COUNTY OF ORANGE CALIFORNIA

Tom Daly
County Clerk-Recorder
12 Civic Center Plaza, Rm.106
PO Box 238
Santa Ana, CA 92702

ORANGE COUNTY WATER DISTRICT

Environment Impact Reports
Amendment of "Public Resources Code, Section 21092.3"

The attached notice was received, filed and a copy was posted on **08/17/2006** It remained posted for 30 (THIRTY) days.

Tom Daly
County Clerk-Recorder
In and for the County of Orange

By: ______________________ Deputy

Public Resource Code 21092.3

The notices required pursuant to Sections 21080.4 and 21092 for an environmental impact report shall be posted in the office of the County Clerk of each county in which the project will be located and + shall remain for a period of 30 days. The notice required pursuant to Section 21092 for a negative declaration shall be so posted for a period of 20 days, unless otherwise required by law to be posted for 30 days. The County Clerk shall post notices within 24 hours of receipt.

Public Resources Code 21152

All notices filed pursuant to this section shall be available for public inspection, and shall be posted within 24 hours of receipt in the office of the County clerk. Each notice shall remain posted for a period of 30 days. Thereafter, the clerk shall return the notice to the local agency with a notation of the period it was posted. The local agency shall retain the notice for not less than nine months.

NOTICE OF DETERMINATION

To: ☒ County of Orange
County Clerk, EIR Desk
12 Civic Center Plaza, Room 106
Santa Ana, California 92701

☒ County of Riverside
County Clerk Office
Gateway Office
2720 Gateway Drive
Riverside, CA 92507

☒ County of San Bernardino
Clerk of the Board
385 N. Arrowhead Avenue
Second Floor
San Bernardino, CA 92415

☒ Office of Planning and Research
P. O. Box 3044
Sacramento, CA 95812-3044

From: Orange County Water District (Lead Agency)(Applicant)
P.O. Box 8300
Fountain Valley, CA 92728-8300
Contact: Greg Woodside
Telephone: (714) 378-3275
10500 ELLIS AVENUE
FOUNTAIN VALLEY, CA 92708

POSTED
AUG 17 2006
TOM DALY, CLERK-RECORDER
By ________ DEPUTY

Recorded in Official Records, Orange County
Tom Daly, Clerk-Recorder
850.00
200685000837 09:06am 08/17/06
90 67 Z02
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Subject: Filing of Notice of Determination in compliance with Sections 21108 or 21152 of the Public Resources Code.

FILED
AUG 17 2006
TOM DALY, CLERK-RECORDER
________ DEPUTY

State Clearinghouse Number: 2004051004

Project Title: Prado Basin Water Conservation Feasibility Study

Project Location:
County: Orange/Riverside/San Bernardino
City/Nearest Community: The project is located at Prado Dam and the Prado Reservoir, which are located in Riverside County and San Bernardino County near the intersection of State Highway 91 and State Highway 71. Areas potentially impacted by the project include: Anaheim, Orange, Yorba Linda, Chino, Chino Hills, Norco, Corona.

The project location is shown in Figure 2-2 in the February 2005 Environmental Impact Statement/Environmental Impact Report

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Project Description:

Prado Dam is currently used for flood control and water conservation purposes. The primary use of Prado Dam is for flood control purposes. Water conservation is implemented in a manner so that it does not interfere with Prado Dam's flood control function. During the flood season (generally October through February), water can currently be stored up to elevation 494 feet mean sea level for water conservation purposes in accordance with the United States Army Corps of Engineer's operational control manual for Prado Dam.

The project would capture additional surplus water behind Prado Dam during the flood season, thus raising the elevation of the conservation pool. The project would modify the United States Army Corps of Engineer's operational control manual for Prado Dam, but would require no additional construction. During the flood season, a greater volume of water could be impounded behind the dam, up to elevation 498 feet mean sea level. The four-foot increase in the water storage elevation would allow up to an additional 5,205 acre-feet of water storage. During the non-flood season, water would continue to be impounded up to elevation 505 feet msl, as with existing operations.

This is to advise that the Orange County Water District (Lead Agency) has approved the above-described project on August 16, 2006, and has made the following determinations regarding the above-described project:

1. The project [☐ will ☒ will **not**] have a significant effect on the environment.
2. ☒ An Environmental Impact Report was prepared for this project pursuant to the provisions of CEQA.
   ☐ A Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
3. Mitigation measures [☒ were ☐ were **not**] made a condition of the approval of the project.
4. A mitigation reporting or monitoring plan [☒ was ☐ was **not**] adopted for this project.
5. A Statement of Overriding Considerations [☐ was ☒ was **not**] adopted for this project.
6. Findings [☒ were ☐ were **not**] made pursuant to the provisions of CEQA.

This is to certify that a copy of the Final Environmental Impact Report, with comments and responses and record of project approval, is available to the General Public at the Orange County Water District, 10500 Ellis Avenue, Fountain Valley, California 92708.

Greg D Woodside — 8-16-2006 — Planning Director

Signature — Date — Title

Date received for filing and posting at SCH:

FILED

AUG 1 7 2006

TOM DALY, CLERK-RECORDER

By ______ DEPUTY

POSTED

AUG 1 7 2006

TOM DALY, CLERK-RECORDER

By ______ DEPUTY

STATE OF CALIFORNIA - THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME
ENVIRONMENTAL FILING FEE CASH RECEIPT
DFG 753.5a (8-03)

277992

Lead Agency: OC Water District   Date: [illegible]

County / State Agency of Filing: OC Recorder   Document No.: [illegible]

Project Title: [illegible] Water Conservation [illegible]

Project Applicant Name: OC Water District   Phone Number: [illegible]

Project Applicant Address: 10500 Ellis Ave Fountain Valley CA [illegible]

Project Applicant *(check appropriate box)*: Local Public Agency [X] School District [ ] Other Special District [ ] State Agency [ ] Private Entity [ ]

CHECK APPLICABLE FEES:

(X)	Environmental Impact Report	$850.00	$ [illegible]
( )	Negative Declaration	$1,250.00	$
( )	Application Fee Water Diversion *(State Water Resources Control Board Only)*	$850.00	$
( )	Projects Subject to Certified Regulatory Programs	$850.00	$
(✓)	County Administrative Fee	$25.00	$ [illegible]
( )	Project that is exempt from fees		
	TOTAL RECEIVED		$ [illegible]

Signature and title of person receiving payment: [illegible]

WHITE-PROJECT APPLICANT   YELLOW-DFG/FASB   PINK-LEAD AGENCY   GOLDENROD-STATE AGENCY OF FILING

PRADO BASIN WATER CONSERVATION
FEASIBILITY STUDY
RECIRCULATED DRAFT ENVIRONMENTAL IMPACT REPORT
State Clearinghouse Number 2004051004

MAY 2006

PREPARED BY:

Orange County Water District
10500 Ellis Avenue
Fountain Valley, CA 92708

Contact: Greg Woodside, P.G.
(714) 378-3275

Prado Basin
Water Conservation Feasibility Study
Draft Recirculated
Environmental Impact Report

State Clearinghouse Number 2004051004

MAY 2006

PREPARED BY:

Orange County Water District
10500 Ellis Avenue
Fountain Valley, CA 92708

Contact: Greg Woodside, P.G.
(714) 378-3275

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EXECUTIVE SUMMARY

ES-1 INTRODUCTION

The U.S. Army Corp of Engineers (USACE) and Orange County Water District (OCWD) published the Prado Basin Water Conservation Feasibility Study – Main Report With Environmental Impact Statement/Environmental Impact Report (EIS/EIR) in February 2005 pursuant to the National Environmental Protection Act (NEPA) and the California Environmental Quality Act (CEQA). USACE is the NEPA lead agency and OCWD is the CEQA lead agency for this project. This document augments the analysis of specific portions of the February 2005 EIS/EIR to ensure compliance with CEQA requirements, including an expanded analysis of the project's potential for inducing growth, an expanded analysis of the project's potential cumulative impacts, significance criteria and additional discussion on environmental impacts and mitigation commitments. The Recirculated Draft EIR consists of the February 2005 EIS/EIR in its entirety as well as the additional information provided in this document. A compact disk containing the February 2005 EIS/EIR in an electronic file is attached to the inside back cover of this document. The Recirculated Draft EIR is being circulated for a 45-day public review period.

PURPOSE

The Recirculated Draft EIR for the Prado Basin Water Conservation Feasibility Study provides the information necessary for OCWD to comply with CEQA environmental review requirements. In July 2004, the USACE published the Prado Basin Water Conservation Feasibility Study Main Report and Draft Environmental Impact Statement/Environmental Impact Report (SCH 2004051004). Subsequently, in February 2005, the USACE published the Prado Basin Water Conservation Feasibility Study Main Report and Environmental Impact Statement/Environmental Impact Report (referred to herein as February 2005 EIS/EIR). Notice of availability of this document was published in the Federal Register on June 24, 2005, 70 Fed. Reg. 36581. Comments were received during the public comment period stating that the EIR portion of the document was lacking certain analyses and procedural requirements needed to fully comply with CEQA. In response to these comments, OCWD as the CEQA lead agency circulated a Notice of Preparation on September 30, 2005 and has prepared the Recirculated Draft EIR.

The Recirculated Draft EIR is being circulated for a 45-day public review period. Comments received on the previous draft EIS/EIR are not reproduced in the recirculated draft EIR and individual responses for each comment previously received have not been prepared. The Recirculated Draft EIR has been prepared to include information that sufficiently addresses concerns raised in comments received on the previous EIS/EIR. Pursuant to Section 15088.5(f)(1) of the *CEQA Guidelines*, when an EIR is recirculated in its entirety, the lead agency may require that reviewers submit new comments. OCWD is requesting that anyone wishing to comment on the project submit a new set of comments reflecting the Recirculated Draft EIR. The Final EIR will provide responses to comments received on the Recirculated Draft EIR only.

The NEPA process has been completed and no additional information or notification requirements are needed to comply with NEPA. The Record of Decision for the Prado Basin Water Conservation Feasibility Study was signed on April 16, 2006 by the Director of Civil Works for the United States Army. The Record of Decision includes the finding that the operational plan recommended by the Feasibility Study and EIS/EIR is technically feasible, economically justified, environmentally acceptable, and in the public interest.

CONTENTS OF THE RECIRCULATED DRAFT EIR

The Recirculated Draft EIR consists of the February 2005 EIS/EIR in its entirety as well as the additional information provided in this document. The additional information provided in this document includes information regarding the environmental analysis, significance criteria, potential impacts, mitigation measures, growth inducement, and cumulative impacts.

In addition, this document compiles all mitigation commitments developed in the February 2005 EIS/EIR into a summary table (Table ES-1; also Table 3-3) for ease of reference and for inclusion in a subsequent Mitigation Monitoring and Reporting Plan (MMRP). The remaining analysis, impact conclusions, and mitigation commitments contained in the February 2005 EIS/EIR remain applicable to the project.

ES-2 PROJECT DESCRIPTION

The proposed project would capture additional surplus water behind Prado Dam during winter months, thus raising the elevation of the conservation pool. The project would modify the USACE's operational control manual for Prado Dam, but would require no additional construction. The February 2005 EIS/EIR evaluated the potential environmental impacts of five project alternatives. Alternative 2 is the preferred project alternative. The following sections describe each alternative.

ALTERNATIVE 1 - NO ACTION ALTERNATIVE

The No Action Alternative involves no change to existing operations at Prado Dam. During the flood season (October 1 through the end of February), water would continue to be impounded up to an elevation of 494 feet above mean sea level (msl). During the non-flood season (March 1 through September 30), water would be impounded up to an elevation of 505 feet msl.

For Alternative 1, and for all other Alternatives, prior to a forecasted storm event, the conservation pool could be drawn down to an elevation of 490 feet msl within 24 hours to accommodate incoming storm flow volume and maintain the Reservoir's primary function as a flood control facility.

ALTERNATIVE 2: PREFERRED PROJECT ALTERNATIVE

During the flood season, a greater volume of water could be impounded behind the dam, up to elevation 498 feet msl. During the non-flood season, water would continue to be impounded up to elevation 505 feet msl, as with existing operations.

ALTERNATIVE 3

During the flood season, a greater volume of water could be impounded behind the dam, up to elevation 500 feet msl. During the non-flood season, water would continue to be impounded up to elevation 505 feet msl, as with existing operations.

ALTERNATIVE 4

During the flood season, a greater volume of water could be impounded behind the dam, up to elevation 505 feet msl. During the non-flood season, water would continue to be impounded up to elevation 505 feet msl, as with existing operations.

ALTERNATIVE 5

During the flood season, a greater volume of water could be impounded behind the dam, up to elevation 508 feet msl. Similarly, during the non-flood season, a greater volume of water could be impounded behind the dam, up to elevation 508 feet msl as well.

ES-3 CALIFORNIA ENVIRONMENTAL QUALITY ACT ANALYSIS

Analyses of resource categories are presented in the general order of the CEQA Initial Study Checklist Form. To assist the reader, references to the corresponding sections of the February 2005 EIS/EIR are provided for each subsection. An expanded discussion of the existing conditions, significance criteria, impacts analysis, and mitigation measures is also provided for several environmental resource categories (such as farmlands and agricultural resources). See Section 3 for this information.

No significant and unavoidable impacts would result from the proposed project. Mitigation measures have been identified that would reduce potentially significant impacts to less than significant levels for the proposed project. The impact summary and mitigation measures are provided in Table ES-1.

Alternative 2, the Preferred Project Alternative, is determined to be the environmentally superior alternative.

