in detail by Smith (1980) who proposed the term "alluvial scrub" for the association. It differs from typical coastal sage scrub by 1) being found in more mesic (wet) conditions of the floodplain, 2) having a high percentage of evergreen shrubs as opposed to drought deciduous shrubs typical of coastal sage scrub, 3) the presence of scalebroom (*Lepidospartum squamatum*), a plant associated with alluvial substrates, 4) the occurrence of California juniper (*Juniperus californicus*), a species typical of desert slopes, 5) a high percentage of lemonadeberry (*Rhus integrifolia*) which is primarily a coastal species, and 6) high species diversity due to the co-occurrence of species and lifeforms typical of both high desert and coastal habitats.

While the succession of plants on the alluvial floodplain is a continuum, three more or less distinct seral stages can be discerned within the more general alluvial scrub classification. The three seral stages, "pioneer", "intermediate", and "mature", correspond with the age of the habitat since last disturbed. The time period of this succession is thought to be many decades. Many of the animal species that occur in this environment are primarily associated with one, and only one, of these successional habitat types.

The pioneer designation indicates recently-active channels in which the substrate consists of accumulations of loose sand. In these areas, perennial vegetation is usually poorly established and very widely spaced. Annual species commonly observed on these loose sands include white forget-me-not (*Cryptantha intermedia*), chia (*Salvia columbariae*), and buckwheat (*Eriogonum gracile* and *E. thurberi*). Pioneer phase alluvial scrub is created when major flood events scour out new channels and remove the dense, mature vegetative overstory. Between periodic flooding events, the scrub matures and cycles into the other two successional stages.

The intermediate seral association of alluvial scrub develops on more stabilized terraces. While more extensive than the pioneer assemblage, the shrub cover of this assemblage is still open with numerous spring annuals and ground-hugging non-flowering plants that cover the soil surface, perhaps helping to prepare the soil for colonization by the larger species. Often this association is readily identified by the presence of California juniper. Other species commonly found in the intermediate association include yerba santa (*Eriodictyon trichocalyx*), white sage, California sagebrush, scalebroom, and brittle bush.

The mature or climax phase of alluvial scrub is found on the highest terraces of the floodplain. Smith (1980) stated that mature alluvial scrub is created "as soil moisture stress is gradually alleviated through time by wind and deposition of fine grained particles, shading by established shrubs, and incorporation of organic material into the soil". Vegetation here is the oldest of the three zones and exhibits a high species diversity. It has a preponderance of large, woody, evergreen shrubs common to chaparral associations. It is dominated by golden currant (*Ribes aureum*), buckwheat (*Eriogonum* sp.), and laural sumac (*Malosma laurina*). Other shrubs and subshrubs in this association include black sage (*Salvia mellifera*), scalebroom, chamise (*Adenostoma fasciculatum*), elderberry (*Sambucus mexicanus*), croton, and deerweed. Vegetative ground cover in the mature scrub zone is relatively high and consists primarily of grasses such as fescue (*Festuca* sp.), bromes (*Bromus* sp.), and melic (*Melica* sp.). Herbaceous perennials and annuals include popcorn flower (*Plagiobothrys* sp.), filaree (*Erodium* sp.), spurge (*Euphorbia* sp.), and many others.

Alluvial scrub once covered a large area in southern California (Rey-Vizgirdas 1994). However, urbanization has eliminated all but a few scattered remnants. Only about 14,504 acres, or 5 to 9 percent of the original alluvial scrub habitat remained in 1994 (MBA 1988, Rey-Vizgirdas 1994). In the Santa Ana River alone, alluvial scrub habitat had been reduced from approximately 53,496 to 6,088 acres (an 88.6 percent reduction) prior to the Dam project. With completion of the Dam, over 1,000 additional acres will be lost either directly or due to altered hydrology (e.g., removed from the 100-year floodplain)(Sweetwater Environmental Biologists 1996). Over the 50 year lifespan of the Dam project, the Santa Ana River channel below the Dam will be down-cut, and become narrower and armored (USACE 1988), thereby reducing the river's ability to support vegetative communities on the adjacent benches and terraces.

Much of the remaining alluvial scrub is, or will be after the completion of the Dam, significantly degraded. Most of this degradation is due to the invasion of non-native grasses. Non-native grasses thrive in areas where periodic scour is absent and nutrients are allowed to build up in the alluvium. Under these altered conditions the non-native grasses can outcompete many native annual plants and drastically change the habitat composition and structure. This type of change typically leads to extirpation of vertebrate species that are dependent upon the natural, or unmodified, open habitats.

Alluvial scrub is considered sensitive by resource agencies because of its scarcity, its riparian nature, and its rare flora and fauna. However, very little has been done to protect the remaining habitat fragments from future loss and disturbance. Altered flood flows below the Dam, and the urban growth that could occur as a result of the flood protection provided by the Dam, could impact significant amounts of the remaining alluvial scrub in the Santa Ana River.

In a small portion the upper canyon, barren cobble occupy much of the canyon floor. The vegetation consists mainly of pioneer phase alluvial scrub and less commonly of intermediate phase alluvial scrub. Common plant species in these communities include scalebroom, California buckwheat, California sagebrush, golden-aster (*Chrysopsis villosa*), yerba santa, white everlasting (*Gnaphalium microcephalum*), brickellia (*Brickellia californica*), western ragweed (*Ambrosia psilostachya*), deerweed, and sweetbush (*Bebbia juncea*). In more mature terraces, chamise and mountain mahogany (*Cercocarpus betuloides*) are common. Trees are rare in this community, however, Fremont cottonwood (*Populus fremontii*) and California sycamore (*Platanus racemosa*) are found in small numbers throughout the drainage. Herbaceous species include forget-me-not and mustang mint (*Monardella lanceolata*). Wetter areas in the channel are sparsely vegetated by mulefat, scarlet monkey-flower (*Mimulus cardinalis*), and other wetland species.

Aquatic Habitats

The Santa Ana River is the largest of three major drainages within the Los Angeles Basin (the others are the Los Angeles River and San Gabriel River drainages). Its watershed originates more than 75 miles from the ocean and encompasses an area of 2,450 square miles including much of the western portion of the San Bernardino National Forest and the northern portion of the San Gorgonio Wilderness. The area above the Dam encompasses only about 7.2 percent of the total watershed. However, 52 percent (38.5 miles) of the main stem of the Santa Ana River will be affected by altered flow and flooding characteristics due to the Seven Oaks Dam (USFWS 1988).

Flows in the upper Santa Ana River Canyon are perennial to a diversion at the Southern California Edison Power House #1. The diversion transfers water to a flume that courses along the east canyon wall to the Edison Power House #2 at the mouth of the Santa Ana River Canyon. Another diversion near the mouth of the canyon transports water downstream to percolation ponds on the margins of the alluvial fan. Surface flows in this area are typically intermittent during the driest few months of the year. There is, however, enough water of high enough quality in the upper canyon to support breeding populations of both brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*) and provide an excellent fishery.

Water quality in the mountain portion of the Santa Ana River is excellent with low concentrations of total dissolved solids, nitrates, and other pollutants. Although elevated levels of total coliforms and silt have been identified with storm flows, water quality far exceeds the California State standards set for the identified beneficial uses of the water. Below the Dam, treated municipal wastewater is discharged into the river at several points between the mouth of the canyon and Prado Dam.

Wildlife

Invertebrates

No baseline inventories of the invertebrates in the study and project area have been completed to date. Representatives of at least the following insect orders could reasonably be expected to occur in the study area: Orthoptera (grasshoppers and allies), Plecoptera (stoneflies), Dermaptera (earwigs), Hemiptera (true bugs), Homoptera (leafhoppers, aphids, and scale insects), Odonata (dragonflies and damselflies), Lepidoptera (butterflies and moths), Coleoptera (beetles), Neuroptera (lacewings, dobson flies, and allies), Diptera (flies), and Hymenoptera (bees and wasps). Insects are part of the diverse and complex food web, as prey, predators, pollinators, water purifiers, grazers, soil reducers, decomposers, and biological control agents. Many species of birds are highly dependant upon them as forage (Smith 1980).

Fish

Coastal southern California drainages had a distinctive endemic native freshwater fish fauna that was one of the smallest in the United States due to high topographic relief, geographic isolation, and arid conditions (Swift et *al.* 1993). Of the 38 native freshwater fish species that occurred in southern California drainages, all are either extirpated or severely reduced within their native range. Most of these species have been recommended for special conservation efforts.

The recent compilation by Swift et *al.* (1993) on the status and distribution of freshwater fishes of southern California indicated that four native species might be expected to occur in the Santa Ana River drainage: unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*), Santa Ana sucker (*Catostomus santaanae*), Santa Ana speckled dace (*Rhinichthys osculus* ssp.), and the arroyo chub (*Gila orcutti*). Two non-native species of fish, brown trout and rainbow trout, are also expected to occur within the project area.

Trout are known to spawn in the upper Santa Ana River Canyon above the Dam. Stocking records from the California Department of Fish and Game indicate that the upper Santa Ana River was consistently stocked with rainbow trout from the late 1950's through 1993. Rainbow trout are also known to inhabit several tributaries to the Santa Ana River, including Bear Creek where they are the dominant fish species (USACE 1985; EA Environmental Science and Technology 1995).

The brown trout population in the upper Santa Ana River is apparently a self-sustaining population as they have not been stocked in that area since the 1960s (USACE 1985; USACE 1988). In 1995, population levels of brown trout in the upper Santa Ana River were estimated at 1,144 fish per mile, and biomass was estimated at 25.5 pounds/acre (EA Environmental, Science, and Technology 1995). Additional sampling in Hemlock Creek, a tributary to Alder Creek, which is a tributary to the Santa Ana River, revealed the presence of brown trout. Therefore, it is reasonable to assume that during certain periods of the year, particularly when flows are high, both species of trout could occur within the project area.

Amphibians

At least eleven species of amphibians are known or are reasonably expected to occur in the study area based on literature and comparisons of known range, distribution, and apparent suitable habitat (Table 1).

Table 1. Listing of amphibian species known, or reasonably expected to occur within the Seven Oaks Dam Water Conservation Study Area, San Bernardino County, California.

		Status[1]	
Species Common Name	Scientific Name	Federal	State
Arroyo southwestern toad	*Bufo microscaphus californicus*	E	CSC
Western toad	*Bufo boreas*		
Western spadefoot toad	*Scaphiopus hammondii*	CSC	
California tree frog	*Hyla cadaverina*		
Pacific tree frog	*Hyla regilla*		
California chorus frog	*Pseudacris cadaverina*		
Pacific chorus frog	*Pseudacris regilla*		
California red-legged frog	*Rana aurora draytonii*	E	CSC
Foothill yellow-legged frog	*Rana boylii*	S	CSC
Large-blotched ensatina	*Ensatina escholtzii klauberi*	S	CSC
Pacific salamander	*Batrachoseps pacificus*		

[1] Status: (E) refers to species which are listed as endangered by the respective government agencies. (S) refers to species that were Federal category 2 candidate species before that designation was abolished. Category 2 species were those that may have been warranted for listing as federally endangered or threatened, but sufficient information was not available to make a determination. (CSC) refers to California State Species of Special Concern.

Reptiles

Twenty-five species of reptiles are known or are reasonably expected to occur within the study area based on literature and comparisons of known range, distribution, and apparent suitable habitat (Table 2).

Table 2. Listing of reptile species known, or reasonably expected to occur within the Seven Oaks Dam Water Conservation Study Area, San Bernardino County, California.

		Status[1]	
Species Common Name	Scientific Name	Federal	State
California lyre snake	*Trimorphodon biscutatus* ssp. *vandenburghi*		

Table 2. (con't)

Species Common Name	Scientific Name	Status[1] Federal	State
California night snake	*Hypsiglena torquata*		
California mountain kingsnake	*Lampropeltis zonata*		
Common kingsnake	*Lampropeltis getulus*		
Coast patch-nosed snake	*Salvadora haxalepi*	S	CSC
Two-striped garter snake	*Thamnophis hammondii*	S	
San Bernardino ringneck snake	*Diadophis punctatus modestus*	S	
Coastal rosy boa	*Lichanura trivirgata roseofusca*	S	
California lyre snake	*Trimorphodon biscutatus*		
Gopher snake	*Pituophis melanoleucus*		
California glossy snake	*Arizona elegans occidentalis*		
California whipsnake	*Masticophis lateralis*		
Red diamond rattlesnake	*Crotalus ruber*	S	CSC
Speckled rattlesnake	*Crotalus mitchellii*		
Southern Pacific rattlesnake	*Crotalus viridis helleri*		
Great Basin fence lizard	*Sceloperus occidentalis biseriatus*		
Sagebrush lizard	*Scleoperus graciosus*	S	
Side-blotched lizard	*Uta stansburiana*		
San Diego horned lizard	*Phrynosoma coronatum*	S	CSC
Orange-throated whiptail	*Cnemidophorus hyperythrus*	S	CSC
Coastal western whiptail	*Cnemidophorus tigris multicarinatus*	S	CSC
San Diego alligator lizard	*Gerrhonotus multicarinatus webbi*		
Silvery legless lizard	*Anniella pulchra pulchra*		CSC
Gilbert's skink	*Eumeces gilberti rubricaudatus*		
Coastal banded gecko	*Coleonyx variegatus*		
Southwestern pond turtles	*Clemmys marmorata pallida*	S	CSC

[1] Status: (S) refers to species that were Federal category 2 candidate species before that designation was abolished. Category 2 species were those that may have been warranted for listing as federally endangered or threatened, but sufficient information was not available to make a determination. (CSC) refers to California State Species of Special Concern.

Mammals

Over 30 species of mammals have been documented from the project area (Hall 1981; Marsh 1984; Zembal *et al.* 1985; Jameson and Peters 1988)(Table 3).

Although bats have not been studied in the project or study area, several species have been detected and several others are expected to occur within the study area based on known ranges,

Table 3. Listing of mammal species known, or reasonably expected to occur within the Seven Oaks Dam Water Conservation Study Area, San Bernardino County, California.

Species Common Name	Scientific Name	Status[1] Federal	State
Mountail lion	*Felis concolor*		SP
Mule deer	*Odocoileus hemionus*		
Coyote	*Canis latrans*		
Gray fox	*Urocyon cinereoargenteus*		
Bobcat	*Felis rufus*		
Raccoon	*Procyon lotor*		
Badger	*Taxidea taxus*		
Beaver	*Castor canadensis*		
Striped Skunk	*Mephitis mephitis*		
Opposum	*Didelphis virginiana*		
Ringtail cat	*Bassariscus astutus*		SP
Long-tailed weasel	*Mustela frenata*		
Desert cottontail	*Sylvilagus audubonii*		
Brush rabbit	*Sylvilagus bachmani*		
Black-tailed jack rabbit	*Lepus californicus bennettii*	S	CSC
Western gray squirrel	*Sciurus griseus*		
California ground squirrel	*Spermophilus beecheyi*		
Deer mouse	*Peromyscus maniculatus*		
Brush mouse	*Peromyscus boylii*		
Cactus mouse	*Peromyscus eremicus*		
Canyon mouse	*Peromyscus crinitus*		
Western harvest mouse	*Reithrodontomys megalotus*		
Southern grasshopper mouse	*Onochomys torridus ramona*	S	CSC
Los Angeles little pocket mouse	*Perognathus longimembris brevinasus*	S CSC	
San Diego pocket mouse	*Chaetodipus fallax*	S	CSC
California pocket mouse	*Chaetodipus californicus*		
San Bernardino Merriam's kangaroo rat	*Dipodomys merriami parvus*	S	CSC
Pacific kangaroo rat	*Dipodomys agilis*		
San Diego desert woodrat	*Neotoma lepida intermedia*	S	CSC
Dusky-footed woodrat	*Neotoma fuscipes*		
California vole	*Microtus californicus*		
Pocket gopher	*Thomomys bottae*		
Spotted bat	*Euderma maculatum*		
Pacific western big-eared bat	*Plecotus townsendii*		
Pocketed free-tailed bat	*Nyctinomops femorosacca*		
Big free-tailed bat	*Nyctinomops macrotis*		
California leaf-nosed bat	*Macrotus californicus*	S	CSC

Table 3. (con't)

Species Common Name	Scientific Name	Status[1] Federal	State
Mastiff bat	*Eumops perotis californicus*		CSC
Western pipistrelle	*Pipistrellus hesperus*		
Arizona myotis	*Myotis occultus*	S	CSC
Hoary bat	*Lasiurus cinereus*		

[1] Status: (S) refers to species that were Federal category 2 candidate species before that designation was abolished. Category 2 species were those that may have been warranted for listing as federally endangered or threatened, but sufficient information was not available to make a determination. (CSC) refers to California State Species of Special Concern. SP refers to species that are fully protected by the State of California.

distributions, and habitat requirements. Locally occurring bats are primarily aerial insectivores that feed over or close to streams and lakes (Faber *et al.* 1989). Roosting areas for these species include rock crevices in bluffs, trees, bridges, and other man-made structures, such as those that exist in the general vicinity of the study area. Bat numbers are declining throughout southern California and undoubtably some bat Species of Special Concern do use the area.

Birds

Based on a literature search and comparisons of known range, distribution, and apparent suitable habitat, at least 133 species of birds could reasonably be expected to occur in the study area (Table 4).

Table 4. Listing of avian species known, or reasonably expected to occur within the Seven Oaks Dam Water Conservation Study Area, San Bernardino County, California.

Species Common Name	Scientific Name	Status[1] Federal	State
Turkey vulture	*Cathartes aura*		
Cooper's hawk	*Accipiter cooperii*		CSC
Sharp-shinned hawk	*Accipiter striatus*		CSC
Merlin	*Falco columbarius*		CSC
Red-tailed hawk	*Buteo jamaicensis*		
Red-shouldered hawk	*Buteo lineatus*		
Ferruginous hawk	*Buteo regalis*	S	CSC
Northern harrier	*Circus cyaneus*		CSC
Black-shouldered kite	*Elanus caerulens*		SP
Golden eagle	*Aquila chrysaetos canadensis*		SP,CSC
Bald eagle	*Haliaetus leucocephalus*	E	
Prairie falcon	*Falco mexicanus*		CSC
American peregrine falcon	*Falco peregrinus*	E	E,SP

Table 4. (con't)

Species Common Name	Scientific Name	Status[1] Federal	State
California spotted owl	*Strix occidentalis occidentalis*	S	CSC
American kestrel	*Falco sparverius*		
Burrowing owl	*Athene cunicularia*	S	CSC
Long-eared owl	*Asio otus*		CSC
Great horned owl	*Bubo virginianus*		
Common barn owl	*Tyto alba*		
Western screech-owl	*Otus kennicottii*		
Killdeer	*Charadrius vociferus*		
Greater roadrunner	*Geococcyx californianus*		
Lesser nighthawk	*Chordeiles acutipennis*		
White-throated swift	*Aeronautes saxatalis*		
Vaux's swift	*Chaetura vauxi*		CSC
Belted kingfisher	*Ceryle alcyon*		
Western kingbird	*Tyrannus verticalis*		
Mountain chickadee	*Parus gambeli*		
Scrub jay	*Aphelocoma coerulesens*		
Black phoebe	*Sayornis nigricans*		
Say's phoebe	*Sayornis saya*		
Plain titmouse	*Parus inornatus*		
Ash-throated flycatcher	*Myriarchus cinerascens*		
Horned lark	*Eremophila alpestris*	S	CSC
Nuttall's woodpecker	*Picoides nuttallii*		
Cliff swallow	*Hirundo pyrrhonota*		
Barn swallow	*Hirundo rustica*		
Tree swallow	*Tachycineta bicolor*		
American crow	*Corvus brachyrhynchos*		
Common raven	*Corvus corax*		
California quail	*Callipepla californica*		
Band-tailed dove	*Columbia fasciata*		
Mourning dove	*Zenaida macroura*		
Bewick's wren	*Thryomanes bewickii*		
Rock wren	*Salpinctes obsoletus*		
Cactus wren	*Campylorhynchus brunneicapillus*	S	CSC
Bushtit	*Psaltriparus minimus*		
Loggerhead shrike	*Lanius ludovicianus*	S	
European starling	*Sturnus vulgaris*		
American dipper	*Cinculus mexicanus*		
American goldfinch	*Carduelis tristis*		
American robin	*Turdus migratorius*		

Table 4. (con't)

Species Common Name	Scientific Name	Status[1] Federal	State
Black-chinned hummingbird	*Archilochus alexandri*		
Black-chinned sparrow	*Spizella atrogularis*		
Black-headed grosbeak	*Pheucticus melanocephalus*		
Blue-gray gnatcatcher	*Poliptila caerulea*		
Brown-headed cowbird	*Psaltriparus minimus*		
Canyon wren	*Catherpes mexicanus*		
Common poorwill	*Phalaenoptilus nuttallii*		
Common snipe	*Gallinago gallinago*		
Dark-eyed junco	*Junco hyemalis*		
Downy woodpecker	*Picoides pubescens*		
Acorn woodpecker	*Melanerpes formicivorus*		
Red-breasted sapsucker	*Sphyrapicus ruber*		
Hairy woodpecker	*Picoides villosus*		
Northern flicker	*Colaptes auratus*		
Fox sparrow	*Passerella iliaca*		
Golden-crowned sparrow	*Zonotrichia atricapilla*		
Swainson's thrush	*Catharus ustulatus*		
Varied thrush	*Ixorus naevius*		
Hermit thrush	*Catharus guttatus*		
House wren	*Troglodytes aedon*		
Lazuli bunting	*Passerina amoena*		
Lesser goldfinch	*Carduelis psaltria*		
Mallard	*Anas platyrhynchos*		
Lesser scaup	*Aythya affinis*		
Ringneck duck	*Aythya collaris*		
Green-winged teal	*Anas crecca*		
Redhead	*Aythya americana*		
Ruddy duck	*Oxyura jamaicensis*		
Mountain quail	*Oreortyx pictus*	S	
Northern flicker	*Colaptes auratus*		
Northern mockingbird	*Mimus polyglottos*		
Northern oriole	*Icterus galbula*		
Olive-sided flycatcher	*Contopus borealis*		
Orange-crowned warbler	*Vermivora celata*		
Phainopepla	*Phainopepla nitens*		
Pine siskin	*Carduelis pinus*		
Rough-winged swallow	*Stelgidopteryx serripennis*		
Golden-crowned kinglet	*regulus satrapa*		
Ruby-crowned kinglet	*Regulus calendula*		
Rufous-sided towhee	*Pipilo erythrophthalmus*		

Table 4. (con't)

Species Common Name	Scientific Name	Status[1] Federal	State
Solitary vireo	*Vireo solitarius*		
Steller's jay	*Cyanocitta stelleri*		
Townsend's solitaire	*Myadestes townsendi*		
Violet-green swallow	*Tachycineta thalassina*		
American pipit	*Anthus rufescens*		
Water pipit	*Anthus spinoletta*		
Mountain bluebird	*Sialia currucoides*		
Western bluebird	*Sialia mexicana*		
Western flycatcher	*Empidonax difficilis*		
Western wood pewee	*Contopus sordidulus*		
White-breasted nuthatch	*Sitta carolinensis*		
Wilson's warbler	*Wilsonia pusilla*		
Wrentit	*Chamaea fasciata*		
Yellow-rumped warbler	*Dendroica coronata*		
Red-winged blackbird	*Agelaius phoeniceus*		
Brewer's blackbird	*Euphagus cyanocephalus*		
Savannah sparrow	*Passerculus sandwichensis nevadensis*		
Song sparrow	*Melospiza melodia*		
Lincoln's sparrow	*Melospiza lincolnii*		
White-crowned sparrow	*Zonotrichia leucophrys*		
House sparrow	*Passer domesticus*		
Rufous-crowned sparrow	*Aimophila rugiceps*	S	CSC
California Bell's sage sparrow	*Amphispiza belli belli*	S	
California gnatcatcher	*Polioptila c. californica*	T	CSC
Common yellowthroat	*Geothlypis trichas*		
Yellow-breasted chat	*Icteria viren*		CSC
California yellow warbler	*Dendroica petechia brewsteri*		CSC
MacGillivray's warbler	*Oporornis tolmiei*		
Black-throated gray warbler	*Dendroica nigrescens*		
Common yellowthroat	*Geothypis trichas*		
House finch	*Carpodacus mexicanus*		
Hutton's vireo	*Vireo huttoni*		
Warbling vireo	*Vireo gilvus*		
Blue grosbeak	*Guiraca caerulea*		
California thrasher	*Toxostoma redivivum*		
Rufous-sided towhee	*Pipilo erythropthalmus*		
California brown towhee	*Pipilo fuscus crissalis*		
Costa's hummingbird	*Calypte costae*		

[1]Status: (E) refers to species which are listed as endangered by the respective government

agencies. (T) refers to species that are listed as threatened by the respective government agencies. (S) refers to species that were Federal category 2 candidate species before that designation was abolished. Category 2 species were those that may have been warranted for listing as federally endangered or threatened, but sufficient information was not available to make a determination. (CSC) refers to California State Species of Special Concern. (SP) refers to species that are listed as fully protected by the state of California.

Sensitive Species

Sensitive species are defined here to include species listed as endangered, threatened, proposed, Category 1 candidate, and federally sensitive (former Category 2 candidate species).

Plants

At least five listed and sensitive species of plants are known to occur in, or in the vicinity of, the study area. Theses species include the Santa Ana River woolly-star (*Eriastrum densifolium* ssp. *sanctorum*), slender-horned spineflower (*Dodecahema leptoceras*), Gambel's watercress (*Rorippa gambellii*), Parry's spineflower (*Chorizanthe parryi* var. *parryi*), and California spineflower (*Mucronea californica*).

The Santa Ana River woolly-star is a Federal and State endangered species (USFWS 1987) that formerly occupied about 60 miles of habitat along the Santa Ana River in Orange, Riverside, and San Bernardino counties. It is now limited to less than 18 miles of linear habitat located just downstream of the Dam.

The Santa Ana River woolly-star is an early seral stage, or pioneer, species that colonizes washed sand deposits created by sporadic fluvial (flooding) action. Its habitat along the Santa Ana River is characterized by periodic disturbances, at aperiodic frequencies, that regenerate habitat by fluvial scouring of existing alluvium and deposition of clean sand (washed of most fine particles and organic matter). Between major flood events, these deposits typically exist as terraces above the high water mark of the river and its braided channels. Based on a comparison of photographic and schematic records of past flooding events, and the observed distribution of Santa Ana River woolly-star, it has been hypothesized that the average optimal time interval between fluvial habitat renewing events required for this subspecies persistence is approximately 50 years (USFWS 1995).

In 1989, through an Endangered Species Act section 7 consultation between the Service and the Corps (Ref. No. 1-6-88-F-6), impacts from the Dam on the Santa Ana River woolly-star were to be primarily mitigated through the establishment and management of a preserve. The preserve was to be placed along those sections of the wash that, based on the best information available at that time, would most likely maintain the hydrology necessary for habitat revitalization. The specific areas targeted for preservation were also chosen on the basis of proximity to existing protected lands either already in Federal ownership or under Federal permit jurisdiction (USACE

1988). Currently, the land acquisition required to establish the preserve is nearly completed and a habitat management plan has been implemented. However, even with the mitigation lands, threats from alterations of the fluvial dynamics still remain. For example, a loss in sediment load will likely result in a pattern of degradation of channelbed sediments and may cause fluvial removal of portions of the Santa Ana River woolly-star mitigation lands (USFWS 1995). A long term management strategy that considers these threats is currently being developed by the Corps, the Service, and other interested parties.

The slender-horned spineflower is a Federal and State endangered species (USFWS 1987) and is known to occur within the study area. This species is currently limited to nine known extant populations along the foothills of the San Gabriel, San Bernardino, and Santa Ana mountains in Los Angeles, Riverside, and San Bernardino counties (Rey-Vizgirdas 1994).

The distribution of slender-horned spineflower is restricted to alluvial scrub habitats within stabilized flood-deposited sandy terraces of floodplains and washes from 700 to 2,500 feet in elevation (Reveal 1988; Reveal and Hardham 1989a). Unlike the Santa Ana River woolly-star that is primarily associated with the pioneer seral stage of the alluvial fan scrub, the slender-horned spineflower is generally associated with the intermediate, and occasionally the mature, seral stages of that successional continuum. Rey-Vizgirdas (1994) estimated that the amount of alluvial scrub habitat at locations known to support extant populations of slender-horned spineflower has been reduced by 91 percent.

Direct habitat destruction and alteration of the fluvial geomorphological regime have contributed significantly to the decline of the slender-horned spineflower, Santa Ana River woolly-star, and their alluvial scrub habitat. Interruption of the fluvial cycle by construction of the Dam and nearby levees will, upon completion, result in a significant alteration to the flooding regimes and natural forces responsible for habitat renewal. The Dam will eliminate opportunities for major overwash events and the creation of pioneer phase alluvial scrub. This will promote senescence and degradation of the alluvial scrub community by converting it to sage scrub and chaparral and facilitating the invasion of a non-native grasse understory. The Service has concluded elsewhere that these factors could incur severe adverse impacts on slender-horned spineflower survival (USFWS 1994a).

Gambel's watercress is a Federal endangered species. It is a member of the mustard family (Brassicaceae). This herbaceous perennial was historically reported from about a dozen locations in southern California and from near Mexico City, Mexico. The populations in the counties of San Bernardino and San Diego have possibly been extirpated due to habitat alteration. Currently the three known extant populations of Gambel's watercress occur in San Luis Obispo County at Black Canyon, Oso Flaco Lake, and Little Oso Flaco Lake. The species could occur within the project area but has not been observed there in recent years.

Parry's spineflower is a sensitive species that is reportedly declining in California. The California Native Plant Society (CNPS) includes this variety on its current List 3 (Plants about which we need more information - a review list), with a note questioning whether the variety should be moved to List 1B (Plants, rare, threatened, or endangered in California and elsewhere) (Skinner and Pavlik 1994).

The species *Chorizanthe parryi* includes two varieties, *fernandina* and *parryi*. Variety *fernandina* was historically known to occupy sandy habitats in the San Gabriel Mountains, Los Angeles County, and at least one location near Santa Ana in Orange County. Reveal and Hardham (1989b) state that the variety *fernandina* is now likely extinct. Likewise, it appears on the CNPS List 1A (Plants presumed extinct in California) (Skinner and Pavlik 1994).

The historic distribution of Parry's spineflower includes locations near and in the foothills of the San Gabriel, San Bernardino and San Jacinto mountains of Los Angeles, San Bernardino, and Riverside counties, between 300 and 2,500 foot elevations. Representative specimens housed at various herbaria include collections from 1) San Bernardino County, near Redlands, east end of San Bernardino Valley, 2) San Bernardino Valley near San Bernardino, 3) Devore, and 4) Colton.

The current distribution of Parry's spineflower is not known but is gradually becoming more apparent as more data is added to the California Natural Diversity Database. It is reportedly an infrequently collected taxon and is found in a part of southern California where available habitats are rapidly disappearing. Many of the locations where the plant was found along the foothills surrounding the greater Los Angeles area have been dramatically altered over the last half century. In the few places where the variation *parryi* has survived, the extent of available information is exceedingly limited.

Parry's spineflower habitat is described by Reveal and Hardham (1989a) as sandy areas on flats near the foothills. The species is known to occur in association with intermediate and mature alluvial scrub seral phases on the Santa Ana River (Jigour 1992; Jigour and McKernan 1992). Some of the Parry's spineflower populations occur in close proximity to populations of slender-horned spineflower.

The California spineflower is a species which remains abundant in the northern portion of its range, but is apparently becoming uncommon in the southern portion. The historic distribution of California spineflower has been described as along the Pacific coast from San Luis Obispo County south to San Diego County and inland in the southern Coast and Traverse ranges from Monterey County to Los Angeles, extreme western San Bernardino and northwest Riverside counties, from sea level to 3,200 feet in elevation.