Table ES-1

Prado Basin Water Supply Feasibility Study EIR – Summary Of Impacts And Mitigation Measures

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	ALTERNATIVES				LEVEL OF SIGNIFICANCE AFTER MITIGATION
		2	3	4	5	
AESTHETICS						
AE-1: Raising the conservation pool would alter existing views from residences surrounding Prado Basin.	None required for any alternative	X	X	X	X	Less Than Significant
AE-2: Raising the conservation pool would alter existing views from State Route 71, a scenic highway.	None required for any alternative.	X	X	X	X	Less Than Significant
AE-3: Raising the conservation pool would alter existing views from land uses below the dam.	None required for any alternative	X	X	X	X	Less Than Significant
FARMLANDS/AGRICULTURAL LANDS						
FA-1: Raising the conservation pool would inundate crops and reduce the available growing season.	None required for any alternative.	X	X	X	X	Less Than Significant
AIR QUALITY						
AQ-1: Raising the conservation pool would increase exhaust and fugitive dust emissions from maintenance-related activities downstream of Prado Dam.	None required for any alternative.	X	X	X	X	Less Than Significant
BIOLOGICAL RESOURCES - ABOVE THE DAM						
BI-1: Critical Habitat: Raising the conservation pool would increase the number of days critical habitat for least Bell's vireo and southwestern willow flycatcher would be inundated above the dam.	All Alternatives: To mitigate impacts to biological resources **above the dam**, the local sponsor shall acquire the following amounts of land for restoration to willow woodland and riparian habitat: Alt. 2: 6.2 ha (5.2 ac); Alt. 3 - 8.1 ha (20.1ac); Alt. 4: 38.5 ha (95.1 ac); Alt 5: 124 8 ha (308.1 ac). The land shall be obtained from a 45.4-ha (112-ac) parcel within Prado Basin that is available for restoration If the total amount of land to be acquired exceeds 45.4 ha (112 ac), then the local sponsor also will provide compensation to the Trust Fund at a rate of $50,000 per acre for the loss of the remaining acreage. All Alternatives: To mitigate impacts to biological resources **above the dam**, the local sponsor will provide compensation to the Trust Fund for maintenance of the above-mentioned habitat acquired for restoration The total compensation will be $25,000 per acre.	X	X	X	X	Less Than Significant

Table ES-1
Prado Basin Water Supply Feasibility Study EIR – Summary Of Impacts And Mitigation Measures

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	ALTERNATIVES				LEVEL OF SIGNIFICANCE AFTER MITIGATION
		2	3	4	5	
BI-2 Sensitive Habitat: Raising the conservation pool would affect willow woodland and mixed eucalyptus/willow woodland above the dam.	See the Dam Mitigation Measures for BI-1 (above)	X	X	X	X	Less Than Significant
BI-3: Sensitive Habitat: Raising the conservation pool could affect riparian scrub habitat above the dam.	None required for any alternative.	X	X	X	X	Less Than Significant
BI-4: Sensitive Habitat: Raising the conservation pool would affect freshwater marsh vegetation above the dam.	See the Dam Mitigation Measures for BI-1 (above).				X	Less Than Significant
BI-5: Sensitive Species: Raising the conservation pool could directly affect southwestern willow flycatcher above the dam.	See the Dam Mitigation Measures for BI-1 (above).	X	X	X	X	Less Than Significant
BI-6: Sensitive Species: Raising the conservation pool could directly affect Least Bell's vireo nests above the dam.	None required for any alternative.			X	X	Less Than Significant
BI-7: Sensitive Species: Raising the conservation pool could directly affect Santa Ana suckers above the dam.	None required for any alternative.		X	X	X	Less Than Significant
BI-8: Sensitive Species: Raising the conservation pool could affect directly yellow warbler and yellow-breasted chat above the dam.	See the Dam Mitigation Measures for BI-1 (above)				X	Less Than Significant
BI-9: Sensitive Species: Raising the conservation pool could directly affect the San Diego black-tailed jackrabbit above the dam.	None required for any alternative.	X	X	X	X	Less Than Significant
BI-10: Sensitive Species: Raising the conservation pool could directly affect pond turtles above the dam.	None required for any alternative.	X	X	X	X	Less Than Significant
BI-11: Sensitive Species: Raising the conservation pool could directly affect the western spadefoot toad above the dam.	None required for any alternative.	X	X	X	X	Less Than Significant
BI-12: Sensitive Species: Raising the conservation pool could directly affect arroyo chub above the dam.	None required for any alternative.	X	X	X	X	Less than Significant
BI-13: Fully-Protected Species: Raising the conservation pool could directly affect while-tailed kite nests above the dam.	None required for any alternative.	X	X	X	X	Less Than Significant

TABLE ES-1

PRADO BASIN WATER SUPPLY FEASIBILITY STUDY EIR – SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	ALTERNATIVES				LEVEL OF SIGNIFICANCE AFTER MITIGATION
		2	3	4	5	
BI-14: Wildlife Movement: Raising the conservation pool could affect wildlife movement above the dam	None required for any alternative	X	X	X	X	Less Than Significant
BI-15: Non-Sensitive Native Vegetation: Raising the conservation pool could affect non-sensitive native vegetation above the dam.	None required for any alternative.	X	X	X	X	Less Than Significant
BI-16: Ruderal and Invasive Vegetation: Raising the conservation pool could affect ruderal and invasive vegetation above the dam.	None required for any alternative	X	X	X	X	Less Than Significant
BIOLOGICAL RESOURCES - BELOW THE DAM						
BI-17: Nesting Habitat. Raising the conservation pool would increase the number of days nesting habitat for least Bell's vireo and southwestern willow flycatcher would be inundated below the dam.	All Alternatives: To mitigate impacts to biological resources **below the dam**, the local sponsor shall acquire the following amounts of land for restoration to willow woodland and riparian habitat: Alt. 2: 8 9 ha (22 ac); Alt. 3 - 10.6 ha (26.3 ac); Alt. 4: 17.0 ha (41.8 ac); Alt 5: 24.0 ha (59 2 ac) The land shall be obtained from a 45 4-ha (112-ac) parcel within Prado Basin that is available for restoration If the total amount of land to be acquired exceeds 45.4 ha (112 ac), then the local sponsor also will provide compensation to the Trust Fund at a rate of $50,000 per acre for the loss of the remaining acreage All Alternatives: To mitigate impacts to biological resources **below the dam**, the local sponsor will provide compensation to the Trust Fund for maintenance of the above-mentioned habitat acquired for restoration. The total compensation will be $25,000 per acre		X	X	X	Less Than Significant
BI-18: Sensitive Habitat: Raising the conservation pool would affect cottonwood/willow woodland below the dam.	See the Dam Mitigation Measures for BI-1 (above)		X	X	X	Less Than Significant
BI-19: Sensitive Habitat: Raising the conservation pool would affect riparian scrub below the dam.	See the Dam Mitigation Measures for BI-1 (above)			X	X	Less Than Significant
BI-20: Sensitive Habitat: Raising the conservation pool would directly affect least Bell's vireo below the dam.	None required for any alternative.			X	X	Less Than Significant

Table ES-1

Prado Basin Water Supply Feasibility Study EIR – Summary Of Impacts And Mitigation Measures

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	ALTERNATIVES				LEVEL OF SIGNIFICANCE AFTER MITIGATION
		2	3	4	5	
BI-21. Sensitive Species: Raising the conservation pool would directly affect Santa Suckers below the dam.	All Alternatives: To mitigate impacts to the Santa Ana sucker, the local sponsor will prepare a Santa Ana Sucker Management Plan This plan will be completed prior to the first winter of project implementation. The focus of the plan will be to manage the aquatic environment, not just the Santa Ana sucker, to enhance habitat value throughout the Basin and Reach 9. The plan must be adaptive so that adjustments to the plan can be made as needed OCWD will provide $25,000 annually for the first five years and $10,000 annually for 45 years toward the implementation of the Santa Ana Sucker Management Plan. The plan will require a periodic reporting to CDFG of the status and effectiveness of the plan with respect to Santa Ana sucker viability.	X	X	X	X	Less Than Significant
BI-22: Sensitive Species: Raising the conservation pool would directly affect the yellow warbler and yellow-breasted chat below the dam.	See the Dam Mitigation Measures for BI-1 (above).			X	X	Less Than Significant
BI-23: Sensitive Species: Raising the conservation pool would directly affect San Diego black-tailed jackrabbit below the dam.	None required for any alternative.			X	X	Less Than Significant
BI-24: Sensitive Species: Raising the conservation pool would directly affect pond turtles below the dam.	See the Dam Mitigation Measures for BI-1 (above).			X	X	Less Than Significant
BI-25: Sensitive Species: Raising the conservation pool would directly affect arroyo chub below the dam.	None required for any alternative.	X	X	X	X	Less Than Significant
BI-26: Fully-Protected Species: Raising the conservation pool would directly affect white-tailed kite below the dam.	None required for any alternative			X	X	Less Than Significant
BI -27: Wildlife Movement: Raising the conservation pool could destroy habitat necessary for shelter and foraging below the dam.	See the Dam Mitigation Measures for BI-1 (above).			X	X	Less Than Significant
BI-28: Non-Sensitive Native Vegetation: Raising the conservation pool would directly non-sensitive native vegetation below the dam.	None required for any alternative.			X	X	Less Than Significant

Table ES-1
Prado Basin Water Supply Feasibility Study EIR – Summary Of Impacts And Mitigation Measures

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	ALTERNATIVES				LEVEL OF SIGNIFICANCE AFTER MITIGATION
		2	3	4	5	
BI-29: *Ruderal and Invasive Vegetation:* Raising the conservation pool could affect ruderal and invasive vegetation below the dam.	See the Dam Mitigation Measures for BI-1 (above).			X	X	Less Than Significant
BI-30: Non-Sensitive Species: Raising the conservation pool could affect non-sensitive wildlife below the dam.	See the Dam Mitigation Measures for BI-1 (above)			X	X	Less Than Significant
CULTURAL RESOURCES						
CR-1: Raising the conservation pool could affect National Register eligible resources above the dam.	Compliance with Section 106 of the National Historic Preservation Act (36 CFR 800) is required prior to implementation of Alternative 5. The four potentially National Register (NRHP) eligible historic sites will require a test excavation to determine their significance. The Corps will conduct test pits as required if Alternative 5 is pursued. If any of these excavations are determined to be NRHP eligible, the Corps will consult with the SHPO and the Advisory Council on Historic Preservation to determine the appropriate course of action to comply with 36 CFR 800.11.				X	Less Than Significant
CR-2: Raising the conservation pool could affect National Register eligible resources downstream of Prado Dam	Compliance with Section 106 of NHPA (36 CFR 800) shall be required prior to implementation of project alternatives. Test excavations shall be required at National Register eligible sites to determine significance. Final mitigation measures shall then be developed in consultation with the SHPO and the Advisory Council on Historic Preservation.	X	X	X	X	Less Than Significant
CR-3: Raising the conservation pool could affect unknown cultural resources.	All Alternatives: In the event that previously unknown resources are uncovered during implementation of water conservation, the Corps will be required to comply with 36 CFR 800.11, *Properties Discovered During Implementation of an Undertaking*. This might occur if previously undisturbed landforms are eroded away to reveal buried cultural resources. In such an event, the Corps will consult with the SHPO and the Advisory Council on Historic Preservation to determine the appropriate course of action to comply with 36 CFR 800 11	X	X	X	X	Less Than Significant

TABLE ES-1
PRADO BASIN WATER SUPPLY FEASIBILITY STUDY EIR – SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	ALTERNATIVES				LEVEL OF SIGNIFICANCE AFTER MITIGATION
		2	3	4	5	
GEOLOGY AND SOILS						
GE-1: Increased water impoundment volumes that would occur during the flood season could result in increased under-seepage through the Prado Dam foundation.	None required for any alternative.	X	X	X	X	Less Than Significant
GE-2: Sediment deposition within Prado Reservoir would increase by 41 to 96 acre-feet per year compared to existing conditions.	None required for any alternative	X	X	X	X	Less Than Significant
HAZARDS AND HAZARDOUS WASTE/MATERIALS						
HA-1:	None required for any alternative.	X	X	X	X	Less Than Significant
HYDROLOGY AND WATER QUALITY						
HY-1: Hydrology: Deposition of sediment and debris within Prado Reservoir would increase, reducing water storage capacity at Prado Dam.	None required for any alternative.	X	X	X	X	Less Than Significant
HY-2: Hydrology: Less sediment would be transported and deposited downstream of Prado Dam.	None required for any alternative.	X	X	X	X	Beneficial
HY-3: Hydrology: Annual groundwater recharge yield at downstream spreading facilities would increase.	None required for any alternative.	X	X	X	X	Beneficial
HY-4: Hydrology: Sediment erosion would increase at the River View Golf Course downstream from Prado Reservoir.	All Alternatives: When maximum discharge rates are realized under the proposed water conservation operations, sediment material at the downstream River View Golf Course shall be replaced by the Corps as needed to maintain flood protection values of the channel. In addition, the Corps shall repair erosion damage at the Golf Course to the extent that such reconstruction requirements are specified in lease agreements.	X	X	X	X	Less Than Significant
HY-5: Water Quality: The quality of water released from Prado Dam to downstream spreading grounds would be higher than under existing operations.	None required for any alternative	X	X	X	X	Beneficial

TABLE ES-1
PRADO BASIN WATER SUPPLY FEASIBILITY STUDY EIR – SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	ALTERNATIVES				LEVEL OF SIGNIFICANCE AFTER MITIGATION
		2	3	4	5	
HY-6: Water Quality: The increase in water impoundment would dilute pollutants associated with water that enters Prado Reservoir, thereby improving surface water quality in Prado Basin.	None required for any alternative	X	X	X	X	Beneficial
LANDUSE AND PLANNING						
LA-1: Raising the conservation pool could impair existing and/or planned land uses. (Potential impacts to recreational and agricultural land uses are described in corresponding sections of this table.)	None required for any alternative.	X	X	X	X	Less Than Significant
MINERAL RESOURCES						
MI-1: Raising the conservation pool could interfere with oil extraction activities within the Prado Basin.	None required for any alternative.	X	X	X	X	Less Than Significant
NOISE						
NO-1: Raising the conservation pool would increase noise emissions from periodic maintenance activities below the dam.	None required for any alternative.	X	X	X	X	Less Than Significant
PUBLIC SERVICES/UTILITIES/EMERGENCY SERVICES						
PU-1: Project implementation would increase the need for public services or utilities.	None required for any alternative	X	X	X	X	Less Than Significant
PU-2: Project implementation would create the need for new public facilities and/or require the relocation of major existing facilities.	None required for any alternative.	X	X	X	X	Less Than Significant
RECREATION						
RE-1. Raising the conservation pool would affect the availability of existing recreational and other uses due to inundation above the dam.	None required for any alternative.	X	X	X	X	Less Than Significant

Table ES-1
Prado Basin Water Supply Feasibility Study EIR – Summary Of Impacts And Mitigation Measures

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	ALTERNATIVES				LEVEL OF SIGNIFICANCE AFTER MITIGATION
		2	3	4	5	
RE-2: Raising the conservation pool would contribute to the physical degradation of existing recreational and other uses due to inundation above the dam.	All Alternatives: The Corps shall restore inundated areas above Prado Dam to pre-inundation conditions to the extent that such reconstruction requirements are specified in lease agreements Maintenance shall be limited to clean up efforts only and not the re-building of structures, as all recreational facilities within the Prado Basin are required to be floodable.	X	X	X	X	Less Than Significant
RE-3: Raising the conservation pool would affect the availability of existing recreational and other uses due to inundation below the dam.	None required for any alternative.	X	X	X	X	Less Than Significant
RE-4: Raising the conservation pool would contribute to the physical degradation of existing recreational and other uses due to inundation below the dam.	All Alternatives: The Corps shall restore inundated areas below Prado Dam to pre-inundation conditions to the extent that such reconstruction requirements are specified in lease agreements Maintenance shall be limited to clean up efforts only and not the re-building of structures, as all recreational facilities within the Prado Basin are required to be floodable.		X	X	X	Less Than Significant
RE-5: Raising the conservation pool would affect the availability of future recreational and other uses due to inundation within the Prado Basin.	None required for any alternative.	X	X	X	X	Less Than Significant
RE-6: Raising the conservation pool would contribute to physical degradation of future recreational and other uses due to inundation within the Prado Basin.	None required for any alternative All future recreational uses within Prado Basin will be planned and constructed according to Corps regulations for uses within flood control basins. No recreational facilities will be constructed at the lower elevations below 566 feet unless they are compatible with inundation.	X	X	X	X	Less Than Significant
TRAFFIC AND TRANSPORTATION						
TR-1: Raising the conservation pool could inundate roadways and impair vehicular traffic.	All Alternatives: Only unimproved dirt maintenance roads (for official use only) within the wetlands would be inundated and the existing and future circulation network for the surrounding area would be unaffected.	X	X	X	X	Less Than Significant

TABLE ES-1
PRADO BASIN WATER SUPPLY FEASIBILITY STUDY EIR – SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	ALTERNATIVES				LEVEL OF SIGNIFICANCE AFTER MITIGATION
		2	3	4	5	
PUBLIC HEALTH AND SAFETY (NEPA ONLY)						
PU-1: Raising the conservation pool would increase the number of breeding mosquitoes.	All Alternatives: The Corps shall notify the Northwest Mosquito Abatement District, West Valley Vector Control District, and Orange County Vector Control District of the increased wetted area resulting from the conservation pool In coordination with these districts, the Corps will contribute funds as necessary annually to ensure that mosquito nuisances to the public resulting from the increased wetted area are minimized.	X	X	X	X	Less Than Significant

1 INTRODUCTION

The U.S. Army Corp of Engineers (USACE) and Orange County Water District (OCWD) published the Prado Basin Water Conservation Feasibility Study – Main Report With Environmental Impact Statement/Environmental Impact Report (EIS/EIR)[1] (State Clearinghouse (SCH) Number 2004051004) in February 2005 pursuant to the National Environmental Protection Act (NEPA) and the California Environmental Quality Act (CEQA). USACE is the NEPA lead agency and OCWD is the CEQA lead agency for this project. This document augments the analysis of specific portions of the February 2005 EIS/EIR to ensure compliance with CEQA requirements, including an expanded analysis of the project's potential for inducing growth, an expanded analysis of the project's potential cumulative impacts, significance criteria and additional discussion on environmental impacts and mitigation commitments. The Recirculated Draft EIR consists of the February 2005 EIS/EIR in its entirety as well as the additional information provided in this document. A compact disk containing the February 2005 EIS/EIR in an electronic file is attached to the inside back cover of this document. The Recirculated Draft EIR is being circulated for a 45-day public review period.