Although this species is reportedly common in San Luis Obispo and Santa Barbara counties, it is considered relatively rare in the more southerly extent of its range. The CNPS has placed this species on its List 4 (Plants of limited distribution - a watch list), and further described it as 1) rare, but found in sufficient numbers and distributed widely enough that the potential for extinction is low at this time, and 2) endangered in a portion of its range.

Two populations of California spineflower are known to occur in association with the intermediate phase alluvial scrub vegetation in the Santa Ana River (Jigour 1992). The habitat requirements of this species include deep sandy soils (Reveal 1989), like those found throughout the alluvial fan. Both of the Santa Ana River populations are in relatively close proximity to populations of Parry's spineflower. Reveal (1989) stated that the California spineflower "was once fairly widely distributed in southern California, but given the extensive urbanization of the Los Angeles and San Diego areas, the species is now relatively rare in the more southerly counties. In general, if the habitat is badly disturbed the species will gradually disappear".

Invertebrates

Three sensitive species of insects are known or expected to occur in the general vicinity of the project area. These species include the Quino checkerspot butterfly (*Euphydryas editha quino*), California diplectronan caddisfly (*Diplectrona californica*), and the California McCoy snail (*Eremarionta rowelli mccoina*).

The Quino checkerspot butterfly is a Federal endangered species (USFWS 1997). Records indicate that scattered colonies occur in San Diego, Orange, and western Riverside counties (Emmel and Emmel 1973). The closest documented colonies, within the region of the project site, occur along State Highway 71 in Orange County and the Santa Ana Mountains in Orange and western Riverside counties (Emmel and Emmel 1973). The foodplant of this species is plantain (*Plantago erecta*). Although there are no known records of this species within the immediate vicinity of the proposed project, the vagility of this species may allow for it to occur in neighboring natural areas throughout the region.

The California diplectronan caddisfly, a Federal Category 1 candidate for listing, could occur within the study area. There is apparent suitable habitat within the study area, however, no recent surveys have been conducted.

The California McCoy snail, a sensitive species, may occur within the study area. Although there is apparent suitable habitat within the study area, no recent surveys have been conducted.

Fish

The native freshwater fish fauna is depauperate in the coastal drainages of southern California. Four of the five native fishes are strictly freshwater and the fifth, steelhead (*Oncorhynchus mykiss*), is anadromous. All four of the native freshwater fish are considered sensitive species. They include the unarmored threespine stickleback, Santa Ana sucker, Santa Ana speckled dace, and arroyo chub. The steelhead is currently proposed as an endangered species by the National Marine Fisheries Service.

The unarmored threespine stickleback is a Federal endangered species. Historically, the unarmored threespine stickleback had a widespread distribution, including the headwaters of the Santa Clara River and low gradient sections of the Los Angeles, San Gabriel, and Santa Ana rivers. At present, the only recognized unarmored threespine stickleback populations are confined to the headwaters of the Santa Clara River and its tributaries (northern Los Angeles County); Shay Creek which drains into Baldwin Lake located just east of Big Bear Lake (San Bernardino County); and San Felipe Creek which drains into the Salton Sea (Imperial County) (Swift *et al.* 1993). The study area is within the range of this species.

The peak of reproductive activity for unarmored threespine stickleback occurs in the spring, about March, and continues at a lower level throughout the summer and fall. The male of the species establishes a territory and builds a nest of aquatic vegetation derived from the bottom of the stream channel.

Unarmored threespine stickleback tend to gather in areas of the stream that are slow moving or have standing water. Young fish are often observed at the shallow edge of the stream in areas of dense vegetation. The larger juveniles and sub-adults also tend to be found in the protection of vegetation. In places where the water is moving rapidly, adults tend to be found behind obstructions, or at the edge of the stream, especially under the edge of algal mats. The fish are generally found in the greatest abundance in pools with some flow and in shallow backwater areas rather than in the main channel of the stream. In small pond situations, the unarmored threespine stickleback tend to be concentrated at the upstream, or inflow, end of the pond. No adult fish have been found to be living permanently in ponds isolated from the main stream.

The decline of the unarmored threespine stickleback has been attributed to habitat destruction associated with channelization of streams and the drying of suitable habitat within watercourses caused by groundwater pumping and surface water diversions. Other threats to its continued existence are hybridization of the unarmored threespine stickleback populations with other stickleback subspecies and mortality from predators such as the exotic African clawed frog (*Xenopus laevis*). The introduced, non-native, African clawed frog is known to occur in Soledad Canyon and is considered a severe threat to local unarmored threespine stickleback populations (USFWS 1988).

Based on the habitat requirements and known range of the unarmored threespine stickleback, it is possible that this species occurs within the project area. However, electrofishing surveys conducted upstream of the project area did not detect this species (SCE 1995).

The Santa Ana sucker, a sensitive species, is endemic to southern California and has been known to occur within the project area (Swift *et al.* 1993). This species is also a California State Species of Special Concern. A petition to add the Santa Ana Sucker to the Federal list of threatened and endangered species was recently submitted to the Service and is currently under review.

The Santa Ana sucker is the smallest sucker species in California, rarely exceeding 6 inches in standard length. This small size has probably been selected for by the great annual water fluctuations of the species' native streams. They are found in small to medium sized (<20 feet wide) streams with water depths ranging from an inch to a few feet. In the late summer, many portions of these habitats are reduced to little pools, where small fish that can tolerate warm water with low oxygen levels have the best chance for survival.

In the project area, habitat for the Santa Ana sucker occurs primarily in the many small braided channels and rivulets that occur throughout the alluvial fan. These channels, which experience seasonal flows, are created and maintained by the periodic scouring associated with large storm events. The extreme fluctuations in seasonal flows are critical to conserving this species and protecting it from extirpation due to invasion from non-natives. The Santa Ana sucker breeds primarily during the spring, or wet months of the year. During the drier months, non-native species that are otherwise highly competitive but not adapted to the fluctuating environment and water temperatures will die off. No recent surveys have been conducted for this species.

The Santa Ana speckled dace is a sensitive species and is one of the rarest native freshwater fish in coastal southern California. It is also listed as a California State Species of Special Concern. It is abundant only in the lower parts of the East, North, and West forks of the San Gabriel River. Many smaller populations have been found in tributaries to the Santa Ana River, including the Cajon Wash. Historic records indicate that populations of Santa Ana speckled dace also occurred in the Santa Ana River immediately downstream of the study area. The Service was petitioned to add the Santa Ana speckled dace to the Federal list of threatened and endangered species. However, the review of the petition has been suspended until questions about the taxonomy of the species are resolved.

The arroyo chub is a sensitive species and is also listed as a California State Species of Special Concern. Records indicate that populations of this species have been significantly reduced (Moyle and Williams 1990; Tres 1992), primarily due to habitat modifications. Its preferred habitat includes low gradient streams, most of which have now been diverted, channelized, or filled. The arroyo chub is adapted for the rigors of the seasonal changes in southern California's streams, particularly the intermittent flows in summer months.

The arroyo chub has been recorded from the Santa Ana River, between the Seven Oaks Dam and Prado Dam, and from several tributaries to the Santa Ana River in Riverside and San Bernardino counties (Swift *et al.* 1993). This species was also recorded as abundant (and probably introduced) in Big Bear lake in 1922 (Shebley 1922).

Amphibians

Five of the eleven amphibian species known or expected to occur within the study area are considered sensitive by local, State, and Federal resource agencies. These species include the arroyo southwestern toad (*Bufo microscaphus californicus*) which is expected within the study area, the California red-legged frog (*Rana aurora draytonii*) which was historically found within the study area, the western spadefoot toad (*Scaphiopus hammondii*) which is known from the study area, the foothill yellow-legged frog (*Rana boylii*) which is expected within the study area, and the large-blotched ensatina (*Ensatina escholtzii klauberi*) which is expected based on historical range and the presence of suitable habitat, but has never been observed within the study area.

The arroyo southwestern toad is a Federal endangered species (USFWS 1994b). Arroyo southwestern toads were historically found along the length of drainages in southern California from San Luis Obispo to San Diego County. However, within the United States the species has been extirpated from an estimated 75 percent of its former range. At the time of listing, they were only known from the headwaters of a few streams in small isolated populations, primarily on Forest Service owned lands. They have recently been found in the lower San Luis Rey River in San Diego County and in San Mateo Creek on Marine Corps Base Camp Pendleton.

Arroyo southwestern toads are restricted to rivers that have shallow, gravelly pools adjacent to sandy terraces. Breeding occurs on large streams with persistent water from late March to mid-June (Sweet 1989). Eggs are deposited and larvae develop in shallow pools with minimal current and little or no emergent vegetation and with sand or pea gravel substrate overlain with silt. After metamorphosis (June-July), the juvenile toads remain on the bordering gravel bars until the pool no longer persists (3 to 8 weeks depending on site and year) (Sweet 1992). Adult toads excavate shallow burrows on the terraces where they shelter during the day when the surface is damp, or during longer intervals in the dry season (Sweet 1989).

The primary threats to this species are destruction and degradation of their habitat mostly due to altering stream hydrology or riparian vegetation. The construction of dams has been responsible for the loss of 40 percent of the species original range. Other threats include urban development, mining, human disturbance, and grazing. Exotic predators, such as bullfrog (*Rana catesbeiana*), rainbow trout, and green sunfish (*Lepomis cyanellus*) can have a major impact on already reduced populations.

Dams can have a significant effect on habitat quality downstream. Artificially regulated flows disrupt the natural processes that produce the terrace and pool habitats required by arroyo southwestern toads. Unseasonal water releases may either prevent them from breeding altogether or wash away eggs and larvae if water releases, seasonal or aseasonal, are made after breeding has occurred (Sweet 1992). Siltation from increased stream flow or from disturbances upstream may affect survival by covering the food supply and inhibiting feeding by larval arroyo southwestern toads.

Arroyo southwestern toads are especially sensitive to stream diversions due to its breeding well after the normal rainy season. Water diversions that alter normal flows degrade habitats and adversely affect them by leading to 1) the early drying of breeding pools, causing breeding failures or loss of the larval population, 2) restriction of the period essential for rapid growth when newly-metamorphosed toads can forage on damp gravel bars, and 3) loss of damp subsurface soil that may result in high adult mortality during late summer and early fall (Sweet 1992).

Over the past 20 years, at least 60 species of fishes have been introduced to the western American states, 59 percent of which are predatory (Hayes and Jennings 1986). Introduced predators are thought to be highly significant in reducing the size of all extant populations of arroyo southwestern toads, and may have contributed to regional extirpations.

Most streams with populations of arroyo southwestern toads also have populations of introduced bullfrogs (*Rana catesbeiana*). Adult bullfrogs are highly predatory and are believed to prey on adult arroyo southwestern toads (Sweet 1992). Artificially maintained perennial flows below dams enhance the habitat for bullfrogs to the detriment of arroyo southwestern toads.

The range of the arroyo southwestern toad includes the project area. Suitable habitat for this species can be found both upstream and downstream of the Dam (Jigour and McKernan 1992, Dr. R. Fisher, UCSD, pers. com.). Surveys for arroyo southwestern toads were conducted upstream of the Dam along the mainstem of the Santa Ana River in July of 1996 for a Southern California Edison flowline relocation project (Edith Read, PSOMAS, pers. comm.). Although no arroyo southwestern toads were found, the surveys were conducted at a time of year when the animals are not very detectable and can easily be missed. Additional surveys have been scheduled for spring of 1997 but will again be limited to the mainstem of the Santa Ana River and not include any of the tributaries. No recent surveys have been conducted for this species downstream of the Dam.

The California red-legged frog is a Federal endangered species (USFWS 1996b). It is one of two subspecies of red-legged frogs on the Pacific Coast and was historically distributed throughout most of lowland California. The boundaries of its range extended from Point Reyes on the coast, inland to Redding, and southward into northwestern Baja California, Mexico (Hayes and Kremples 1986). The range of this species includes the study area and it could occur where suitable habitat exists upstream of the Seven Oaks Dam.

The California red-legged frog is the largest native frog in the western United States, ranging from 1.5 to 5.1 inches in length (Wright and Wright 1949). They breed from November to March with earlier breeding records occurring in southern localities (Storer 1925). Females deposit egg masses on emergent vegetation such that the egg masses float on the surface (Hayes and Miyamoto 1984). Eggs hatch within 6 to 14 days. Larvae undergo metamorphosis in 3.5 to 7 months and sexual maturity is reached at three to four years (Storer 1925; Jennings and Hayes 1990). Adults may live up to eight to ten years (Jennings *et al.* 1992).

Habitat for the California red-legged frog is distinct in its aquatic and riparian elements (Hayes and Jennings 1988; Jennings 1988). The adults require dense riparian vegetation associated with deep, still, or slowly moving water (Jennings *et al.* 1992). Heavily vegetated, terrestrial riparian areas may provide important wintering habitat as they estivate in small mammal burrows and moist leaf litter up to 85 feet from the water's edge (Rathburn *et al.* 1993).

Habitat loss and alteration are primary factors in the decline of the California red-legged frog. Wetland alterations include stream channelization, vegetation clearing, water diversions, and reservoirs. Reservoirs have the added impact in that they support and are sometimes stocked with exotic predators such as fish, crayfish, and bullfrogs.

The California red-legged frog has suffered severe losses of habitat, to the extent that the taxa has been extirpated from approximately 75 percent of its historic geographic range (Jennings *et al.* 1992). Currently, they are known from about 190 streams or drainages in 15 counties in central and southern California. In southern California, only four population localities are currently extant as compared with more than 80 historic locality records. The California red-legged frog was listed as an endangered species due to population declines and current threats, including urban encroachment, reservoir construction, water diversion, and introduced predators and competitors. In the study area, suitable habitat for this species primarily occurs along tributaries to the Santa Ana River. A small amount of habitat also occurs in the Santa Ana River mainstem at the uppermost reaches of the study area (Dr. R. Fisher, pers. comm.). During surveys conducted for Southern California Edison in 1996, no red-legged frogs were detected in the Santa Ana River mainstem. These surveys will be repeated in spring 1997, but will again be confined to the mainstem of the river and not include the tributaries.

The foothill yellow-legged frog is a sensitive species and a State Species of Special Concern. Foothill yellow-legged frogs inhabit streams and rivers in the coastal mountains of California (Stebbins 1985). They prefer small streams and riffles with sunny, rock banks surrounded by mixed conifer, coastal scrub, and chaparral habitats. Although this species has not been reported from the study area, suitable habitat does exist in the foothills and lower mountain slopes of the Santa Ana River canyon.

The western spadefoot toad, a Federal sensitive species and State Species of Special Concern, lives mainly in lowland areas where it frequents vernal pools, washes, river floodplains, playas, and alkali flats. It prefers open areas with sandy or gravelly soil, and can be found in valley and foothill grasslands, chaparral, sage scrub, and pine-oak woodlands. It breeds from January to May in quiet streams and is found throughout much of western California (Stebbins 1985). This species has recently been found in the percolation ponds on the alluvial floodplain below the Seven Oaks Dam (A. Davenport, U.S. Fish and Wildlife Service, pers. com.).

Large-blotched ensatina frequent forests and well-shaded canyons, as well as oak woodlands and old chaparral. They are typically found under rotting logs, bark, and rocks. Although there are no known occurrences of this species in the project area, the upper Santa Ana River canyon may represent a former connection or dispersal route in the Transverse mountain system in southern California (Stebbins 1985). No recent surveys have been conducted for this species within the study area.

Reptiles

Eleven of the 25 reptile species known or expected to occur within the study area are considered sensitive by local, State, and Federal resource agencies. These eleven species include: the coast patch-nosed snake (*Salvadora haxalepi*), two-striped garter snake (*Thamnophis hammondii*), San Bernardino ringneck snake (*Diadophis punctatus modestus*), red diamond rattlesnake (*Crotalus ruber*), sagebrush lizard (*Scleoperus graciosus*), San Diego horned lizard (*Phynosoma coronatum*), orange-throated whiptail (*Cnemidophorus hyperythrus*), and coastal western whiptail (*Cnemidophorus tigris multicarinatus*), all of which are known from the study area; the coastal rosy boa (*Lichanura trivirgata roseofusca*) and the silvery legless lizard (*Anniella pulchra pulchra*), both of which are expected within the study area; and the southwestern pond turtle (*Clemmys marmorata pallida*) which occurred historically within the study area.

The coast patch-nosed snake is a Federal sensitive species that is generally found in grassland, chaparral, sagebrush and desert scrub (Stebbins 1985) and prefers washes, sandy flats, and rocky areas (Zeiner *et al.* 1988). Its distribution includes the entire County of San Bernardino but details on its distribution are unknown. According to Stebbins (1954), this species is a broad generalist in its diet and habitat requirements. Suitable habitat for the coast patch-nosed snake occurs both above and below the Seven Oaks Dam, and specimens were found within the study area during the 1995 field season (Dr. R. McKernan, San Bernardino County Museum, pers. com.).

The two-striped garter snake is a Federal sensitive species and a State Species of Special Concern. It is distributed in coastal California from the vicinity of Salinas to northwest Baja California, Mexico. The two-striped garter snake is a highly aquatic species inhabiting clear, permanent streams with rocky beds and protected pools, and especially along streams with rocky beds bordered by riparian growth. Several individuals of this species were observed in the study area upstream of the Dam during 1992 (SCE 1995), 1993 (CNDDB), and 1996 (Dr. R. Fisher, pers. comm.). It is possible, therefore, that it occurs throughout the study area above the Dam.

The San Bernardino ringneck snake is a Federal sensitive species. Its preferred habitat includes woodland, forest, and chaparral, especially moist areas along streams. In the study area, the most suitable habitat for this species occurs near the upper extent of the project. A few individuals were observed in the study area in 1992 (SCE 1995).

The red diamond rattlesnake is a Federal sensitive species. Its range extends from the cape of Baja California, Mexico, north to the foothills of the San Bernardino Mountains. They are typically found below 4,000 feet and prefer sage scrub, chaparral and other habitats with rocky substrates or boulder outcrops (Wright and Wright 1957; Klauber 1972). This species is known to occur within the study area (A. Davenport, Service, pers. com.).

The sagebrush lizard is a Federal sensitive species. Its preferred habitat includes montane chaparral, hardwood, conifer, and Great Basin shrub habitats (Zeiner *et al.* 1988). Isolated populations occur in the coast ranges of California, in the southern California mountains, and in the desert mountains in Inyo County. Suitable habitat exists in the vicinity of the Dam and the species was observed on a few occasions in the study area in 1992 (SCE 1995).

The San Diego horned lizard is a Federal sensitive species as well as a State Species of Special Concern. The preferred habitat of this species is coastal sage scrub in arid and semi-arid climate conditions with friable, rocky, or shallow sandy soils (Zeiner *et al.* 1988). The San Diego horned lizard feeds primarily on harvester and carpenter ants. Major threats include loss and fragmentation of preferred habitat. Suitable habitat for the San Diego horned lizard exists within the study area. This species was observed upstream of the Dam in 1994 (SCE 1994), and both upstream and downstream of the Seven Oaks Dam in 1995 (SCE 1995; A. Davenport, pers. com.).

The orange-throated whiptail is a Federal sensitive species. Its preferred habitat is low-elevation (below 2950 feet) coastal scrub, chamise-redshank chaparral, mixed chaparral, and valley-foothill hardwood habitats (Zeiner *et al.* 1988). Orange-throated whiptails are most commonly found in washes and other sandy areas with patches of brush and rocks (Stebbins 1972). The species was reported as occurring in the upper canyon in 1988 (USACE 1988). Although suitable habitat exists throughout the study area, orange-throated whiptails were not observed in the study area during several other survey efforts (USFWS 1988; A. Davenport, Service, pers. com.). It has been suggested that the 1988 observation may have been a mis-identification (A. Davenport, Service, pers. com.).

The coastal western whiptail is a Federal sensitive species. They are generally associated with deserts and semi-arid habitats and prefer sandy areas along gravelly arroyos or washes (Stebbins 1954). The major threat to this species is the loss of habitat and fragmentation of its habitat by agriculture and urbanization. This species was fairly commonly observed in the study area in 1992 (SCE 1995) and again in 1995 (A. Davenport, Service, pers. com.).

Coastal rosy boa, a sensitive species, inhabits rocky chaparral covered hillsides and canyons. Although it does not require permanent water, it is usually found in the vicinity of permanent or intermittent streams. The range of the coastal rosy boa includes the southwestern corner of San Bernardino County and the study area. This species most likely occurs on the hillsides adjacent to the Dam.

The silvery legless lizard is a State Species of Special Concern and is on the San Diego Herpetological Society's threatened list. Its habitat requirements include areas of soft, sandy substrate typically associated with sandbar, beach, or dune habitat ranging from San Francisco to upper Baja California, Mexico (Stebbins 1985). The sandy washes located within the project area may provide suitable habitat for this species. The greatest threat to the silvery legless lizard is the loss of habitat due to urbanization, agriculture, and streambed modifications.

The southwestern pond turtle, a Federal sensitive species, is distributed from sea level to approximately 6,500 feet, with the majority of populations below about 4,250 feet. They occur, or formerly occurred, along all major river systems within their present range occupying both permanent and intermittent aquatic habitats. They are restricted to areas near the banks or quiet backwaters where the current is relatively slow and basking sites and refugia are available. However, they appear to be uncommon in heavily shaded areas, being concentrated where openings in the streamside canopy allow sufficient sunlight to facilitate basking. In an estimated 75-80 percent of its range the species is thought to be in a general state of decline. Historical records indicate that southwestern pond turtles occurred within the study area.

Mammals

Twelve of the forty-one mammal species known or expected to occur within the study area are considered sensitive by local, State, and Federal resource agencies. These twelve species include: the mountain lion (*Felis concolor*), badger (*Taxidea taxus*), ringtail cat (*Bassariscus astutus*), black-tailed jack rabbit (*Lepus californicus bennettii*), southern grasshopper mouse (*Onochomys torridus ramona*), Los Angeles little pocket mouse (*Perognathus longimembris brevinasus*), San Diego pocket mouse (*Chaetodipus fallax fallax*), San Bernardino Merriam's kangaroo rat (*Dipodomys merriami parvus*), and San Diego desert woodrat (*Neotoma lepida intermedia*), all of which are known from the project area; and the California leaf-nosed bat (*Macrotus californicus*), the greater western mastiff bat (*Eumops perotis californicus*), and the Arizona myotis (*Myotis occultus*), all of which are expected within the project area.

Mountain lions occur throughout undeveloped areas in southern California, and are fully protected by California State Law. This species is generally secretive, but may, on occasion, wander out onto the alluvial fan to hunt. Mountain lions tend to avoid human activity like all large predatory mammals. However, the encounter rate between humans and mountain lions is increasing in southern California primarily because their territories are being constricted by encroachment from development.

Mountain lions primarily prey upon mule deer. The mule deer is a highly managed species and is listed in the California Hunting Regulations with seasons and bag limits set by the California State Fish and Game Commission. The Santa Ana River watershed has been described as one of the most productive areas for both resident and migratory mule deer in southern California (USACE 1985). Because mule deer have been recorded using some portion of all habitat types present in the study area, mountain lions could be expected to occur throughout the study area as well.

The San Diego black-tailed jackrabbit is a Federal sensitive species. The species range extends from San Luis Obispo to San Quintin, Baja California, Mexico. San Diego black-tailed jackrabbits are generally associated with grassy and/or shrubby habitats. They will often use shallow depressions under bushes or shrubs as resting sites or to reduce thermal stress on hot days (Lechleitner 1958; Costa *et al.* 1976). As herbivores, they browse on a large variety of forbs and shrubs including members of the genuses *Artemesia*, *Opuntia*, *Atriplex*, and the families Boraginaceae and Leguminosae. San Diego black-tailed jackrabbits are known to occur throughout the alluvial floodplain below the Dam.

The Los Angeles little pocket mouse is a Federal sensitive species. It is generally found in lowland grasslands and coastal sage scrub associations in the Los Angeles basin, San Fernando and San Bernardino valleys, and in western Riverside County (Williams 1986). The decline of this species is directly related to losses in sage scrub habitats by land conversion and urbanization. In the study area, this species is known to occur primarily below the Dam on the alluvial floodplain.

The San Diego pocket mouse is a Federal sensitive species and a California State Species of Special Concern. Its range extends from San Bernardino County south to northern Baja California, Mexico. The preferred habitat of this species includes sage scrub, chaparral, and annual grasslands. The decline of the San Diego pocket mouse is directly related to losses in sage scrub habitats. This species is known to occur below the Seven Oaks Dam on the alluvial floodplain and may occur throughout the study area in areas with suitable habitat.

The San Bernardino Merriam's kangaroo rat (SBKR), a Federal Category 1 candidate species for listing as threatened or endangered, is a subspecies of the wide ranging Merriam's kangaroo rat of the southern California deserts. It was originally described by Rhoads (1894, *as in* Hall 1981) as a full species (*Dipodomys parvus*). However, the species' taxonomy was later reviewed by Merriam (1898, *as in* Hall 1981) and the species was reclassified and named *Dipodomys merriami parvus*. Lidicker (1960) noted that *D. m. parvus* was one of the most differentiated races of *D. merriami* and that it had likely nearly reached species rank.

This species historically occurred throughout cismontane San Bernardino and San Jacinto valleys, and on the Pacific slope of southern California in San Bernardino and Riverside counties (McKernan 1991; Vizgirdas 1992). The distribution of SBKR has been drastically reduced by urbanization, flood control projects, aggregate mining, water recharge basins, and agricultural land conversion, with only three remnant, isolated populations remaining in San Bernardino and Riverside counties. These populations are located in the Cajon/Lytle Creek area, the Santa Ana River, and the San Jacinto River drainages. Today, these populations appear to be isolated from each other primarily due to agricultural and urban development.

Based on the current range and plant communities that the SBKR occupies, the historic distribution probably included pioneer phase alluvial scrub plant communities found in the active floodplains of small streams and rivers that drained the San Gabriel, San Bernardino, and San Jacinto mountains. In addition to these dynamic areas, SBKR have been found to occupy open habitats adjacent to, but outside of, the active floodplain. Habitat in these areas would best be characterized as intermediate phase alluvial scrub. The higher terraces may serve as refugia to SBKR during major storm events and/or serve as the basis for recolonization of the active floodplain in subsequent years.

The open structure of the plant community and the presence of alluvial or fluvial sandy soils appear to be essential components of SBKR habitat. SBKR rely upon the occasional scouring of flood events which open up, or reduce the vegetative cover in the alluvial scrub plant community. The invasion of higher terraces with intermediate and mature phase habitats by introduced European grasses places the SBKR at risk. European grasses such as *Bromus* sp. and *Avena* sp. form a mat that apparently interferes with SBKR's ability to occupy otherwise suitable habitat. The inability for significant portions of the population to occupy these higher terraces dominated by non-native grasses places the species at considerable risk, as the only remaining suitable habitat will be in the most active and dynamic portions of the channel.

The SBKR is known to occur throughout pioneer and intermediate phase alluvial scrub habitats below the Seven Oaks Dam (Sweetwater Environmental Biologists 1995). The Draft Biological Assessment for Seven Oaks Dam and San Timoteo Creek Flood Control Projects (Sweetwater Environmental Biologists 1995) states that "most of the approximate 2,600 acres of [SBKR] occupied habitat could be indirectly impacted" as a result of altered hydrology from the Dam. The Final Biological Assessment for Seven Oaks Dam and San Timoteo Creek Flood Control Projects (BA)(Sweetwater Environmental Biologists 1996) modified that number stating that "946 of the 2963 occupied acres will be affected by the Dam". Recent surveys conducted by Robert McKernan of the San Bernardino County Museum revealed that the surveys conducted for the Corps' BA missed several areas of occupied habitat that will be affected by the Dam (R. McKernan, pers. com.).

The BA also states that "based on the limited distribution of SBMKR [=SBKR] within the region, the loss of any SBMKR-occupied habitat is significant". However, equally important to the overall acreage of habitat that will be lost with the completion of the Dam is the suitability of the lost and remaining patches of habitat for the SBKR. One of the four most densely occupied areas (and therefore inferred to be supporting the most suitable habitat) will be removed from the 100-year floodplain by the Dam (R. McKernan, pers. comm.). The altered hydrology in this area will lead to senescence of the alluvial scrub, facilitate the invasion of European grasses, and likely render the habitat unsuitable for SBKR. The loss of this high density, or core segment of the SBKR population may significantly reduce the long-term viability of this species in the study area.

The conditions following the completion of the Dam form the basis for the 'baseline condition' or 'without project condition' for the water conservation project. Based on the surveys commissioned by the Corps and the Service, and the Service's current understanding of the ecology of the SBKR, the Service has estimated what the condition of the SBKR population in the study area will be after the completion of the Dam. In short, the Service believes that the SBKR population may be so reduced and the habitat so compromised that any further impacts to that population could cause extirpation of the SBKR from the study area.

The greater western mastiff bat is a sensitive species and occurs from central California, southward to central Mexico (Williams 1986). Its range includes the southwestern corner of San Bernardino County. It occurs in many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, annual and perennial grasslands, palm oases, chaparral, desert scrub, and urbanized areas (Zeiner *et al.* 1990a). Although the majority of the greater western mastiff bat populations are resident in the state, some bats are thought to migrate from the colder areas and winter in lowland areas (Williams 1986). McKernan (1991) observed this species along the Santa Ana River west of the project area. Although there are no known occurrences in the project area, suitable habitat does exist within the study area boundaries.

The Arizona myotis is a Federal sensitive species with an isolated distribution in the southwest corner of San Bernardino County in the San Bernardino Mountains (Zeiner *et al.* 1990a). It appears to be most common in mid- to high-elevation forests but is also fairly common in sagebrush, bitterbrush, alkali desert scrub, wet meadow, and montane chaparral (Zeiner *et al.* 1990a). It is less common in valley foothill woodlands, mixed chaparral, low sagebrush, coastal scrub, and grasslands. Its roosts are usually buildings, but also in hollow trees, under rocks and wood, or occasionally in caves. Suitable habitat exists in the study area although there are no records of its occurrence.

Birds

Twenty-two of the 133 avian species known or expected to occur within the study area are considered sensitive by local, State, and Federal resource agencies. Of these twenty-two, two species, the American peregrine falcon (*Falco peregrinus anatum*) and bald eagle (*Haliaetus leucocephalus*), are Federal endangered species, and one species, the coastal California gnatcatcher (*Polioptila californica californica*), is a Federal threatened species.

The peregrine falcon occurs throughout much of North America, including southern California. This species was at the brink of extinction in California in the 1960's, but is now increasing due to captive breeding and release efforts. The peregrine falcon was listed as endangered by the Service in 1970, and by the State of California in 1971.

Peregrine falcons breed throughout most of California, including the southern and central Coast Ranges north of Santa Barbara, in the Sierra Nevada, Klamath, and Cascade ranges, inland coastal mountains of northern California, coastal San Diego County, and the Channel Islands (Pavelka 1990; Zeiner et *al.* 1990b; Jurek 1992). Currently, the project area is not within the breeding range of this species. In addition, the project area currently lacks suitable habitat to support nesting peregrines.

The peregrines principle food items are passerine birds, waterfowl, and shorebirds (Snow 1972). Foraging areas commonly include coastal estuaries, marshes, lakes, reservoirs, ponds, and other areas where waterfowl congregate. Although there are no reported sightings of peregrine falcons within the project area, they could be expected to occur there based on foraging habitat and prey availability. With the completion of the Dam, the potential for peregrines in the project area will increase significantly. Peregrine falcons are known to occur along other parts of the Santa Ana River including downstream in the Prado Basin (Zembal et *al.* 1985; Hays 1987).