1.1 PURPOSE AND BACKGROUND

The Recirculated Draft EIR for the Prado Basin Water Conservation Feasibility Study provides the information necessary for OCWD to comply with CEQA environmental review requirements. In July 2004, the USACE published the Prado Basin Water Conservation Feasibility Study Main Report and Draft Environmental Impact Statement/Environmental Impact Report (SCH 2004051004). Subsequently, in February 2005, the USACE published the Prado Basin Water Conservation Feasibility Study Main Report and Environmental Impact Statement/Environmental Impact Report (referred to herein as February 2005 EIS/EIR). Notice of availability of this document was published in the Federal Register on June 24, 2005, 70 Fed. Reg. 36581. Comments were received during the public comment period stating that the EIR portion of the document was lacking certain analyses and procedural requirements needed to fully comply with CEQA. In response to these comments, OCWD as the CEQA lead agency circulated a Notice of Preparation on September 30, 2005 and has prepared the Recirculated Draft EIR.

[1] USACE, Prado Basin Water Conservation Feasibility Study Draft Main Report with Environmental Impact Statement/Environmental Impact Report, February 2005.

The Recirculated Draft EIR is being circulated for a 45-day public review period. Comments received on the previous draft EIS/EIR are not reproduced in the recirculated draft EIR and individual responses for each comment previously received have not been prepared. The Recirculated Draft EIR has been prepared to include information that sufficiently addresses concerns raised in comments received on the previous EIS/EIR. Pursuant to Section 15088.5(f)(1) of the *CEQA Guidelines*, when an EIR is recirculated in its entirety, the lead agency may require that reviewers submit new comments. OCWD is requesting that anyone wishing to comment on the project submit a new set of comments reflecting the Recirculated Draft EIR. The Final EIR will provide responses to comments received on the Recirculated Draft EIR only.

The Recirculated Draft EIR is available for review in its entirety at the following locations:

OCWD Headquarters
10500 Ellis Avenue
Fountain Valley, California 92708

Public Libraries:

Norco Public Library
3954 Old Hamner Road
Norco, CA 92860

Corona Public Library
650 South Main Street
Corona, CA 91720

Riverside Public Library
Government Documents
3581 Mission Inn Avenue
Riverside, CA 92501

Chino Branch Library
13180 Central Avenue
Chino, CA 91710

San Bernardino County Library
104 West 4th Street
San Bernardino, CA 92401

Main Library
City of Anaheim
500 W. Broadway
Anaheim, CA 92805

Orange County Public Library
17565 Los Alamos
Fountain Valley, CA 92708

On the District's web site at

http://www.ocwd.com

Hard copies of the Recirculated Draft EIR can also be obtained by contacting Greg Woodside at (714) 378-3275 or by email at gwoodside@ocwd.com.

The NEPA process has been completed and no additional information or notification requirements are needed to comply with NEPA. The Record of Decision for the Prado Basin Water Conservation Feasibility Study was signed on April 16, 2006 by the Director of Civil Works for the United States Army. The Record of Decision includes the finding that the operational plan recommended by the Feasibility Study and EIS/EIR is technically feasible, economically justified, environmentally acceptable, and in the public interest.

1.2 CONTENTS OF THE RECIRCULATED DRAFT EIR

The Recirculated Draft EIR consists of the February 2005 EIS/EIR in its entirety as well as the additional information provided in this document. The additional information provided in this document includes information regarding the environmental analysis, significance criteria, potential impacts, mitigation measures, growth inducement, and cumulative impacts.

In addition, this document compiles all mitigation commitments developed in the February 2005 EIS/EIR into a summary table for ease of reference and for inclusion in a subsequent Mitigation Monitoring and Reporting Plan (MMRP). The remaining analysis, impact conclusions, and mitigation commitments contained in the February 2005 EIS/EIR remain applicable to the project.

2 PROJECT DESCRIPTION

The proposed project would capture additional surplus water behind Prado Dam during winter months, thus raising the elevation of the conservation pool. The project would modify the USACE's operational control manual for Prado Dam, but would require no additional construction. The February 2005 EIS/EIR evaluated the potential environmental impacts of five project alternatives. Alternative 2 is the preferred project alternative. The following sections describe each alternative.

2.1 ALTERNATIVE 1 - NO ACTION ALTERNATIVE

The No Action Alternative involves no change to existing operations at Prado Dam. During the flood season (October 1 through the end of February), water would continue to be impounded up to an elevation of 494 feet above mean sea level (msl). During the non-flood season (March 1 through September 30), water would be impounded up to an elevation of 505 feet msl.

For Alternative 1, and for all other Alternatives, prior to a forecasted storm event, the conservation pool could be drawn down to an elevation of 490 feet msl within 24 hours to accommodate incoming storm flow volume and maintain the Reservoir's primary function as a flood control facility.

2.2 ALTERNATIVE 2: PREFERRED PROJECT ALTERNATIVE

During the flood season, a greater volume of water could be impounded behind the dam, up to elevation 498 feet msl. During the non-flood season, water would continue to be impounded up to elevation 505 feet msl, as with existing operations.

2.3 ALTERNATIVE 3

During the flood season, a greater volume of water could be impounded behind the dam, up to elevation 500 feet msl. During the non-flood season, water would continue to be impounded up to elevation 505 feet msl, as with existing operations.

2.4 ALTERNATIVE 4

During the flood season, a greater volume of water could be impounded behind the dam, up to elevation 505 feet msl. During the non-flood season, water would continue to be impounded up to elevation 505 feet msl, as with existing operations.

2.5 ALTERNATIVE 5

During the flood season, a greater volume of water could be impounded behind the dam, up to elevation 508 feet msl. Similarly, during the non-flood season, a greater volume of water could be impounded behind the dam, up to elevation 508 feet msl as well.

3 CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) ANALYSIS

Analyses of resource categories are presented in the general order of the CEQA Initial Study Checklist Form in the following subsections. To assist the reader, references to the corresponding sections of the February 2005 EIS/EIR are provided for each subsection. An expanded discussion of the existing conditions, significance criteria, impacts analysis, and mitigation measures is also provided for several environmental resource categories (such as farmlands and agricultural resources).

3.1 AESTHETICS

3.1.1 EXISTING CONDITIONS

Existing aesthetics and visual conditions within the project area and site vicinity upstream and downstream from Prado Reservoir are described in Section 3.8 of the February 2005 EIS/EIR.

3.1.2 SIGNIFICANCE CRITERIA

For this CEQA analysis, aesthetics and visual impacts were considered significant if project implementation would:

- Obstruct an existing public scenic view or view from a designated scenic highway, or;
- Substantially alter the existing visual character or quality of the project area and/or scenic element.

3.1.3 IMPACTS

Potential aesthetic and visual impacts associated with the implementation of the proposed project and project alternatives are described in Section 4.7 of the February 2005 EIS/EIR.

3.1.4 MITIGATION MEASURES

No significant adverse aesthetic impacts would result from implementation of the proposed project or alternatives and therefore no mitigation measures are required.

3.2 FARMLANDS/AGRICULTURAL LANDS

3.2.1 EXISTING CONDITIONS

Portions of the Prado Reservoir have been mapped as prime farmland as shown on Figure 3-1. Approximately 55 ha (136 acres) of periodically active agricultural fields are located between elevations 494 and 508 feet within the Prado Basin. Nearly all of this agricultural land is located along Chino Creek within the northern portion of the Basin.

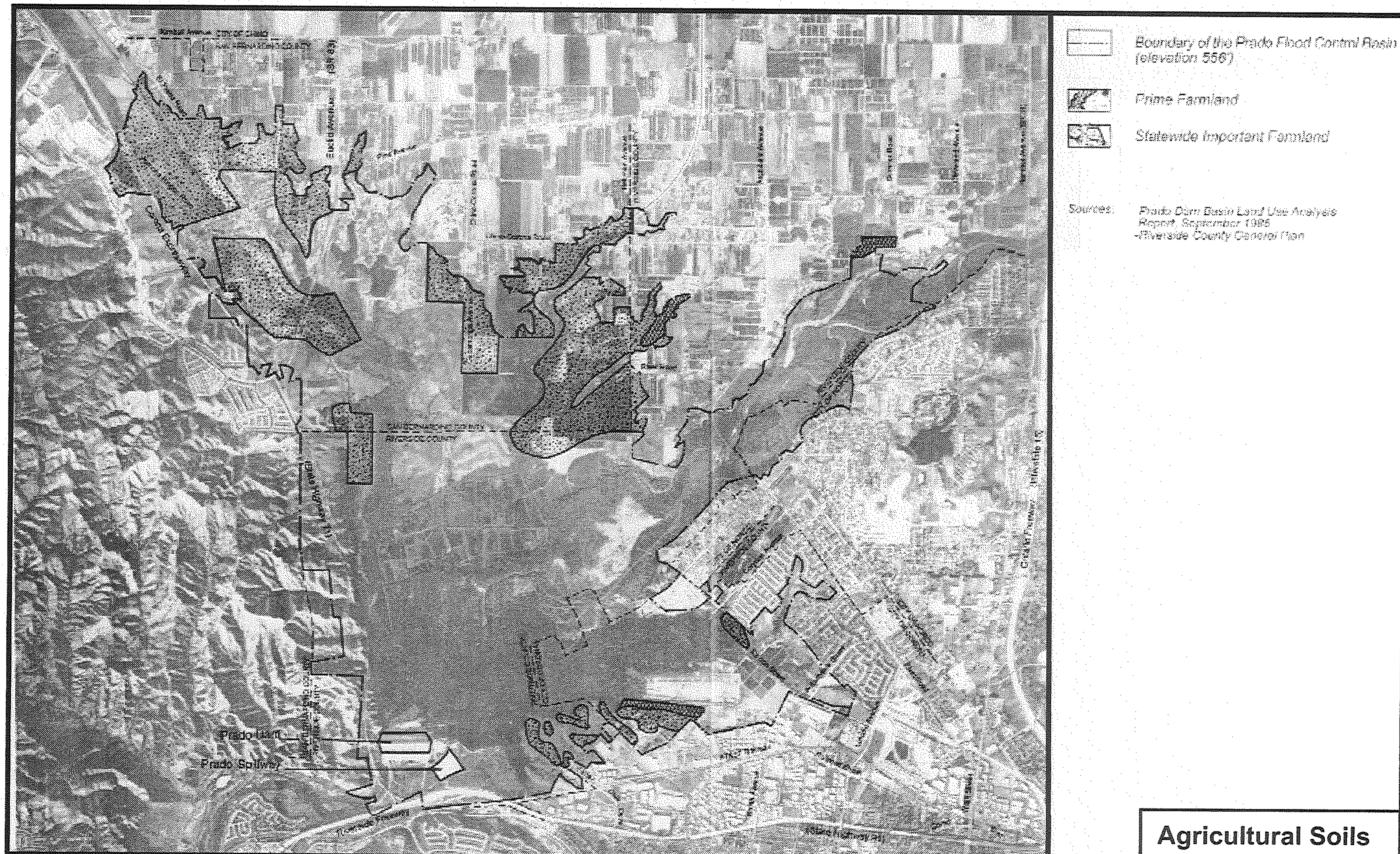

Prado Dam
Prado Spillway
Euclid Avenue
Boundary of the Prado Flood Control Basin (elevation 556')
Prime Farmland
Statewide Important Farmland
Sources: Prado Dam Basin Land Use Analysis Report, September 1985
-Riverside County General Plan
Agricultural Soils

Figure 3-1

These are lands that have been planted with monoculture crops for human consumption or to provide feed for livestock. Typically, once the crops have been harvested the lands are allowed to lie fallow for several years. All USACE agricultural leases in the County of Riverside and County of San Bernardino portions of the Prado Reservoir are temporary uses of master recreation outgrants until the counties develop the areas for recreational use.

Historically, land use in the area surrounding the Prado Reservoir has been predominantly agricultural with some single-family residential and commercial uses gradually developing over time. More recently, there has been a relatively rapid conversion of agricultural land to residential and commercial uses and the local dairy industry has relocated to other areas. New residential developments are anticipated in areas previously utilized for agricultural production, particularly in the area north and northeast of the project area.

3.2.2 SIGNIFICANCE CRITERIA

For this CEQA analysis, potentially adverse impacts to farmland and agricultural resources were considered significant if the project implementation would:

- Remove or substantially reduce the amount of productive prime farmland, farmland of local significance, or land protected under the Williamson Act, from production, unless such removal was accounted for in the approved local plan.

3.2.3 IMPACTS

Alternative 1

This alternative would not result in any farmland or agricultural resources impacts, as no changes to existing operations would occur.

Alternative 2, 3, 4 and 5

Implementation of the proposed project or alternatives 3 through 5 would result in an increase in the duration of inundation within the Prado Basin as compared with existing operations. This increased period of inundation during the flood season would incrementally reduce the available growing season for agricultural lands that are located below the proposed water surface elevation. However, it would not result in the conversion of any agricultural lands to other land uses or limit agricultural operations in the region.

As described in Section 4.6. of the February 2005 EIS/EIR, agricultural land use in the Prado Basin below elevation 510 feet msl could experience a maximum average of six additional days inundation per year under existing conditions and a maximum average 20 additional days per year under future conditions. A maximum average of 20 additional days of inundation per year would result in a four percent annual reduction in the availability of agricultural lands below 510 feet msl. This reduction would occur during the flood season, which is typically the non-growing season (or dormant season) for many types of crops and at a time of the year when daily photoperiod is relatively short.

Implementation of the proposed project or alternatives 3 through 5 would not remove or substantially reduce the amount of productive prime farmland, farmland of local significance, or land protected under the Williamson Act. Therefore, the potential additional four percent incremental decrease in annual availability of agricultural lands located below an elevation of 510 feet msl for production each year is considered less than significant.

3.2.4 Mitigation Measures

No significant adverse farmland/agricultural impacts would result from implementation of the proposed project and therefore no mitigation measures are required.

3.3 AIR QUALITY

3.3.1 Existing Conditions

Existing air quality conditions and the regulatory framework within the project area are described in Section 3.4 of the February 2005 EIS/EIR.

3.3.2 Significance Criteria

Adverse air quality impacts were deemed to be significant under CEQA if project implementation would:

- Exceed limits established by the South Coast Air Quality Management District.
- Violate any ambient air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the region is a non-attainment area under an applicable federal or state ambient air quality standard (including release of emissions which exceed quantitative thresholds for ozone precursors), or;
- Expose sensitive receptors (persons such as children, the elderly, or persons with lung impairments that make them particularly susceptible to impacts from air pollutants) to substantial pollutant concentrations.

3.3.3 Impacts

Potential air quality impacts associated with the implementation of the proposed project and project alternatives are described in Section 4.4 of the February 2005 EIS/EIR.

3.3.4 Mitigation Measures

No significant adverse air quality impacts would result from the implementation of the proposed project or alternatives and therefore no mitigation measures are required.

3.4 BIOLOGICAL RESOURCES

3.4.1 EXISTING CONDITIONS

Existing biological conditions within the project area and the Santa Ana River below Prado Dam to Weir Canyon are described in Section 3.3 of the February 2005 EIS/EIR.

3.4.2 SIGNIFICANCE CRITERIA

Significant adverse impacts to biological resources would occur if implementation of the project would result in:

- Loss of nesting habitat or other limited resource used by a Federal or State Threatened or Endangered Species;
- Loss of individuals or populations of a Federal or State Threatened or Endangered Species or its habitat;
- Substantial loss of individuals or populations of a species proposed for Federal listing, a candidate for state listing, or species that are regionally rare or otherwise sensitive;
- Substantial loss of species diversity in natural vegetation and wildlife habitat;
- Loss of habitat that is regionally unique, declining; or designated as sensitive by resource agencies;
- Disturbances to populations or breeding areas of listed Threatened or Endangered Species, or reduction in the foraging habitat for Threatened or Endangered Species, and/or;
- Loss of endangered, rare, endemic, or otherwise sensitive species individuals dependant upon the study area.

3.4.3 IMPACTS

Potential biological impacts associated with the implementation of the proposed project and alternatives are described in Section 4.3 of the February 2005 EIS/EIR.

3.4.4 MITIGATION MEASURES

Biological mitigation measures which shall be implemented to reduce adverse impacts associated with the proposed project or alternatives are described in Section 4.3.3 of the February 2005 EIS/EIR.

Implementation of these mitigation measures would reduce potentially significant adverse impacts to less than significant levels.

3.5 CULTURAL RESOURCES

3.5.1 EXISTING CONDITIONS

Existing cultural resource conditions within the project area and vicinity are described in Section 3.9 of the February 2005 EIS/EIR.

3.5.2 SIGNIFICANCE CRITERIA

For this CEQA analysis of cultural resources, criteria for the evaluation of effects to National Register properties described in 36 CFR 800.9, *Criteria of Effect and Adverse Effect* were utilized to determine significant adverse impacts. Project implementation would be considered to have a significant adverse impact when the effect on a historic property may diminish the integrity of the property's location, design setting, materials, workmanship, feeling, or association. Potentially significant adverse impacts include, but are not limited to:

- Physical destruction, damage, or alteration of all or part of the property;
- Isolation of the property from or alteration of the character of the property's setting when the character contributes to the property's qualification for the National Register;
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
- Neglect of a property resulting in its deterioration or destruction;
- Transfer, lease, or sale of the property, or;
- Alteration of the characteristics of a historic property that may qualify the property for inclusion in the National Register.

3.5.3 IMPACTS

Potential cultural resource impacts associated with the implementation of the proposed project and project alternatives are described in Section 4.8.1 of the February 2005 EIS/EIR.

3.5.4 MITIGATION MEASURES

Cultural resource mitigation measures that shall be implemented for the proposed project or project alternatives are summarized in Section 4.8.2 of the February 2005 EIS/EIR. Implementation of these mitigation measures would reduce potentially significant adverse impacts to less than significant levels.

3.6 GEOLOGY AND SOILS

3.6.1 EXISTING CONDITIONS

Existing geology and soil conditions within the project area and the Santa Ana River below Prado Dam to Weir Canyon are described in Section 3.1 of the February 2005 EIS/EIR.

3.6.2 SIGNIFICANCE CRITERIA

Significant adverse impacts to or as a result of geological resources would occur if implementation of the project would result in:

- People or structures being exposed to a major geologic hazard, or;
- Disruption of a unique geologic feature of unusual scientific value;

3.6.3 IMPACTS

Potential geological and soils related impacts associated with the implementation of the proposed project and project alternatives are described in Section 4.1 of the February 2005 EIS/EIR.

3.6.4 MITIGATION MEASURES

No significant adverse geological or soils impacts would result from the implementation of the proposed project and therefore no mitigation measures are required.

3.7 HAZARDS AND HAZARDOUS WASTE/MATERIALS

3.7.1 EXISTING CONDITIONS

Hazards and hazardous waste/materials conditions within the existing environment and surrounding vicinity are described in Section 3.5 of the February 2005 EIS/EIR.

3.7.2 SIGNIFICANCE CRITERIA

Significant adverse hazard or hazardous materials impacts would occur if:

- Project implementation would result in exposure of the public to hazardous materials, or;
- Project implementation would result in exposure of the public to unsafe conditions or safety issues.

3.7.3 IMPACTS

The proposed project would not increase the use of hazardous materials or expose sensitive receptors to hazardous materials. No sites listed in Government Code Section 65962.5 as hazardous waste sites would be inundated or otherwise affected by the proposed project. None of the areas used as firing ranges within the Prado Basin would be inundated by the proposed project. No other past uses within the proposed inundation zones are known to have contaminated soils. Therefore, water quality would not be adversely affected by soil conditions in the inundation zone. The Prado Basin has been used historically and to the present day for duck hunting. In the earlier years, lead shot was allowed but has not been since the 1990s. Although lead in the environment can be problematic, the lead shot would now be located under many feet of sediment and no longer bio-available. Deposition of sediment is still occurring in the Basin and the proposed project's average of six days additional inundation will have no effect on the buried shot.

3.7.4 MITIGATION MEASURES

Implementation of the proposed project would not result in any potentially significant hazards or hazardous materials and therefore no mitigation measures are required.

3.8 HYDROLOGY AND WATER QUALITY

3.8.1 EXISTING CONDITIONS

Existing hydrological conditions and water quality within the project area and the Santa Ana River below Prado Dam to Weir Canyon are described in Section 3.2 of the February 2005 EIS/EIR.

3.8.2 SIGNIFICANCE CRITERIA

For this CEQA analysis, an alternative is considered to result in a significant adverse hydrology and/or water quality impact if project implementation would result in:

- Substantial erosion or sedimentation;
- Adversely affect the flood control function of the Prado Dam basin area;
- A reduction in the flood control protection that is currently provided by the downstream flood control facilities;
- A decrease in the groundwater yield in the project vicinity, or;
- Substantial degradation of the quality of surface water.

3.8.3 IMPACTS

Potential hydrology and water quality impacts associated with the implementation of the proposed project and project alternatives are described in Section 4.2 of the February 2005 EIS/EIR.

3.8.4 MITIGATION MEASURES

Hydrology and water quality mitigation measures are described in Section 4.2.2 of the February 2005 EIS/EIR. Implementation of the proposed mitigation measures would reduce adverse impacts to a level that is considered less than significant.

3.9 LAND USE AND PLANNING

3.9.1 EXISTING CONDITIONS

Existing land use within the project site and surrounding vicinity are described in Section 3.7 of the February 2005 EIS/EIR. Applicable planning and policy documents (such as city and county general plans) are described in Section 3.7.2 of the February 2005 EIS/EIR.

3.9.2 Significance Criteria

For this CEQA analysis, land use and planning impacts were considered significant if project implementation would:

- Be inconsistent with existing or planned land uses within the project area or vicinity;
- Be inconsistent with the adopted policies, goals, and objectives of General Plans, Community Plans, Specific Plans or other applicable plans within the project area or vicinity, and/or;
- Result in substantial displacements of residents and/or businesses.

3.9.3 Impacts

Project implementation would result in direct and adverse but less than significant impacts to existing onsite and surrounding land uses upstream from Prado Dam. See Section 4.6.1.2 of the February 2005 EIS/EIR for further information.

Implementation of the preferred project alternative would result in direct and adverse but less than significant impacts to existing land uses downstream of Prado Dam. Significant direct adverse impacts causing physical degradation of existing recreational and other land uses may occur with certain other alternatives but not the preferred project alternative. See Section 4.6.1.3 of the February 2005 EIS/EIR for further information.

3.9.4 Mitigation Measures

No significant adverse land use impacts would result from the implementation of the proposed project and therefore no mitigation measures are required.

3.10 MINERAL RESOURCES

3.10.1 Existing Conditions

Known mineral resources within the Prado Basin are mainly related to oil and gas production. The Prado Petroleum Company formerly operated a total of 13 oil wells between the elevations of 493 and 505 feet within the central-west portion of the lower Prado Reservoir. All 13 wells were properly abandoned in 1996 in accordance with state and federal regulations (which included cleaning out each well and then filling each with cement).

Three of these abandoned wells were leased through the federal government Bureau of Land Management and were located at an elevation of approximately 500 feet msl. Ten of the abandoned wells fall within oil and gas rights underlying a portion of land formerly owned by the Santa Ana River Development Company (SARDCO). The wellhead elevations of these ten wells ranged from approximately 493 to 505 feet msl. The surface area of the former SARDCO lease is approximately 472 acres, and was acquired by OCWD through eminent domain proceedings in 1967.

Under present conditions, the abandoned oil wells could be inundated for approximately 0 to 275 days during a 2-year to a 100-year recurrence interval flood. Under future conditions, the abandoned oil wells could be inundated for approximately 0 to 315 days during a 2-year to a 100-year recurrence interval flood. The average annual number of days that the oil wells could be inundated would shift from approximately nine to 42 days under present conditions to 12 to 68 days under future conditions.

3.10.2 SIGNIFICANCE CRITERIA

For this CEQA analysis, impacts to mineral and/or energy resources were considered significant if project implementation would:

- Result in the loss of availability of a known mineral or energy resource of value to the state or region, or;
- Result in the loss of availability of a locally important mineral resource recovery site delineated on a local government plan, specific plan, or other land use plan.

3.10.3 IMPACTS

Alternative 1

This alternative would not result in any impacts to mineral resources as no changes to existing operations would occur.

Alternative 2, 3, 4 and 5

The former oil and gas wells located within the Prado Reservoir are all inactive and have all been properly abandoned. Even though oil and/or gas production within the Prado Basin has ceased, implementation of the proposed project or alternative 3 through 5 would not preclude future oil production if economically viable reserves remain within the leases. Therefore, no significant adverse oil and gas production impacts would result from implementation of the proposed project or alternatives.

No other designated Mineral Resources Zones are located within the proposed inundation zone. Therefore, implementation of the proposed project or alternatives would not limit access or result in the loss of availability of known mineral or energy resources and no significant adverse impacts would occur.

3.10.4 MITIGATION MEASURES

No significant adverse mineral or energy resources impacts would result from the implementation of the proposed project and therefore no mitigation measures are required.

3.11 NOISE

3.11.1 Existing Conditions

The existing noise environment and regulatory noise framework within the project area and vicinity is characterized in Section 3.6 of the February 2005 EIS/EIR.

3.11.2 Significance Criteria

For this CEQA analysis, noise impacts were considered significant if project implementation would:

- Result in operational noise associated with maintenance activities, which does not conform to local noise ordinances.

3.11.3 Impacts

Potential noise impacts associated with the implementation of the proposed project and project alternatives are described in Section 4.5 of the February 2005 EIS/EIR.

3.11.4 Mitigation Measures

No significant adverse noise impacts would result from the implementation of the proposed project and therefore no mitigation measures are required.

3.12 PUBLIC SERVICES/UTILITIES/EMERGENCY SERVICES

3.12.1 Existing Conditions

Information regarding public services, utilities, and emergency services was obtained primarily from the following documents:

- *Draft Prado Basin Master Plan and Environmental Impact Statement,* (USACE, August, 2005).
- *Design Memorandum No. 1, Phase II GDM on the Santa Ana River Mainstem Including Santiago Creek, Vol. 2, Prado Dam,* (USACE, August 1988).
- *Review of Prado Dam Operation for Water Conservation, Final Report and Environmental Impact Statement,* (USACE, February 1992).

Utilities

Utilities include electricity, natural gas, telephone, water, sewer and storm drain facilities. Major utility corridors in the Prado Basin have been identified, and utility easements are shown in Figure 3-2.