The bald eagle was listed as endangered in its range south of the 40th parallel under the Endangered Species Protection Act of 1966 on March 11, 1967. The listing was subsequently revised on February 14, 1978 and the bald eagle is currently listed pursuant to the Endangered Species Act of 1973, as amended (ACT), as endangered throughout the lower 48 states except for Michigan, Minnesota, Wisconsin, Washington, and Oregon, where it is listed as threatened. Bald eagles are also protected under the Bald Eagle Protection Act, the Migratory Bird Treaty Act, and the Lacey Act. As of July 12, 1994, the Service has been considering a change in the listing status from endangered to threatened in all but the southwestern region, which includes southern California (USFWS 1994c). The bald eagles in the southwestern United States would remain designated as endangered under the proposal because the bald eagle population in this region is small (about 30 nesting pairs), isolated from other populations, and is still vulnerable to natural or human-caused, catastrophic events (USFWS 1994d).

Bald eagles are the only North American representative of the fish or sea eagles. There are two recognized subspecies of the bald eagle: *Haliaeetus leucocephalus alascanus* or northern bald eagle, and *Haliaeetus leucocephalus leucocephalus* or southern bald eagle. The southern bald eagle is the locally-occurring subspecies. Bald eagles of this race are most numerous locally in the Big Bear Basin, upstream from the study area.

Bald eagles typically concentrate around open water where fish can be seen and where waterfowl congregate. Southern bald eagles feed primarily on fish, waterfowl, carrion, seabirds, and small mammals (largely rabbits), and rarely, other small vertebrates (Sapphos Environmental 1994). Diet and feeding habits vary according to locality, season, and availability and vulnerability of food. The primary prey of the bald eagle in the Big Bear Basin is the American coot followed by the common carp (*Cyprinus carpio*) (USFWS 1993a). The diet of the bald eagles in the Prado Basin remains unknown.

Although bald eagles typically occur in most southern California locales only in late fall, winter, and early spring, some birds do remain in the summer and occasionally attempt to nest. Garrett and Dunn (1981) described the bald eagle as a "local winter visitant, fairly common at a few favored wintering sites around inland bodies of water but generally rare otherwise." Although generally scarce elsewhere in southern California, up to 25-30 birds are recorded annually in Big Bear Valley in the San Bernardino Mountains. With the completion of the Seven Oaks Dam, it is anticipated that bald eagles may become a regular visitor to the project area.

The coastal California gnatcatcher (gnatcatcher), a small gray songbird, is an obligate resident of sage scrub dominated plant communities that occur from Los Angeles County generally southward along the coast to the United States/Mexico border (Grinnell and Miller 1944; Atwood 1980; Garrett and Dunn 1981). Due to extensive habitat loss and fragmentation, the gnatcatcher was listed as threatened on March 30, 1993, by the Service (USFWS 1993b). On December 10, 1993, pursuant to section 4(d) of the Act, the Service defined specific conditions associated with certain land use activities under which incidental take of gnatcatchers and their habitat would not be a violation of Section 9 of the Act (USFWS 1993c).

Although the gnatcatcher is strongly associated with sage scrub habitats, not all subassociations of this community appear to be used. The gnatcatcher appears to be most abundant in areas dominated by California sagebrush (*Artemesia californica*) (ERCE 1990). Other important plant species include California buckwheat (*Eriogonum fasiculatum*), laurel sumac (*Malosma laurina*), encelia (*Encelia farinosa*), Mexican elderberry (*Sambucus mexicana*), and lemonadeberry (*Rhus integrifolia*). However, not all these species occur in all habitats where the gnatcatcher is found.

would occur, it was assumed that all habitat upstream of the Dam and below the 50 year flood line (2,400 feet) would be degraded or lost. Therefore, the habitat in this area, as it relates to the State and federally listed species identified in the 1988 GDM, was fully mitigated for under the Dam project (USACE 1988). The 1988 GDM did not evaluate impacts of inundation on two species that were recently listed as endangered, the arroyo southwestern toad and the California red-legged frog. The proposed water conservation project would cause up to 5,500 feet of potential habitat for these two species to be flooded each year with still, non-flowing waters of the conservation pool. This distance is the linear difference between the target debris pool elevation for the Dam (2,200 feet) and the proposed water conservation pool elevation (2,300 feet).

Downstream of the Dam

Although suitable habitat for the arroyo southwestern toad exists both upstream and downstream of the Dam, surveys have not yet been completed to determine if this Federal endangered species occurs within the study area. If arroyo southwestern toads occur downstream of the Dam, their reproductive success and long-term viability may be significantly reduced as a direct result of the proposed water conservation project. The restriction of flows during the spring and early summer months will cause small pools of water downstream of the Dam to dry up prematurely due to the lack of inflow. The arroyo southwestern toads may use these pools for egg laying and reproductive purposes in March, April, and May. Until targeted surveys are completed for arroyo southwestern toads, it is impossible to quantify the direct, or indirect impacts that could result from this project.

Fish potentially breeding downstream of the Dam may be impacted by the same factors as the arroyo southwestern toad. The fish species of primary concern include the Santa Ana sucker, Santa Ana speckled dace, and arroyo chub. Under normal (without project) conditions, adult fish could breed in the small pools, backwater areas, and braided stream channels during the spring, and their offspring could move into the more perennial waters of the main channel before these shallow waters dry up in the summer months. An elimination of spring flows could cause these small pools and backwater areas to become isolated and dry up prematurely, thereby reducing the reproductive success and long term viability of fish species in that area. Again, no recent surveys have been conducted for fish species in the area and therefore the direct impacts of the proposed project on fish species cannot be quantified.

Indirect Impacts

Upstream of the Dam

The loss of habitat upstream will affect species of all taxonomic groups. If the endangered arroyo southwestern toad and/or California red-legged frog is present in the project area, their reproductive success will be severely reduced due to habitat inundation, an increase in exposure of the eggs to predation, and the reduction/elimination of vegetative cover.

Downstream of the Dam

The goal of the water conservation project is to impound spring runoff behind the Dam until a target water conservation pool elevation is reached and then release the water at a relatively steady rate throughout the summer months. The time it takes to reach this pool elevation is wholly dependent upon precipitation, input from natural springs, and groundwater forced to the surface at the base of the Dam. In most years, it will take several months before the target elevation is reached, if ever, thereby preventing any water from being released during the growing season of most vegetative communities (the months of March, April, and May). Preventing flows, even small flows, from reaching the floodplain downstream of the Dam during these months would have adverse impacts on biological resources that have adapted to the presence of spring runoff.

The proposed water conservation project would also alter flows from relatively large, spring flood events. For example, for a 50 year seasonal flood event, the peak discharge will be reduced from 2500 cfs under normal Dam operations, to 550 cfs after the proposed water conservation project is implemented (USACE 1997). A significant portion of the 550 cfs will be diverted into percolation ponds and distribution systems, thereby allowing very little water to reach the downstream biological communities. However, the current diversions and distribution systems are limited in their capacity, and a 2500 cfs release would reach far beyond the diversions and allow a significant amount of water to reach the downstream ecosystems. The biological communities in the downstream floodplain rely on relatively large and infrequent storm events to promote habitat renewal, hinder the invasion of exotic species, and promote seed dispersal. Therefore, the proposed water conservation project may 1) impact the Santa Ana River woolly-star and its habtat, and 2) limit the management options available to the Woolly-Star Management Committee for protecting the Santa Ana River woolly-star and the Preserves.

The amount of habitat that will be lost as an indirect result of this project cannot be calculated based on the limited information currently available. However, we agree with the Corps' BA that states "the loss of any SBMKR[SBKR]-occupied habitat is significant". Following the construction of the Dam, it is estimated that suitable habitat for the SBKR will begin to degrade and be confined to areas directly adjacent to the active stream channel. As upland areas, deprived of the natural periodic flooding events, senesce and become dominated by invasive non-native grasses, the SBKR will be forced to the channel margins. The proposed water conservation project will further reduce the spring flows, thereby causing the animals to move even closer into the active channel as the habitat degrades on the terraces. This puts the entire population of SBKR in the Santa Ana River alluvial floodplain at very high risk of being exirpated by a single storm event. This indirect impact could be the proverbial straw that breaks the camels back and causes the extirpation of the SBKR from the study area.

Growth Inducement

The water conservation project is growth inducing. The proposed project will recharge the local aquifer, thereby providing more water to local communities for growth and expansion. Without the project, water will be released as soon as possible after each storm event. With the proposed project, the water will be held for up to several months before being released. As the release rate will be relatively constant, the water supply to downstream users and recharge of the downstream aquifer(s) will also be relatively constant and possibly expanded. Improved water supplies will facilitate urban growth and expansion in water service areas. In turn, there could be impacts on listed species throughout the water service area.

SUMMARY

The Corps has proposed to operate the Seven Oaks Dam for water conservation purposes in addition to flood protection. The project would result in the impounding of water up to an elevation of 2,300 feet behind the Dam between March 1 and May 30 of each year. The water would be released at a nearly constant rate between June 1 and September 30. The exact dates and duration of impoundment would be determined each year as the result of several factors including the amount of water flowing into the reservoir behind the Dam, the amount of water entering the Santa Ana River from anthropogenic sources, and the level of water in the Prado Basin. Additional access roads may be built as part of this project but the specifics have not been resolved.The Corps has therefore requested that the Service assume that no new roads would be constructed for the purposes of this report.

Implementation of the proposed project will impact both the upstream and downstream biological communities, including sensitive habitats and federally sensitive and listed species. Many of these species are obligates to alluvial scrub habitat, a habitat type that is rapidly disappearing in southern California. The alluvial scrub habitat below the Dam and within the area that would be impacted by the proposed project supports several sensitive and listed species of plants and animals. Federally listed endangered species may be impacted upstream of the Dam but surveys to determine the presence/absence of those species have not been completed.

The magnitude of the impacts associated with the proposed water conservation project is much smaller than the magnitude of impacts associated with the construction of the Dam. However, the significance of any project related impacts is based on a comparison between the without-project and estimated with project conditions. The without-project condition for the proposed water conservation project is the same as the estimated with project condition for the Dam construction project as it appears in the 1988 Phase II GDM. This is a projected condition for the year 2000, after the Dam is completed and functional. However, the Corps and the Service are currently conducting studies and meetings to evaluate the impacts of the Dam on species that were not considered sensitive in 1988. In addition, new information on the hydrology of the Santa Ana River, proposed non-Federal activities in the area downstream of the Dam, and on the resource needs of some sensitive species, may lead the Service to change it's assessment of the without-project condition for the proposed water conservation project from that which appeared in the 1988 Phase II GDM. As these evaluations are not yet complete, the Service is compelled to err on the side of resource protection in its estimate of the without-project condition for the proposed water conservation project.

Specific aspects of the proposed project that will impact biological resources in the study area are: 1) impounding water behind the Seven Oaks Dam for an extended period of time thereby diminishing and/or preventing natural spring flows from reaching the alluvial scrub downstream, 2) extending the period of inundation of habitats upstream of the Seven Oaks Dam and flooding potential habitat for federally listed endangered species, and 3) releasing waters during the normally dry late summer months thereby changing the dynamics of downstream ecosystems. Collectively, these impacts will lead to permanent loss of native plant communities and wildlife habitat upstream of the Dam, increase the degradation (caused by the Dam) of sensitive habitats downstream, potentially extirpate the federally sensitive SBKR from the study area, and facilitate growth inducement and the loss of habitat for listed species in the water service areas by providing expanded or more reliable water supplies.

RECOMMENDATIONS

The Fish and Wildlife Coordination Act states that "...wildlife conservation shall receive equal consideration and be coordinated with other features of water-resource developement programs through the effectual and harmonious planning, developement, maintenance, and coordination of wildlife conservation...". Should the Corps' preferred alternative be implemented, incorporation of the following recommendations would minimally offset project induced losses to fish and wildlife resources and minimize impacts to federally listed and sensitive species.

1) The Corps shall continue working with the Woolly-Star Management Committee to develop a long-term managment plan for the Santa Ana River Woolly-Star Preserve. If the committee deems that a necessary part of their management plan cannot be fulfilled due to the water conservation practices, the Corps shall initiate formal consultation pursuant to section 7 of the Endangered Species Act of 1973, as amended, for impacts to the Santa Ana River woolly-star (*Eriastrum densifolium* ssp. *sanctorum*).

2) The Corps shall conduct surveys and then initiate formal consultation pursuant to section 7 of the Endangered Species Act of 1973, as amended, for the arroyo southwestern toad (*Bufo microscaphus californicus*) and the California red-legged frog (*Rana aurora draytonii*) if they are found in the study area.

3) The Corps shall fund surveys for the presence of sensitive fish species so that information on their presence/absence can be incorporated into the long-term strategy for preserving the biological communitites downstream of the Dam.

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BIOLOGICAL SURVEYS FOR SENSITIVE SPECIES

RESULTS OF SURVEYS FOR THE ARROYO SOUTHWESTERN TOAD, CALIFORNIA RED-LEGGED FROG, AND THE SANTA ANA SUCKER ALONG THE SANTA ANA RIVER, SEVEN OAKS DAM AREA, SAN BERNARDINO COUNTY, CALIFORNIA

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Carlsbad, California

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EXECUTIVE SUMMARY

Surveys were conducted for the arroyo southwestern toad (*Bufo microscaphus californicus),* California red-legged frog (*Rana aurora draytonii*) and the Santa Ana sucker (*Catostomus santaanae*) near the Seven Oaks Dam in San Bernardino County, California. Fish surveys for the Santa Ana sucker were conducted in all areas containing water. No fish were found, nor have there been any records of their occurance in recent years.

Potential habitat for the California red-legged frog and the southwestern arroyo toad were surveyed during day and nighttime hours in accordance with the U.S. Fish and Wildlife Service (USFWS) survey protocol. There have been no records for the southwestern arroyo toad in the area. The California red-legged frog has not been recorded in the area since the 1960's. No sensitive amphibians were found during the current survey.

Based on the results of the study, no impacts to these sensitive species are expected to occur from the proposed water conservation proposal at the Seven Oaks Dam. No additional surveys are recommended.

INTRODUCTION

Purpose and Scope

As part of the U.S. Army Corps of Engineers'(Corps) evaluations of potential effects (direct, indirect, and cumulative) to threatened, endangered and proposed species for the Seven Oaks Dam Water Conservation Feasibility Study, biological surveys for the arroyo southwestern toad (*Bufo microscaphus californicus)*, California red-legged frog (*Rana aurora draytonii*), and Santa Ana sucker (*Catostormus santaanae*) are required to determine the presence or absence of populations within the proposed study area.

Figure 1 delineates the general vicinity of the study area. The area investigated included the Santa Ana River from the Seven Oaks Dam, to 2.5 miles down-stream of the dam, as well as the 100-year flood line of the dam, including the river's tributaries. This study includes an analysis of the existing literature base, field studies and an analysis of the potential for these species to occur in the study area.

Previous Studies

Santa Ana Sucker

Populations of the Santa Ana sucker have been adversely affected by elimination or alteration of its stream habitats, reduction or alteration of stream flows, pollution, urbanization, and introduced species. The Santa Ana sucker is warranted for listing as threatened, but precluded by other listings of higher priority (62 FR 15872, April 3, 1997). The anticipated date of listing is October, 1998, or April, 1999 (Barrett pers. comm.).

Santa Ana suckers have a limited distribution, naturally occurring within Los Angeles, San Gabriel, and Santa Ana River systems, and introduced in the Santa Clara River system (Swift et al. 1993). In the Santa Ana River, they survive only in the lower portions. They have been extirpated from the upper Santa Ana River drainage due to Prado Dam altering the flow regime and impeding upstream access, reduced water quality, reduced flows due to diversions, and introduced brown trout.

The Santa Ana sucker occur in small to medium-sized permanent streams with depths ranging from a few centimeters to a meter or more (Smith 1966, Deinstadt et. al 1990), with flows described from slight to swift. Santa Ana suckers prefer clear water and coarse substrates consisting of gravel, rubble, and boulder. The suckers are often associated with algae but not macrophytes; they feed primarily on detritus, algae, and diatoms (Greenfield et al. 1970). Most suckers live two to three years, but some may live up to three to four years. Sexual maturity occurs by the first year and spawning occurs from March until early July, peaking between late May through early June (Moyle 1976). Based on the search of the California Natural Diversity Data Base CNDD) and communication with the California Department of Fish and Game, no recent records of the Santa Ana Sucker exist within or near the study area.

Arroyo Southwestern Toad and California Red-Legged Frog

Information on the historical distribution of the arroyo southwestern toad and California red-legged frog was gathered from the following sources:

- California Department of Fish and Game's (DFG's) publication Amphibian and Reptile Species of Special Concern (Jennings and Hayes 1994);
- California Natural Diversity Data Base (NDDB) (Natural Diversity Data Base 1994);
- conversations with species experts and agency biologists; and
- literature records (especially Stebbins 1985).

Neither the arroyo southwestern toad nor the California red-legged frog had been observed during surveys conducted by biologists for Southern California Edison. Pete Bloom and Robert Fisher (Southern California Edison) conducted surveys for both species in our Survey Area 5 on June 22-23, 1996, and July 3, 5, 6, and 7, 1996; none were found. In addition, there are no NDDB locations for either species in the Santa Ana River. Jennings (pers. comm.) and Jennings and Hayes (1994) indicated there are no known records of the arroyo toad from the Santa Ana River, but it historically supported red-legged frogs back in the 1950's and 1960's.

Report Organization

This report outlines the method used for the fish and amphibian surveys and provides the results of those surveys. A discussion and conclusions section analyzes the potential for the three species to occur within the study area, study limitations and an analysis of potential impacts to the three species. Records of fish surveys are provided in Appendix A and data sheets are contained in Appendix B. List of other wildlife species observed during the study are provided in Appendix C.

METHODS

Fish Surveys

A survey to determine the presence of Santa Ana sucker (*Catostomus santaanae*) was conducted in the vicinity of Seven Oaks Dam construction. No Santa Ana suckers were detected in the survey area around Seven Oaks Dam.

The Seven Oaks Dam occurs in the Santa Ana River Canyon, approximately one mile upstream from the mouth of the canyon. The Santa Ana River Canyon is a steep-walled canyon that originates in the San Bernardino Mountains. The steeps slopes are covered with chaparral scrub, sage scrub, grasses, and forbes (U.S. Fish and Wildlife Service 1997). A narrow belt of riparian habitat meanders along the bottom of the canyon, but most of the floodplain vegetation is open shrub scrub and alluvial scrub. There is little or no vegetation along the river.

The area of inundation outlined in Figure 2 (above the dam) and the stream channel below the dam for 2.5 miles was surveyed. Due to access conditions and construction activities, the study area was broken into 5 components, listed in order sampled: (1) downstream of dam, (2) upstream of dam, (3) north fork, (4) Government Canyon, and (5) Warm Springs.

Pre-survey sampling was conducted on May 13 and 14, 1997, counting habitat units (pool, riffle, run) and visually surveying streams for fish species. Habitat surveys were conducted on May 15, 1997, sampling every fifth habitat unit type by measuring physical parameters (length, width, depth, temperature, substrate and bank composition) and surveying for fish presence by seining, dip netting, or visual observation and snorkeling. Typically, water depth was too shallow or substrate too rocky to effectively sample by snorkeling or seining, respectively. Therefore, visual surveying was the primary means of observing fish. All sampling was done by working upstream. Appendix A contains a table outlining each sampling site.

Amphibian Surveys

Surveys for the federally-listed endangered arroyo southwestern toad and the federally-listed threatened California red-legged frog were conducted during day and night in accordance with U.S. Fish and Wildlife Service (USFWS) survey protocol (Davenport pers. comm.). Mr. Art Davenport with the Carlsbad Field Office of USFWS recommended the following modifications to the USFWS survey protocols to increase the detectability of either species:

Increase the number of survey visits from the recommended three to six for the California red-legged frog (3 sets of two days each) with each day consisting of a daytime and nighttime component. He normally recommends that the surveys be conducted at least 20 days apart but agreed that we could conduct them closer together, to follow the USFWS arroyo southwestern toad protocol and to also go ahead and carefully survey for eggs and breeding adults.

Surveys were conducted in suitable habitat in the Santa Ana River wash approximately 2.5 miles downstream of the Seven Oaks Dam and in areas upstream of the dam within the 100-year floodplain (approximately 2400 feet), including tributaries in Government and Warm Springs Canyons. Figure 3 illustrates the locations that amphibian surveys were conducted.

Visual surveys were conducted in all suitable habitat for arroyo southwestern toads and California red-legged frogs. Aquatic habitats were scanned with binoculars from 50 to 100 feet away to avoid frightening basking individuals. The perimeter of the water was surveyed on foot, including checking aquatic grasses, stream side margins, and water surfaces. Acoustic and spotlighting surveys for amphibians were conducted at night when the detectability was increased. Biologists familiarized themselves with calls of both species by listening to the *Cornell Laboratory of Ornithology's Frog and Toad Calls of the Pacific Coast*. Acoustic surveys were conducted while walking along the waters perimeter to determine species and number of individual frogs calling.

Spotlight surveys were conducted to detect eye shine using flashlights with either one 6-volt or four D-cell batteries. Biologists walked along the banks using spotlights to detect eye shine from adult amphibians and to survey water for adults.

Jones & Stokes Associates' biologists conducted an initial survey to determine the extent of suitable habitat (including estivation habitat) for both species and to identify survey areas for the daytime and nighttime acoustic and spotlighting surveys. Based on our initial survey we identified seven survey areas, as shown in Figure 3. The Santa Ana River from the Greenspot Bridge to about 1.5 miles downstream was dry and was not included in the amphibian surveys. Survey Areas 1 and 2 are in the Santa Ana River below the dam, Survey Area 3 is a created pond on the backside of the dam that appears to receive runoff from a sprinkler system and rain. Survey Areas 4 and 5 are in the Santa Ana River upstream of the dam. Survey Area 6 is Warm Springs Canyon and Survey Area 7 is Government Canyon.

During the initial visit biologists identified potential habitat for both species in the Santa Ana River (Survey Areas 1, 2, 4, and 5) and for the California red-legged frog only in the pond (Survey Area 3). Neither Warm Springs or Government Canyon provide suitable habitat for either the arroyo southwestern toad or the California red-legged frog. The first set of surveys (a survey set consisted of visiting each survey area two days and two nights) was conducted on May 13, 14 15, and 16, 1997. The second set of surveys was conducted on May 22, 23, and 24th (full moon on the 22nd), 1997, and the final set of surveys on June 5, 6, and 7th, 1997. Only two daytime surveys were conducted in Government and Warm Springs Canyon because they did not provide suitable habitat for either the toad or frog.

RESULTS

Fish Surveys

A total of 318 habitat units were identified in the sampled area (115 pools, 138 riffles, and 65 runs) and 61 were sampled (23 pools, 26 riffles, 12 runs). Water clarity was good and bank vegetation was practically non-existent, except in Government Canyon and Warm Springs. From May 13 to May 15, the water level was observed to have dropped at least 4 inches (e.g., some shallow pools were no longer present on the day of the survey). Water and air temperature increased rapidly throughout the day. Only trout were observed, comprised primarily of rainbow trout (*Oncorhynchus mykiss*), although brown trout (*Salmo trutta*) were also observed. No Santa Ana Suckers were found during the survey.

The survey began at the southern end of the study area, which was dry up to Greenspot Road bridge (approximately 1.5 miles downstream from dam). Surface water was intermittent for approximately one-half mile upstream. The dry streamed was 100 to 200 feet wide, and was composed of boulders and sand. Typically, the wetted areas were only a few feet wide. Flowing surface water conditions began near a power house flume (approximately 0.75 miles below dam); however, flow conditions could only be described as trickling. Streamed composition consisted of small boulders and cobble to gravel. Trout were observed in some pools and runs, some of which were isolated by subsurface flow conditions.

Flows increased above the dam. Alternate braided channels occurred along the flood plain and occasionally supported dense marsh-type vegetation communities. The main wetted channel was only a few feet wide, composed of cobble and gravel. Trout were occasionally observed in relatively deep pools (greater than 12 inches-deep) and runs. However, only every fifth unit type was sampled and fish counted and recorded.

In the north fork reach, flows were reduced, often intermittent, and eventually dried up (approximately 1.75 miles upstream of the dam). Bank vegetation was rare and the stream bed consisted of small boulders, cobble, and gravel or sand. The wetted channel was typically only a few feet wide. Trout were observed in relatively deep pools (greater than 12 inches-deep) and runs, and were sometimes isolated by subsurface flow conditions.

Starting at the confluence with the Santa Ana River, Government Canyon was dry for the first mile up-river and then began flowing continuously. The flow conditions would be described as trickling. The stream bank was occasionally vegetated but mostly consisted of bedrock. Shrubs, grasses and trees occurred along the entire reach, set back from channel several feet. The stream was well shaded by the steep canyon walls which contributed to cooler water temperatures, even late in the day. Due to the bedrock substrate, the stream consisted predominately of pool and riffle habitats with a very narrow channel of flow. No fish were observed in Government Canyon.

Warm Springs was dry at the confluence but began flowing intermittently further upstream. The sample area extended approximately one half mile from the confluence. A trickling flow occurred, which was choked with thick mats of surface algae, and vegetation was present along channel. The stream bed consisted of sand and gravel with cobble. No fish were observed in Warm Springs, with the exception of a recently deceased six-inch rainbow trout observed late in the day during the initial pre-survey.

Amphibian Surveys

Neither the arroyo southwestern toad nor the California red-legged frog were observed during the surveys. Two special-status reptiles were observed during our surveys and including the two-striped garter snake and the coastal western whiptail. The survey area supports suitable habitat for both the arroyo southwestern toad and the California red-legged frog. However, neither species is expected to occur in the survey area because none were observed during our surveys, none have been observed during surveys for Southern California Edison in our Survey Area 5 and upstream, and due to the lack of NDDB records for the site.

Biologists identified adult and larval Pacific chorus frog, California chorus frog, and western toad. Western toads were observed in amplexus and laying eggs. California chorus frogs and western toad metamorphs were observed in Survey Area 1 during our final survey in June. We observed at least five two-striped garter snakes in the Santa Ana River, one below the dam in Survey Area 2, and the rest above the dam in Survey Areas 4 and 5.

DISCUSSION AND CONCLUSIONS

Habitat Requirements and the Potential for the Three Sensitive Species to Occur Within the Study Area

The study area was once habitat for the Santa Ana sucker, and the portion of the study area containing water would be considered potential habitat for the species. The detailed survey of the area confirmed previous conclusions that the species does not currently occur in the upper Santa Ana River.

Potential habitat for the arroyo southwestern toad occurs throughout the study area in Survey Areas 1, 2, 4, and 5. Survey Areas 2 and 4 appeared to be the most suitable with the greatest extent of sandy banks with willows and loose gravely areas in the stream. Survey Area 3 is a pond and does not provide suitable habitat for the toad.

Survey Areas 2 and 4 had 100 percent flow during all of our field surveys and provided the best habitat for both the arroyo toad and red-legged frog. Both areas had sections suitable for arroyo toads, as described above, as well as deeper pooled areas with overhanging willows that could support red-legged frogs. All of the deeper pool habitat appeared to be the result of earth movement activities. Survey Area 1 was the driest and only about 25 percent of the reach held water. Survey Area 3 (the pond) remained at a fairly constant water level; there was no stream side vegetation and no emergent vegetation. It provided marginal habitat for red-legged frogs.

Survey Limitations

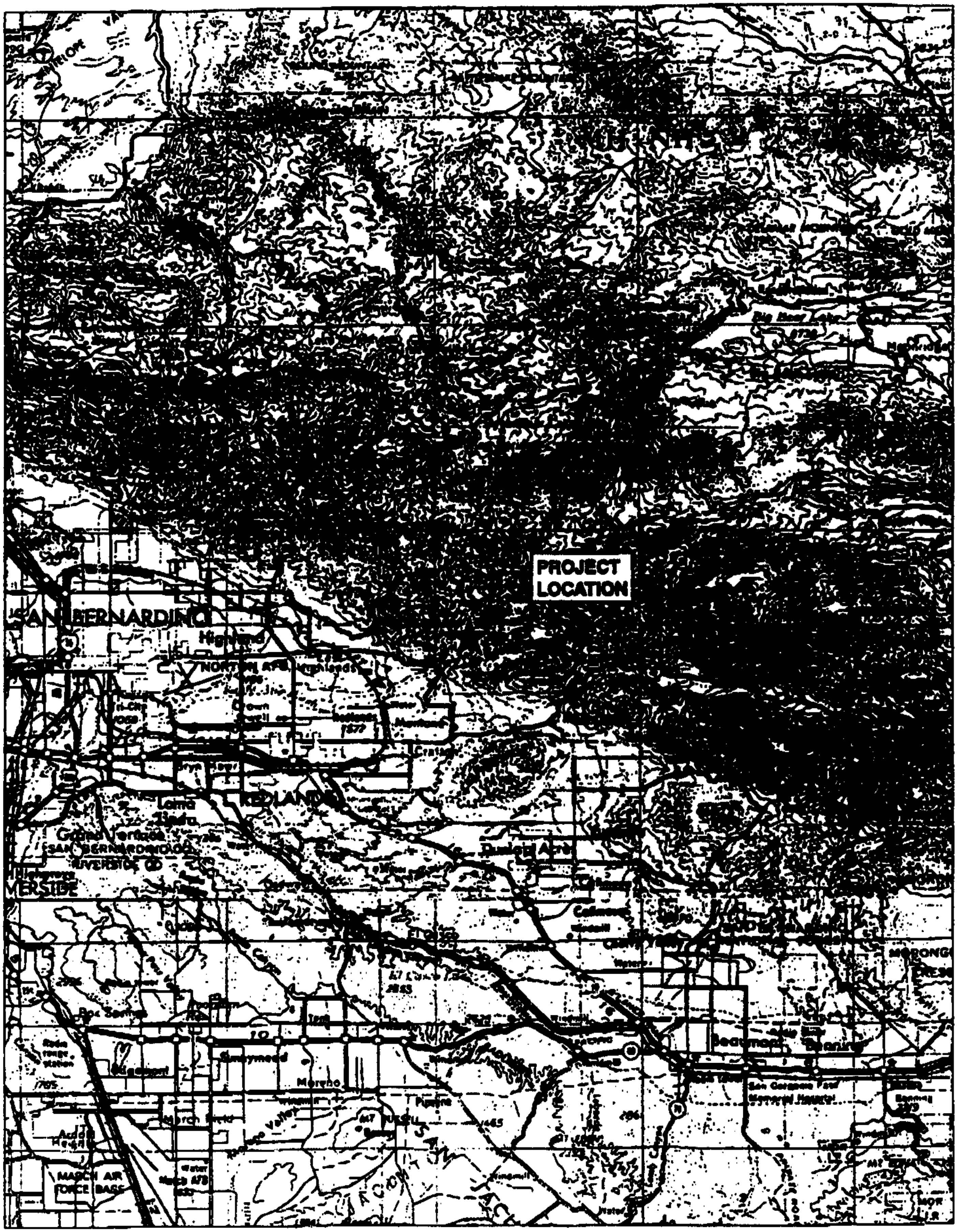
Both the fish and amphibian surveys were conducted during only one season. Since the year had average rain fall and amphibians were surveyed using U.S. Fish and Wildlife Service protocol, the studies are representative of the current biological conditions in the area.

Potential Impact and Determination of "May Affect"

Due to the absence of any of the three sensitive species in the area, as well as no recent records of their occupance, no potential impacts to these species are anticipated as a result of implementation of the proposed action. Therefore, it is believed that there would be no effect on these three species.

Recommendation for Further Studies

No additional studies are recommended since no individuals of the three species were found and no recent records exist for their occurance in the study area.