Public Services

Fire and Emergency Medical Services

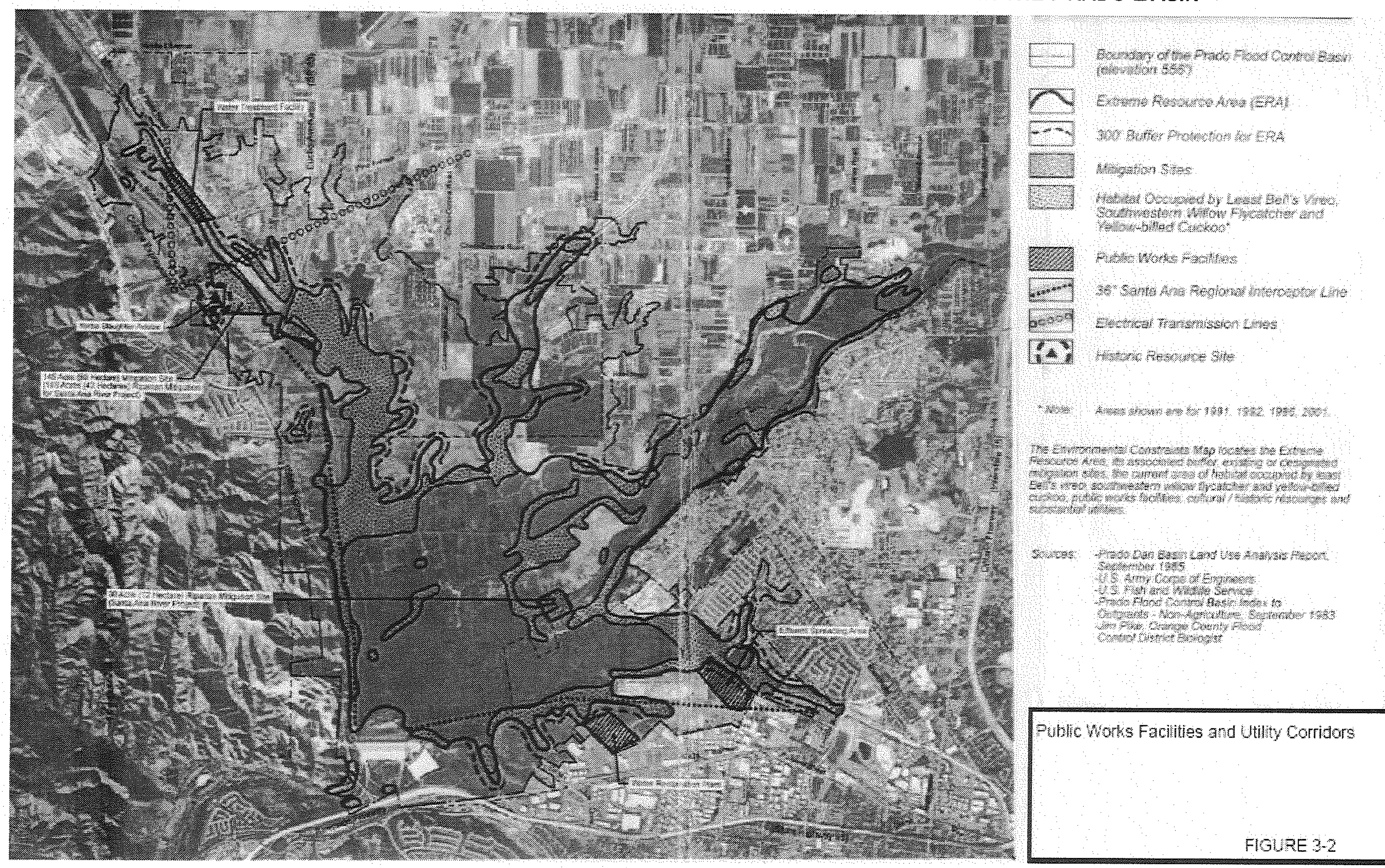
Fire protection and emergency medical services are provided by most of the agencies whose jurisdictional boundaries extend into the Prado Basin. These include the California Department of Forestry (CDF), Chino Valley Independent Fire District, Riverside County Fire Department, the City of Corona Fire Department, the California Department of Forestry-Corona Station and the City of Chino Fire Department. The specific responding agency is determined by the jurisdiction in which the emergency occurs. These agencies provide fire prevention, fire suppression, emergency medical, hazardous material abatement and public service assistance. Specific responsibilities for the Prado watershed vegetation areas belong to the CDF while structures in these areas are the responsibility of the jurisdiction in which the call is located. Additional service is provided through a mutual aid agreement between the County of Riverside and City of Norco.

The objective of fire protection service is to reduce fire hazards and loss from fire through the promotion of public awareness and the enforcement of fire prevention regulations and standards. These objectives are attained through implementation of programs identified in the Fire Protection Master Plan of each jurisdiction.

Law Enforcement

Municipal law enforcement and investigative services are also provided by the agencies with jurisdictional boundaries in the Prado Basin. These include the Riverside County Sheriff's Department, San Bernardino County Sheriff's Department and Cities of Corona and Norco Police Departments. As with other public services, the responding agency is determined by the location of the call and law enforcement for leased areas would be provided by the agency having jurisdiction over that particular area. In addition, the CDFG and USFWS enforce state and federal laws, respectively, regarding issues such as hunting violations and endangered species.

FIGURE 3-2 - PUBLIC WORKS FACILITIES AND UTILITY CORRIDORS WITHIN THE PRADO BASIN



(Source: P&D Technologies, 2005)

3.12.2 SIGNIFICANCE CRITERIA

For this CEQA analysis, potential public services, utilities and emergency services impacts were considered significant if project implementation would:

- Result in the relocation of existing major utilities such as gas lines, or wastewater lines;
- Increase demand for schools, parks, fire protection and/or law enforcement services or public facilities due to increased land use intensity or population growth in a jurisdiction, or;
- Require or result in the construction of new water or wastewater facilities or result in the expansion of existing facilities.

3.12.3 IMPACTS

<u>Alternative 1</u>

The no-action alternative would result in no changes to the existing operations within the Prado Basin, and therefore no impacts to existing public services, utilities, and emergency services would occur.

<u>Alternatives 2, 3, 4 and 5</u>

The proposed project and alternatives 3, 4, and 5 would not increase the need for public services such as police and fire services in the region. No new housing, commercial, retail or other development would result from implementation of the project that would increase demand for schools, religious institutions, or parks. Therefore, implementation of any of these alternatives would not result in the need for any new water or wastewater treatment facilities or the expansion of existing facilities.

3.12.4 MITIGATION MEASURES

Project implementation would not result in any significant adverse impacts to existing or planned utilities, public services, or emergency services and therefore no mitigation measures are required.

3.13 RECREATION

3.13.1 EXISTING CONDITIONS

Existing recreation conditions within the Prado Reservoir and vicinity are described in Section 3.7 of the February 2005 EIS/EIR.

3.13.2 SIGNIFICANCE CRITERIA

For this CEQA analysis, potentially adverse impacts to recreational resources were considered significant if the project implementation would:

- Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated;
- Reduce or eliminate existing recreational opportunities within the local area or in regional parks, or;
- Include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment.

3.13.3 Impacts

Potential impacts associated with the proposed project and alternatives are described in Section 4.6 of the February 2005 EIS/EIR. Although lands under recreational leases would be inundated an average of six or more additional days, the impact is less than significant. It should also be noted that recreational leases in the Basin are done under lease agreement with the Corps and it is clearly stated that the authorized purposes of the Prado Facility and lands usurp any other subsidiary use including recreational. These authorized purposes include both flood control and water conservation.

3.13.4 Mitigation Measures

No significant adverse recreational resource impacts would result from the implementation of the proposed project and therefore no mitigation measures are required.

3.14 TRAFFIC AND TRANSPORTATION

3.14.1 Existing Conditions

The area encompassed by the Prado Basin is largely undeveloped. The road system in the lower and central parts of the Basin consists of 20-ft wide asphalt and dirt tracks criss-crossing the area, providing access for maintenance and official vehicles. Roads in the lower elevations of the Basin (central part) are posted for restricted vehicle entry. Around the periphery of the Basin are circulation features under the jurisdictions of San Bernardino and Riverside Counties and the Cities of Corona and Norco. Figure 3-3 illustrates the existing road system within the Prado Basin. Specific roads in the study area are described below. Roads are described as "divided" (with painted median or median island) or "undivided" (with double yellow centerline), which affect road capacity.

State Route 91 (SR-91, Riverside Freeway)

A ten-lane (8 mixed flow, 2 carpool lanes), grade separated, limited access freeway through the entire study area. SR-91 transitions to a 12-lane (8 mixed flow, 4 Fast Trak lanes) configuration west of SR-71 outside the study area. SR-91 has interchanges at SR-71, Serfas Club Drive/Auto Center Drive, Maple/6th Street, Lincoln Avenue and Main Street within the study area.

State Route 71 (SR-71, Corona Expressway)

SR-71 is a limited access expressway, classified as a freeway on the State Transportation Plan. Improvements to SR-71 in San Bernardino County adjacent to the Prado Basin have been completed, resulting in a four-lane configuration to the county boundary, where a two-lane configuration remains.

SR-83

SR-83 is a two-lane undivided road from SR-71 to Pine Avenue, with auxiliary lanes at the SR-83/SR-71 intersection. North of Pine Avenue, SR-83 is a four-lane undivided road. SR-83 is classified as a major divided arterial in the San Bernardino County General Plan Circulation Element.

Archibald Avenue

Archibald Avenue is a two-lane undivided road extending north from River Road to the boundary of the study area. Archibald Avenue is classified as a major arterial in the San Bernardino County General Plan Circulation Element.

Lincoln Avenue

Lincoln Avenue is a four-lane undivided road that enters the study area from the south and ends at Parkridge Avenue north of the Lincoln Avenue/SR-91 interchange. Lincoln Avenue is classified as a secondary arterial by the City of Corona.

Main Street (SR 81)

.Main Street is a six-lane divided major arterial from 6th Street, south of SR-91, to River Road.

Pine Avenue

Pine Avenue is a two-lane undivided road extending east and west between SR-71 and Archibald Avenue. Pine Avenue is classified as a four-lane secondary road in the San Bernardino County General Plan Circulation Element.

Railroad Street

Railroad Street is a four-lane divided road approximately parallel to SR-91 from Auto Club Drive to Main Street. Railroad Street is classified as a secondary arterial by the City of Corona.

River Road

North of the Santa Ana River, River Road is known as Archibald Avenue. South of the Santa Ana River to Corydon Avenue, River Road is a two-lane undivided road. River Road is a four-lane divided road, with a median island, between Corydon Avenue and Lincoln Avenue, and is a four-lane divided road with two-way center turn lane median south of Lincoln Avenue. River Road is classified as a major arterial by the City of Corona.

Serfas Club Drive/Auto Center Drive

Serfas Club Drive is a four-lane divided highway south of SR-91. North of SR-91, Serfas Club Drive has no median and is known as Auto Center Drive.

Smith Avenue

Smith Avenue is a four-lane divided road that crosses over SR-91 and ends at Rincon Street. Smith Avenue is classified as a secondary arterial by the City of Corona.

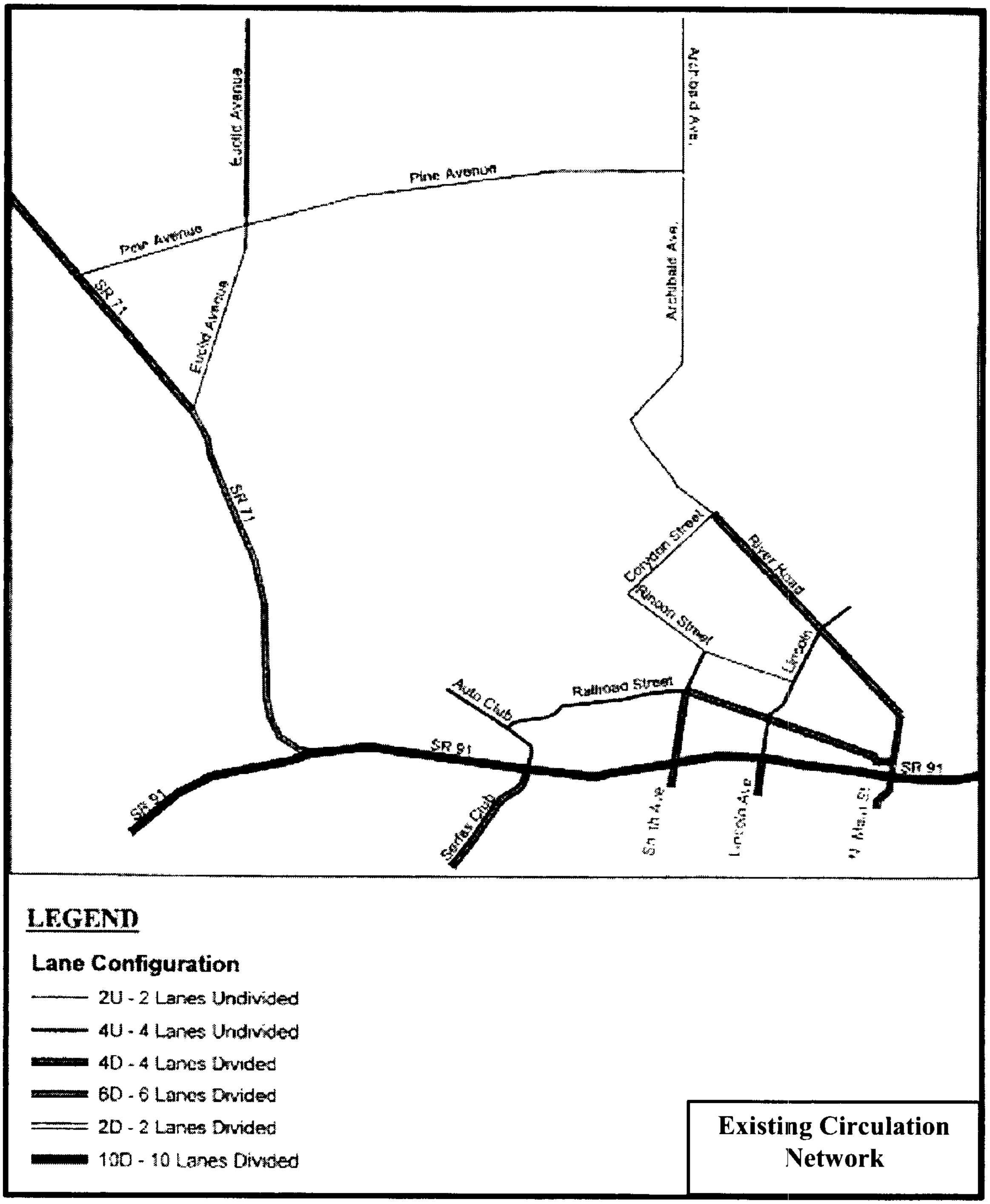
Traffic Volumes

Existing average daily traffic (ADT) volumes in the study area were obtained from the Counties of San Bernardino and Riverside, the City of Corona and Caltrans. Traffic counts were taken from 1999 to 2000. Existing traffic conditions are summarized in Table 3-1 and are shown on Figure 3-4. Figure 3-4 also shows the level of service (LOS) for key roads in the study area. LOS is described below.

Level of Service

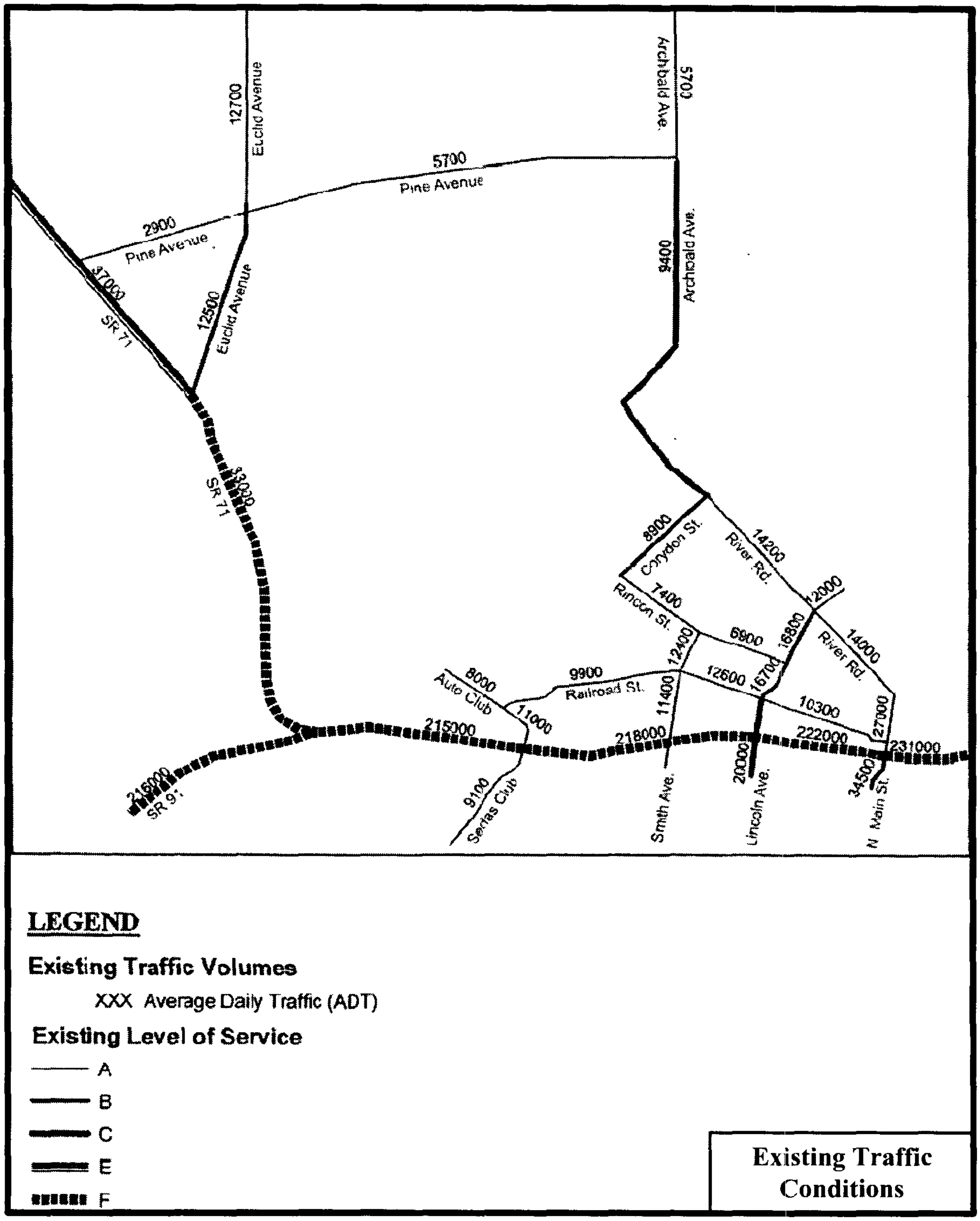
Level of service is based on a comparison of the traffic volume on a road to the design capacity of that road (V/C ratio). Capacities in this study were based on the Riverside County Integrated Plan, Road Capacity/Level of Service, dated September 9, 1999. The Riverside County standards were used because they are based on the Highway Capacity Manual and are accepted values for a program-level analysis. The LOS concept was developed to evaluate the operating conditions of different components of a transportation circulation system. The Highway Capacity Manual (HCM) defines LOS as a qualitative measure which describes operational conditions within a traffic stream, generally in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience. LOS is rated from A to F, with LOS A representing the best operating conditions and LOS F representing the worst. Table 3-2 (Definitions of Levels of Service) gives the definitions of LOS. The existing LOS for key roads in the study area are shown in Table 3-1 on Figure 3-4. Nearly all the local arterials are currently operating at acceptable LOS C or better. Regional facilities (SR-91 and SR-71) are currently at unacceptable LOS (i.e. LOS E or F), largely due to the location of the study area adjacent to several major regional facilities in a heavily traveled regional corridor.

FIGURE 3-3 - EXISTING CIRCULATION NETWORK



Source: P&D Technologies, Inc., 2005

FIGURE 3-4 - EXISTING TRAFFIC CONDITIONS



Source: P&D Technologies, Inc., 2005

TABLE 3-1 - EXISTING TRAFFIC CONDITIONS IN THE PRADO RESERVOIR AREA

Arterial	From	To	Lanes	Capacity	Volume	LOS
SR-71	SR-91	SR-83	2D[1]	18,000	33,000	F
SR-71	SR-83	Pine Ave.	4D	40,900	37,000	E
SR-91	Green River	SR-71	10D	200,800	216,000	E
SR-91	SR-71	Serfas Club	10D	200,800	215,000	E
SR-91	Serfas Club	Lincoln	10D	200,800	218,000	E
SR-91	Lincoln	Main	10D	200,800	222,000	E
SR-91	Main	I-15	10D	200,800	231,000	E
Serfas Club	Monterey	SR-91	4D	35,900	9,100	A
Auto Club	SR-91	Railroad	4U[2]	25,900	11,000	A
Auto Club	Railroad	Rincon Rd.	4U	25,900	8,000	A
Railroad St.	Auto Club	Smith	4U	25,900	9,900	A
Railroad St.	Smith	Lincoln	4D	35,900	12,600	A
Railroad St.	Lincoln	Main	4D	35,900	10,300	A
Smith St.	6th Street	Railroad	4D	35,900	11,400	A
Smith St.	Railroad	Rincon St.	4U	25,900	12,400	A
Lincoln	6th Street	SR-91	4D	35,900	26,000	F
Lincoln	SR-91	Railroad	4U	25,900	20,000	C
Lincoln	Railroad	Rincon St.	4U	25,900	16,700	B
Lincoln	Rincon St.	River Road	4U	25,900	16,800	B
Lincoln	River Road	Parkridge Ave.	4U	25,900	12,000	A
Rincon St.	Lincoln	Smith	2U	13,000	6,900	A
Rincon St.	Smith	Corydon	2U	13,000	7,400	A
Main Street	6th St.	SR-91	6D	53,900	34,500	B
Main St.	SR-91	Grand	6D	53,900	30,000	A
Main St.	Grand	River Road	6D	53,900	27,000	A
River Road	Main St.	Lincoln	4D	35,900	14,000	A
River Road	Lincoln	Corydon	4D	35,900	14,200	A
Archibald Ave.	River Road	Schliesman	2U	13,000	9,400	C
Archibald Ave.	Schliesman	Edison Rd.	2U	13,000	5,700	A
Pine Ave.	SR-71	Euclid Ave.	2U	13,000	2,900	A
Pine Ave.	Euclid Ave.	Archibald	2U	13,000	5,700	A
Euclid Ave.	SR-71	Pine Ave.	2U	18,000	12,500	B
Euclid Ave.	Pine Ave.	Kimball	4U	25,900	12,700	A
Corydon St.	Rincon St.	River Road	2U	13,000	8,900	B

Notes:

1. D – denotes divided highway
2. U – denotes undivided highway

TABLE 3-2 - DEFINITION OF LEVELS OF SERVICE

Level of Service (LOS)	Definition
A	Free flow in which there is little or no restriction on speed or maneuverability.
B	Stable flow though operating speed is beginning to be restricted by other traffic.
C	Stable flow though drivers are becoming restricted in their freedom to select speed, change lanes or pass.
D	Tolerable average operating speeds are maintained but are subject to considerable sudden variation.
E	Speeds and flow rates fluctuate and there is little independence on speed selection or ability to maneuver.
F	Speeds and flow rates are below those attained in Level E and may, for short periods, drop to zero.

3.14.2 SIGNIFICANCE CRITERIA

For this CEQA analysis, traffic and transportation impacts were considered significant if project implementation would:

- Cause an increase in traffic as compared to the existing traffic load and capacity of the street system, resulting in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections;
- Exceed, either individually or cumulatively, a level of service standard established by county congestion management agencies for designated roads or highways;
- Result in inadequate emergency access;
- Result in inadequate parking capacity, or;
- Conflict with adopted policies, plans, or programs supporting alternative transportation.

3.14.3 IMPACTS

The proposed project would not affect the local transportation network. The proposed inundation zone would be entirely within the existing Prado Basin and only internal dirt maintenance roads (for official use only) would be affected. No public roadways or access routes would be inundated through the implementation of the preferred project or alternatives. No new activities that would increase traffic in the region would result from project implementation.

3.14.4 Mitigation Measures

Implementation of the proposed project would not result in any significant adverse traffic and/or transportation impacts and therefore no mitigation measures are required.

3.15 SUMMARY OF IMPACTS AND MITIGATION MEASURES

The potential environmental impacts, mitigation measures and levels of significance following implementation of the mitigation measures are summarized for the proposed project and project alternatives in Table 3-3.

TABLE 3-3 - PRADO BASIN WATER SUPPLY FEASIBILITY STUDY EIR – SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	ALTERNATIVES				LEVEL OF SIGNIFICANCE AFTER MITIGATION
		2	3	4	5	
AESTHETICS						
AE-1: Raising the conservation pool would alter existing views from residences surrounding Prado Basin.	None required for any alternative	X	X	X	X	Less Than Significant
AE-2: Raising the conservation pool would alter existing views from State Route 71, a scenic highway.	None required for any alternative	X	X	X	X	Less Than Significant
AE-3: Raising the conservation pool would alter existing views from land uses below the dam.	None required for any alternative	X	X	X	X	Less Than Significant
FARMLANDS/AGRICULTURAL LANDS						
FA-1: Raising the conservation pool would inundate crops and reduce the available growing season.	None required for any alternative.	X	X	X	X	Less Than Significant
AIR QUALITY						
AQ-1: Raising the conservation pool would increase exhaust and fugitive dust emissions from maintenance-related activities downstream of Prado Dam.	None required for any alternative.	X	X	X	X	Less Than Significant
BIOLOGICAL RESOURCES - ABOVE THE DAM						
BI-1: Critical Habitat: Raising the conservation pool would increase the number of days critical habitat for least Bell's vireo and southwestern willow flycatcher would be inundated above the dam.	All Alternatives: To mitigate impacts to biological resources **above the dam**, the local sponsor shall acquire the following amounts of land for restoration to willow woodland and riparian habitat: Alt. 2: 6.2 ha (5.2 ac); Alt 3 - 8 1 ha (20.1ac); Alt. 4: 38.5 ha (95.1 ac), Alt 5: 124 8 ha (308.1 ac). The land shall be obtained from a 45.4-ha (112-ac) parcel within Prado Basin that is available for restoration. If the total amount of land to be acquired exceeds 45.4 ha (112 ac), then the local sponsor also will provide compensation to the Trust Fund at a rate of $50,000 per acre for the loss of the remaining acreage. All Alternatives: To mitigate impacts to biological resources **above the dam**, the local sponsor will provide compensation to the Trust Fund for maintenance of the above-mentioned habitat acquired for restoration. The total compensation will be $25,000 per acre.	X	X	X	X	Less Than Significant
BI-2: Sensitive Habitat. Raising the conservation pool would affect willow woodland and mixed eucalyptus/willow woodland above the dam.	See the Dam Mitigation Measures for BI-1(above).	X	X	X	X	Less Than Significant
BI-3: Sensitive Habitat: Raising the conservation pool could affect riparian scrub habitat above the dam.	None required for any alternative	X	X	X	X	Less Than Significant

TABLE 3-3 - PRADO BASIN WATER SUPPLY FEASIBILITY STUDY EIR – SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	ALTERNATIVES				LEVEL OF SIGNIFICANCE AFTER MITIGATION
		2	3	4	5	
BI-4: Sensitive Habitat: Raising the conservation pool would affect freshwater marsh vegetation above the dam.	See the Dam Mitigation Measures for BI-1 (above).				X	Less Than Significant
BI-5. Sensitive Species: Raising the conservation pool could directly affect southwestern willow flycatcher above the dam.	See the Dam Mitigation Measures for BI-1 (above)	X	X	X	X	Less Than Significant
BI-6: Sensitive Species: Raising the conservation pool could directly affect Least Bell's vireo nests above the dam.	None required for any alternative			X	X	Less Than Significant
BI-7 Sensitive Species: Raising the conservation pool could directly affect Santa Ana suckers above the dam	None required for any alternative		X	X	X	Less Than Significant
BI-8: Sensitive Species: Raising the conservation pool could affect directly yellow warbler and yellow-breasted chat above the dam	See the Dam Mitigation Measures for BI-1 (above).				X	Less Than Significant
BI-9: Sensitive Species: Raising the conservation pool could directly affect the San Diego black-tailed jackrabbit above the dam.	None required for any alternative.	X	X	X	X	Less Than Significant
BI-10: Sensitive Species: Raising the conservation pool could directly affect pond turtles above the dam.	None required for any alternative.	X	X	X	X	Less Than Significant
BI-11: Sensitive Species: Raising the conservation pool could directly affect the western spadefoot toad above the dam.	None required for any alternative	X	X	X	X	Less Than Significant
BI-12: Sensitive Species: Raising the conservation pool could directly affect arroyo chub above the dam.	None required for any alternative.	X	X	X	X	Less than Significant
BI-13: Fully-Protected Species: Raising the conservation pool could directly affect while-tailed kite nests above the dam.	None required for any alternative.	X	X	X	X	Less Than Significant
BI-14: Wildlife Movement: Raising the conservation pool could affect wildlife movement above the dam	None required for any alternative.	X	X	X	X	Less Than Significant
BI-15: Non-Sensitive Native Vegetation Raising the conservation pool could affect non-sensitive native vegetation above the dam.	None required for any alternative.	X	X	X	X	Less Than Significant
BI-16: Ruderal and Invasive Vegetation: Raising the conservation pool could affect ruderal and invasive vegetation above the dam.	None required for any alternative.	X	X	X	X	Less Than Significant
BIOLOGICAL RESOURCES - BELOW THE DAM						

TABLE 3-3 - PRADO BASIN WATER SUPPLY FEASIBILITY STUDY EIR – SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	ALTERNATIVES				LEVEL OF SIGNIFICANCE AFTER MITIGATION
		2	3	4	5	
BI-17: Nesting Habitat: Raising the conservation pool would increase the number of days nesting habitat for least Bell's vireo and southwestern willow flycatcher would be inundated below the dam.	All Alternatives: To mitigate impacts to biological resources **below the dam**, the local sponsor shall acquire the following amounts of land for restoration to willow woodland and riparian habitat: Alt. 2: 8.9 ha (22 ac), Alt. 3 - 10.6 ha (26.3 ac); Alt. 4: 17.0 ha (41 8 ac); Alt 5: 24.0 ha (59.2 ac). The land shall be obtained from a 45.4-ha (112-ac) parcel within Prado Basin that is available for restoration If the total amount of land to be acquired exceeds 45.4 ha (112 ac), then the local sponsor also will provide compensation to the Trust Fund at a rate of $50,000 per acre for the loss of the remaining acreage. All Alternatives: To mitigate impacts to biological resources **below the dam**, the local sponsor will provide compensation to the Trust Fund for maintenance of the above-mentioned habitat acquired for restoration. The total compensation will be $25,000 per acre		X	X	X	Less Than Significant
BI-18: Sensitive Habitat: Raising the conservation pool would affect cottonwood/willow woodland below the dam.	See the Dam Mitigation Measures for BI-1 (above).		X	X	X	Less Than Significant
BI-19: Sensitive Habitat: Raising the conservation pool would affect riparian scrub below the dam.	See the Dam Mitigation Measures for BI-1 (above).			X	X	Less Than Significant
BI-20: Sensitive Habitat: Raising the conservation pool would directly affect least Bell's vireo below the dam.	None required for any alternative.			X	X	Less Than Significant
BI-21 Sensitive Species: Raising the conservation pool would directly affect Santa Suckers below the dam.	All Alternatives: To mitigate impacts to the Santa Ana sucker, the local sponsor will prepare a Santa Ana Sucker Management Plan. This plan will be completed prior to the first winter of project implementation. The focus of the plan will be to manage the aquatic environment, not just the Santa Ana sucker, to enhance habitat value throughout the Basin and Reach 9. The plan must be adaptive so that adjustments to the plan can be made as needed. OCWD will provide $25,000 annually for the first five years and $10,000 annually for 45 years toward the implementation of the Santa Ana Sucker Management Plan The plan will require a periodic reporting to CDFG of the status and effectiveness of the plan with respect to Santa Ana sucker viability.	X	X	X	X	Less Than Significant
BI-22: Sensitive Species: Raising the conservation pool would directly affect the yellow warbler and yellow-breasted chat below the dam.	See the Dam Mitigation Measures for BI-1(above).			X	X	Less Than Significant