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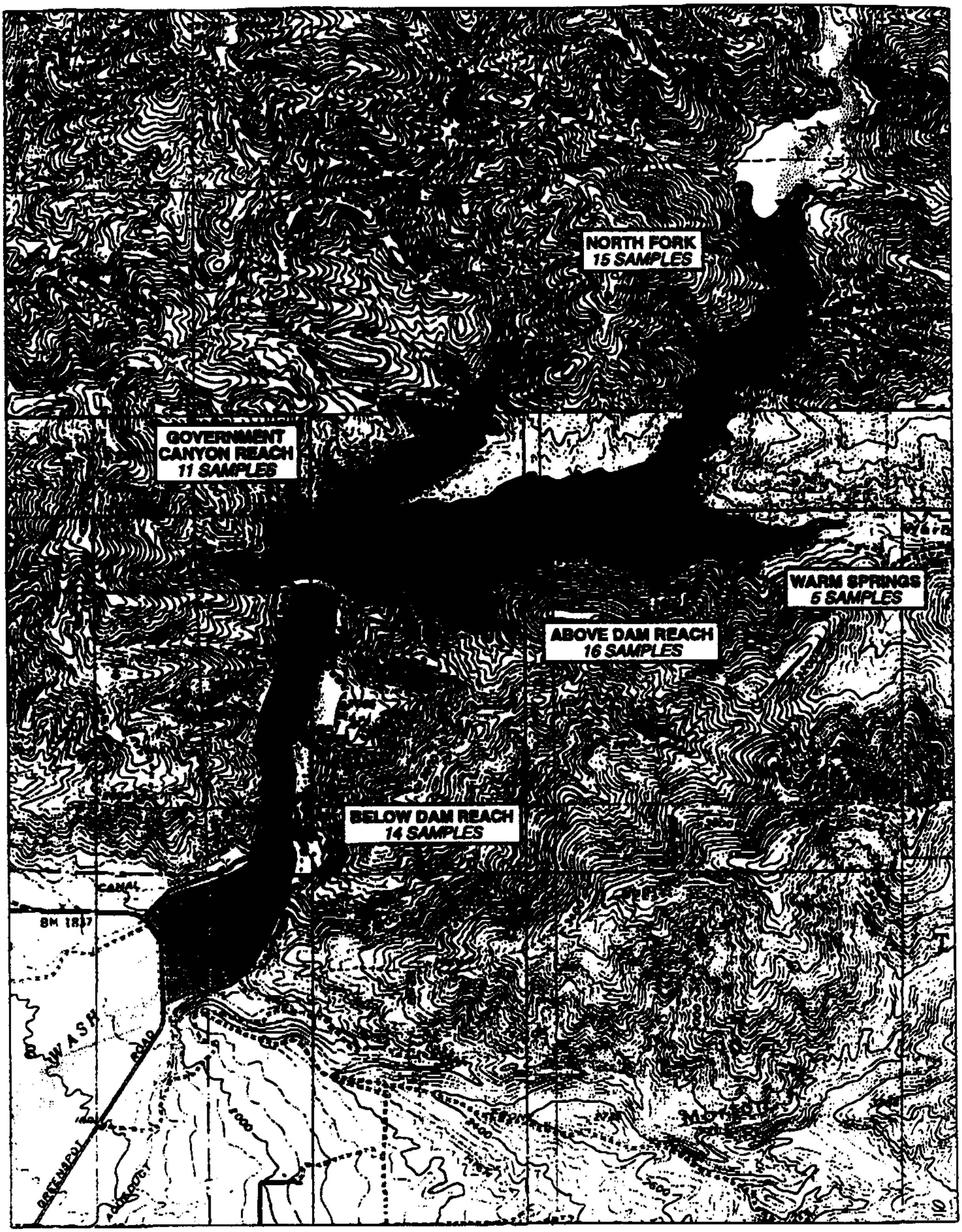
San Bernardino, Santa Ana, CA

PROJECT VICINITY MAP
Figure 1



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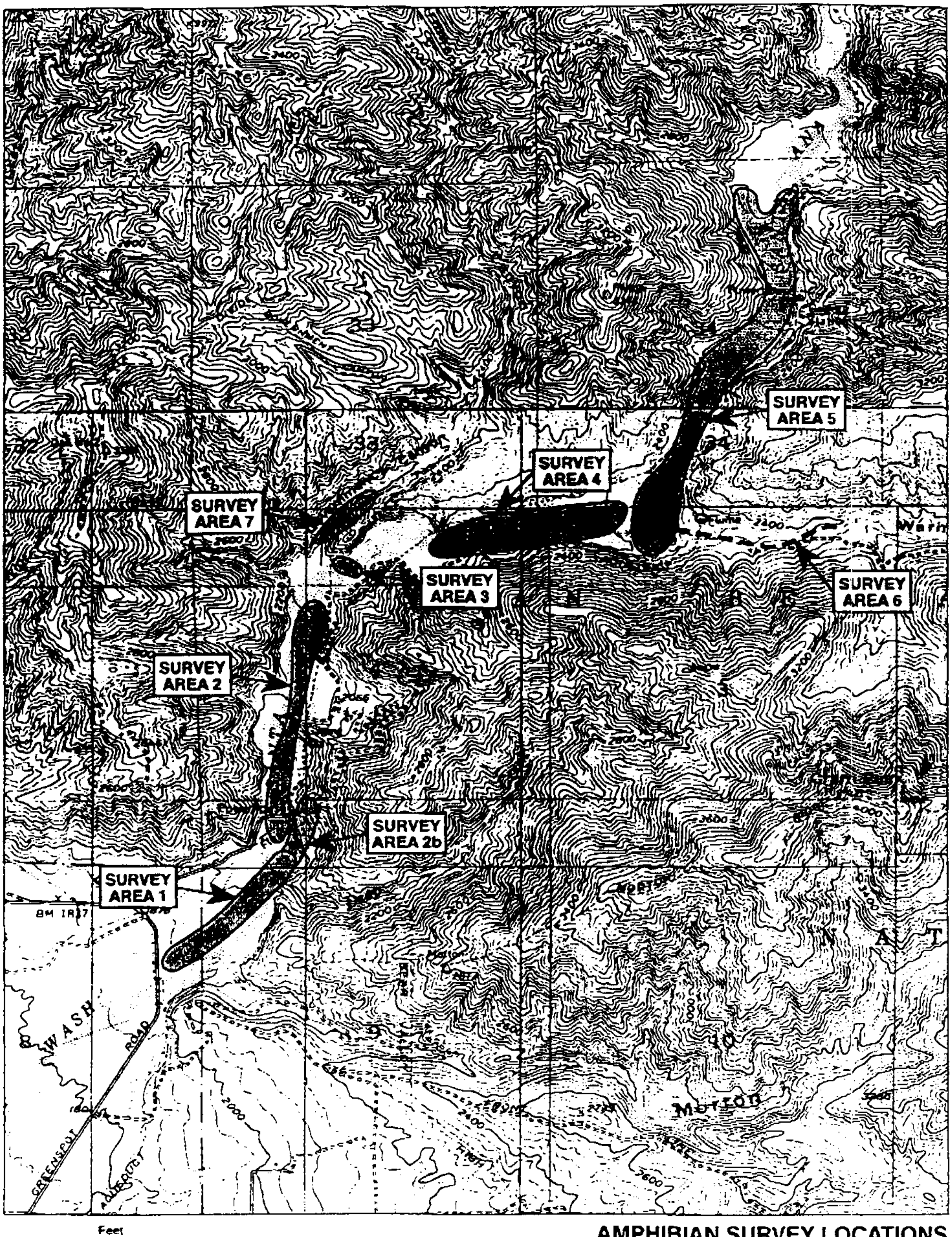
Keller Peak, Yucaipa, CA

FISH SURVEY LOCATIONS
Figure 2



Base Map Source: USGS 1:24,000
Keller Peak, Yucaipa, CA

AMPHIBIAN SURVEY LOCATIONS
Figure 3

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APPENDIX A

Fish Sampling Locations

APPENDIX B

Amphibian Data Sheets

APPENDIX C

Other Wildlife Species Noted During the Survey

Table 1. Other Species Observed During the Fish & Amphibian Surveys Near Seven Oaks Dam

Species Common Name	Scientific Name
Western toad	*Bufo boreas*
California chorus frog	*Pseudacris cadaverina*
Pacific chorus frog	*Pseudacris regilla*
Granite spiny lizard	*Sceloporus orcutti*
Two-striped garter snake	*Thamnophis hammondii*
Speckled rattlesnake	*Crotalus mitchellii*
Southern Pacific rattlesnake	*Crotalus viridis helleri*
Great Basin fence lizard	*Sceloperus occidentalis biseriatus*
Side-blotched lizard	*Uta stansburiana*
Coastal western whiptail	*Cnemidophorus tigris milticarinatus*
Mule deer	*Odocoileus hemionus*
Coyote	*Canis latrans*
Bobcat	*Urocyon cinereoargenteus*
Desert cottontail	*Sylvilagus audubonii*
California ground squirrel	*Sciurus griseus*
Western pipistrelle	*Pipistrellus hesperus*
Red-tailed hawk	*Buteo jamaicensis*
American kestrel	*Falco sparverius*
Common barn owl	*Tyto alba*
Killdeer	*Charadrius vociferus*
Lesser nighthawk	*Chordeiles acutipennis*
White-throated swift	*Aeronautes saxatalis*
Western kingbird	*Tyrannus verticalis*
Scrub jay	*Aphelocoma coerulesens*
Black phoebe	*Sayornis nigricans*
Cliff swallow	*Hirundo pyrrhonota*
Great blue heron	*Ardea herodias*
Black-crowned night heron	*Nycticorax nycticorax*
Common raven	*Corvus corax*
California quail	*Callipepla californica*
Mourning dove	*Zenaida macroura*
Bewick's wren	*Thryomanes bewickii*
Rock wren	*Salpinctes obsoletus*

Table 1. (Continued)	
Species Common Name	**Scientific Name**
Cactus wren	*Campylorhynchus brunneicapillus*
Bushtit	*Psaltriparus minimus*
European starling	*Strunus vulgaris*
American goldfinch	*Carduelis tristis*
Black-headed grosbeak	*Pheucticus melanocephalus*
Brown-headed cowbird	*Psaltriparus minimus*
Canyon wren	*Catherpes mexicanus*
House wren	*Troglodytes aedon*
Lesser goldfinch	*Carduelis psaltria*
Mallard	*Anas platyrhynchos*
Great-tailed grackle	*Cassidix mexicanus*
Costa's hummingbird	*Calypte costae*
Northern flicker	*Colaptes auratus*
Northern mockingbird	*Mimus polyglottos*
Northern oriole	*Icterus galbula*
Phainopepla	*Phainopepla nitens*
Rough-winged swallow	*Stelgidopteryx serripennis*
Rufous-sided towhee	*Pipilo erythrophthalmus*
Violet-green swallow	*Tachycineta thalassina*
Wrentit	*Chamaea fasciata*
Red-winged blackbird	*Agelaius phoeniceus*
Brewer's blackbird	*Euphagus cyanocephalus*
Song sparrow	*Melospiza melodia*
House sparrow	*Passer domesticus*
Rufous-crowned sparrow	*Aimophila rugiceps*
Black-headed grosbeak	*Pheucticus melanocephalus*
House finch	*Carpodacus mexicanus*
Rufous-sided towhee	*Pipilo erythropthalmus*
California brown towhee	*Pipilo fuscus crissalis*

APPENDIX C

AIR QUALITY: REGULATORY REQUIREMENTS

AIR QUALITY: REGULATORY REQUIREMENTS

Air quality in the South Coast Air Basin (basin) is regulated by federal, state, and regional control authorities. The U.S. Environmental Protection Agency (EPA) is involved in local air quality planning through the Federal Clean Air Act (CAA), as recently amended by the Clean Air Act Amendments of 1990 (the "1990 Amendments"). The EPA is responsible for setting and enforcing the national standards for atmospheric pollutants. The EPA enforces these national standards and also regulates emission sources that are under the exclusive authority of the federal government, such as aircraft and certain locomotives. At the state level, the Lewis-Presley Air Quality Management Act (originally adopted in 1976 and substantially amended in 1987) and the California Clean Air Act of 1988 (the Sher Bill, AB 2595) set air quality planning and regulatory responsibilities for the basin. The California Air Resources Board (ARB), which became part of the California Environmental Protection Agency (Cal EPA), is charged with the responsibility for ensuring implementation of the California Clean Air Act (CCAA), responding to the federal Clean Air Act (CAA), coordinating efforts to attain and maintain ambient air quality standards and conducting research into the causes of, and solutions to, air pollution problems. At the regional level, the SCAQMD and the Southern California Association of Governments (SCAG) have responsibility for preparing and periodically revising the Air Quality Management Plan (AQMP), which contains measures to meet state and federal requirements. SCAG also serves as the regional clearinghouse for projects requiring environmental documentation under federal and state law. In this role, SCAG reviews proposed projects to analyze their impacts on SCAG's regional plans.

FEDERAL REGULATORY REQUIREMENTS

The early federal legislative response to air quality concerns consisted of the Air Pollution Control Act of 1955, the Clean Air Act of 1963, and the Air Quality Act of 1967. The goal of the Clean Air Act (CAA) of 1970, as stated by Congress in the 1977 CAA Amendments, was "to protect and enhance the quality of the Nation's air resources." The 1990 Amendments are extremely broad. One of the primary goals of the 1990 Amendments was an overhaul of the planning provisions for those areas not currently meeting NAAQS. The major titles of the 1990 Amendments address attainment of air quality standards, mobile source emissions, air toxics, acid rain, a new federal permit program, enforcement, and protection of stratospheric ozone. The title that have the potential to affect the air quality analysis of the proposed project is Title I (attainment and maintenance provisions).

TITLE I OF THE CLEAN AIR ACT AMENDMENTS OF 1990

The goal of Title I is to attain federal air quality standards for six criteria pollutants: ozone (O_3), carbon monoxide (CO), fine particulate (PM10), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead (Pb).

Federal standards are established by the EPA at levels to protect public health with an adequate margin of safety.

The 1990 Amendments divided the nation into five categories of planning regions, depending on the severity of their pollution, and set new timetables for attaining the air quality standards. The categories range from "marginal" to "extreme." Attainment deadlines are from 3 to 20 years, depending on the category. The South Coast Air Basin is the only region in the nation classified as an "extreme" ozone nonattainment area. For areas designated "extreme," Section 181 of the CAA sets the ozone attainment deadline as 20 years from the date of the CAA's enactment. Deadlines for attainment of carbon monoxide and PM10 standards are years 2000 and 2005, respectively.

Title I also requires each nonattainment area to submit a comprehensive inventory of actual emissions as part of a State Implementation Plan (SIP) revision to demonstrate the means for achieving federal standards by the established deadlines. Each nonattainment area must achieve a 15 percent reduction from its actual 1990 emissions inventory within 6 years. Thereafter, each area must achieve a 3 percent annual reduction. The SCAQMD and ARB have a good record for providing the required SIP submittals in the allotted time frame. The basin has been able to comply with all key actions required under Title I.

Provisions of Section 182 of the 1990 Amendments relate to ozone nonattainment areas, and Sections 186 and 187 relate to carbon monoxide nonattainment areas. These sections emphasize strategies for reducing vehicle miles traveled. Section 182 requires submission of a SIP revision "that identifies and adopts specific enforceable transportation control strategies and transportation control measures to offset any growth in emissions from growth in vehicle miles traveled or numbers of vehicle trips in such area" to meet statutory requirements for demonstrating periodic emissions reduction requirements. Section 187 makes the same basic requirement applicable to carbon monoxide nonattainment areas. Section 189 sets forth requirements for PM10 nonattainment areas.

CALIFORNIA CLEAN AIR ACT REQUIREMENTS

The California Clean Air Act of 1988 (CCAA), amended in 1992, requires all air districts in the state to endeavor to achieve and maintain state ambient air quality standards for ozone, carbon monoxide, sulfur dioxide, and nitrogen dioxide by the earliest practicable date. California's ambient air standards are generally stricter than national standards for the same pollutants. California also has established its own standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. California standards are shown on Exhibit 3.6-2.

Based on pollutant levels, the 1992 amendments to the CCAA divide ozone nonattainment areas into four categories–moderate, serious, severe, and extreme–to which progressively more stringent requirements apply. Despite its improved air quality over the past years, the South Coast Air Basin has the worst ozone air quality in the nation and is the only area designated as "extreme" nonattainment for ozone. An extreme ozone nonattainment area is one in which ozone concentrations were greater than 0.20 parts per million (ppm) during 1989 to 1991. The basin is designated a "serious" area for carbon monoxide and nitrogen dioxide.

Riverside and San Bernardino counties are designated "attainment" for state carbon monoxide standards. Fine particulate matter (PM10) is not currently addressed in the CCAA. The basin is in attainment for sulfates and has met attainment goals for all other criteria pollutant standards (sulfur dioxide, lead, etc.). The 1988 CCAA, upon which the 1991 regional Air Quality Management Plan and the 1994 revisions were based, specified that attainment plans for areas which could not demonstrate attainment of state standards until after December 31, 1997, must include specified emission reduction strategies and meet milestones in implementing emission controls and achieving more healthful air quality.

Specific strategies for these nonattainment areas include (1) an indirect and area source control program, (2) best available retrofit control technology (BARCT) for existing sources, (3) a program to mitigate all emissions from new and modified permitted sources, (4) transportation control measures to attain a 1.5 average passenger vehicle ridership during weekday commute hours, and (5) significant use of low-emission vehicles by fleet operators. The CCAA also includes several additional goals and requirements, including reducing districtwide emissions, vehicular trips, and vehicle miles traveled, as well as ranking control measures by priority and cost effectiveness, no net increase in vehicle emissions after 1997, and a reduction in overall population exposure to ambient pollutant levels in excess of the applicable standards by at least 50 percent of 1986 to 1988 levels by December 31, 2000.

The CCAA provides air districts with new authority to regulate indirect sources. Each district plan is to achieve a 5 percent annual reduction, averaged over consecutive 3-year periods, in districtwide emissions of each nonattainment pollutant or its precursors unless, despite the inclusion of all feasible measures in the plan and an expeditious adoption schedule, the area is not able to achieve the required 5 percent annual reduction. However, an air basin may use an alternative emission reduction strategy which achieves a reduction of less than 5 percent per year if it can be demonstrated that either of the following applies:

- The alternative emission reduction strategy is equal to or more effective than the 5 percent per year control approach in improving air quality.
- That despite the inclusion of every feasible measure and an expeditious adoption schedule, the air basin is unable to achieve the 5 percent per year reduction in emissions.

REGIONAL AIR QUALITY PLANNING

The SCAQMD and SCAG are responsible for formulating and implementing the AQMP for the basin. Designated portions of the AQMP which are prepared to comply with federal and state standards are submitted to the ARB for incorporation in the SIP with plans and regulations from other air quality management and air pollution control districts in the state. Because air quality plans are prepared to meet CCAA requirements, as well as federal CAA requirements, they may be broader than federal requirements in certain respects.

Regional AQMPs were prepared for the basin in 1979, 1982, 1989, 1991, and 1994. Each revision of the AQMP represents a snapshot in time, based on best available information. The 1994 Air Quality Management Plan, which contains measures intended to comply with the CAA and CCAA, was adopted by the SCAQMD Board on September 9, 1994, submitted to the ARB, and approved on November 15, 1994. The 1994 AQMP generally follows the structure of the last plan (1991) but, like all new editions, includes many enhancements. Previous versions of the AQMP have been submitted to EPA, which has approved portions of the plan for inclusion in the SIP for the basin. However, because the basin does not have an approved plan that demonstrates attainment of all National Ambient Air Quality Standards (NAAQS) by the CAA deadlines, and pursuant to a decision of the Ninth Circuit Court of Appeals (*Coalition for Clean Air v. United States EPA*, July 1, 1992), EPA was required to prepare a Federal Implementation Program (FIP) for the basin. The final FIP was adopted in February 1995. Implementation of the FIP, however, is prohibited by H.R. 889, the Department of Defense Emergency Supplemental Appropriations bill, signed into law by President Clinton in April 1995, that contains legislative language which will allow California to comply with the CAA by using its own SIP to attain federal air quality standards. The state's SIP is expected to be approved in late 1995.

In addition, federal law requires only an ozone plan this year, giving the region until 1997 to submit a PM10 plan to achieve health standards for particulate. This will give SCAQMD additional time to fine-tune nitrogen oxide control measures, necessary to control PM10, that rely on advanced technology, like clean fuels. In addition, revised conformity procedures have not been adopted to date. Until the conformity procedures for the 1994 AQMP are adopted, the 1991 Conformity Procedures will be used in making an AQMP conformity determination related to the proposed project.

APPENDIX D

PUBLIC HEALTH AND SAFETY

SITE ASSESSMENT PLUS REPORT
(EXTENDED BY 1 MILE)

PROPERTY INFORMATION	CLIENT INFORMATION
Project Name/Ref #: SEVEN OAKS DAM SEVEN OAKS DAM GREENSPOT RD SANTA ANA CANYON REDLANDS, CA 92359 Latitude/Longitude: (34.118327, 117.081988)	JASON BRANDMAN MICHAEL BRANDMAN ASSOC-IRVINE 17310 RED HILL AVE STE 250 IRVINE, CA 92714

Site Distribution Summary

Agency / Database - Type of Records			*within 1 1/8 miles*	*1 1/8 to 1 1/4 miles*	*1 1/4 to 1 1/2 miles*	*1 1/2 to 2 miles*
A) Databases searched to 2 miles:						
US EPA	NPL	National Priority List	0	0	0	0
US EPA	CORRACTS	RCRA Corrective Actions	0	0	0	0
US EPA	TSD	RCRA permitted treatment, storage, disposal facilities	0	0	0	0
STATE	SPL	State equivalent priority list	0	0	0	0
B) Databases searched to 1 1/2 miles:						
US EPA	CERCLIS	Sites under review by US EPA	0	0	0	-
STATE	SCL	State equivalent CERCLIS list	0	0	0	-
STATE REG CO	LUST	Leaking Underground Storage Tanks	0	0	0	-
STATE/ REG/CO	SWLF	Permitted as solid waste landfills, incinerators, or transfer stations	0	0	0	-
STATE	DEED RSTR	Sites with deed restrictions	0	0	0	-
STATE	CORTESE	State index of properties with hazardous waste	0	0	0	-
STATE	TOXIC PITS	Toxic Pits cleanup facilities	0	0	0	-
C) Databases searched to 1 1/4 miles:						
US EPA	RCRA Viol	RCRA violations/enforcement actions	0	0	-	-
US EPA	TRIS	Toxic Release Inventory database	0	0	-	-
STATE	UST/AST	Registered underground or aboveground storage tanks	0	0	-	-
D) Databases searched to 1 1/8 miles:						
US EPA	ERNS	Emergency Response Notification System of spills	0	-	-	-
US EPA	GNRTR	RCRA registered small or large generators of hazardous waste	0	-	-	-

This geographic database search meets the American Society for Testing Materials (ASTM) standards for a government records review. A (-) indicates the search distance exceeds ASTM search parameters.

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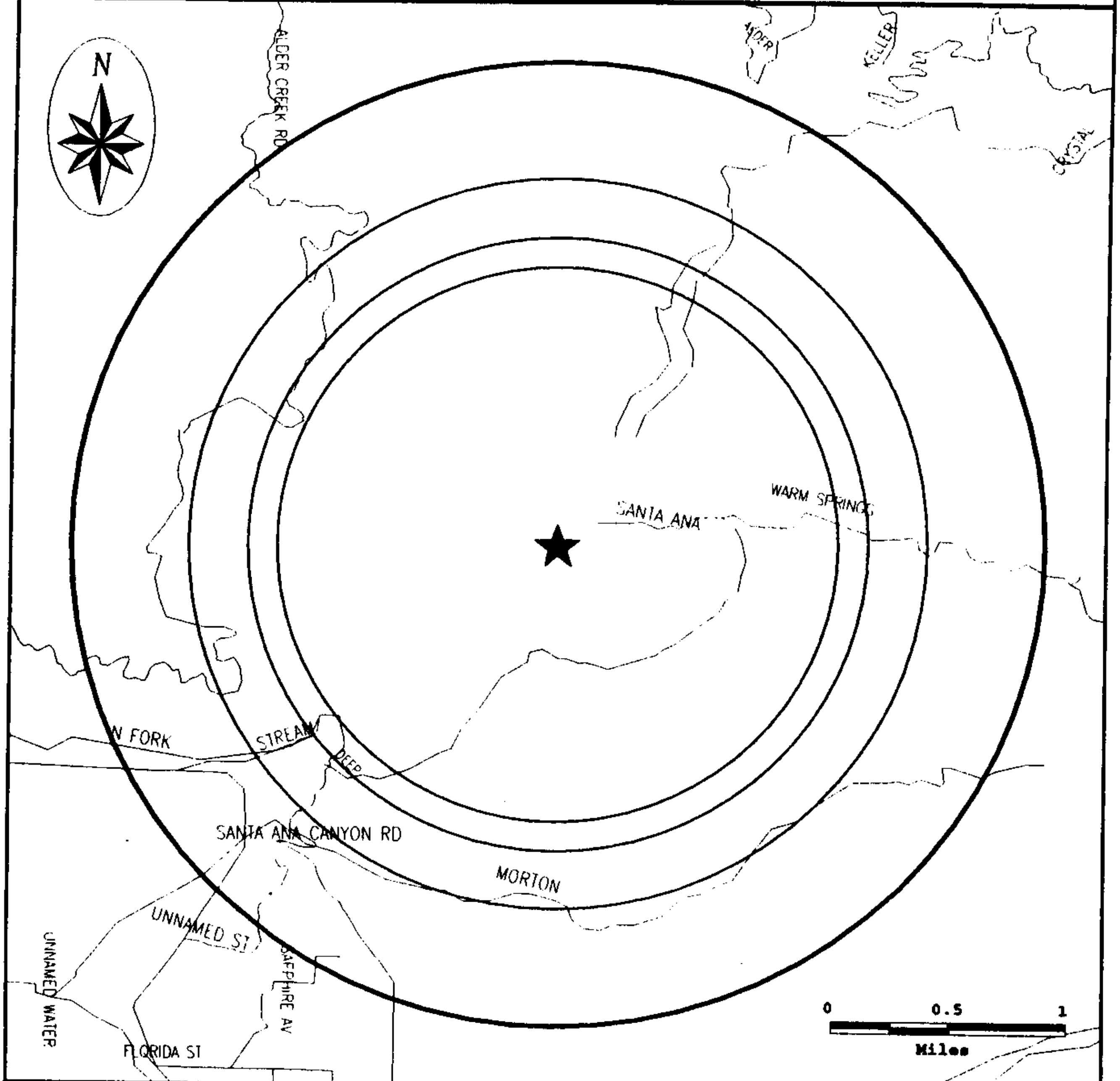
NOTES

SITE ASSESSMENT PLUS REPORT (EXTENDED BY 1 MILE)

Map of Sites within Two Miles



Subject Site ★

Category:	A	B	C	D
Databases Searched to:	2 mi.	1 1/2 mi.	1 1/4 mi.	1 1/8 mi.
Single Sites	◆	■	△	○
Multiple Sites	◆	■	△	○
	NPL, SPL, SCL, TSD	CERCLIS, LUST, SWLF	UST	ERNS, GENERATORS

Roads
Highways
Railroads
Rivers or Water Bodies
Utilities

If additional databases are listed in the cover page of the report they are also displayed on this map. The map symbol used corresponds to the database category letter A,B,C,D.

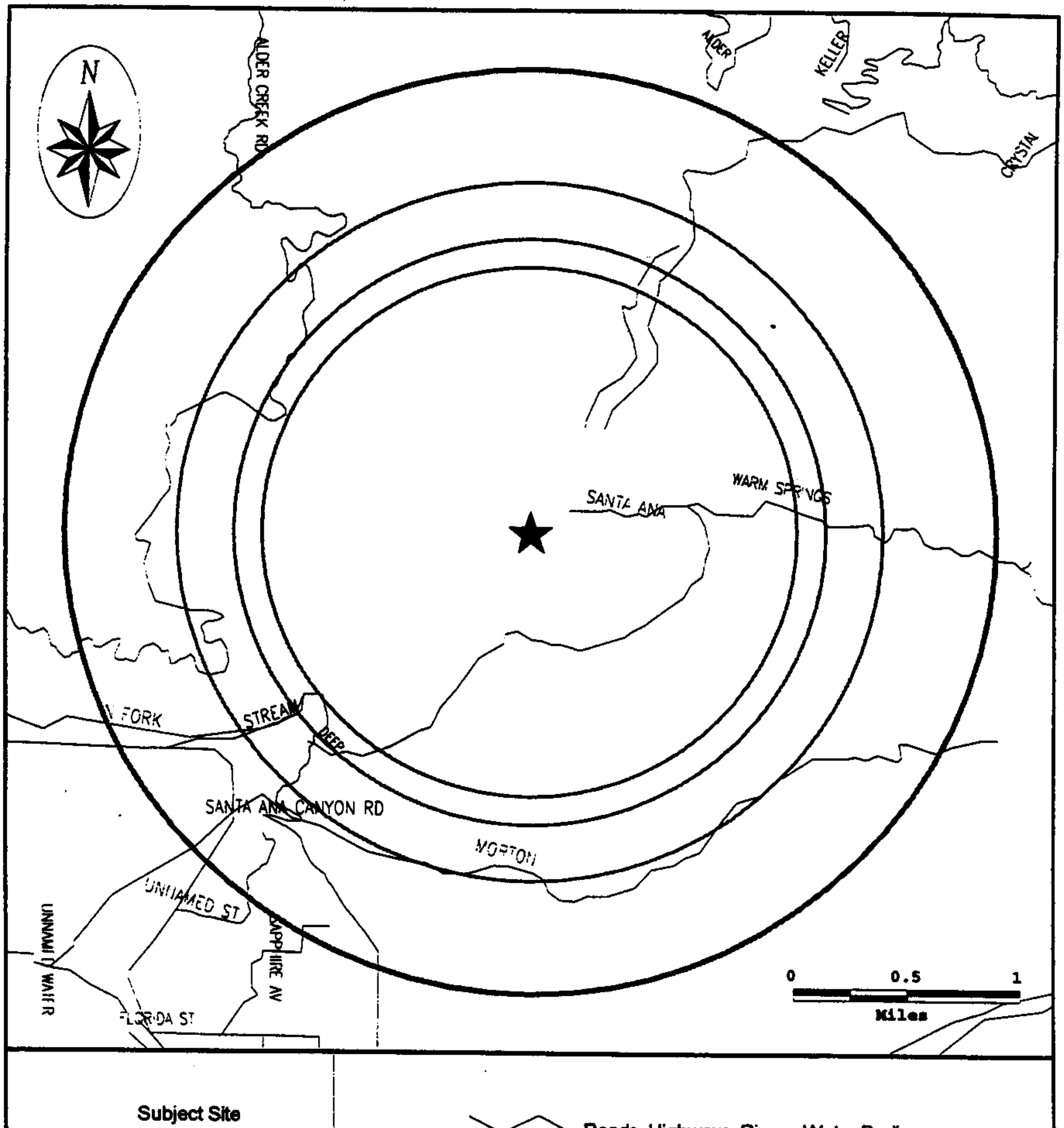
For More Information Call VISTA Information Solutions, Inc. at **1 - 800 - 767 - 0403**

Report ID: **082833-001**

Date of Report: **August 30, 1995**

SITE ASSESSMENT PLUS REPORT (EXTENDED BY 1 MILE)

Street Map



Subject Site

Roads, Highways, Rivers, Water Bodies

Railroads, Utilities

SITE ASSESSMENT PLUS REPORT (EXTENDED BY 1 MILE)

SITE INVENTORY

MAP ID	PROPERTY AND THE ADJACENT AREA (within 1 1/8 miles)	A				B							C			D	
	VISTA ID DISTANCE DIRECTION	NPL	CORRACTS	TSD	SPL	CERCLIS	SCL	LUST	SWLF	DEED RSTR	CORTESE	TOXIC PITS	RCRA VIOL	TRIS	UST/AST	ERNS	GNRTR

No Records Found

MAP ID	SITES IN THE SURROUNDING AREA (within 1 1/8 - 1 1/4 miles)	A				B							C			D	
	VISTA ID DISTANCE DIRECTION	NPL	CORRACTS	TSD	SPL	CERCLIS	SCL	LUST	SWLF	DEED RSTR	CORTESE	TOXIC PITS	RCRA VIOL	TRIS	UST/AST	ERNS	GNRTR

No Records Found

MAP ID	SITES IN THE SURROUNDING AREA (within 1 1/4 - 1 1/2 miles)	A				B							C			D	
	VISTA ID DISTANCE DIRECTION	NPL	CORRACTS	TSD	SPL	CERCLIS	SCL	LUST	SWLF	DEED RSTR	CORTESE	TOXIC PITS	RCRA VIOL	TRIS	UST/AST	ERNS	GNRTR

No Records Found

MAP ID	SITES IN THE SURROUNDING AREA (within 1 1/2 - 2 miles)	A				B							C			D	
	VISTA ID DISTANCE DIRECTION	NPL	CORRACTS	TSD	SPL	CERCLIS	SCL	LUST	SWLF	DEED RSTR	CORTESE	TOXIC PITS	RCRA VIOL	TRIS	UST/AST	ERNS	GNRTR

No Records Found

UNMAPPED SITES		A				B							C			D	
	VISTA ID	NPL	CORRACTS	TSD	SPL	CERCLIS	SCL	LUST	SWLF	DEED RSTR	CORTESE	TOXIC PITS	RCRA VIOL	TRIS	UST/AST	ERNS	GNRTR

No Records Found

SITE ASSESSMENT PLUS REPORT (EXTENDED BY 1 MILE)

DETAILS

PROPERTY AND THE ADJACENT AREA (within 1 1/8 mile)

No Records Found

SITES IN THE SURROUNDING AREA (within 1 1/8 - 1 1/4 mile)

No Records Found

SITES IN THE SURROUNDING AREA (within 1 1/4 - 1 1/2 mile)

No Records Found

SITES IN THE SURROUNDING AREA (within 1 1/2 - 2 miles)

No Records Found

UNMAPPED SITES

No Records Found

SITE ASSESSMENT PLUS REPORT (EXTENDED BY 1 MILE)

DESCRIPTION OF DATABASES SEARCHED

A) DATABASES SEARCHED TO 2 MILES

NPL
SRC#: 2435

VISTA conducts a database search to identify all sites within 2. mile of your property.
The agency release date for NPL was May, 1995.

The National Priorities List (NPL) is the EPA's database of uncontrolled or abandoned hazardous waste sites identified for priority remedial actions under the Superfund program. A site must meet or surpass a predetermined hazard ranking system score, be chosen as a state's top priority site, or meet three specific criteria set jointly by the US Dept of Health and Human Services and the US EPA in order to become an NPL site.

SPL
SRC#: 2293

VISTA conducts a database search to identify all sites within 2. mile of your property.
The agency release date for Calsites Database: Annual Workplan Sites was April, 1995.

This database is provided by the Cal. Environmental Protection Agency, Dept. of Toxic Substances Control. Annual Work Plan (AWP) sites and sites where Preliminary Endangerment Assessments are a high priority are included.

CORRACTS
SRC#: 2271

VISTA conducts a database search to identify all sites within 2. mile of your property.
The agency release date for RCRA Corrective Action Sites List was March, 1995.

The EPA maintains this database of RCRA facilities which are undergoing "corrective action". A "corrective action order" is issued pursuant to RCRA Section 3008 (h) when there has been a release of hazardous waste or constituents into the environment from a RCRA facility. Corrective actions may be required beyond the facility's boundary and can be required regardless of when the release occurred, even if it predates RCRA.

RCRA-TSD
SRC#: 2271

VISTA conducts a database search to identify all sites within 2. mile of your property.
The agency release date for RCRIS was March, 1995.

The EPA's Resource Conservation and Recovery Act (RCRA) Program identifies and tracks hazardous waste from the point of generation to the point of disposal. The RCRA Facilities database is a compilation by the EPA of facilities which report generation, storage, transportation, treatment or disposal of hazardous waste. RCRA TSDs are facilities which treat, store and/or dispose of hazardous waste.

B) DATABASES SEARCHED TO 1 1/2 MILES

CERCLIS
SRC#: 2240

VISTA conducts a database search to identify all sites within 1.5 mile of your property.
The agency release date for CERCLIS was March, 1995.

The CERCLIS List contains sites which are either proposed to or on the National Priorities List(NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL. The information on each site includes a history of all pre-remedial, remedial, removal and community relations activiies or events at the site, financial funding information for the events, and unrestricted enforcement activities.

NFRAP
SRC#: 2241

VISTA conducts a database search to identify all sites within 1.5 mile of your property.
The agency release date for CERCLIS was March, 1995.

NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly, or the contamination was not serious enough to require Federal Superfund action or NPL consideration.

Cal Cerclis
SRC#: 2462

VISTA conducts a database search to identify all sites within 1.5 mile of your property.
The agency release date for Ca Cerclis w/Regional Utility Description was June, 1995.

This database is provided by the U.S. Environmental Protection Agency, Region 9. These are regional utility descriptions for California CERCLIS sites.

SCL
SRC#: 2292

VISTA conducts a database search to identify all sites within 1.5 mile of your property.
The agency release date for Calsites Database: All Sites except Annual Workplan Sites (incl. ASPIS) was April, 1995.

This database is provided by the Department of Toxic Substances Control. These are lower priority than the SPL sites.

SWLF
SRC#: 2232

VISTA conducts a database search to identify all sites within 1.5 mile of your property.
The agency release date for Ca Solid Waste Information System (SWIS) was March, 1995.

This database is provided by the Integrated Waste Management Board.

SBC Landfill
SRC#: 1114

VISTA conducts a database search to identify all sites within 1.5 mile of your property.
The agency release date for San Bernadino County Private and County Owned Landfills was January, 1993.

This database is provided by the San Bernardino County Solid Waste Management Department.

WMUDS
SRC#: 2463

VISTA conducts a database search to identify all sites within 1.5 mile of your property.
The agency release date for Waste Management Unit Database System (WMUDS) was June, 1995.

This database is provided by the State Water Resources Control Board. This is used for program tracking and inventory of waste management units. This system contains information from the following eight main databases: Facility, Waste Management Unit, SWAT Program Information, SWAT Report Summary Information, Chapter 15 (formerly Subchapter 15), TPCA Program Information, RCRA Program Information, and Closure Information.

LUST
SRC#: 2296

VISTA conducts a database search to identify all sites within 1.5 mile of your property.
The agency release date for Lust Information System (LUSTIS) was February, 1995.

This database is provided by the California Environmental Protection Agency.

LUST RG6
SRC#: 2288

VISTA conducts a database search to identify all sites within 1.5 mile of your property.
The agency release date for Region #6-Leaking Underground Storage Tank Listing was April, 1995.

This database is provided by the Regional Water Quality Control Board, Region #6.

LUST RG7 SRC#: 2289	VISTA conducts a database search to identify all sites within 1.5 mile of your property. **The agency release date for Region #7-Colorado River Basin Leaking Underground Storage Tank Listing was January, 1995.** This database is provided by the Regional Water Quality Control Board, Region #7.
LUST RG8 SRC#: 2290	VISTA conducts a database search to identify all sites within 1.5 mile of your property. **The agency release date for Region #8-Santa Ana Regional Underground Tank Database List was April, 1995.** This database is provided by the Regional Water Quality Control Board, Region #8.
CORTESE SRC#: 2298	VISTA conducts a database search to identify all sites within 1.5 mile of your property. **The agency release date for Cortese List-Hazardous Waste Substance Site List was February, 1995.** This database is provided by the Office of Environmental Protection, Office of Hazardous Materials.
Deed Restrictions **SRC#: 1703**	VISTA conducts a database search to identify all sites within 1.5 mile of your property. **The agency release date for Deed Restriction Properties Report was April, 1994.** This database is provided by the Department of Health Services-Land Use and Air Assessment. These are voluntary deed restriction agreements with owners of property who propose building residences, schools, hospitals, or day care centers on property that is "on or within 2,000 feet of a significant disposal of hazardous waste".
Toxic Pits **SRC#: 2229**	VISTA conducts a database search to identify all sites within 1.5 mile of your property. **The agency release date for Summary of Toxic Pits Cleanup Facilities was February, 1995.** This database is provided by the Water Quality Control Board, Division of Loans Grants.

C) DATABASES SEARCHED TO 1 1/4 MILES

RCRA-Viols/En **SRC#: 2271**	VISTA conducts a database search to identify all sites within 1.25 mile of your property. **The agency release date for RCRIS was March, 1995.** The EPA's Resource Conservation and Recovery Act (RCRA) Program identifies and tracks hazardous waste from the point of generation to the point of disposal. The RCRA Facilities database is a compilation by the EPA of facilities which report generation, storage, transportation, treatment or disposal of hazardous waste. RCRA Violators are facilities which have been cited for RCRA Violations at least once since 1980. RCRA Enforcements are enforcement actions taken against RCRA violators.
UST's SRC#: 1612	VISTA conducts a database search to identify all sites within 1.25 mile of your property. **The agency release date for Underground Storage Tank Registrations Database was January, 1994.** This database is provided by the State Water Resources Control Board, Office of Underground Storage Tanks.
AST's SRC#: 2297	VISTA conducts a database search to identify all sites within 1.25 mile of your property. **The agency release date for Aboveground Storage Tank Database was February, 1995.** This database is provided by the State Water Resources Control Board.

TRIS
SRC#: 1954

VISTA conducts a database search to identify all sites within 1.25 mile of your property.
The agency release date for TRIS was August, 1994.

Section 313 of the Emergency Planning and Community Right-to-Know Act (also known as SARA Title III) of 1986 requires the EPA to establish an inventory of Toxic Chemicals emissions from certain facilities(Toxic Release Inventory System). Facilities subject to this reporting are required to complete a Toxic Chemical Release Form(Form R) for specified chemicals.

D) DATABASES SEARCHED TO 1 1/8 MILES

ERNS
SRC#: 2255

VISTA conducts a database search to identify all sites within 1.125 mile of your property.
The agency release date for ERNS was March, 1995.

The Emergency Response Notification System (ERNS) is a national database used to collect information on reported releases of oil and hazardous substances. The database contains information from spill reports made to federal authorities including the EPA, the US Coast Guard, the National Response Center and the Department of transportation. A search of the database records for the period October 1986 through September 1994 revealed the following information regarding reported spills of oil or hazardous substances in the stated area.

RCRA-LgGen
SRC#: 2271

VISTA conducts a database search to identify all sites within 1.125 mile of your property.
The agency release date for RCRIS was March, 1995.

The EPA's Resource Conservation and Recovery Act (RCRA) Program identifies and tracks hazardous waste from the point of generation to the point of disposal. The RCRA Facilities database is a compilation by the EPA of facilities which report generation, storage, transportation, treatment or disposal of hazardous waste. RCRA Large Generators are facilities which generate at least 1000 kg./month of non-acutely hazardous waste (or 1 kg./month of acutely hazardous waste).

RCRA-SmGen
SRC#: 2271

VISTA conducts a database search to identify all sites within 1.125 mile of your property.
The agency release date for RCRIS was March, 1995.

The EPA's Resource Conservation and Recovery Act (RCRA) Program identifies and tracks hazardous waste from the point of generation to the point of disposal. The RCRA Facilities database is a compilation by the EPA of facilities which report generation, storage, transportation, treatment or disposal of hazardous waste. RCRA Small and Very Small generators are facilities which generate less than 1000 kg./month of non-acutely hazardous waste.

End of Report

APPENDIX E

CLEAN WATER ACT SECTION 404(b)(1) EVALUATION

SECTION 404 (b)(1) ALTERNATIVE ANALYSIS
SEVEN OAKS DAM WATER CONSERVATION STUDY
EFFECTS OF THE DISCHARGE OF DREDGED OR FILL MATERIAL INTO THE WATERS OF THE UNITED STATES

I. INTRODUCTION

The following evaluation is provided in accordance with Section 404 (b) (1) of the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500) as amended by the Clean Water Act of 1977 (Public Law 95-217). Its intent is to succinctly state and evaluate information regarding the effects of discharge of dredged or fill material into Waters of the U.S. As such, it is not meant to stand alone and relies heavily upon information provided in the Seven Oaks and Prado Dams Water Conservation Study EIS/EIR to which it is attached. Information from the EIS/EIR is incorporated by reference in this evaluation.

II. PROJECT DESCRIPTION

A. **Location:** The proposed water conservation project would be implemented at/behind Seven Oaks Dam. Seven Oaks Dam is located in the upper Santa Ana River Canyon, approximately 1 mile upstream from the mouth of the canyon at the confluence of the Santa Ana River and Government Canyon and approximately 8 miles northeast of the City of Redlands in San Bernardino County, California.

B. **General Description:** The proposed project involves the implementation of a water conservation project at Seven Oaks Dam. The water conservation project would use water retention space behind the dam to conserve runoff and groundwater brought to the surface by the dam after the annual flood season has passed. In the dry summer months, the water level behind the dam would be drawn down by releasing water to downstream users at a rate commensurate with diversion and groundwater recharge needs.

Implementation of the water conservation project would involve minor modifications to Seven Oaks Dam. These improvements would include: (1) demolishing activities associated with improvements to the intake structure of the dam, (2) minor modifications to the anchoring system of the intake structure and (3) the construction of temporary earthen berms in the riverbed bottom to divert water away from the construction area.

C. **Authority and Purpose:** It is the U.S. Army Corps of Engineers (USACE) policy to balance the use of reservoir resources by conserving as much water as possible consistent with other constraints. Code of Federal Regulations 33 222.7 (6d) states "development and execution of water control plans will include appropriate consideration for efficient water management in accordance with the emphasis on water conservation as a national priority".

The purpose of the proposed project is to implement a water conservation plan at Seven Oaks Dam that will provide maximum water conservation benefits to the project area.

D. **General Description of Dredged or Fill Material:** The proposed modifications to the water intake structure would involve the demolishing of the existing intake tower. This activity could result in the incidental discharge up to 100 cubic yards of concrete debris into the reservoir area. Modifications to the dam anchoring system would involve minor drilling into the sides of the canyon and up to approximately 40 cubic yards of incidental debris could be discharged into the reservoir area. Temporary earthen berms would be constructed upstream of the dam to divert surface water from the construction area. The fill material needed for the temporary berms will be excavated from the project area.

E **Description of the Proposed Discharge Site:** The existing downstream reservoir area would be the discharged site for the incidental debris. The temporary earthen berms will be constructed immediately upstream of the dam.

F. **Description of Disposal Method**: Heavy construction equipment such as bulldozers, backhoe, and off-road transport trucks may be utilized for demolishing and excavation operations. Concrete debris associated with demolishing activities will be collected and transported offsite for disposal. After completion of construction, the temporary berms will be removed from the reservoir area.

III. FACTUAL DETERMINATION

A. DISPOSAL SITE PHYSICAL SUBSTRATE DETERMINATION

1. Impact on Substrate Elevation and Slope

The proposed demolishing and drilling activities associated with modifications to the dam intake structure would not result in any long-term impacts to the substrate of the disposal site. However, construction of the temporary berms will temporary change the substrate of the reservoir bottom. Once construction operations are completed, the riverbed bottom will be returned to its existing substrate form.

2. Impact on Sediment Type

Implementation of the water conservation project will not have any long term impacts related to sediment types. Incidental debris associated with modifications to the intake structure would not have any impacts on sediment types. Fill material for the temporary berm will be excavated from the project area. No contaminated sediments will be introduced into the disposal site.

3. Dredge/Fill Material Movement

Potential erosion of exposed areas on the temporary berms may occur during construction operations. Potentially, stormwater runoff may result in the downstream movement of sediment and incidental debris. However, construction activities for the project would occur during dry summer months to help reduce the potential for erosion and movement of construction-related sediment and debris. Additionally, erosion control mitigation measures provided in the EIS/EIR will reduce potential erosion impacts to a level that is less than significant.

B. EFFECT ON WATER CIRCULATION, FLUCTUATION, AND SALINITY

Implementation of the proposed project would maximize water conservation benefits to Seven Oaks Dam. Periodic releases of water from the dam would occur in summer months to recharge underground water basins. No significant long-term impacts related to the circulation or fluctuation of water in the river will occur. Creation of the temporary berms will temporary divert upstream water around the construction area. However, this impact is short-term and is not considered to be significant.

In general, water quality is anticipated to be degraded by an extended impoundment of water in long, deep storage pools, particularly during summer months when higher temperatures cause water column stratification and lowered levels of dissolved oxygen. However, a mitigation measure in the EIS/EIR requires the implementation of a monitoring program that will measure and monitor water quality in the reservoir pool. No significant impacts related to water quality are expected.

C. SUSPENDED PARTICULATE/TURBIDITY DETERMINATIONS AT THE DISPOSAL SITE.

Short-term increases in downstream turbidity would be expected to occur during the construction phase. The EIS/EIR requires the implementation of erosion control measures to reduce potential erosion and sedimentation impacts caused by construction activities. Because construction activities would occur in summer months, it is unlikely that construction related debris would be released into surface water flows, however, in the unlikely event that the debris is released into surface water flows, short-term erosion and sedimentation impacts may occur. Implementation of erosion control measures would help reduce these potential impacts. With the implementation of erosion control measures, no significant impacts related to increased levels of suspended particulates or turbidity are expected.

D. CONTAMINANT DETERMINATIONS

No contaminants are known or expected to be present in the released incidental debris or fill material for the temporary berms. However, use of construction equipment and vehicles on the site may result in introduction of contaminants such as oil and grease. The EIS/EIR includes mitigation measures that will reduce the potential for the release of toxic materials or contaminants from construction equipment. With the implementation of erosion control measures, no significant impacts related to contaminants are expected.

E. EFFECT ON AQUATIC ECOSYSTEM AND ORGANISM DETERMINATIONS

Implementation of the proposed project would not have any significant effects on any aquatic ecosystem or organisms upstream or downstream of the project area.

F. PROPOSED DISPOSAL SITE DETERMINATION

The discharge of materials at the disposal site would be kept to the smallest practicable volume. The proposed project is not expected to violate applicable water quality standards and would not affect human use of water downstream. Mitigation measures from the EIS/EIR have incorporated into the project to minimize water quality effects.

G. DETERMINATION OF CUMULATIVE EFFECTS OF DISPOSAL OR FILL ON THE AQUATIC ECOSYSTEM

Construction of the Seven Oaks Dam has resulted in significant adverse effects to regionally valuable aquatic resources. These impacts have been fully mitigated for as part of the Santa Ana River Mainstem Project. Implementation of the proposed water conservation project will not result in any additional impacts to aquatic habitat in areas that have not already been fully mitigated.

H. DETERMINATION OF INDIRECT EFFECTS OF DISPOSAL OR FILL ON THE AQUATIC ECOSYSTEM

Incidental disposal and fill operations associated with the proposed project will not have any indirect effects to aquatic ecosystems in the project area.

IV. FINDING OF COMPLIANCE

A. No significant deviation from the established guidelines were made relative to this evaluation.

B. Four alternatives and the no project alternative were considered in the EIS/EIR for the proposed water conservation project. The preferred alternative involves the fewest amount of modifications to Seven Oaks Dam and associated construction related impacts, while still meeting the purpose and objective of the project. The no project alternative would present the fewest amount of impacts, but it would not meet the purposes and objective of the project. See the Main Report and EIS/EIR for further information regarding project alternatives.

C. The proposed project would not (1) violate any applicable state water quality standards or the Toxic Effluent Standards of Section 307 of the Clean Water Act; (2) jeopardize the existence of Federally-listed endangered or threatened species or their habitat; (3) violate requirements of any Federally-designated marine sanctuary; and (4) have any adverse impacts on the aquatic ecosystem.

D. Appropriate and practicable steps have been taken to minimize potential adverse short-term construction-related and long-term operational impacts to water quality.

E. The proposed project will have a beneficial impact on municipal and private water supplies.

F. On the basis of the guidelines and inclusion of the mitigation measures described above and contained in the Seven Oaks and Prado Dams Water Conservation Study EIS/EIR, the proposed disposal site for the discharge of fill materials and construction-related debris is specified as complying with Section 404(b) (1) of the Clean Water Act.

APPENDIX F

RESPONSES TO COMMENTS RECEIVED FROM PUBLIC REVIEW OF THE DRAFT FEASIBILITY REPORT AND DRAFT EIS/EIR

RESPONSES TO COMMENTS RECEIVED FROM PUBLIC REVIEW OF THE DRAFT FEASIBILITY REPORT AND DRAFT EIS/EIR

A. East Valley Water District letter dated May 15, 1997.

1. The responsibility for operating the Seven Oaks Dam for water conservation including maintaining historic water rights and diversions would be a non-Federal responsibility. It is expected that the non-Federal sponsors interested in developing the potential water conservation yields at Seven Oaks Dam will prepare the Water Control Manual for water conservation operations with full consideration of maintaining all historic rights. It is expected that these operations will require review and approval from the State Water Resources Control Board.

2. The estimate of potential water conservation yield was based on a simplified approach using the USGS gage as an estimate for this potential. A more complete analysis would have considered historic diversions and eligible water rights which would reduce potential yield. However, there are also opportunities for increasing potential yields beyond the feasibility study estimates. This could occur during some years when impoundment levels could be reached early in the March to May conservation impound period, which could allow for early releases of the conservation storage capacity for downstream recharge, and reusing this storage capacity to capture additional water before the end of May. There is also opportunity to retain water when downstream groundwater levels are too high for direct recharge. These and other opportunities will be further considered in preparation of the water control manual for water conservation. It is expected that these additional yield potentials would offset any reduction in yield estimates based on considering historic diversions below the Mentone gage.

3. Section 3.08 of the Hydrology Appendix has been revised in the Final Report to clarify that diversions do exist and also to address the concern with impacts on the yield estimates derived for the feasibility study. This has also been clarified in the main report.

East Valley Water District

1155 Del Rosa Ave., P.O. Box 3427
San Bernardino, California 92413
(909) 889-9501

Kip E. Sturgeon
President
Edward S. Negrete
Vice-President
Glenn R. Lightfoot
Director
Glenda A. Douglas
Director
Donald D. Goodin
Director
Robert E. Martin
General Manager/Bd. Secretary
Alberta M. Hess
Auditor/Controller

May 15, 1997

Mr. Jared Miller, Study Manager
911 Wilshire Blvd., Suite1420
Los Angeles, CA 90017-3401

Subject: Seven Oaks Dam Water Conservation Feasibility Report

Dear Mr. Miller:

Reference is made to the draft Feasibility Report for the Seven Oaks Dam Water Conservation Project on the Santa Ana River, dated March 1997. The East Valley Water District is a County Water District serving domestic water and sewer services to the eastern portion of the City of San Bernardino and to the City of Highland. A major portion of the Districts' water supply is from the Bunker Hill Groundwater Basin in the San Bernardino Valley. The District is also a major share holder in the North Fork Mutual Water Company which receives water from the Santa Ana River through diversions made by the Bear Valley Mutual Water Company.

We have reviewed the draft Feasibility Report and wish to offer the following comments:

1. The East Valley Water District is a firm proponent of any type of project which would enhance the water supply in the San Bernardino Valley. This said, however, we are also concerned of the impacts that any project would have on the Districts' ability to continue its operations, both in the production and delivery of groundwater , as well as the ongoing delivery of Santa Ana River water through the Seven Oaks Dam Project. (1)

2. The Districts' primary concern with the Study involves the hydrology analysis presented in Volume II of the draft Feasibility Report. It is our understanding that the hydrology analysis is based upon the stream-flow records taken from the USGS Santa Ana River near Mentone Gauge (#11051500). Based upon the report and follow-up conversations I have had with COE staff members, it is my understanding that the analysis assumed that any water which reached this gauging station was, in essence, lost water and was available for conservation behind the Dam. This assumption, however is incorrect . (2)

   The San Bernardino Valley Water Conservation District owns and operates groundwater recharge facilities downstream of this project, as noted in your report. Their primary diversion structure, which supplies these groundwater recharge basins, is located immediately downstream of the USGS gauge which is used for your analysis. The SBVWCD has been operating their facilities for many years and

East Valley Water District

their records are readily available. Their operations are vitally important to the East Valley Water District. These recharge basins are located upstream of many of the wells that our District operates to meet its daily domestic demands.

In addition to the San Bernardino Valley Water Conservation District, the Bear Valley Mutual Water Company also diverts stream-flows from the Santa Ana River in the vicinity of this same USGS Stream Gauge. Although BVMWC normally obtains its water from the Southern California Edison Company, they may also divert water directly from the streambed if the Edison flume is "down" for any reason. BVMWC's delivery obligations include the North Fork Mutual Water Company. The diversion points that have been operated by BVMWC over the years have changed but in general are located in the vicinity of this stream gauge. Apparently, neither one of these two diversions were accounted for in the hydrologic analysis. These are long term diversions that are of vital importance to the East Valley Water District and need to be accounted for in this analysis by the Corp. of Engineers.

3. Reference is made to Appendix A - Hydrology as shown in Volume II of the report. In section 3.08 a (Procedures), the statement is made *"In the case of Seven Oaks no firm downstream diversion requirement or diversion capacity has been established"*. The statement is also made that *"the assumption was made that the downstream diversion facilities and recharge facilities would be developed to accommodate the release for the selected plan"*. As I have stated previously, there are existing diversion facilities downstream of the Seven Oaks Dam as well as recharge facilities operated by the San Bernardino Valley Water Conservation District. Although these facts have been noted in other portions of this report, I believe that this section should also be clarified. 3

I wish to thank you for the opportunity to comment on this study. If you should have any questions regarding these comments or our concerns, please do not hesitate to contact me.

Post-it® Fax Note 7671	Date 5/15/97 # of pages ▸ 2
To Jared Miller	From Robert Martin
Co./Dept. U.S. Army Corps of Engineers – L.A. Dist.	Co. EVWD
Phone # (213)452-3837	Phone # (909)885-4900
Fax # 213)452-4204	Fax # 909)889-5733

Very truly yours,

Robert Martin
General Manager

RM:eb

B. County of Orange , Public Facilities and Resources Department letter dated May 27, 1997.

1. The status of real estate acquisitions for the Santa Ana River Project have been clarified to indicate that the sponsors have legal possession of all lands required for construction of the dam and that applicable lands will be transferred to the U.S. Forest Service.

The downstream HTW sites mentioned in the letter will not be impacted by the water conservation plan and therefore does not have to be addressed in the Feasibility Report or EIS/EIR.

2. The estimated OMRR costs are considered reasonable for the Feasibility Study. Further review of the estimated increase in OMRR requirements associated with water conservation operations may be accomplished by non-Federal interests upon review of the Water Control Manual and other OMRR guidelines provided to the sponsor when the Seven Oaks Dam is completed and turned over to the non-Federal sponsors for OMRR.

The issue on whether the additional cost for Southern California Edison to modify the structural capacity of their proposed pipeline because of potential water conservation use of the reservoir must be reviewed and worked out between non-Federal interests and Edison. This includes location of the pipeline alignment which based on the recent design by Edison was relocated to the bottom of the reservoir as compared to earlier designs which was adjacent to the reservoir. It is also noted that the selected plan for water conservation is limited to the area that is coincidental with the flood control debris basin, which also needs to be considered in the Edison design criteria.

3. The impact of water conservation on the thickness of the Edison pipeline needs to be worked out between non-Federal interests and Edison as discussed above.

4. The sentence has been corrected to reflect the SAR sponsors are the Flood Control Districts for the Counties of San Bernardino, Riverside, and Orange Counties.

5. Any Corps assistance desired by non-Federal interests in implementing water conservation at Seven Oaks Dam would have to be arranged under the Corps Work for Others program at 100 percent non-Federal cost.

6. In accordance with the Local Cooperation Agreement for the Santa Ana River Project, the local sponsors are required to take over OMRR of the Seven Oaks Dam facility when the Corps considers the feature has been completed. It is understood that arrangements being made include the Corps providing OMRR for the first three years of project operations. This arrangement is being worked out. The section has been clarified to indicate this arrangement and to indicate that non-Federal interests will decide on when they may be interested in requesting and implementing water conservation at the dam.

7. The Hydraulic Appendix has been corrected to clarify that Plan 4 is the NED Plan and Alternative 4 is the NED Plan.

8. The requested clarification has been included in the EIS/EIR on page 1-4, first paragraph..

County of Orange

Public Facilities & Resources Department

John W. Sibley, Director

MAY 27 1997

Mr. Robert Joe, Chief
Planning Division, U. S. Army Corps of Engineers
Los Angeles District
P. O. Box 532711
Los Angeles, CA 90053-2325

Subject: Seven Oaks Dam Water Conservation Draft Feasibility Report Dated March 1997

Dear Mr. Joe:

On behalf of the Orange County Flood Control District (OCFCD), the following comments on the Water Conservation Draft Feasibility Report (Report) dated March 1997, are provided:

1. **Page 26, (Real Estate 4th and 5th Paragraphs):**

   Clarify that: The SAR Project Local Sponsors (the SAR Sponsors) have legal possession of all the land required for construction of the Dam. When a Memorandum of Understanding between the Corps of Engineers (Corps) and the U. S. Forest Service (USFS) is completed, applicable lands will be transferred to the USFS.

   We understand that there are two serious HTW sites in the area downstream of the Dam (the Norton Plume on and near Norton Air Force Base, and the Redlands Plume, south of the Santa Ana River in the Redlands area). We are unsure if these areas/sites need to be considered in the Report.

2. **Pages 73 and 74, (Section H) Appendix D:**

   The O & M cost estimates included on Table 17 are slightly lower than estimated by OCFCD. For example, the Corps estimate for increased annual O & M cost for Alternative #1 is $42,000; however, OCFCD's rough estimate is $63,000.

   The Design and Cost Appendix notes the $3 to $4 million cost estimate prepared by Southern California Edison to modify the structural capacity of their proposed pipeline within the reservoir for water conservation. The potential impact of this issue may need to be mentioned in the main Report with clarification as to the Corps' position on how this issue would be addressed, and that the water agencies proposing implementation of water conservation would be responsible for any additional cost.

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MAILING ADDRESS
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3. **Pages 84-85 (Section B):**

The Report focuses on reduced use of the access road between power houses No. 1 and 2 due to water conservation (pages 84 and 85); however, as noted above, it appears that the issue of adequate pipe wall thickness and associated impact if water conservation is implemented needs to be addressed, based on comments from the San Bernardino County Flood Control District (SBCFCD).

4. **Page 85 (Section C, First Paragraph, Second Sentence):**

Modify Sentence to: The non-Federal (SAR) Sponsors for the flood control project are the Flood Control Districts for the Counties of San Bernardino, Riverside and Orange.

5. **Pages 88, 93, 94 (Section C, Section E, Section G):**

The SAR Sponsors anticipate that the Corps will provide us with the necessary permits and property rights (from the Corps and USFS) to conduct Operation, Maintenance, Replacement and Rehabilitation (OMRR) activities, regardless if a water conservation proposal is implemented. We concur that it is a non-Federal responsibility to acquire any additional rights/approvals for water conservation purposes; however, we anticipate the Corps will assist, if necessary, in acquiring additional rights from USFS and processing a modified 404 Permit. We also anticipate the Corps would assist the SAR Sponsors to acquire State of California Dam Safety approval for water conservation design and revised dam operation. We do not suggest changing the Report text, but wish to reiterate the need for the SAR Sponsors to have sufficient rights over USFS land, a 404 Permit for dam OMRR, and for Corps assistance in acquiring additional approvals, permits, and other rights as necessary for water conservation.

6. **Page 98 (Section VI, J):**

The SAR Sponsors have not indicated a willingness to assume dam OMRR responsibilities at an earlier date than three years after construction is complete. Further, it may be appropriate to monitor dam operation for a few years, prior to embarking on a water conservation proposal. We suggest deleting the second paragraph in this Section (or clarifying that we do not plan to assume OMRR earlier than scheduled), in order to not potentially confuse the public as to our intentions.

7. **Page 1, (Hydraulic Appendix B):**

Page 1 of the Hydraulic Appendix needs to be corrected to reflect Alternative 1 as the LPP and Alternative 4 as the NED plan.