TABLE 3-3 - PRADO BASIN WATER SUPPLY FEASIBILITY STUDY EIR – SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	ALTERNATIVES				LEVEL OF SIGNIFICANCE AFTER MITIGATION
		2	3	4	5	
BI-23: Sensitive Species: Raising the conservation pool would directly affect San Diego black-tailed jackrabbit below the dam.	None required for any alternative.			X	X	Less Than Significant
BI-24: Sensitive Species. Raising the conservation pool would directly affect pond turtles below the dam.	See the Dam Mitigation Measures for BI-1(above).			X	X	Less Than Significant
BI-25: Sensitive Species: Raising the conservation pool would directly affect arroyo chub below the dam.	None required for any alternative.	X	X	X	X	Less Than Significant
BI-26: Fully-Protected Species: Raising the conservation pool would directly affect white-tailed kite below the dam.	None required for any alternative			X	X	Less Than Significant
BI -27: Wildlife Movement: Raising the conservation pool could destroy habitat necessary for shelter and foraging below the dam.	See the Dam Mitigation Measures for BI-1(above)			X	X	Less Than Significant
BI-28: Non-Sensitive Native Vegetation. Raising the conservation pool would directly non-sensitive native vegetation below the dam.	None required for any alternative.			X	X	Less Than Significant
BI-29: Ruderal and Invasive Vegetation: Raising the conservation pool could affect ruderal and invasive vegetation below the dam.	See the Dam Mitigation Measures for BI-1(above).			X	X	Less Than Significant
BI-30: Non-Sensitive Species: Raising the conservation pool could affect non-sensitive wildlife below the dam.	See the Dam Mitigation Measures for BI-1(above).			X	X	Less Than Significant
CULTURAL RESOURCES						
CR-1: Raising the conservation pool could affect National Register eligible resources above the dam	Compliance with Section 106 of the National Historic Preservation Act (36 CFR 800) is required prior to implementation of Alternative 5. The four potentially National Register (NRHP) eligible historic sites will require a test excavation to determine their significance. The Corps will conduct test pits as required if Alternative 5 is pursued. If any of these excavations are determined to be NRHP eligible, the Corps will consult with the SHPO and the Advisory Council on Historic Preservation to determine the appropriate course of action to comply with 36 CFR 800.11.				X	Less Than Significant
CR-2: Raising the conservation pool could affect National Register eligible resources downstream of Prado Dam.	Compliance with Section 106 of NHPA (36 CFR 800) shall be required prior to implementation of project alternatives. Test excavations shall be required at National Register eligible sites to determine significance. Final mitigation measures shall then be developed in consultation with the SHPO and the Advisory Council on Historic Preservation	X	X	X	X	Less Than Significant

TABLE 3-3 - PRADO BASIN WATER SUPPLY FEASIBILITY STUDY EIR – SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	ALTERNATIVES				LEVEL OF SIGNIFICANCE AFTER MITIGATION
		2	3	4	5	
CR-3. Raising the conservation pool could affect unknown cultural resources	All Alternatives: In the event that previously unknown resources are uncovered during implementation of water conservation, the Corps will be required to comply with 36 CFR 800.11, *Properties Discovered During Implementation of an Undertaking*. This might occur if previously undisturbed landforms are eroded away to reveal buried cultural resources. In such an event, the Corps will consult with the SHPO and the Advisory Council on Historic Preservation to determine the appropriate course of action to comply with 36 CFR 800.11.	X	X	X	X	Less Than Significant
GEOLOGY AND SOILS						
GE-1 Increased water impoundment volumes that would occur during the flood season could result in increased under-seepage through the Prado Dam foundation.	None required for any alternative.	X	X	X	X	Less Than Significant
GE-2: Sediment deposition within Prado Reservoir would increase by 41 to 96 acre-feet per year compared to existing conditions.	None required for any alternative.	X	X	X	X	Less Than Significant
HAZARDS AND HAZARDOUS WASTE/MATERIALS						
HA-1:	None required for any alternative.	X	X	X	X	Less Than Significant
HYDROLOGY AND WATER QUALITY						
HY-1: Hydrology: Deposition of sediment and debris within Prado Reservoir would increase, reducing water storage capacity at Prado Dam.	None required for any alternative.	X	X	X	X	Less Than Significant
HY-2: Hydrology: Less sediment would be transported and deposited downstream of Prado Dam.	*None required for any alternative.*	X	X	X	X	*Beneficial*
HY-3: Hydrology Annual groundwater recharge yield at downstream spreading facilities would increase	None required for any alternative	X	X	X	X	Beneficial
HY-4: Hydrology: Sediment erosion would increase at the River View Golf Course downstream from Prado Reservoir.	All Alternatives: When maximum discharge rates are realized under the proposed water conservation operations, sediment material at the downstream River View Golf Course shall be replaced by the Corps as needed to maintain flood protection values of the channel. In addition, the Corps shall repair erosion damage at the Golf Course to the extent that such reconstruction requirements are specified in lease agreements.	X	X	X	X	Less Than Significant

TABLE 3-3 - PRADO BASIN WATER SUPPLY FEASIBILITY STUDY EIR – SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	ALTERNATIVES				LEVEL OF SIGNIFICANCE AFTER MITIGATION
		2	3	4	5	
HY-5: Water Quality: The quality of water released from Prado Dam to downstream spreading grounds would be higher than under existing operations.	None required for any alternative	X	X	X	X	Beneficial
HY-6: Water Quality: The increase in water impoundment would dilute pollutants associated with water that enters Prado Reservoir, thereby improving surface water quality in Prado Basin.	None required for any alternative.	X	X	X	X	Beneficial
LANDUSE AND PLANNING						
LA-1: Raising the conservation pool could impair existing and/or planned land uses. (Potential impacts to recreational and agricultural land uses are described in corresponding sections of this table.)	None required for any alternative.	X	X	X	X	Less Than Significant
MINERAL RESOURCES						
MI-1: Raising the conservation pool could interfere with oil extraction activities within the Prado Basin.	None required for any alternative.	X	X	X	X	Less Than Significant
NOISE						
NO-1: Raising the conservation pool would increase noise emissions from periodic maintenance activities below the dam	None required for any alternative.	X	X	X	X	Less Than Significant
PUBLIC SERVICES/UTILITIES/EMERGENCY SERVICES						
PU-1: Project implementation would increase the need for public services or utilities.	None required for any alternative.	X	X	X	X	Less Than Significant
PU-2: Project implementation would create the need for new public facilities and/or require the relocation of major existing facilities.	None required for any alternative	X	X	X	X	Less Than Significant
RECREATION						
RE-1: Raising the conservation pool would affect the availability of existing recreational and other uses due to inundation above the dam.	None required for any alternative.	X	X	X	X	Less Than Significant
RE-2: Raising the conservation pool would contribute to the physical degradation of existing recreational and other uses due to inundation above the dam.	All Alternatives: The Corps shall restore inundated areas above Prado Dam to pre-inundation conditions to the extent that such reconstruction requirements are specified in lease agreements Maintenance shall be limited to clean up efforts only and not the re-building of structures, as all recreational facilities within the Prado Basin are required to be floodable.	X	X	X	X	Less Than Significant

TABLE 3-3 - PRADO BASIN WATER SUPPLY FEASIBILITY STUDY EIR – SUMMARY OF IMPACTS AND MITIGATION MEASURES

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	ALTERNATIVES				LEVEL OF SIGNIFICANCE AFTER MITIGATION
		2	3	4	5	
RE-3 Raising the conservation pool would affect the availability of existing recreational and other uses due to inundation below the dam.	None required for any alternative.	X	X	X	X	Less Than Significant
RE-4: Raising the conservation pool would contribute to the physical degradation of existing recreational and other uses due to inundation below the dam	All Alternatives The Corps shall restore inundated areas below Prado Dam to pre-inundation conditions to the extent that such reconstruction requirements are specified in lease agreements Maintenance shall be limited to clean up efforts only and not the re-building of structures, as all recreational facilities within the Prado Basin are required to be floodable.		X	X	X	Less Than Significant
RE-5: Raising the conservation pool would affect the availability of future recreational and other uses due to inundation within the Prado Basin.	None required for any alternative.	X	X	X	X	Less Than Significant
RE-6: Raising the conservation pool would contribute to physical degradation of future recreational and other uses due to inundation within the Prado Basin.	None required for any alternative. All future recreational uses within Prado Basin will be planned and constructed according to Corps regulations for uses within flood control basins. No recreational facilities will be constructed at the lower elevations below 566 feet unless they are compatible with inundation.	X	X	X	X	Less Than Significant
TRAFFIC AND TRANSPORTATION						
TR-1: Raising the conservation pool could inundate roadways and impair vehicular traffic.	All Alternatives: Only unimproved dirt maintenance roads (for official use only) within the wetlands would be inundated and the existing and future circulation network for the surrounding area would be unaffected.	X	X	X	X	Less Than Significant
PUBLIC HEALTH AND SAFETY (NEPA ONLY)						
PU-1: Raising the conservation pool would increase the number of breeding mosquitoes.	All Alternatives: The Corps shall notify the Northwest Mosquito Abatement District, West Valley Vector Control District, and Orange County Vector Control District of the increased wetted area resulting from the conservation pool. In coordination with these districts, the Corps will contribute funds as necessary annually to ensure that mosquito nuisances to the public resulting from the increased wetted area are minimized.	X	X	X	X	Less Than Significant

4 GROWTH-INDUCING IMPACTS

The CEQA Guidelines (Section 15126.2(d)) require that an EIR evaluate the growth-inducing potential of a proposed action. Growth inducing potential is defined by the CEQA Guidelines as:

> *...the ways in which a proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this definition are public works projects, which would remove obstacles to population growth.... It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.*

A project can have direct and/or indirect growth inducement potential. Direct growth would result if a project involved construction of new housing. A project can have an indirect growth inducement effect if it would establish substantial, new, or permanent employment opportunities and indirectly stimulate the need for additional housing and services. Similarly, a project would have an indirect growth inducement effect if it would remove an obstacle to additional growth and development, such as providing urban services to unserved or underserved areas.

This section discusses the growth inducement potential of raising the conservation pool behind Prado Dam to 498 feet above mean sea level (msl) during flood season as proposed in the NED Alternative (Alternative 2). The NED Alternative is the preferred project alternative. Raising the conservation pool would make more water available for recharging the Orange County Groundwater Basin downstream of Prado Dam. In this respect, implementation of the NED Alternative would increase water storage in the Orange County groundwater basin, which would be used to meet existing and future water demand in Orange County.

This section reviews the population growth projections for Orange County and describes the existing and projected water demand and water supply conditions. It provides a description of OCWD's role in managing the Orange County Groundwater Basin and in protecting the local water supply and discusses the growth inducement potential of the proposed project.

4.1 POPULATION GROWTH

Since the 1950s, Orange County has experienced rapid change from a rural, agricultural area to a densely populated region of over three million people. The northern portion of Orange County was extensively developed in the 1970s and 1980s and continues to increase in population density. Since 1990 Orange County's population has increased by an average 1.7 percent annually, compared with a 1.46 percent increase in Southern California as a whole.[2] As shown in Table 4-1, the Southern California Association of Governments (SCAG)

[2] SCAG, RTP PEIR, February 1, 2001.

projects that Orange County's population will increase to 3.49 million by the year 2025, just over 12 percent. SCAG estimates that most of the projected growth in Southern California will result from local birth rates rather than immigration, which accounted for most of the growth in the 20th Century.[3]

SCAG growth estimates are used as a basis for regional planning efforts such as future transportation infrastructure needs. OCWD obtained population projections within its service area using data compiled by the Center for Demographic Research (CDR) at the California State University in Fullerton. The CDR maintains population records and conducts estimates of future population within Orange County based on locally planned land uses, historic birth rates, and immigration trends.

TABLE 4-1 - POPULATION PROJECTIONS (MILLIONS OF PEOPLE)

Area	2005	2010	2025
Orange County [a]	3.10	3.29	3.49
OCWD Service Area [b]	2.27	2.33	2.55

Sources:

(a) SCAG Growth Forecasting, City Projections http://www.scag.ca.gov/forecast/downloads/2004gf.xls

(b) Center for Demographic Research, MWDOC.

4.2 WATER DEMAND AND SUPPLY

Neither the Corps nor OCWD supply water directly to customers for use. OCWD is empowered to maintain and protect the groundwater basin under northern and central Orange County to maximize its beneficial uses by others. Water demand in Orange County is met by local water suppliers including MWDOC, and the cities of Anaheim, Fullerton, and Santa Ana, each of which are member agencies of the Metropolitan Water District of Southern California (Metropolitan). Groundwater is produced from the Orange County Groundwater Basin by water retailers, which include cities, water districts, and a private water company. The water retailers deliver groundwater to their customers, such as residents and businesses.

Water supplies that are available in Orange County include groundwater, imported water provided by Metropolitan, and local supplies available from the Santiago Creek Watershed and water recycling. Metropolitan imports water to Southern California via the California Aqueduct and the Colorado River Aqueduct, supplying approximately one-half of Orange County's water demand on a county-wide basis. Within the District's boundary, approximately one-third of the water supply is provided by Metropolitan. The remaining two-thirds of the water supply in the District's boundary is provided primarily by groundwater produced from the Orange County Groundwater Basin. The primary source of

3 *Ibid.*

recharge water for the Orange County Groundwater Basin is the Santa Ana River.

Metropolitan has conducted extensive evaluations of their available water supplies. Table 4-2 summarizes Metropolitan's single dry-year supply portfolio through 2020, identifying existing supplies and the supplies under development both for additional import as well as locally within Metropolitan's service area. By the year 2020 Metropolitan projects that water demands within its service area will increase almost 15 percent. As shown in Table 4-2, Metropolitan has developed a multiple supply portfolio to meet demand within its service area.