8. **Page 1-3, (EIS/EIR, Last Paragraph):**

You may wish to clarify that the dam is to be turned over to the SAR Sponsors, and that SBCFCD is expected to operate the dam on behalf of the SAR Sponsors.

Per discussion at the last two SAR Project Working Group meetings, I anticipate that the Corps PPMD will arrange a meeting soon with the SAR Sponsors and Corps Engineering, Operations, Real Estate and Planning staff to discuss rights and permits that the Sponsors would need to provide OMRR. Questions regarding the above comments may be directed to Dick Runge at (714) 834-2968 or Elayne Rail at (714) 834-6060.

Very truly yours,

W L Zaun

W. L. Zaun
Deputy Director/Chief Engineer

JRV/ER:mm/C:\WinWord\Elayne\SOD97Rpt.doc

cc: George Beams, Corps/Con-Ops.
Richard Guthrie, Corps/Real Estate
Robert Koplin, Corps/Engineering
Ken Miller, SBCFCD
Brian Moore, Corps/PPMD
H. I. Nakasone, OCFCD
E. Rail, OCFCD
R. D. Runge, OCFCD
Dan Young, Corps/Planning
David Zappe, RCFC&WCD

C. Bear Valley Municipal Water Company letter dated April 23, 1997.

The feasibility report presents in Appendix A, the Hydrology Appendix information on the historic runoffs and impoundments that could be anticipated to develop water conservation at Seven Oaks Dam. The requested information on when and under what conditions water will pass through the dam will be further defined by the non-Federal water conservation sponsors in developing the Water Control Manual for water conservation operations. The non-Federal sponsors will also be responsible for any working out any water rights arrangements with the State Water Resources Control Board.

Moreover, per a request from the comment letter received from the San Bernardino County Flood Control District, dated 17 June 1997, a paragraph has been added to EIS/EIR text on page 3-1, Section 3.1, second paragraph, indicating the intention of the Sponsors to honor the rightful and long-standing business interests the water agencies have in the canyon.

J.R. BRUCKART, JR.
PRESIDENT

E.D. PATTERSON, JR.
VICE PRESIDENT

JOHN R. SHONE
GENERAL MANAGER

CHARLOTTE VAN ECK
SECRETARY AND TREASURER

BEAR VALLEY MUTUAL WATER COMPANY

101 EAST OLIVE AVENUE
REDLANDS, CALIFORNIA 92373
(909) 793-4901

April 23, 1997

Mr. Jared Miller, Study Manager
Suite 1420
P.O. Box 532711
Los Angeles, Ca. 90053-2325

Dear Mr. Miller,

In response to your request for comments on the Seven Oaks Dam Water Conservation Study, I would like to offer the following suggestion.

Volume 1 of your report acknowledges that the water rights of the Santa Ana River are owned by Bear Valley Mutual, North Fork, and Lugonia Water Companies, as well as the Water Conservation District, but there is nothing in your report to indicate when, and under what condition, our water will pass through the dam. I would appreciate hearing your proposed solution to this problem at the public hearing scheduled for April 30, 1997.

Sincerely,

J R Shone

John R. Shone,
General Manager

JRS/cve

cc: David Moore
Board of Directors

D. San Bernardino Valley Water Conservation District letter dated May 16, 1997.

1. The SBVMWD's yearly entitlement to SWP water has been corrected from 100,000 acre-feet to 102,600 acre-feet.

2. The requested clarification has been included in the report.

3. The information on which the without project shortages is based is contained in the Economics Appendix. It is recognized that there may be some differences in estimated supplies and demands which could alter the time period indicated when shortages are realized. This would only impact when the Selected Water Conservation Plan should be implemented rather than whether the project is feasible.

4. The estimate of potential water conservation yields for the alternative plans is considered reasonable for a feasibility level analysis. The Hydrology Appendix and Main Report have been revised to note that the estimated yields do not reflect historic diversions, which could reduce the yield estimates. The Appendix also notes that there will continue to be excess water after the conservation pools are filled that would be use to meet historic diversion volumes. For the Selected Plan, about 70 percent of the additional yield is realized in the years when the conservation pool is filled and excess water is released downstream during the March-May period, This excess water would be available in these years for downstream diversion and recharge, and would still supply some of the water historically diverted. Also storing water in the conservation pool makes it available for periods when it can best be used downstream. High groundwater conditions may limit the downstream recharge capability in the spring after a wet winter. The simulation used in deriving the estimated storage and yields did not reflect any release of water from the conservation pool during the March to May period. In actual operation for years like 1978, early March inflows could be captured and released for downstream recharge thus making space for May runoff. This would increase the yield determined from the simulations. All these factors, while not rigorously addressed quantitatively, would increase the actual yield and tend to offset any loss in historical diversion not accounted for in the simulations. It is expected that the non-Federal sponsors for adding water conservation at Seven Oaks Dam will further consider diversion requirements and potential for increasing water yields in developing the water control manual for water conservation at Seven Oaks Dam.

5. The estimated yields derived for the alternative plans reflect increases in yield above the No Action Plan. In this regard, the estimated yield is based on the estimated storage above the debris pool elevation at the end of May, before any releases were made from the conservation pool. The historic diversions to downstream spreading grounds and the potential for increasing diversions significantly to downstream recharge basin as a result of the flood control project and flood control operations was not considered in the simulated estimates. However, the estimated potential for the water conservation is considered reasonable. Further analysis of the diversions and potential for increasing diverted water recognizing limited groundwater capacity during certain period of times, and other factors could be considered by non-Federal interests in

preparing the Water Control Manual to meet historic requirements and optimize yield from conserving water at Seven Oaks.

6. All costs identified at this time that are needed to implement any of the alternatives have been included in the cost estimates for each alternative plan. The blanket drain required for conservation for Plan 3 is not needed for the selected plan, Alternative 1. It is understood that the non-Federal sponsors are proceeding with the blanket drain at this time to allow for possible future plans to increase water conservation levels similar to Plan 3. The SCE penstock is under review by non-Federal interests to determine whether the additional thickness and costs are needed as a result of water conservation operations. In this regard, it is noted that the selected plan involves water conservation pool elevations coincident with the flood control debris basin which should also be considered in the design criteria for the penstock. It is also noted that the project cost estimate includes real estate costs based on fair market value for the additional real estate needed to operate water conservation on U.S. Forest Service lands, which may be on the high side since these lands are also within the flood control debris pool. In addition, the plans include relocation of the reservoir access road, which may not be necessary if it is determined that other existing U.S. Forest Service roads are adequate to meet Edison needs.

SAN BERNARDINO VALLEY WATER CONSERVATION DISTRICT
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1932

May 16, 1997

Mr. Jared Miller
US Army Corps of Engineers, Los Angeles District
Study Manager
Suite 1420, P.O. Box 532711
Los Angeles, CA 90053-2325

Re: Comments on Seven Oaks Dam Water Conservation Feasibility Study

Dear Mr. Miller:

The following written comments are in support of those made orally at the Public Hearing held on April 30, 1997. As stated at the Hearing, the San Bernardino Valley Water Conservation District (Conservation District) supports the construction, maintenance, and operation of facilities capable of retaining storm related flows on the Santa Ana River for the purpose of direct delivery or groundwater recharge. The Conservation District, and its predecessor the Water Conservation Association, has been operating recharge facilities on the Santa Ana River debris cone for over 80 years and is the agency principally responsible for maintaining native water supplies in the Bunker Hill Basin. During that time the Conservation District has been responsible for the diversion and recharge of over 1 million acre-feet of water. Therefore, considering the Conservation District's interest in water conservation of Santa Ana River waters, we support the conservation of floods flows behind the Seven Oaks Dam if it is found to be economically and technically feasible.

Several general content errors are:

1. Volume 1, page 29 states "SBVMWD's yearly entitlement to SWP water is 100,000 acre-feet." It should be 102,600 acre-feet. 1

2. Volume 1, page 35 states, "The San Bernardino Valley Municipal Water District utilizes the wash area below the damsite for water spreading activities." We believe a more correct statement is that; "The San Bernardino Valley Water Conservation District utilizes the wash area below the damsite for spreading of Santa Ana River water. The Conservation District owns or has water conveyance and spreading rights on most of the wash area. The San Bernardino Valley Municipal Water District has an agreement with the Conservation District to spread State Water Project water on the lands owned by the Conservation District." 2

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3. Volume 1, page 100 states, "Under the without-project conditions, local water supply sources would not meet municipal demand beginning in the year 2000 ..." While water shortages are a long-term possibility for this area, as with all of Southern California, the Conservation District does not believe the local water supply picture is as bleak as the report states. 3 Nothing in our calculations shows an inability to meet domestic demands in two and one-half years, as stated. We believe the conclusion is speculative and unsubstantiated. Please provide study material used to make this conclusion.

4. Volume 1, Exhibit 4 shows an inset map of the Prado Basin area, not the Seven Oaks Dam area.

The following comments on the Draft Feasibility Report are more substantive in nature.

<u>The draft report does not adequately address existing beneficial uses of Santa Ana River water.</u> 4

It appears as though the purpose of the conservation study is to determine if it is beneficial, from a National Economic Development (NED) benefit/cost ratio standpoint, to conserve water behind Seven Oaks Dam at certain times of the year. The formal authority for the Corps of Engineers is stated in the provisions of 33CFR 222.7(f)(4) where the ACOE is urged to maximize water conservation. Specifically, the provision states, "The objectives of efficient water control management are to produce beneficial ***water savings and improvements*** in the availability and quality of water resulting from project regulation and operation." (emphasis added) To truly provide improvements, the conservation pool must be shown to be capable of storing enough "new water" to pay for the costs associated with retrofitting a flood control project design to allow water conservation.

To provide benefits to the local area, water that would have otherwise been lost from the Bunker Hill Basin without the operation of a conservation pool behind Seven Oaks Dam must be captured and made available for use later in the year. This would be considered "new water" because without the conservation pool the water would not be available for use by the local water agencies. This is the only water that can be properly considered in determining the benefits of the conservation pool.

The hydrology section of the feasibility report uses historical data from USGS gage 11051500 to determine how much water can be captured behind the dam from March 1 to May 31 each year. This gage is actually the combination of flows at gage #'s 11051499 and 11051502. The former is located in the main river channel along the north canyon wall just above the San Bernardino Valley Water Conservation District diversion which is designed to divert up to 1,000 cfs. The latter, which measures flows in a channel that discharges directly into the SCE Powerhouse #3 afterbay for delivery to the Bear Valley Mutual Water Company system and has a capacity of 40-50 cfs, is on the south side of the canyon. Since the USGS gage #11051500 is upstream of established river diversion structures, the flow recorded there does not accurately portray the amount of additional water that would be made available by the conservation pool.

The Conservation District has historically put Santa Ana River surface flows to beneficial use by spreading water through its 1000-cfs diversion point to various recharge basins in the Santa Ana River Wash. This is done pursuant to pre-1914 water rights, and appropriative licenses. Historically, the Conservation District has spread all available water that could be accommodated through this system, which has averaged per-year 5,000 acre-feet during the 3-month period from March through May. Although, the Conservation District is not limited to this 5,000 acre-feet amount under its applicable water entitlements, for planning purposes we believe that this amount, along with that diverted by Bear Valley Mutual Water Company, should be subtracted from the USGS gage 11051500 readings to accurately estimate the average amount of any additional water conservation created by the Conservation Pool. This modification to the analysis should be implemented to be consistent with the way the "true yield" of the Seven Oaks Dam Conservation Pool was determined by reducing the actual yield by 18% to account for water that would have otherwise been conserved at Prado Dam.

<u>The "No Action Plan" is assumed to provide no benefits or costs and is not analyzed.</u> 5

The "No Action Plan", as we understand it, is the operation of the Seven Oaks Dam as a flood control project with no formal conservation pool. There are certain water conservation benefits associated with the operation of the Seven Oaks Dam without a conservation pool that have been ignored or overlooked in this analysis. The operation of the dam will significantly change the flow patterns, as compared to historic events, at the Santa Ana Canyon mouth. Specifically, the dam will tend to take the peaks off the flows and significantly reduce the amount of suspended solids in the water flowing through the dam outlet structure. Both of these changes will enhance the Conservation District's ability to beneficially recharge the groundwater basin with storm related flows. Some of these flows may not have been diverted in the past because of the suspended sediment content or because large storm events have deposited flows in the river at a time when all available spreading basins were full, and therefore could not be retained. The dam operation will permit more flexibility to maximize the amount of water retained in the basin and will make it possible to put more of the water to beneficial use.

These benefits of the "No Action Plan" must be taken into account when determining the savings or improvements associated with the conservation pool.

<u>All costs associated with the conservation pool should be considered in the benefit/cost analysis.</u>

The Draft Feasibility Report estimates that Alternative 1, the Locally Preferred Plan (LPP), will cost $8,334,000 in first costs. This amount includes modifications to the intake tower, anchorage system, and an unpaved access road behind the dam. It does not include substantial additional costs associated with the conservation pool. Two such costs are the extension of the blanket drain and modifications to the SCE penstock that is going to be relocated under the riverbed from Powerhouse #1 to the existing tunnel in the dam abutment. The former has already been approved by the

San Bernardino Valley Municipal Water District at a cost of up to $5.6 million, while the latter is estimated by SCE at $2.5 million. These two items alone almost double the first costs. To eliminate these items in an economic benefit analysis of the conservation pool would lead to a significant distortion of the results.

Again, the San Bernardino Valley Water Conservation District supports the concept of water conservation behind the dam if it is proven to be feasible from an economic and technical basis. The Feasibility Report, in our opinion, does not currently meet this criteria of proof. It appears that the Feasibility Report has over-simplified the hydrologic system and operation of the Santa Ana River and in doing so has produced results and conclusions that may not be accurate.

If you have questions regarding these comments, please contact Douglas Headrick, P.E., Deputy Manager Water Resources and Information Systems at (909) 793-2503.

Sincerely,

D Burnell Cavender

D. Burnell Cavender, AICP
General Manager

E. California EPA, State Water Resources Control Board, Division of Water Rights letter dated May 16, 1997.

1. The Selected Plan to be implemented at this time is Alternative 1, which includes water conservation to the 2300 foot NGVD level, and storage up to 16,000 acre-feet. The SBVMWD's application may reflect the potential of increasing the level of water conservation in the future, consistent with Alternative 3, which could reach storage volumes up to 50,000 acre-feet.

2. The SCE project relates to relocation of facilities as a result of construction of the Seven Oaks Dam as part of the Santa Ana River Flood Control Project, which was addressed in the 1988 Supplemental EIS/EIR for the flood control project. The addition of water conservation is not expected to cause any impact on the SCE project, although questions have been recently raised and are being addressed by non-Federal interests on whether the penstock thickness needs to be increased due to water conservation. Accordingly, at this time, there is no inter-relationship between the SCE project and the water conservation project.

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To Jared Miller	From Edward Anton
Co. U.S. Army Corps	Co. SWRCB
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State Water Resources Control Board

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Pete Wilson
Governor

MAY 16 1997

In Reply Refer
to:333:MFC:266.0

U.S. Army Corps of Engineers
Los Angeles District
c/o Jared Miller, Study Manager
Suite 1420
P.O. Box 532711
Los Angeles, CA 90053-2325

Dear Mr. Miller:

SEVEN OAKS DAM WATER CONSERVATION DRAFT FEASIBILITY REPORT (DFR) AND THE DRAFT ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT (DEIS/EIR)

The following comments are submitted in response to the above reports on the Seven Oaks Dam Water Conservation Study.

Before water can be appropriated at Seven Oaks Dam, a water right permit must first be issued by the State Water Resources Control Board (SWRCB). However, the SWRCB has declared the Santa Ana River System to be fully appropriated and an application for a water right permit cannot be accepted until there is a hearing before the SWRCB and subsequent revision of the Declaration of Fully Appropriated Streams (Declaration). Applicants for water right permits along the Santa Ana River must first submit a petition for revision to the Declaration. The petition must include sufficient data to show that reasonable cause exists to conduct a hearing on the question whether the fully appropriated status of the Santa Ana River should be revoked or revised.

San Bernardino Valley Municipal Water District (SBVMWD) and Western Municipal Water District (WMWD), identified as the local sponsors for the proposed project, submitted to our office a petition and an application for the right to store water year round behind the dam. The Division is currently awaiting submission of additional data from the petitioners to support a hearing.

The application filed by the SBVMWD and WMWD seeks a permit to store 50,000 acre-feet per year. This amount conforms with the amount identified in Alternative 3 of the feasibility report. However, the feasibility report summary identifies Alternative 1 (16,000 af storage, elev. 2300 ft) as the locally preferred plan. Could you please explain this apparent inconsistency. 1

The Seven Oaks Dam is located in an area which is subject to numerous permit actions by the SWRCB. The SWRCB is processing a water quality certification request pursuant to section 401 of the Federal Clean Water Act for relocation of the Santa Ana River Powerhouse No. 2 (SAR2) of Southern California Edison Company (SCE). The section 401 certification is required in order for SCE to obtain a section 404 permit from the U.S. Army Corps of Engineers to relocate the hydroelectric power facilities which are subject to potential inundation by Seven Oaks Dam. Additional actions which are pending are the section 401 certification for the Federal Energy Regulatory Commission (FERC) license amendment related to relocation of the SAR 2 powerhouse and, an additional section 401 certification action regarding long-term FERC relicensure of the SAR 1, SAR 2, and SAR 3 facilities. The EIR/EIS does not disclose the inter-relationship of the SCE project and the Seven Oaks Dam project. This inter-relationship should be disclosed, and any cumulative impacts identified and addressed. 2

Thank you for allowing the opportunity for us to comment on the Corps of Engineers' DFR and the DEIS/DEIR. If there are any questions, the staff engineer assigned to this petition and application is Melanie Collins, and she can be reached at (916) 657-0442.

Sincerely,

Roger Johnson

for Edward C. Anton, Chief
Division of Water Rights

cc: San Bernardino Valley
Municipal Water District
c/o Mr. Sam Fuller
1350 South "E" Street
San Bernardino, CA 92415-0835

F. Southern California Association of Governments letter dated 24 April 1997

1. The details in developing the water demand estimates and costs are presented in the Addendums to the Economics Appendix, Appendix E. The projected future demands include consideration of SCAG projected growth.

2. The draft EIS/EIR includes an air quality conformity evaluation. The findings indicate that the Selected Plan conforms with adopted air quality plans.

3. Mitigation measures associated with the proposed project will be monitored in accordance with the requirements of AB 3180. Section 1.6.7 of the EIS/EIR has been revised to reflect this.

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April 24, 1997

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Suite 1240, P.O. Box 532711
Los Angeles, CA 90053-2325

RE: **Comments on the US Army Corps of Engineers, Draft Environmental Impact Report and Draft Environmental Impact Statement for Seven Oaks Dam Water Conservation Feasibility Report - SCAG No. I 9700147**

Dear Mr. Miller:

Thank you for submitting the **US Army Corps of Engineers, Draft Environmental Impact Report and Draft Environmental Impact Statement for Seven Oaks Dam Water Conservation Feasibility Report** to SCAG for review and comment. As areawide clearinghouse for regionally significant projects, SCAG assists cities, counties and other agencies in reviewing projects and plans for consistency with regional plans.

The attached detailed comments are meant to provide guidance for considering the proposed project within the context of our regional goals and policies. If you have any questions regarding the attached comments, please contact Bill Boyd at (213) 236-1960.

Sincerely,

VIVIANE DOCHE-BOULOS
Manager, Intergovernmental Review

**COMMENTS ON THE SEVEN OAKS DAM
WATER CONSERVATION FEASIBILITY REPORT
DRAFT ENVIRONMENTAL IMPACT STATEMENT &
DRAFT ENVIRONMENTAL IMPACT REPORT**

PROJECT DESCRIPTION

The Project considers the potential modification of the operation of Seven Oaks Dam to provide for seasonal water conservation. The Project is a 50/50 cost shared effort of the San Bernardino County Flood Control District and the Western Municipal Water District. The dam is the upstream component of the Santa Ana River Mainstream Flood Control Project. It is currently under construction (scheduled for completion in 1999) in the San Bernardino National Forest in the steep-walled Santa Ana River Canyon at the base of the San Bernardino Mountains in San Bernardino County. The report concludes that seasonal storage of water behind the dam to 2,3000 feet from March to May for the purposes of supplementing regional water supplies, appears to be feasible and may be implemented by the Santa Ana River Mainstream Flood Control Sponsors, subject to certain conditions.

The study examines four alternative strategies, plus a no-action alternative as follows:

- **Alternative 1: Seasonal Storage of 16,000 acre-feet at Elevation 2,300 feet.** The locally preferred alternative would have a 16,300 acre-feet pool in year 2000 and 7,200 acre-feet pool in year 2050. Storage would be 2,140 acre-feet by year 2050. Average annual economic benefits would be $868,000 with costs of $675,000 for a benefit-cost ratio of 1.29.

- **Alternative 2: Seasonal Storage of 35,000 acre-feet at Elevation 2,375 feet.** This alternative has normal flood operations in winter months, then an extended pool would be developed over 10 days to the 2,375 fool level. Storage in year 2050 would be 22,050 acre-feet. Average annual economic benefits would be $1,773,000 with costs of $1,774,000 for a cost-benefit ratio of 1.00.

- **Alternative 3: Seasonal Storage of 50,000 acre-feet at Elevation 2,418 feet.** This alternative has normal flood operations in winter months, then an extended pool would be developed over 10 days to the 2,418 fool level. Storage in year 2050 would be 35,600 acre-feet. Average annual economic benefits would be $2,235,000 with costs of $2,364,000 for a benefit-cost ratio of 0.95.

- **Alternative 4: Seasonal Storage of 10,265 acre-feet at Elevation 2,265 feet.** The National Economic Plan alternative would have a seasonal storage pool of 3,400 acre-feet in year 2050. Average annual economic benefits would be $499,000 with costs of $203,000 for a benefit-cost ratio of 2.46.

The Locally Preferred Plan has been selected because it provides the local sponsor with a significant increase in the realizable water conservation yield compared to the NED plan, and the local sponsor would be willing to pay all of the construction and operating and maintenance costs.

INTRODUCTION TO SCAG REVIEW PROCESS

The document that provides the primary reference for SCAG's project review activity is the Regional Comprehensive Plan and Guide (RCPG). The RCPG chapters fall into three categories: core, ancillary, and bridge. The Growth Management (adopted June 1994), Regional Mobility (adopted June 1994), Air Quality (adopted October 1995), Hazardous Waste Management (adopted November 1994), and Water Quality (adopted January 1995) chapters constitute the core chapters. These core chapters respond directly to federal and state planning requirements. The core chapters constitute the base on which local governments ensure consistency of their plans with applicable regional plans under CEQA. The Air Quality and Growth Management chapters contain both core and ancillary policies, which are differentiated in the comment portion of this letter. The Regional Mobility Element (RME) constitutes the region's Transportation Plan. The RME policies are incorporated into the RCPG.

Ancillary chapters are those on the Economy, Housing, Human Resources and Services, Finance, Open Space and Conservation, Water Resources, Energy, and Integrated Solid Waste Management. These chapters address important issues facing the region and may reflect other regional plans. Ancillary chapters, however, do not contain actions or policies required of local government. Hence, they are entirely advisory and establish no new mandates or policies for the region.

Bridge chapters include the Strategy and Implementation chapters, functioning as links between the Core and Ancillary chapters of the RCPG.

Each of the applicable policies related to the proposed project are identified by number and reproduced below in italics followed by SCAG staff comments regarding the consistency of the project with those policies.

Consistency With Regional Comprehensive Plan and Guide Policies

1. The Growth Management Chapter (GMC) of the Regional Comprehensive Plan contains a number of policies that are particularly applicable to this Specific Plan. The following are selected growth management policies of the GMC in italics and SCAG staff comments regarding the consistency of the project with those policies:

a. *Core Growth Management Policies*

3.01 *The population, housing, and jobs forecasts, which are adopted by SCAG's Regional Council and that reflect local plans and policies, shall be used by SCAG in all phases of implementation and review.*

SCAG staff comments. As SCAG has designated subregions, the project is situated in the San Bernardino Associated Governments subregion. No information is provided on the basis for determining water needs (population, housing and employment forecasts) , which provide the rationale for considering the different water conservation scenarios. Based on the information presented in the Draft EIR/EIS we are unable to determine whether the proposed Project or the different alternatives is consistent with SCAG's regional growth forecasts. 1

3.03 The timing, financing, and location of public facilities, utility systems, and transportation systems shall be used by SCAG to implement the region's growth policies.

SCAG staff comments: The Draft EIR contains information on the timing, financing and location of public facilities (dam structure, operational considerations and provision of water to various local jurisdictions), but without the information on the relationship to regional growth forecasts, referenced under policy 3.01, we are unable to determine whether the proposed Project or the different alternatives is consistent with SCAG's regional growth forecasts. 1

b. *Ancillary Growth Management Policies*

3.05 Encourage patterns of urban development and land use which reduce costs on infrastructure construction and make better use of existing facilities.

SCAG staff comments. This project would allow for the provision of water to large areas of existing urban development and land use, thus minimizing the need for new infrastructure construction. The Project is consistent with this RCPG policy.

3.08 Encourage subregions to define an economic strategy to maintain the economic vitality of the subregion, including the development and use of marketing programs, and other economic incentives, which support attainment of subregional goals and policies.

SCAG staff comments. The project will facilitate the provision of an alternative source of water for urban uses, and thus support economic growth opportunities in the subregion. The Project is consistent with this RCPG policy.

3.09 Support local jurisdictions' efforts to minimize the cost of infrastructure and public service delivery, and efforts to seek new sources of funding for development and the provision of services.

SCAG staff comments: The proposed Project, by providing an alternative source of water, is supportive of local water district's efforts to minimize the cost of infrastructure construction and public service delivery. The Project is consistent with this RCPG policy.

3.19 Support policies and actions that preserve open space areas identified in local, state, and federal plans.

SCAG staff comments. The Project is designed in a manner which will minimize adverse open space impacts. All of the Project is located on Forest Service lands. The different alternatives will impact from 175 to 570 acres of Forest Service land. All of the alternatives will result in Forest Service lands remaining is open space use. The Project is consistent with this RCPG policy.

3.20 Support the protection of vital resources such as wetlands, groundwater recharge areas, woodlands, production lands, and land containing unique and endangered plants and *animals.*

SCAG staff comments. The Draft EIR identifies a range of vital resources and protective actions on the Project site. The Project is consistent with this RCPG policy.

3.23 *Encourage mitigation measures that reduce noise in certain locations, measures aimed at preservation of biological and ecological resources, measures that would reduce exposure to seismic hazards, minimize earthquake damage, and to develop emergency response and recovery plans.*

SCAG staff comments. Mitigation measures and design considerations have been taken in the development of the Seven Oaks Dam to assure for the safe operations of the dam under the various water conservation scenarios. The Project is consistent with this RCPG policy.

2. The Air Quality Chapter (AQC) core actions that are generally applicable to the Project :

5.11 *Through the environmental document review process, ensure that plans at all levels of government (regional, air basin, county, subregional and local) consider air quality, land use, transportation and economic relationships to ensure consistency and minimize conflicts.*

SCAG staff comments: The Draft EIR, page 4-25 includes specific reference to consistency with the South Coast Air Quality Management Plan and consistency with relevant sections of the RCPG. The Project is consistent with this RCPG policy.

The Draft EIR under review requires a federal action, and may be subject to a finding of air quality conformity. 2

3. The Water Quality Chapter (WQC) core recommendations and policy options relate to the two water quality goals: to restore and maintain the chemical, physical and biological integrity of the nation's water; and, to achieve and maintain water quality objectives that are necessary to protect all beneficial uses of all waters. The core recommendations and policy options that are particularly applicable to the Project include the following:

11.02 *Encourage "watershed management" programs and strategies, recognizing the primary role of local governments in such efforts.*

SCAG staff comments: The Project represents a good example of a watershed management program which recognizes the primary role of local governments. The Locally-preferred alternative is a consensus based solution to the problem of providing an alternative source of water to meet subregional needs. The project will provide maximum economic benefits to the service areas of the San Bernardino Valley Municipal Water District and the Western Municipal Water District. The Project will allow for the use of water retention space behind the dam to conserve runoff and groundwater brought to the surface by the dam after the annual flood season has passed. Furthermore, during the dry summer months, the water level behind the dam will be drawn down by releasing water to downstream users at a rate commensurate with diversion and groundwater recharge needs. The Project is consistent with this RCPG policy.

11.03 Coordinate watershed management planning at the subregional level by (1) providing consistent regional data; (2) serving as a liaison between affected local, state and federal watershed management agencies; and (3) ensuring that watershed planning is consistent with other planning objectives (e.g. transportation, air quality, water supply).

SCAG staff comments: The Project represents a good example of a watershed management planning at the subregional level, however, as noted for policy 3.01, it is not possible to determine the consistency of water needs determination with SCAG's growth forecasts. Planning coordination efforts are consistent with subregional planning. Watershed planning is consistent with regional transportation, air quality and water supply planning.. The Project is consistent with most aspects of this policy but it is not possible to determine consistency with the use of regional data aspect of the policy.

11.07 Encourage water reclamation throughout the region where it is cost-effective, feasible, and appropriate to reduce reliance on imported water and wastewater discharges. Current administrative impediments to increased use of wastewater should be addressed.

SCAG staff comments: The Project is a good example of a cost-effective water reclamation/conservation program. It will result in the capture of groundwater and storm water discharges and the utilization of this water to meet various needs. The Project is consistent with this RCPG policy.

Conclusions and Recommendations:

(1) As noted in the staff comments, the proposed Seven Oaks Dam Water Conservation Project is consistent with most of the relevant policies of the Regional Comprehensive Plan and Guide, but we are unable to determine consistency with policies 3.01, 3.03 and parts of 11.03.

(2) All mitigation measures associated with the project should be monitored in accordance with AB 3180 requirements and reported to SCAG through the Annual Reasonable Further Progress Reports.

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

Roles and Authorities

THE SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS is a ***Joint Powers Agency*** established under California Government Code Section 6502 et seq. Under federal and state law, the Association is designated as a Council of Governments (COG), a Regional Transportation Planning Agency (RTPA), and a Metropolitan Planning Organization (MPO). Among its other mandated roles and responsibilities, the Association is:

• Designated by the federal government as the Region's ***Metropolitan Planning Organization*** and mandated to maintain a continuing, cooperative, and comprehensive transportation planning process resulting in a Regional Transportation Plan and a Regional Transportation Improvement Program pursuant to 23 U.S.C. §134(g)-(h), 49 U.S.C. §1607(f)-(g) et seq., 23 C.F.R. §450, and 49 C.F.R. §613. The Association is also the designated ***Regional Transportation Planning Agency***, and as such is responsible for both preparation of the Regional Transportation Plan (RTP) and Regional Transportation Improvement Program (RTIP) under California Government Code Section 65080.

• Responsible for developing the demographic projections and the integrated land use, housing, employment, and transportation programs, measures, and strategies portions of the ***South Coast Air Quality Management Plan***, pursuant to California Health and Safety Code Section 40460(b)-(c). The Association is also designated under 42 U.S.C. §7504(a) as a ***Co-Lead Agency*** for air quality planning for the Central Coast and Southeast Desert Air Basin District.

• Responsible under the Federal Clean Air Act for determining ***Conformity*** of Projects, Plans and Programs to the State Implementation Plan, pursuant to 42 U.S.C. §7506.

• Responsible, pursuant to California Government Code Section 65089.2, for ***reviewing all Congestion Management Plans (CMPs) for consistency with regional transportation plans*** required by Section 65080 of the Government Code. The Association must also evaluate the consistency and compatibility of such programs within the region.

• The authorized regional agency for ***Inter-Governmental Review*** of Programs proposed for federal financial assistance and direct development activities, pursuant to Presidential Executive Order 12,372 (replacing A-95 Review).

• Responsible for reviewing, pursuant to Sections 15125(b) and 15206 of the CEQA Guidelines, ***Environmental Impact Reports*** of projects of regional significance for consistency with regional plans.

• The authorized ***Areawide Waste Treatment Management Planning Agency***, pursuant to 33 U.S.C. §1288(a)(2) (Section 208 of the Federal Water Pollution Control Act)

• Responsible for preparation of the ***Regional Housing Needs Assessment***, pursuant to California Government Code Section 65584(a).

• Responsible (along with the San Diego Association of Governments and the Santa Barbara County/Cities Area Planning Council) for preparing the ***Southern California Hazardous Waste Management Plan*** pursuant to California Health and Safety Code Section 25135.3.

G. Tri-County Conservation League letter dated May 14, 1997.

1. The public review and comment period has been provided for the Seven Oaks Dam Water Conservation Feasibility Study; this is not a public review and comment period for the construction of Seven Oaks Dam for flood control as a component of the Santa Ana River Mainstem Project.

2. Without providing a specific and detailed account of why you find the draft feasibility report "wholly inadequate and unacceptable" it is difficult to meaningfully respond to your comment.

3. While it is inevitable that the construction of a flood control dam will alter the historic hydrological regime of a portion of the watershed it is protecting. Modifications to the hydrological conditions associated with the construction of Seven Oaks Dam were analyzed and mitigated for during preparation of the 1988 FSEIS for the SARP. It is the Corps position that based upon our 1988 analysis, subsequent supplemental investigations and the current water conservation study that impacts associated with the implementation of seasonal water conservation at Seven Oaks Dam to both the upstream and downstream habitats is negligible and can all be mitigated to a level of non-significance.

4. The sediment issue has been analyzed by the Corps in 1988 with supplemental investigations since then. The Corps does not concur that deep erosion, creation of a barrier to animal movement and a hazard to recreationists will be caused by the operation of Seven Oaks Dam.

5. As proposed water conservation releases would be on a demand basis, and would either be diverted into the water conservaton districts' existing distribution system or into their spreading basins for groundwater recharge. Water table fluctuations associated with recharge activities will not be affected by water conservation activities.

6. While riparian species might find the area adjacent to or within the spreading basins favorable habitat, their introduction would impact the ability of the water agencies to spread water and recharge the aquifer;accordingly, their establishment is not permitted in the area oprated for spreading activities.

7. Water spreading activities are unlikely to impact nearby habitats.

8. Seven Oaks Dam was designed as a flood control facility and it does not have the ability to provide "mega" releases as do some of the larger hydroelectric facilities on the Colorado system have.

9. It is the Corps position that the construction and operation of Seven Oaks Dam for flood control purposes is separate from the proposed operation of Seven Oaks for seasonal water

conservation. The dam's construction is a flood control element and not an aspect of water conservation as is indicated in this section.

TRI-COUNTY CONSERVATION LEAGUE
P.O. Box 51127
Riverside, CA 92517

14 May1997

Jared Miller
Seven Oaks Dam Study Manager
PO Box 532711
Los Angeles, CA 90053-2325

RE: Seven Oaks Dam Water Conservation Draft Feasibility Report and DEIS/EIR (DFR); please incorporate this missive into the official record for inclusion in the Final EIS/EIR

Dear Mr. Miller:

TCCL is a public service organization dedicated to preservation of the Santa Ana River and its major tributaries for educational, recreational, wildlife habitat, and water quality and quantity purposes. Our goals are pursued through participation in public discussions, formal reviews, and other forums which pertain to planning for land use and other projects which may affect the Santa Ana River. Through our newsletter, we disseminate information related to our goals, including reports on proposed and on-going flood control, recreational, and water quality issues. Our newsletter is distributed to approximately 500 members, as well as elected officials and other public servants in local jurisdictions in Orange, Riverside, and San Bernardino counties.

TCCL welcomes this opportunity to comment on the proposed construction and operation of the Seven Oaks Dam for flood control and water conservation. TCCL expects these comments to be addressed more sincerely than our request to the Los Angeles District, Army Corps of Engineers (COE), under the Freedom of Information Act, for documents pertaining to the San Timoteo Creek Channelization Project (also a part of the Santa Ana River Mainstem Project); in spite of written promise of compliance and three years beyond the legal time limit for compliance, neither documents nor explanation for non-compliance have been provided to TCCL. Perhaps the noncompliance with TCCL's FOIA request is merely a gross oversight, unrelated to the Corps' additional failures to comply with Executive Order 11988 (requiring all federal agencies to give balanced consideration to all natural flood plain functions, including water quality, quantity, wildlife, etc, as well as drainage of flood waters) and failure to comply with conditions of certification , under section401 of the Clean Water Act, of the San Timoteo Channelization project. i

In spite of TCCL's ongoing negative experience with the COE, as described above, the following comments are offered for inclusion in the public record and incorporation into the Final Feasibility Report and Final EIS/EIR for the Seven Oaks Dam Water Conservation Feasibility Report.

1) The environmental review section of the DFR is wholly inadequate and unacceptable. It was apparently composed by an individual lacking in basic understanding of ecology. The Corps of Engineers can do better. TCCL suggests that the COE seek outside expertise from an experienced ecologist to restate the adverse effects of the Seven Oaks Dam and the additive and cumulative effects of its use for a conservation pool. Alternatively, TCCL would be pleased to offer our assistance through our members and associates who have the necessary expertise in order to properly address these issues and their appropriate mitigations. We are ready to offer out services to the COE at any time. Perhaps the Engineering Branch of the COE could even find and borrow appropriate staff (trained and experienced in field ecology) from the Regulatory Branch of the Corps. For now, TCCL offers the following discussion of issues and suggested mitigations in the spirit of informing and educating COE staff of some serious issues they have overlooked. 2

In order to assuage concerns that the COE does not take seriously the environmental impacts due to the Seven Oaks Dam and its use for water conservation, TCCL requests that the Corps re-examine these issues and present them to the public in a more realistic and comprehensive manner for further discussion. TCCL also requests that all persons responsible for presenting these issues in the DFR and additional relevant documents be identified and their educational and technical qualifications be included in those documents.

2) The Seven Oaks Dam will substantially modify hydrological conditions in the immediate vicinity of the Dam site near the mouth of the Santa Ana River Canyon and downstream at least as far as Prado Dam. The DFR proposes several alternatives for impoundment and subsequent release of storm water from the Seven Oaks Dam, currently under construction. TCCL's comments apply generally to all alternatives that have been proposed. Some, but not all, adverse effects due to anticipated changes in the hydrological conditions of the Santa Ana River, pertaining to the overall Santa Ana River Mainstem Flood Control Project in general, and to the Seven Oaks Dam in particular, have been addressed (and only partially mitigated) in previous environmental documents. The currently proposed plans to modify the operation of the dam for a seasonal conservation pool will further additively and negatively impact natural communities created by and dependent on natural hydrological conditions which (until the inception of Dam construction) have prevailed for millenia. **The DFR has failed to note a plethora of potentially disastrous adverse impacts to the alluvial scrub community downstream from the dam, which may occur as a result of the manner in which it is operated. These issues and their mitigations must be addressed fully in subsequent documents to be made available for public review prior to the Final EIS/EIR.** 3

The proposal to modify the dam and its operation for water conservation offers opportunities for partially mitigating some of the still-unmitigated impacts of the dam, as well as some additional impacts that will accrue from its operation for water conservation. Thus, the dam could be operated in a manner which maintains its principal flood control function while also accommodating beneficial conservation of water and biological resources.

The primary impacts of the dam on natural communities relate to the altered hydrological conditions due to its operation. Elimination of historical peak flood discharges and prolonged releases of water low in sediment are considered beneficial for narrow, short-term human needs but are detrimental to natural communities adapted to and dependent on more natural conditions. The discussion in the DFR pertaining to decreased downstream sediment flow due to the dam (p. 65) fails to recognize that fresh sediment and alluvial plain scouring are crucial to existence of the rare Riversidean Alluvial Scrub community and its component rare and threatened species occurring below the dam. If the long-term loss of fresh sediment and periodic scouring are not effectively mitigated, this rare natural community will decline and may be extirpated. These impacts are obvious to any plant ecologist and it is inexcusable for the DFR to fail to address them.

Prolonged release of water low in sediment content is likely to have at least three major adverse effects which must be addressed:

3) Prolonged and increased flows of water low in sediments can be expected to degrade the stream course, causing a) deep erosion and possible alteration in the availability of water to existing riparian vegetation in the upper Santa Ana River wash, b) an impediment to animal movement and c) a potential hazard to recreationists. These three issues must be addressed with appropriate proposed mitigations. Possible mitigations might include: a) occasional mechanical recontouring of the eroded stream bed, b) emplacement of tree trunks or other informal bridges for small animals, c) defined safe recreational trails, with bridges, if needed. 4

4) Diversion of water into percolation basins for a more prolonged period of time and in larger quantities than now occurs will alter the water table unfavorably for organisms dependent on relatively dry, well-drained soils (most chapparal species, cacti, junipers, etc). These plants, which comprise the dominant species in the rare Riversidean Alluvial Scrub community, are adapted to dry soil conditions during summer and may suffer increased mortality from soil fungi and invasion of alien species better adapted to unseasonally high soil moisture content. The long-term effects of altered hydrological conditions on endangered species such as slender-horned spine flower and Santa Ana Woolly Star could be catastophic. Any decline in the Riversidean community or its component rare, threatened, and endangered species traceable to increased water percolation activities should be cause for cessation of such activities. 5

These issues, including appropriate mitigations, must be addressed in subsequent environmental documents for this project.

5) Increased water spreading activities (both in extent and seasonal duration) will promote increased growth of hydrophilic plants including riparian trees and other tall shrubs which might adversely affect existing vegetation. Any significant increase in tall shrubs and trees (especially broad-leaf deciduous species) in the vicinity of the Riversidean Alluvial Scrub could be detrimental to its survival. Many components of this rare plant community, including the threatened Slender-horned Spineflower and endangered Santa Ana Woolly Star, require full sun and bare soil for germination, growth, and reproduction. Their insect pollinators, likewise, require dry soil during the summer. These issues have not been addressed in the DFR and must be addressed by a competent plant ecologist, with appropriate proposed mitigation, in all further documents pertaining to this project. 6

6) Artificially large and/or prolonged release of water from the dam for percolation in the vicinity of Riversidean Alluvial Scrub must be regulated to protect that plant community. Water percolation must be conditioned on continued health of nearby sensitive plant communities and discontinued if those communities show signs of decline related to water percolation activities. Prudence dictates that no substantially increased quantities of water be supplied to percolation basins located in close proximity to sensitive plant communities during the summer months (June-September). Again, these issues were overlooked in the DFR and must be adequately addressed by an expert in plant community ecology with relevant experience with Riversidean Alluvial Scrub and its component rare, threatened and endangered species. Potential changes in the estimated quantity of water and related economic benefits must be recalculated based on the practical limit of water-spreading activities adjusted for imperatives to preserve the Riversidean Alluvial Scrub community. Again, these issues were overlooked in the DFR and must be properly addressed and presented to the public for review prior to the Final EIS/EIR. 7

7) Like all man-made structures, the Seven Oaks Dam has a limited life expectancy. However, the expected time frame (perhaps 500 years or more) before it either fills with debris or washes away, may exceed the survival capacity of organisms (individually or as complex communities) dependent on without-dam hydrological conditions. This issue has never been adequately addressed in any environmental documents pertaining to the Seven Oaks Dam. On the other hand, some of the most adverse impacts of the dam might be ameliorated if it were operated appropriately in conjunction with the proposed alterations for water conservation. 8

Thus, occasional (perhaps once in twenty years or so) mega-releases of water sufficient to simulate natural sheet flood conditions could be employed to remove senescent shrubs and excess organic matter detrimental to the natural community. This operation would also leave fresh deposits of sand, gravel, and cobbles and redistribute seeds necessary for the rejuvenation and long-term survival of the Riversidean Alluvial Scrub plant community, including its component endangered and threatened species.

Recent major releases from Lake Powell to restore riparian conditions within the Grand Canyon provide an analogous example of how some of the adverse environmental impacts of the Seven Oaks Dam might be mitigated. TCCL recommends that a similar plan of occasional major water releases from the Seven Oaks Dam be incorporated into its management and operation manual for whichever water conservation/flood control management plan is adopted. The timing and magnitude of such releases should necessarily be regulated in consultation with the state and federal public trust agencies (California Department of Fish and Game and United States Fish and Wildlife Service).

8) The DFR indicates that while the USFWS would like the adverse impacts of the Seven Oaks Dam construction and its operation for a conservation pool to be addressed under one EIS, the Army Corps of Engineers would like the impacts of these two projects to be clearly separated. TCCL recognizes that it is useful to separate the two sets of impacts to the extent that they may be unrelated. However, because the conservation pool project cannot stand alone and because its impacts are closely related and additive to those of the dam alone, it is an integral part of the latter. **It is not only more logical and efficient to address the impacts of the dam's construction and operation for water conservation and flood control together, but CEQA prohibits the piecemeal review of projects as clearly and intimately related as these.** 4

Sincerely,

for Jack Bath, TCCL President

C: Senators Boxer and Feinstein

Representatives Brown and Lewis

USFWS

CDFG

H. City of Redlands letter dated 28 May 1997

1.The estimate of potential water conservation yields for the alternative plans is considered reasonable for a feasibility level analysis. See response #4 to San Bernardino Valley Water Conservation District letter.

2. The minimum flows at the mouth of the canyon is estimated at 3.5 cfs, the dam is located about a mile upstream of the canyon mouth, and at this location the flows are estimated at 3 cfs which is the minimum base flow for flood control operations for the Seven Oaks Dam. Water conservation operations will also maintain this requirement. This is explained in the Hydrology Appendix, Appendix A.

3. Appendix A, the Hydrology Appendix and Section 4.2.2.2 of the EIS/EIR discuss potential for water quality impacts. The recommended plan includes a monitoring program and for measures to be taken to remediate any adverse impacts. If needed, measures such as bubble devices could be implemented if needed to remediate anaerobic conditions.

4. The Hydrology Appendix to the Main Report presents information on the assumptions used in modeling water conservation potential. As discussed about this is considered an estimate of yield. A more detailed analysis will be performed upon completion of the water control manual for the Seven Oaks Dam Water Control Manual for the flood control operations and a revised water control manual for water conservation operations. The latter manual will consider operations that include upstream diversions and preservation of all water rights.

5. SBVMWD and WMWD are the cost sharing partners for the water conservation study. They do not represent any of the other water purveyors. However, further development and implementation of the selected plan would be their responsibility, including coordination with other water purveyors as well as with the non-Federal sponsors for the Seven Oaks Dam Flood Control Project.

6. The sentence has been adjusted to clarify that SBVMWD is a wholesaler. The sentence has also been revised to indicate that they serve 600,000 people instead of 400,000.

7. This has been clarified to indicate that the water purveyors within the SBVMWD use local groundwater extractions and surface runoff as their primary means available to meet water demands.

8. The map is presented to show the SBVMWD Service area and some of their major facilities.

9. See response #6 above.

10. The detailed data used for the model is presented in the Hydrology Appendix, Appendix A.

11. All diversions required based on available water rights will be preserved. This will be addressed in further detailed analysis as part of developing the water control manual for water conservation operations. See response #4 to San Bernardino Valley Conservation District letter.

12. As indicated in the Hydrology Appendix, the 3.5 cfs groundwater flow is at the mouth of the canyon, groundwater flow at the dam location is estimated at 3 cfs, which will be the minimum flow provided by the dam under flood control and water conservation operations.

13. Addendums 1 and 2 which present the basis for the water demand estimates are included in Appendix E. The demands do not reflect populations outside of limits of other retailers.

14. The costs for reclaimed water was based on information provided by the SBMVWD using Camp Dresser and McKee Task II study, and information provided by the City of Riverside's Public Utilities Department. This is explained in the Economic Appendix, Appendix E.

15. Water conservation operations will be further developed to assure all water rights are met, including the downstream diverters such as SBVWCD and BVMWD.

16. The responsibility for arranging any water rights is a non-Federal requirement for proceeding with the water conservation project and is being addressed by the SBVMWD as part of their application to the State Water Resources Control Board.

17. A water quality monitoring program will be implemented to 1) establish a data base for those parameters that could adversely impact water quality and 2) develop measures to remediate any water quality problems if they should occur. This could include aeration or other means to address anaerobic conditions. However, at this time, given the fact that the conservation pool will not be deep, the water will not be held for a prolonged period of time, and the water is very cold to begin with, it is unlikely that anaerobic conditions would develop.

18. The discussion of Downstream Impacts in the Hydrology Appendix explains that the downstream discharges is not in general expected to change significantly as a result of water conservation operations. The second and third lines of Table 5 in Appendix A reflect comparison between base conditions and conditions with the selected plan. The 50-year event reflects a large change in discharges resulting from water conservation, however the impacts are not considered significant as explained in the appendix.

19. Table 5 presents a comparison of seasonal flows for the without project "base" condition and with the selected plan for water conservation, Alternative 1.

20. The 167,000 acre-feet reflect the volume of water available for the San Bernardino Basin Area as presented in the Western San Bernardino Annual Report.

21. The Addendum is included in Appendix E of the Final report.

22. The State water control project costs reflect variable and fixed costs over time based on information from Department of Water Resources annual review of State Water Project water supply contractors. The $16,377,000 reflects the total value of water supply available including a surplus of 53,904 acre feet.

City of Redlands

May 28, 1997

Mr. Jared Miller
U.S. Army Corps of Engineers, Los Angeles District
Study Manager, Suite 1420
P.O. Box 532711
Los Angeles, California 90053-2325

COMMENTS REGARDING THE SEVEN OAKS DAM WATER CONSERVATION DRAFT FEASIBILITY REPORT DATED MARCH 1997.

We have recently completed a review of the March 1997 Seven Oaks Dam Water Conservation Draft Feasibility Report document that includes a Main Report, Environment Impact Statement/Environmental Impact Report, and Appendixes. This EIS/EIR addresses and mitigates for new impacts that would occur at the Seven Oaks Dam associated with physical and operational changes at the facility to allow for water conservation. Consequently, the "No Action" alternative assumes dam operations for flood control, not for pre-dam conditions.

Of primary importance to the City of Redlands are the yield calculations and potential impacts to City water supplies. The EIS/EIR does not accurately address the issues of impacts on previous water rights holders. Generally speaking, the analysis does not identify all water that is already used by others in determinng "new" water generated by the project. Yields are developed using the Santa Ana River USGS Gage 11051500 located downstream of the dam. Apparently, the assumption is that all diversions to downstream water rights holders is conveyed by the Southern California Edison (Edison) hydroelectric system and measured at USGS Gage 11049500 downstream of Santa Ana River Powerplant No. 2. This assumption does not account for other waters that historically reach the existing water rights holders. 1

First, since the Bear Valley Mutual Water Company (BVMWC) Well 2 will no longer convey flow to the Edison system and ultimately to the existing water rights holders, that water would need to be picked up downstream. Under a flood control-only operation that would not cause a problem. However, apparently, that flow would now be recovered at the dam and considered as new yield.

P.O. BOX 3005 • REDLANDS, CA 92373

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June 6, 1997
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Second, the flow at USGS Gage 11051500 is actually comprised of two gages: 11051499 on the north side and 11051502 located on the south side. Flow measured at 11051502 is that which has been diverted using a temporary dam and added to the tailrace of Santa Ana River Powerplant No. 3 to serve downstream water right holders. The EIS/EIR analysis does not take that into account. It assumes all water recorded at 11051500 is available. 1

Third, the EIS/EIR estimates the required diversion to minimum flows to be 3 cfs not 3.5 cfs as was used in previous studies. This understates the City of Redlands supply from the Redlands Tunnel. 2

From an evironmental impact perspective, the EIS/EIR must address potential changes in flows to downstream water rights holders due to the potentially significant water quality impacts. If Santa Ana River water is lost in any amount by the City or other users, then an alternative supply may be required - which could include use of imported State Water Project (SWP) flows (Particularly if the project proponents export their yields out of the basin.) The lower quality SWP water would impact the ability of the City's wastewater treatment plant to meet waste discharge requirements for the Bunker Hill Basin. This could cause potential water quality impacts to the basin. 3

Although it may not significantly change the answers, the EIS/EIR must acknowledge water rights held by others and be explicit in the assumptions used for modeling. In addition, releases for diversions to the Santa Ana River Powerplant No. 3 tailrace and for the Redlands Tunnel may be required as mitigation. 4

1. pg. i. Paragraph 4 states that SBCFCD is "representing local water districts" but only lists two of them, SBVMWD and WMWD. Have the other water purveyors given SBCFCD permission to represent them? No!! 5

2. pg. 5. SBVMWD "serves a population of about 400,000 people." SBVMWD is a wholesaler. This paragraph implies that SBVMWD is a retailer. 600,000 6

3. pg. 5, paragraph 3. SBVMWD's "primary water source is from the California State Water Project (SWP)" but pg. 28, paragraph 1 states "Local groundwater extractions and surface runoff are the primary means available to SBVMWD to supply its water demands." SBVMWD does not have any surface water rights nor own any wells. Could the EIS/EIR be confusing water associated with the Exchange Agreement? 7

4. pg. 5, paragraph 4 indicates that exhibit 3 shows several pipelines and service area. The exhibit is hard to read. Are the facilities shown just those that deliver SWP flows? How are these facilities used in the Exchange Agreement? 8

5. pg. 6, paragraph 2 indicates that SBVMWD does not have surface water rights. If that is true how can SBVMWD claim that its primary means of water supply are surface runoff and groundwater extractions? (See item 3) (9)

6. pg. 13, paragraph 4 states that analysis of the system was performed with HEC-5 Reservoir Systems computer model. The City could not locate the input or output for the model for review. Hydrology appendix (10)

7. The dam will eliminate the Santa Ana River Powerplant No. 2 flow pick up from the Santa Ana River. What will happen to this flow that without the dam would have been available to the existing water rights holders? If water is conserved behind the dam, this flow will not be available to the existing water rights holders for pickup. Up stream of the gage 11051500 BVMWC often diverts water at its annual diversion dam. These diversions are not discussed in the EIS/EIR, nor are the decrease in flows that will be available to others, nor how will the water rights of downstream users be satisfied. (11)

mouth vs. location dam

8. Groundwater flow estimation in the EIS/EIR is at 3 cfs. Previous USCOE estimates were at about 3.5 cfs. The report does not clearly describe the basis of 3 cfs. Redlands Tunnel obtains its flow from groundwater at the mouth of the tunnel. Historical records show that flows in the tunnel exceeded 3 cfs on a number of years. The flow in the Tunnel is directly related to flows in the river. The EIS/EIR does not mention the Tunnel, nor does it state how the flows in the Tunnel will be maintained. Page 3 of Appendix A states that 3 cfs will be released at all times to meet downstream groundwater requirements. Nowhere in the report is an analysis performed to see if releases of 3 cfs are adequate to produce historical discharges at Redlands Tunnel or diversions to spreading by SBVWCD to serve local agencies and water companies. (12)

Addendum in Econ Appendix

9. pg. 27, paragraph 2. Water demands. IWR-MAIN 6.1 model inputs and outputs are not included for review. Are the demands needed for SBVMWD based on populations outside of limits of other water retailers? This goes back to questions number 2 & 3. (13)

10. Why is there a discrepancy between reclaimed water costs for SBVMWD ($565) and WMWD ($800) (pgs. 29 & 30)? (14)

11. pg. 39. The linear expansion of conservation pool. How will it affect downstream diverters such as SBVWCD and BVMWC at the temporary diversion dam? Only 3 cfs will be released for groundwater. This goes back to question 8. (15)

12. pg. 85 paragraph 4 states that water rights are administered by the SWRCB. The City could not locate detailed descriptions of water rights in the upper Sata ana River or a (16)

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statement that describes the Santa Ana River as a fully adjudicated stream.

13. Monitoring plan for water quality is beig proposed. What about an implementation plan if the water quality deteriorates due to inpoundment? 17

14. Appendix A pg. 13. The only two downstream impacts discussed here are groundwater and changes in stream velocity downstream of the dam. 18

15. Appendix A pg. 13 states that downstream of the confluence of Santa Ana River and Mill Creek, Mill Creek flows control the flow. The City could not find where a comparison of flows was made. Table 5 summarizes frequency analysis. But the table is not well explained. 19

16. Appendix E, pg. 5. "Extractions for urban water use by member agencies of SBVMWD are approximately 167,000 ac-ft/year" - how was this obtained? This number is also used in the main report pg. 28 states "local groundwater extractions are expected to be 167,000 acre-feet. This number represents the total extractions/diversions from ground and surface water within the study area." Is it groundwater and/or surface?

w/ the San Bernardino Basin Area.

Western San Bernard Annual Report?

Yes inaccurate [illegible]

17. Appendix E, pg. 4, paragraph 5. Where is the Addendum 1 that shows forecasted ~~water~~ usage? 20

18. Appendix E, pg. 8, Table 4. If groundwater/surface water are free, then the costs are only those of the SWP water. How was $16 million obtained for 6,096 acre-feet? That's almost $3,000 per acre-ft. 21

Thank you for the opportunity to provide comments on the EIS/EIR.

Michael Huffstutler

Michael Huffstutler
Chief of Water Resouces

I. United States Environmental Protection Agency letter dated 27 May 1997.

1. End of Pipe conservation measures are included in the demand analysis as part of the IWR-Main model. This is discussed in Addendum 1 of the Economics appendix.

2. It is assumed that conservation measures would be in place and thereby reduce future demands.
It is understood that plumbing and other ordinances are in place by water districts and government agencies.

3. The discussion of downstream impacts as contained in the Hydrology Appendix reflects that the hydrologic and hydraulic changes are not expected to be significant as a result of water conservation operations as compared to flood control operations, except for infrequent flood events. (Environmental needs to address the flora and fauna impacts.)

4. (Environmental needs to address impacts on sensitive and endangered species.)

5. None of the alternatives are expected to cause any long term significant adverse impacts. The least environmentally damaging practicable alternative related to short-term construction impacts and consistent with project objectives is Alternative One, the Recommended Plan. Moreover, the Recommended Plan will be in full compliance with the CWA, Section 404(b)(1) Guidelines prior to the initiation of project construction.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

May 27, 1997

Jared Miller, Study Manager
Army Corps of Engineers
PO Box 2711
Los Angeles, California 90053

Dear Mr. Miller:

The U.S. Environmental Protection Agency has reviewed the Draft Environmental Impact Statement/Report (DEIS/R) for **SEVEN OAKS DAM WATER CONSERVATION, Santa Ana River Basin, San Bernardino County, California**. The DEIS/R was prepared by the Corps and the San Bernardino County Flood Control District (SBCFCD) to satisfy the respective requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The Corps is the Federal agency with jurisdiction over the proposed seasonal water conservation practices at the Seven Oaks Dam site. The SBCFCD is the local sponsor with jurisdiction over the proposed project's alternatives, although the SBCFCD, the Riverside County Flood Control District and the Orange County Flood Control District share ownership of the dam and operational control responsibilities.

Our comments are provided pursuant to NEPA, Section 309 of the Clean Air Act, the Council on Environmental Quality's Regulations for Implementing NEPA and Section 404 of the Clean Water Act (CWA). Regarding the document's Section 404(b)(1) analysis, our comments are advisory and provided in keeping with the CWA Section 404(b)(1) Guidelines. EPA will provide additional comments to the Corps on the proposed project's CWA Section 404 Public Notice when available.

The DEIS/R addresses potential impacts associated with allowing Seven Oaks Dam to provide water conservation. Seven Oaks Dam, a flood control facility, is now under construction (completion is expected in 2000). The project's objective is to use the completed dam for seasonal water conservation. The proposed plan would allow increasing the water pool elevation behind the dam from 2,200 feet NAVD to 2,300 feet NAVD from March to May and an increase in releases from about 20 cubic feet per second (cfs) to 70 cfs from June to September. The seasonal storage is expected to increase water supplies for diversion and groundwater recharge by 4,120 acre-feet per year in 2000 and by 2,140 acre-feet per year in 2050. Modifications to the dam would

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include strengthening the intake structure and possible relocation of an access road to upstream facilities. The DEIS/R assessed in detail four water conservation alternatives in addition to the No Action Alternative:

* Alternative 1, the Locally Preferred Plan, allows seasonal storage of 16,000 acre feet at elevation 2,300 feet.
* Alternative 2 allows seasonal storage of 35,000 acre feet at elevation 2,375 feet.
* Alternative 3 allows seasonal storage of 50,000 acre feet at 2,418 feet.
* Alternative 4 allows seasonal storage of 10,270 acre feet at elevation 2,265 feet.

The No Action Alternative would not provide for the addition of water conservation features at Seven Oaks Dam, which would be constructed in any event. Even though the DEIS/R states that local water supply sources would not meet municipal demand beginning in 2000, several potential action alternatives were not examined in the DEIS/R because, according to the Feasibility Report (p. 100), they are "more costly." Alternatives not examined in detail include using State Water Project water, water importation and reclamation.

We have several concerns with the DEIS/R:

* the alternatives analysis does not include consideration of "end of pipe" water conservation as an alternative to increasing water storage at the dam. We believe that such an alternative should be included pursuant to 40 CFR 1502.14(c). 1

* in analyzing the alternatives presented, there is no discussion of whether or not a comprehensive "end of pipe" water conservation program is currently in place, nor whether such a program would be implemented to minimize the need for additional storage at the dam. This relates directly to the stated need for the proposed project pursuant to 40 CFR 1502.13. 2

* the discussion of the proposed project's potential downstream impacts, specifically impacts from flow regulation on flora and fauna dependent on riparian and alluvial fan ecosystems, is deficient. 3

* according to the U.S. Fish and Wildlife Service in a September 1996 draft report, "...upstream and downstream biological communities... sensitive habitats (and) federally sensitive and listed endangered species" would be affected, yet the Feasibility Report states that ""no significant adverse impacts are expected..." Clarification is needed. 4

5

* there is no indication of which of the evaluated alternatives is considered to be the Least Environmentally Damaging Practicable Alternative pursuant to the CWA Section 404(b)(1) Guidelines.

These issues, expressed in greater detail in the attached comments, form the basis for our rating of EC-2, Environmental Concerns - Insufficient Information. Please refer to the attached "Summary of Rating Definitions and Follow-Up Action" for an explanation of EPA's rating system.

We appreciate the opportunity to comment on the DEIS/R. Please send one copy of the FEIS/R to me (mailcode: CMD-2) at the letterhead address when it is filed with EPA's Washington, D.C. office. If you have any questions, please call me or David Tomsovic of my staff, 415-744-1575.

Sincerely,

David Farrel, Chief
Federal Activities Office

Attachments: 2
(a) Summary of Rating Definitions and Follow-Up Action
(b) EPA's comments on DEIS

cc: Merle Richmond, F&WS, Portland, OR
John Hanlon, F&WS, Carlsbad, CA
Patricia Port, DOI, San Francisco
Vana Olson, SBCFCD, San Bernardino, CA

SUMMARY OF RATING DEFINITIONS AND FOLLOW-UP ACTION

Environmental Impact of the Action

LO-Lack of Objections

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC-Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO-Environmental Objections

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU-Environmentally Unsatisfactory

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of environmental quality, public health or welfare. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommend for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1-Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2-Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3-Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From: EPA Manual 1640, "Policy and Procedures for the Review of Federal Actions Impacting the Environment."

ALTERNATIVES UNDER NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

"End of Pipe" Water Conservation Alternative

The Feasibility Report (p. 100) states that, without the project, local water supply sources would not meet municipal demand starting in 2000 and would need to turn to more costly alternative water supply sources. These alternative sources include State Water Project (SWP) water, importation and reclamation. In discussing the project's purpose and need (DEIS/R, p. 1-1), the document notes that "normal-year water supplies for Southern California will begin to be inadequate to meet anticipated demands during the decade... 2010 to 2020." We assume that the service area's water supply condition would worsen by 2050 (the most distant year projected in the DEIS/R) unless significant new water supplies are ensured and/or the area's water consumption declined, both of which are speculative.

In light of the discussion in the DEIS/R on the project's purpose and need, we believe that the document itself presents a strong case of why a comprehensive "end of pipe" conservation program is very important in the areas serviced by the Seven Oaks Dam, not only for the immediate future but in 2010-2020 and later when normal-year water supplies will begin to be "inadequate." For purposes of our comment letter, an "end of pipe" water conservation alternative may be defined as a program in which the various water users supplied by the water supply districts in the project area (municipalities, industrial, agricultural and commercial users, Federal Facilities, Tribes, etc.) adhere to a comprehensive program to conserve water resources throughout the year, including normal-precipitation years.

Neither the DEIS/R nor the Feasibility Report discusses whether end-of-pipe conservation may be a reasonable alternative for purposes of NEPA analysis. We believe that an "end of pipe" conservation alternative should be analyzed in detail by the Corps and the San Bernardino County Flood Control District (SBCFCD) in coordination with the Riverside and Orange County flood control districts and local water supply agencies. We believe that such an alternative would more adequately address the cost concerns raised by the SWP water, importation and reclamation alternatives (which were eliminated from the DEIS/R due to cost reasons). Please note that EPA made similar comments on the DEIS for **Operation of Prado Dam for Water Conservation/ Supply**. Regarding that EIS, we urged the Corps "to consider alternatives... which focus on reducing water consumption and water supply demand as a means of extending existing...water supplies..." (January 11, 1991 EPA letter from Deanna M. Wieman to Colonel Charles Thomas, District Engineer, Los Angeles District). We again ask the Corps to consider an alternative which focuses on reducing water consumption and extending current supplies.

CLEAN WATER ACT SECTION 404

404(b)(1) Alternatives Analysis [40 CFR 230.10(a)]

The 404(b)(1) Guidelines at 40 CFR 230.10(a) require that no discharge of fill material shall be permitted if there is a practicable alternative to the proposed discharge that would have less damaging impact on the aquatic ecosystem and still achieve the basic project purpose. Practicable alternatives are not unreasonably costly but may produce less return than desired by a permit applicant. In order for a 404(b)(1) alternatives analysis to be useful, the project purpose must be defined generically. The alternatives analysis in Appendix E states that the purpose of the proposed project is to "implement a water conservation plan at Seven Oaks Dam that will provide maximum water conservation benefits to the project area." EPA finds that this definition of the project purpose is too narrowly defined (due to its requirement for the plan to occur at Seven Oaks Dam) to allow for development and in-depth evaluation of a reasonable range of alternatives capable of achieving the project purpose (i.e., water conservation). The four alternative impound plans discussed in the DEIS/R are in effect different versions of a single alternative, seasonal water storage behind Seven Oaks Dam. We believe that, rather than a "water conservation" project, the proposed activity at Seven Oaks Dam would more appropriately be titled as "water storage," since there is no indication that the proposed project would result in a reduction in the amount of water used in the service area, or more efficient use of such water.

Significant Degradation [40 CFR 230.10(c)]

The 404(b(1) Guidelines prohibit discharges of fill material that would cause or contribute to significant degradation of the aquatic environment [40 CFR 230.10(c)]. EPA is concerned that implementation of the proposed water conservation project at the dam could result in cumulative adverse impacts to the aquatic environment that have not been clearly described in the DEIS/R (these cumulative impacts would be beyond the impacts associated with the flood control project's construction and operation). We also disagree with some of the document's findings on environmental effects and believe that project commitments to avoid or minimize potential cumulative adverse impacts on the Santa Ana River's sensitive biological resources have not been satisfactorily addressed. In terms of significant degradation:

1. The DEIS/R states that additional impoundment of water behind the dam will further reduce the amount of solids entering the downstream reaches of the Santa Ana River, and that this sediment reduction (although minimal) will be a beneficial impact. EPA disagrees with this conclusion and believes that additional sediment capture behind the Seven Oaks Dam may increase the

severity of an adverse phenomenon known as "hungry water," which the presence of the dam will cause. We believe that the trapping of sediment behind the dam as a result of its flood control operations would likely result in significant downstream degradation of the Santa Ana River's bed and banks. The increased sediment retention associated with the water conservation project would incrementally increase this adverse effect.

2. According to the DEIS/R, the proposed project would expand the seasonal conservation pool for ten days, beginning in March, to a target storage elevation of 2,300 feet. From March 10 through May, all inflow would be released from the dam after the target elevation is reached. The DEIS/R concludes that "water conservation alternatives would nominally change downstream water flows and the peak water release during flood control conditions would remain the same compared to the Seven Oaks Dam project." The DEIS/R does not address the possibility that, during some years, the target conservation elevation might not be achieved during the prescribed ten-day period. In such cases, would retention of inflows continue until the target conservation elevation is reached? EPA is concerned that water retention and the consequent reduction in downstream flows during the spring could occur during a critical period of the life cycle for some sensitive aquatic species (e.g., spawning in amphibians). We question whether specific project commitments (or fail safe measures) have been developed to ensure that the cumulative effects of downstream flow reduction associated with both the conservation and flood control operations would not imperil sensitive aquatic species or their habitat.

Federally Listed Species [40 CFR 230.10(b)(3)]

The Guidelines at 40 CFR 230.10(b)(3) state that no discharge of dredged or fill material shall be permitted if it jeopardizes the continued existence of species listed as endangered or threatened under the federal Endangered Species Act. From our discussions with the F&WS, we understand that the F&WS believes that the document's assessment of potential biological impacts (particularly downstream effects) is insufficient and that the concerns raised by the F&WS were not satisfactorily addressed in the document. We are concerned that these issues relative to sensitive species and habitats have not been resolved, and strongly recommend that your office address these issues more clearly in the FEIS/R. As one example, the DEIS/R indicates that the proposed project would have "no significant impacts" on biological resources. However, this assertion may be premature since we understand that surveys for threatened and endangered species have not yet been completed.

Least Environmentally Damaging Practicable Alternative (LEDPA):

Neither the DEIS/R nor the Feasibility Report discusses which of the four action alternatives analyzed in detail is considered to be the Least Environmentally Damaging Practicable Alternative pursuant to 40 CFR 230.10 (Restrictions on Discharge). We recommend that this be provided in the FEIS/R, assessing the proposed project's direct, indirect and cumulative impacts. As noted, we believe that an action alternative integrating "end of pipe" water conservation may need to be considered in the LEDPA analysis, should the Corps determine it to be a reasonable alternative for purposes of NEPA analysis.

Pollution Prevention

The DEIS/R does not address pollution prevention mechanisms in the proposed project to the extent recommended in guidance issued by the Council on Environmental Quality (January 29, 1993 Federal Register, pp. 6478-6481). We believe that the proposed project could be strengthened by specifically designing, constructing and operating the project with pollution prevention measures. For example, constructing a diversion berm and relocating an access road would have adverse impacts on environmental quality. However, the DEIS/R has little discussion on ways to minimize adverse construction impacts. We encourage the Corps and the SBCFCD to plan and locate site access routes and equipment storage areas in a manner that minimizes erosion potential as much as possible, e.g., by keeping the activities away from steep slopes, unstable soil areas and areas with inadequate vegetative density.

A second measure may be to inventory the use of any chemicals and hazardous materials used in the construction phase so as to reduce the use of hazardous compounds and/or substitute less hazardous materials. We note that p. 4-7 of the DEIS/R discusses means to control and limit the release of toxic materials from construction equipment, but does not identify potential measures to reduce the use of toxic materials. Reducing the use of hazardous materials would have an added benefit, i.e., reducing the generation of hazardous waste. Additionally, due to potential adverse effects on water quality, wildlife and worker health and safety, we encourage the adoption of vegetation restoration efforts that minimize or avoid using pesticides and herbicides. We encourage adoption of a comprehensive solid waste recycling program for the proposed project's construction as well as ongoing construction of Seven Oaks Dam. Other opportunities to reduce the impacts associated with air emissions, water quality discharges, solid waste and hazardous materials may also present themselves. We recommend that appropriate pollution prevention features be identified in the FEIS/R and that appropriate commitments be included in the ROD and, as appropriate, as CWA Section 404 permit conditions.

J. United States Department of Interior, Letter received 10 June 1997.

Response #1: In the draft Coordination Act Report (DCAR), the U.S. Fish and Wildlife Service, Carlsbad Field Office, recommended surveys for two endangered amphibian species and one candidate fish species be conducted throughout the project area. Accordingly, surveys for the arroyo southwestern toad (*Bufo microscaphus californicus*), California red-legged frog (*Rana aurora draytonii*), and Santa Ana sucker (*Catostomus santaanae*) have recently been completed. None of the target species were found to exist within the project area. The EIS/R has been revised to include the survey results, and the survey Report of Findings is appended to the EIS/R as Appendix B.

Response#2: Do not concur. The alternatives considered in the study are consistent with the study authorization which is to determine whether the addition of water conservation at Seven Oaks Dam is feasible. In this regard, it should be recognized that opportunities to conserve water in the study area are rather limited. This has been recognized by other studies conducted by water supply interests. Because of these limited opportunities, it is expected that under without-project conditions, or the No Action Plan, the needed water supply would be obtained through the State Water Project and water reclamation projects. These are compared to the only other known alternative to conserve water at Seven Oaks, considering different levels of conservation. Any other option would likely require a major impoundment structure, which is not deemed viable or reasonable at this time in light of Seven Oaks Dam.

Response #3: The seasonal nature of the water conservation plan, the reliance on flows during the March to May impoundment period, and the fact that the available yield will be reduced as the debris basin accumulates in the future, all corroborate that selected plan is not growth-inducing.

Response #4: Biological impacts from the potential road realignment will be further addressed in a supplemental NEPA document, if it is determined through negotiations between the non-Federal sponsors, the U.S. Forest Service, and Southern California Edison (SCE) that other existing roads are not adequate to meet SCE requirements. It is expected at this time that since the relocation alignment is within the 50-year reservoir pool, and that this area has already been mitigated at 100%, the any additional impacts occurring within this area are considered negligible. However, should the need to realign the access road be deemed necessary, and should the resultant permanent loss of native vegetation affect a Federally-listed species or its critical habitat, the Corps would at that time evaluate such impacts and consult with the USFWS in accordance with Section 7 of the Endangered Species Act.

Response #5: The Summary section (p. S-3) of the EIS/R discloses and discusses areas of controversies and unresolved issues. Although the Corps and the USFWS are continuing to resolve biological issues pertaining to the Seven Oaks Dam Mainstem Project, incorporation of the recommendations set forth in the Seven Oaks Dam Water Conservation Final Coordination Act Report (FCAR) indicate that Water Conservation project-induced impacts would be appropriately offset. Therefore, by virtue of fulfilling these FCAR recommendations, the Corps has resolved any perceived outstanding issues with the USFWS. Relevant information pertaining to sensitive and endangered species has been incorporated into the text of the EIS/R to reflect such compliance.

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
600 Harrison Street, Suite 515
San Francisco, California 94107-1376

Colonel Robert L. Davis
District Engineer, Los Angeles District
U.S. Army Corps of Engineers
P.O. Box 532711
Los Angeles, California 90053-2325

Dear Colonel Davis:

The Department of the Interior (Department) has reviewed the Draft Environmental Impact Statement/Environmental Impact Report (DEIS/R) for the Seven Oaks Dam Water Conservation Feasibility Study, Santa Ana River Basin, San Bernardino County, California. The following comments are provided for your information and use when preparing the Final Environmental Impact Statement/Environmental Impact Report (FEIS/R).

GENERAL COMMENTS

The Department recognizes the importance of water conservation in the service areas of the project sponsors, the San Bernardino Valley Municipal Water District and the Western Municipal Water District. However, we disagree with the conclusion in the DEIS/R that the proposed project would have "no significant impacts" on biological resources. This conclusion is premature since surveys for species, listed as threatened or endangered species under the Endangered Species Act of 1973 (ESA), have not yet been completed throughout the project area. 1

We have four additional concerns. Firstly, the definition of the objective of the project includes one possible alternative for accomplishing the goal. The "alternatives" identified later in the DEIS/R are, therefore, variations of the single alternative outlined in the project objective. 2 Secondly, the section on growth inducing impacts of the project is unclear and possibly self contradicting. Thirdly, the biological impacts associated with the potential realignment of the upstream access road are not stated or evaluated. 3 Lastly, the Fish and Wildlife Service's (FWS) findings and recommendations, as presented in their September 1996 Draft Fish and Wildlife Coordination Act Report (DFWCA Report), have not been accurately presented in the DEIS/R. 4

<u>Conclusion of No Significant Impact</u> The Corps of Engineers (Corps) has determined the proposed project would not have any significant biological impacts. This determination is not consistent with the findings of the FWS detailed in the DFWCA Report (included as an enclosure with the DEIS/R). The FWS responded to the Corps' determination in a March of 1997 revision of the DFWCA Report. The analysis in the redraft of the DFWCA Report also concludes the proposed project could have significant impacts on biological resources in the project area.

The Department concurs the proposed project is growth inducing since it not only makes more water available but also provides a more stable water supply to the service areas of the project sponsors. Without an adequate or stable water supply, growth in these areas would be limited by the amount of water available to sustain the increasing population. Because the proposed project would increase the amount of water available, more people could be supported and more growth could occur within the service areas of the project sponsors. 3

The project sponsors are also likely to construct additional percolation ponds in response to the proposed project. These additional ponds may be necessary to accommodate the increased water supply. The development of percolation ponds in the study area could result in a direct loss of alluvial fan sage scrub habitat and impact the sensitive species that occur within it. This potential for additional percolation ponds should be addressed in the FEIS/R.

Upstream Access Road Realignment According to the DEIS/R, the road alternative has not been selected, but that a worst case scenario, as depicted in Figure 2-3 of the DEIS/R, was used for the impact analysis. However, Figure 2-3 shows 4 different potential alignments and it is unclear as to which represents the Corps' stated worst case. The four alignments differ in length and their degree of impacts to a variety of habitat types. The FEIS/R should clearly address impacts associated with each potential alignment and identify the Corps' "worst-case" alternative. Without quantification, or at least a clear identification of the alternative being evaluated, the potential biological impacts associated with this aspect of the proposed project cannot be assessed. 4

Clarification of the FWS' Statements and Findings The DEIS/R does not accurately present the FWS premises and findings as presented in the September 1996 DFWCA Report. For example, the DEIS/R includes the statement: "the USFWS believes that adverse impacts resulting from the construction of the Seven Oaks Dam...should be adequately addressed and mitigated within this EIS/EIR." This denotes a misunderstanding of the FWS' concept of baseline conditions. 5

As the FWS has consistently stated, the condition of the environment in the study area after construction and flood control operation of the Seven Oaks Dam is the baseline condition upon which potential impacts from the proposed water conservation project must be evaluated. Therefore, the biological impacts associated with the Seven Oaks Dam must be understood before evaluating the potential impacts of the proposed project. The FWS has presented the impacts of the Seven Oaks Dam in the DFWCA Report and other documents to explain baseline condition for the proposed water conservation project. This explanation is necessary because 1) the baseline condition is a projected future condition that would exist after the completion of the Seven Oaks Dam in the year 2000 and 2) the assessment of impacts for the Seven Oaks Dam in the 1988 Supplemental Environmental Impact Statement did not address several species which are now considered sensitive. The FWS only used the impacts of the Seven Oaks Dam to identify the baseline condition for the analysis of the proposed water conservation project. The FWS has not recommended any mitigation for impacts of the Seven Oaks Dam as part of the proposed water conservation project.

The FWS has addressed many of the comments the Corps provided on the DFWCA Report in a revised DFWCA Report, dated March 1997. The conclusions in the revised DFWCA Report are similar to those in the original DFWCA Report and show that significant impacts to biological resources may result from the implementation of the proposed project.

SUMMARY COMMENTS

The Corps proposes to use the water retention space behind the Seven Oaks Dam for seasonal water conservation purposes. The proposed project may have as yet undetermined significant impacts on fish and wildlife resources in the project area including the effects of the project on alluvial fan sage scrub habitat and listed plants found downstream of the Seven Oaks Dam. The results of the 1997 surveys for threatened, endangered, and sensitive species and any consultation required pursuant to the ESA as well as an assessment of impacts to sensitive habitats should be presented in the FEIS/R to address this outstanding issue.

Four additional concerns need to be addressed in the FEIS/R: 1) a reasonable range of alternatives as prescribed under the National Environmental Policy Act should be evaluated; 2) growth inducing impacts of the project should be accurately presented as discussed in this response; 3) the biological impacts associated with the potential realignment of the upstream access road should be addressed and evaluated; and 4) the FWS' premises and findings should be accurately presented.

We appreciate the opportunity to comment on this project.

Sincerely,

Patricia S Port

Patricia Sanderson Port
Regional Environmental Officer

cc:
Director, OEPC, with original incoming
Regional Director, FWS Portland
Regional Director, BIA, Sacramento

Ja. United States Department of Interior letter, dated June 18, 1997.

1. The addresses for the San Manuel Band of Mission Indians have been added to Chapter 7 of the Final EIS/EIR.

2. The proposed project will not impact existing legally-held water rights to Santa Ana River water, and as such there are no impacts associated with tribal water use and the proposed project. If water conservation implementation is felt to have an effect on tribal land acquisitions and/or tribal water use in the future, then supplemental NEPA/CEQA documentation would be prepared.

3. Regarding comments on impacts to cultural resources associated with the proposed project if it is implemented, a cultural resource survey of the basin has been conducted as part of our CEQA/NEPA compliance for the Santa Ana River Mainstem Project (SARP). No prehistoric resources were found. Compliance with Section 106 of the National Historic Preservation Act (NHPA) was completed.

4. A copy of the Final EIS/EIR , when available, will be sent to the tribe for their information. If the tribe has information about resources within the basin that need to be addressed as part of the proposed water conservation project and its associated impacts, the Corps would appreciate receiving that information.

United States Department of the Interior
Office of the Secretary
Office of Environmental Policy and Compliance
600 Harrison Street, Suite 515, San Francisco, CA 94107-4121
Phone: (415) 427-1477 Fax: (415) 744-4121

June 18, 1997

Colonel Robert L. Davis
District Engineer, Los Angeles District
U.S. Army Corps of Engineers
P.O. Box 532711
Los Angeles, CA 90053-2325

Dear Colonel Davis:

This is an addendum to our earlier comments on Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR), Seven Oaks Dam Water Conservation Feasibility Study, San Bernardino County, California [ER97/210] dated June 6, 1997, that includes comments from the Bureau of Indian Affairs.

The BIA has particular inquiries set forth below regarding the draft document .For future reference and contact purposes are names, phone numbers and addresses for the San Manuel Band of Mission Indians, as *follows*:

1

The Honorable Henry Duro, Chairman
San Manuel Tribal Council
San Manuel Band of Mission Indians
P.O. Box 266
Patton, CA 92369

Will Jenson, Tribal Archeologist
San Manuel Tribal Office
San Manuel Band of Mission Indians
P.O. Box 266
Patton, CA 92369

The Draft EIR/EIS Appendix listing Federal agencies and Governments contacted through the Notice of Intent (NEPA) and the Notice of Preparation (CEQA) does not include the U.S. Bureau of Indian Affairs (BIA) or the San Manuel Band of Mission Indians. The San Manuel Band of Mission Indians is a Federally-recognized tribe under laws of the United States. Under California Public Resources Code Sections 21080.4, 21083 and 21087 (CEQA Section 15802), federal agencies, responsible agencies and trustee agencies are to receive a Notice of Preparation (such as to the San Manuel Band of Mission Indians and the U.S. BIA).

Regarding federal lead agencies (NEPA), we are supplying a Memorandum from the White House regarding Executive Orders Nos. 12875 and 12866 entitled "Government-to-Government Relations With Native American Tribal Governments" (Enclosure 1).

2

<u>San Manuel Indian Reservation</u>: The San Manuel Indian Reservation is under the Trust responsibility of the United States. There do not appear to be on-the-ground impacts associated with dam operation, re-operation or maintenance regarding the water conservation

plan and reservoir pool elevations at the COE Seven Oaks reservoir site. However, we request that effects be addressed in the Final EIR/EIS with regard to tribal water rights, water use by the tribe within the reservation or within the areas of the project area, U.S. Forest Service areas affected by land exchange, and the San Bernardino Valley Municipal Water District service area and service pipeline facilities operations.

Potential impacts should be addressed regarding future tribal land acquisitions near the present trust lands of the tribe near the Santa Ana River affiliated with Norton Air Force Base. Likewise, present and future impacts to water use by the tribe from use of water from the San Bernardino Valley Municipal Water District should be addressed.

San Manuel Native American Concerns: The tribe has occupied the San Bernardino Valley and the San Bernardino Mountain regions since before Spanish control of the area and is of Serrano and other Native American affiliations. The tribe has expressed a minimum 1000-square mile area of cultural/ethnographic interest that overlaps the draft EIR/EIS project area.

The San Manuel Band should be contacted regarding cultural resources values or issues affiliated with the proposed plan and projects and consulted because there appears to have not been contact with the tribe from the CEQA/NEPA NOI/NOP stage, public scoping, or early consultation processes for the Draft EIR/EIS. The tribe recently has expressed significant concern about water projects and cultural mitigation monitoring within this area, especially in relation to U.S. Forest Service lands that have or may be exchanged out of public control. 3

Enclosure 2 contains a listing of other federal law implications. For further information, please contact John Rydzik, Natural Resources Officer, (909) 276-6870, or Richard R. Gundry, Hydrologist-Water Rights, (909) 276-6629.

We appreciate the opportunity to comment on this project.

Sincerely,

Patricia A. Port

Patricia Sanderson Port
Regional Environmental Officer

Enclosures (2)

cc: Director, Office of Environmental Policy and Compliance
Regional Director, Fish and Wildlife Service
Area Director, Bureau of Indian Affairs

Government-to-Government Relations With Native American Tribal Governments

Memorandum for the Heads of Executive Departments and Agencies

The United States Government has a unique legal relationship with Native American tribal governments as set forth in the Constitution of the United States, treaties, statutes, and court decisions. As executive departments and agencies undertake activities affecting Native American tribal rights or trust resources, such activities should be implemented in a knowledgeable, sensitive manner respectful of tribal sovereignty. Today, as part of an historic meeting, I am outlining principles that executive departments and agencies, including every component bureau and office, are to follow in their interactions with Native American tribal governments. The purpose of these principles is to clarify our responsibility to ensure that the Federal Government operates within a government-to-government relationship with federally recognized Native American tribes. I am strongly committed to building a more effective day-to-day working relationship reflecting respect for the rights of self-government due the sovereign tribal governments.

In order to ensure that the rights of sovereign tribal governments are fully respected, executive branch activities shall be guided by the following:

(a) The head of each executive department and agency shall be responsible for ensuring that the department or agency operates within a government-to-government relationship with federally recognized tribal governments.

(b) Each executive department and agency shall consult, to the greatest extent practicable and to the extent permitted by law, with tribal governments prior to taking actions that affect federally recognized tribal governments. All such consultations are to be open and candid so that all interested parties may evaluate for themselves the potential impact of relevant proposals.

(c) Each executive department and agency shall assess the impact of Federal Government plans, projects, programs, and activities on tribal trust resources and assure that tribal government rights and concerns are considered during the development of such plans, projects, programs, and activities.

(d) Each executive department and agency shall take appropriate steps to remove any procedural impediments to working directly and effectively with tribal governments on activities that affect the trust property and/or governmental rights of the tribes.

(e) Each executive department and agency shall work cooperatively with other Federal departments and agencies to enlist their interest and support in cooperative efforts, where appropriate, to accomplish the goals of this memorandum.

(f) Each executive department and agency shall apply the requirements of Executive Orders Nos. 12875 ("Enhancing the Intergovernmental Partnership") and 12866 ("Regulatory Planning and Review") to design solutions and tailor Federal programs, in appropriate circumstances, to address specific or unique needs of tribal communities.

The head of each executive department and agency shall ensure that the department or agency's bureaus and components are fully aware of this memorandum, through publication or other means, and that they are in compliance with its requirements.

This memorandum is intended only to improve the internal management of the executive branch and is not intended to, and does not, create any right to administrative or judicial review, or any other right or benefit or trust responsibility, substantive or procedural, enforceable by a party against the United States, its agencies or instrumentalities, its officers or employees, or any other person.

The Director of the Office of Management and Budget is authorized and directed to publish this memorandum in the Federal Register.

William J. Clinton

THE WHITE HOUSE,
Washington, April 29, 1994.

POSSIBLE FEDERAL LAW IMPLICATIONS

Archeological Resources Protection Act of 1979 (ARPA), 16 U.S.C. 470aa-40711;

National Historic Preservation Act of 1966 (NHPA), 15 U.S.C. 470 *et seq.;*

Native American Graves Protection and Repatriation Act of 1990 (NAGPRA), 25 U.S.C. 3001-3013;

National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. 4321-4370;

American Indian Religious Freedom Act (AIRFA), 42 U.S.C. 1966;

Religious Freedom Restoration Act of 1933 (RFRA), 42 U.S.C. 2000bb;

Presidential Memorandum on Government-to-Government Relations with Native American Tribal Governments, 59 Fed. Reg. 22951 (April 29, 1994);

Executive Order No. 11593 - Protection and Enhancement of the Cultural Environment (1971);

Executive Order of May 24, 1966 - Indian Sacred Sites;

Executive Order No. 12898 - Federal Actions to Address Environmental Justice (February 8, 1996);

Interior Department Secretarial Order No. 3175- - Department Responsibilities for Indian Trust Resources

K. San Bernardino County Flood Control District letter dated 17 June 1997

1. This paragraph has been revised to reflect minor changes in OMRR requirements would be required. The Main Report and Design and Cost Estimate presents further details on the estimated OMRR requirements, which will be refined upon completion of dam construction and development of OMRR guidelines for the flood control project.

2. This has been clarified to indicate that the Corps is presently negotiating real estate arrangements with the U.S. Forest Service to include interagency transfer of lands and a permanent easement for the flood control pool operations. The non-Federal sponsor will be required to obtain real estate interest from the Forest Service for water conservation operations, which at this time is expected to be a special use permit.

3. Section 3.4.1.2 of the EIS/EIR has been revised to reflect the terms of the agreement regarding the well purchased by the Sponsors from Bear Valley Mutual Water Company.

4. A paragraph has been added to Section 3.1 of the EIS/EIR stipulating the Sponsors intention to honor the rightful business interests of the water agencies within the canyon and preserve the long-standing, historic and legally-held water rights in existence.. Specific details of how this will be accomnplished will be developed during the preparation of the Water Control Manuals for flood control operations and water conservation operations.

TRANSPORTATION/FLOOD CONTROL DEPARTMENT - SURVEYOR

COUNTY OF SAN BERNARDINO
PUBLIC SERVICES GROUP

825 East Third Street • San Bernardino, CA 92415-0835 • (909) 387-2800
Fax (909) 387-2667

KEN A. MILLER
Director

June 16, 1997

File: 3-104/6.00

U.S. Army Corps of Engineers
Los Angeles District Office
Post Office Box 532711
Los Angeles, Ca. 90053-2325

Attention: Jared Miller, Study Manager

RE: SEVEN OAKS DAM WATER CONSERVATION DRAFT FEASIBILITY REPORT AND DEIS/EIR

Dear Mr. Miller:

The following are the comments from San Bernardino County Flood Control District for your consideration:

1. **Page 2-8, (EIS/EIR - last paragraph)**

   Operations and Maintenance procedures for the Seven Oaks Dam have not been clearly established at this point in time. Usually, the Corps would develop the O&M Manual at the end of the Dam construction and circulate that document to the local sponsors for concurrence. A discussion of additional O&M for the Water Conservation alternative may not be appropriate until the initial Dam O&M manual is approved and impacts are more fully understood.

2. **Page 2-14, (EIS/EIR - third paragraph)**

   The last sentence states that the sponsors are currently obtaining a special use permit for operation of the Dam. It may be more correct to state that the Corps is continuing the process of negotiating overall right-of-way impacts, from the project, with the U.S. Forest Service. A special use permit may be the result of these negotiations. The Corps has the responsibility to make the arrangements with the other federal agency (being the U.S. Forest Service).

3. **Page 3-15, (EIS/EIR - Section 3.4.1.2)**

The last sentence states that a well is owned by Bear Valley Mutual Water Company. This well has actually been purchased by the sponsors of Seven Oaks Dam on June 14, 1994 and, under terms of the agreement, Bear Valley Mutual Water Company will be allowed to operate until the first inundation from ponding behind the dam.

4. **General Comment**

During the course of the Seven Oaks Dam Water Conservation Feasibility Study as well as the actual construction of the Seven Oaks Dam, a commitment has been made to the local water agencies that own or operate facilities within the area that their facilities will be honored as they have been historically and legally operated. There is no intention on the part of the Sponsors of the Dam to impede the rights of the owners of such facilities to utilize the legally held water rights within the Santa Ana River canyon due to the construction of Seven Oaks Dam. Our intention is to honor those agencies for the business they have in the canyon and work with them during the operation of the dam to provide for their interests while providing flood protection for the inhabitants of the floodplain downstream in each of the three counties involved.

Thank you for the opportunity to review this document. If you have any questions, please contact this office at (909) 387-2571.

Sincerely,

Vana R. Olson

VANA R. OLSON, P.E., Chief
Federal Projects/Flood Control Engineering

VRO/DWL/dja

L. Edison Company letter dated 1 July 1997

It is expected that, during final design for implementation of the Selected Plan, the need for relocation of the reservoir access road and measures to mitigate unacceptable impacts will be further discussed between the non-Federal sponsors for the selected plan, the U.S. Forest Service, and Edison representatives. If it is decided to implement the relocation of the reservoir road, final alignment and design studies will be needed as well as a supplemental document. to comply with NEPA and CEQA

SOUTHERN CALIFORNIA
EDISON
An EDISON INTERNATIONAL℠ Company

July 1, 1997

U.S. Army Corps of Engineers
Los Angeles District
CESPL-PD-C
P.O. Box 532711
Los Angeles, CA 90053-2325

Attn: Mr. Stephen Fine

Subject: Seven Oaks Dam Water Conservation
Draft Feasibility Report

Dear Mr. Fine:

Edison is in receipt of and has reviewed Volume 1, Main Report, Environmental Impact Statement/Environmental Impact Report of the Draft Seven Oaks Dam Water Conservation Feasibility Report dated March 1997. With one exception, Edison generally concurs with the draft feasibility study.

The Forest Service proposes that Edison utilize existing roads to access its facilities, including the Santa Ana River No. 1 Powerhouse and intake, Santa Ana River No 2 Powerhouse forebay, and associated conveyance systems. This proposal is unacceptable to Edison. Increased travel time to access its facilities upstream of the Seven Oaks Dam would result in Edison's utilization of Forest Service roads. Because of this increase in travel time, Edison is concerned that it will be unable to adequately respond to the existing maintenance needs of these facilities. Additionally, during storm events prompt response is critical in accessing these Edison facilities. The development of alternative measures which would reduce the need to visit these locations is recommended.

Edison has a responsibility to meet the electrical needs of its customers and to satisfy agreements of downstream water companies. Increasing the response times to accessing these Edison facilities upstream of the Seven Oaks Dam may compromise both these obligations.

It should be noted that Edison is in the process of engineering a new water conveyance system in compliance with agreements with the sponsors of the Seven Oaks Dam project. This design is based on the assumption of a flood control use of the dam and re-designation to water conservation will have significant impacts and considerations on the design of the conveyance system.

Mr. S. McKenery is no longer Edison's Project Manager for this effort. Accordingly, please revise your distribution to replace Mr. McKenery with my name. If you wish to discuss this further, please call me at (818) 302-8956.

Sincerely,

Mike Cruz

Mike Cruz
Project Manager

P. O. Box 800
2244 Walnut Grove Ave.
Rosemead, CA 91770