TABLE 4-2 - METROPOLITAN'S SINGLE DRY-YEAR SUPPLY CAPABILITY AND DRY-YEAR LOCAL SUPPLIES (AFY)

	2010	***2020***	***2030***
Current Supplies			
Colorado River	722,000	699,000	699,000
California Aqueduct	777,000	777,000	777,000
In-Basin Storage	1,149,000	1,113,000	1,017,000
Supplies under development			
Colorado River	95,000	400,000	400,000
California Aqueduct	330,000	350,000	350,000
In-Basin Storage	78,000	103,000	103,000
Transfers to Other Agencies	0	(35,000)	(35,000)
Metropolitan Supply Capability (with Colorado River Aqueduct at 1.25 million afy)	3,151,000	3,309,000	3,203,000
Firm Demands on Metropolitan	***2,348,000***	***2,275,000***	***2,511,000***
Potential Reserve & Replenishment Supplies	***803,000***	***1,034,000***	***692,000***

Source: Metropolitan, Regional Urban Water Management Plan, November 2005.

Future Supply Options

The water wholesale and retail agencies within the OCWD service area will continue to use a combination of local groundwater and imported surface water to meet their water supply needs as they do now. In addition, several supply options are also being evaluated to improve supply reliability and increase overall supply for the future. These supply options include:

- Imported surface water from Metropolitan
- Increased local recycled water
- Local surface water

- Water transfers – imported surface water from entities other than Metropolitan
- Desalination

Table 4-2, above, reviews the supplies Metropolitan has under development to meet the future needs of its members including those in Orange County. Local agencies also continue to pursue water recycling projects and there are currently three desalination projects under investigation in Orange County. In addition, MWDOC and some of its member agencies are exploring long-term relationships with water suppliers in Northern California to arrange for possible water transfers. MWDOC indicates that while imported supplies will continue to be an important part of the supply mix for the County and within the OCWD service area, it and its member agencies are working to improve water reliability by developing new local supplies and thereby reduce the dependence on imported supply overtime.

Demand

The Orange County General Plan states that municipal and industrial (M&I) water uses comprise about 90 percent of the total demand. Of this M&I use, approximately 65 percent is for residential uses.[4] Table 4-3 compares per capita M&I usage and rainfall in Orange County from 1990 to 2004. As shown in Table 4-3, M&I water usage has varied from 190 to 230 gallons per capita per day (gpcd). M&I water demand fluctuates year-to-year depending on rainfall, with higher usage rates generally occurring in dry years and lower usage rates in wet years. Implementation of water use efficiency measures is credited with reducing per capita use from an average of 230 gallons per day to its current average of 207 gallons per day.

TABLE 4-3 - ORANGE COUNTY HISTORIC PER CAPITA M&I WATER USAGE AND RAINFALL

***Year* (June to June)**	***Per capita (MI)* (gpcd)[ac]**	***Rainfall* (inches)[b]**
1990	230	8.7
1991	210	11.3
1992	190	15.6
1993	198	24.1
1994	197	12.1
1995	196	24.8
1996	207	11.3
1997	214	13.5
1998	192	30.6
1999	201	7.6
2000	210	8.1

4 Orange County Advance Planning Program, Resources Element, RES-2-65.

Year (June to June)	Per capita (MI) (gpcd)[ac]	Rainfall (inches)[b]
2001	202	14.9
2002	206	3.8
2003	196	14.6
2004	203	8.4

Source: MWDOC 2000 RUWMP Update, 2005 UWMP

a. gpcd = gallons per capita per day

b. Rainfall at Santa Ana Civic Center gage (OC#21)

Between 1970 and 2004, water demand grew 1.5 percent per year. MWDOC's assessment of projected demand in Orange County indicates that water demand will increase at an average rate of approximately 1.5 percent from 2005 to 2010, less than 1 percent from 2010 to 2020, and less than 0.5 percent per year from 2020 to 2030. MWDOC also projects that long-term conservation measures are expected to maintain the M&I per capita use at approximately 210 gallons per capita per day.

In 2004, total demand in Orange County was 683,000 AFY (MWDOC, 2005 Urban Water Management Plan). As shown in Table 4-4, imported water purchased from Metropolitan by Orange County member agencies provided about half of that water last year. Within OCWD's service area, total 2004 demand was approximately 500,000 afy, with groundwater production providing about 318,000 afy or approximately 64 percent of this total demand.

TABLE 4-4 - TOTAL WATER PURCHASED FROM METROPOLITAN BY ORANGE COUNTY MEMBER AGENCIES IN 2004

Agency	2004 (afy)
Anaheim	26,357
Fullerton	17,272
Santa Ana	20,459
MWDOC	297,944
Total	***362,032***

Source: Metropolitan, Regional Urban Water Management Plan, November 2005.

Pursuant to the Urban Water Management Act, major water suppliers are required to prepare urban water management plans explaining water supply and demand projections within their respective districts for normal and dry-year periods. These plans are updated every five years. MWDOC's Urban Water Management Plan (UWMP) includes water demand and supply information for each major supplier in OCWD's boundary. OCWD is not required to prepare an urban water management plan since it is not a water supplier.

MWDOC prepared a draft UWMP in October 2005, which updated information contained in its 2000 UWMP. Following public review, MWDOC approved its UWMP on December 21, 2005.

Metropolitan prepared a draft 2005 Regional UWMP that presents its water demand projections for each county within its service area and evaluates water supplies and factors that affect their reliability. Following public review, the Regional UWMP was approved by Metropolitan in November 2005.

MWDOC's 2005 UWMP was developed with water supply information that included available supplies from the groundwater basin, imported water, and other local supplies. The 2005 UWMP was prepared based on completion of OCWD's existing capital improvement projects, including GWR System Phase 1, but no additional capital improvement projects beyond those already approved were considered. The proposed project to increase the amount of water stored at Prado Dam was not included in MWDOC's 2005 UWMP. Based on MWDOC's analysis, information provided in Metropolitan's RUMWP, and evaluations conducted jointly with the water retailers and other agencies, MWDOC's UWMP concluded sufficient supplies are available to meet water demands in MWDOC's service area through 2030 (MWDOC, 2005) without regard to the proposed project to increase the amount of water stored at Prado Dam.

4.3 GROWTH INDUCEMENT POTENTIAL

The proposed project would not have a direct growth-inducing effect. The project does not involve construction of new housing and would not substantially expand or establish new employment opportunities that, in turn, would generate housing development. Nor would the project provide water supply infrastructure to a previously undeveloped or underserved region.

The increased conservation pool would increase OCWD's ability to recharge water into the Orange County groundwater basin. This would assist OCWD with exercising its powers to protect and manage the groundwater basin and to increase and maximize the basin's sustainable yield. This would also help local water agencies reduce their reliance on imported water supply to meet existing and future water demand.

Neither the Corps nor OCWD have authority or responsibility for providing water service directly to customers. OCWD does not make decisions about when and where to extend water service for existing or new development. The cities and water agencies within the District are responsible for assessing the water supply needs of their customers, for extending and maintaining infrastructure to deliver that water and for securing adequate supplies through a combination of pumping local groundwater and purchasing imported surface water supplies.

The proposed project to increase the amount of water stored at Prado Dam would play an important role in managing the area's groundwater supply for use by an expanding population. However, as described above, water suppliers in Orange County have other existing and future sources of water supply to help meet increasing needs.

While MWDOC and other local agencies are interested in maximizing the use of local water sources, primarily the groundwater basin, other sources of supply are available or could be pursued to meet future increases in water demands. These other sources include increased import of water from Metropolitan, increased local water recycling, water transfers for import from others outside the region, and desalination.

OCWD's proposed project would not cause or induce growth within the area since it is reasonably foreseeable that the major water suppliers within OCWD's service area (MWDOC, and the cities of Anaheim, Fullerton, and Santa Ana) and/or the local communities and water agencies within the MWDOC service area would pursue other water supply options to meet the needs of planned growth in the absence of OCWD's proposed project.

A review of several of the existing General Plans for cities in the OCWD boundary indicates that these communities have determined that water supply is not a significant constraint to its planned growth. These General Plans acknowledge that growth would stress the existing water supply infrastructure requiring infrastructure expansion and increased water imports, but that imported water would likely be available to meet projected demands. This conclusion is supported by Metropolitan's Regional UWMP and MWDOC's UWMP.

5 CUMULATIVE IMPACTS

CEQA requires that an EIR assess the cumulative impacts of a project with respect to past, present, and probable future projects within the region (CEQA

Guidelines, Section 15130). Cumulative impacts are defined as "two or more individual effects that, when considered together, are considerable or which compound or increase other environmental impacts. The cumulative impact from several projects result from the incremental impacts of the proposed project when added to other closely related, and reasonably foreseeable, future projects" (CEQA Guidelines, Section 15255).

There are two generally accepted methods for discussing significant cumulative impacts in an EIR:

> "(A) a list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency, or (B) a summary of projections contained in an adopted general plan or related planning document..." (CEQA Guidelines, Section 15130(b)(1)).

This cumulative analysis uses a list-based approach to evaluate impacts that could result when the effects of the proposed project are considered in combination with the effects of other past, present and reasonably foreseeable projects.

5.1 PROJECTS CONSIDERED IN THE CUMULATIVE EFFECTS ANALYSIS

This section describes the existing conditions within Prado Basin that are the result of past activities in this area as well as the reasonably foreseeable future projects within Prado Basin. Theses past, present and potential future activities are then considered in the assessment of cumulative effects for the proposed project.

5.1.1 PAST ACTIVITIES LEADING TO EXISTING CONDITIONS WITHIN PRADO BASIN

Prado Dam was built in 1941 for flood control purposes. Prado Basin encompasses approximately 11,400 acres to an elevation of 566 feet asl. The present biological condition of the basin was created by the construction of Prado Dam. Presently, the riparian woodlands in the basin comprise the largest single stand of this type of riparian habitat in Southern California.

Today Prado Basin includes unincorporated areas of Riverside and San Bernardino Counties and a portion of the City of Corona. Most of the Prado Basin inundation zone is owned by three entities: OCWD, OCFCD, and USACE. There are numerous small private parcels along the upper edge of the basin between the old inundation elevation of 556 feet and the new inundation line at 566 feet that the OCFCD is working to acquire in fee or through easement. Land use within the basin below the 505-foot elevation includes flood control, wetland and riparian habitat, open space and recreation. The USACE leases parcels of land for recreational activities, including parks, golf courses, trails, and hunting clubs within the basin. Other land uses within the basin at higher elevations include structural improvements such as the City of Corona Municipal Airport and the California Institution for Women (State Prison). Table 5-1 lists land uses within Prado Basin.

OCWD operates and maintains the Prado River Road Wetlands, which cover approximately 465 acres within Prado Basin. These constructed wetlands reduce nitrogen levels in SAR water. Approximately 50 percent of the SAR flow is diverted through these wetlands and then back to the SAR channel within the Prado Basin upstream of Prado Dam.

OCWD manages several hundred acres of riparian habitat on both OCWD and Corps – owned land that provides nesting habitat for the least Bell's vireo and southwestern willow flycatcher. In addition, OCWD has partnered with SAWPA to remove the invasive species *Arundo donax* within the basin. These activities have significantly enhanced habitat values within the basin.

TABLE 5-1 - LAND USE LEASES WITHIN PRADO BASIN

LAND USE / FACILITY BY ELEVATION LOCATION	ELEVATION RANGE (FEET NGVD)
Invert of Outlet Works	**460**
Raahauge's Hunting Club	485 – 525
Raahauge's Club House	611
Splatter S Duck Club (Riverside County Flyway Foundation)	485 – 520
Splatter S Club House (Riverside County Flyway Foundation)	520
Top of Debris Pool	**490**
Richardson's Dog Training (Formerly Prado Recreation, Inc.)	490 – 504
Richardson's Dog Training Kennel/Trailer	554
Oil Wells (Formerly by Prado Petroleum Company)	492 – 508
Top of Buffer Pool (Flood Season)	**494**
Prado Olympic Shooting Park	510 – 520
El Prado Golf Course	510 – 567
El Prado Golf Course Club House	554
City of Corona Municipal Airport	514 – 534
Prado Tira Shooting Range Recreation Area	516 – 518
Prado Regional Park (San Bernardino County)	520 – 560
Prado Regional Park Camping Area	550 – 552
Oranco Bowman Archery Range Recreation Area	520 – 560
Prado Basin Park - Developed Area (Riverside County)	525 – 573
Prado Basin Park Interpretation Center	573
Butterfield Stage Trail Park (City of Corona)	527 – 550
Bandini Adobe	534
Kobe Power Fluid Station	536
Chino Basin Water District Waste Water Treatment Plant #2	537 – 546
City of Corona Waste Water Percolation Ponds Perimeter Levee	540
Spillway Crest	**543.0**
12 Unauthorized Dwellings	550 – 554
City of Corona Waste Water Treatment Plant Road Entrance	556
Oil Treating Facilities	560
California Institution for Women (State Prison)	560 – 572
Yorba Slaughter Adobe	560
Prado Equestrian Center	560
2 Dwellings within the Corona National Tract	561 – 566
Top of Dam	**566.0**

NOTES:
1. Source: USACE, Los Angeles District, Prado Dam Facility Elevation Table, http://www.spl.usace.army.mil/resreg/htdocs/prdoface.html

5.1.2 PROPOSED PROJECTS WITHIN PRADO BASIN

USACE is currently preparing a Master Plan for future use of Corps property within the Prado Basin. The Master Plan will establish compatible uses within the basin, taking into account floodplain easement restrictions. No additional property, beyond that already leased, is being considered for development within the basin as part of this Master Plan. The Master Plan will provide a framework to approve land uses within the basin and to ensure consistency of leased areas with long-range planning goals.

Although no additional development is planned by the USACE within the Prado Basin, some flood control and water quality projects are currently underway or are planned for the area, as follows:

- Santa Ana River Flood Control Mainstem Project (SARP)
  - Raising of Prado Dam
  - Norco Bluffs Restabilization
- River Road Wetlands
- Chino Creek Wetlands
- Magnolia Channel

Santa Ana River Flood Control Mainstem Project

USACE currently is implementing Phase II of the SARP, which is designed to provide protection against a 190-year flood in the Santa Ana River watershed. The projects currently under construction within Prado Basin include raising the physical height of Prado Dam to 594.4 feet above NGVD, stabilizing Norco Bluffs, and constructing new dikes and floodwalls in Prado Basin. These projects have been subject to previous environmental review pursuant to NEPA and CEQA and are currently under construction.[5]

River Road Wetlands

OCWD is planning to develop an additional 194 acres of treatment wetlands upstream of the River Road crossing.[6] This proposed project will further improve water quality in the river and improve the quality of the water recharged into the Orange County groundwater basin downstream of Prado Dam. In addition, this project will benefit the recovery of endangered species, such as the least Bell's vireo and the southwestern willow flycatcher, by restoring and enhancing wetland, riparian, and woodland habitats, and will contribute to water conservation through the removal of non-native *Arundo donax* from the project site.

Chino Creek Wetlands

OCWD and the Inland Empire Utilities Agency (IEUA) are jointly developing the Chino Creek Master Plan and Surface Wetlands Project.[7] The confluence of Chino Creek and the SAR is located in the Prado Basin. The Master Plan will identify projects to restore portions of the Chino Creek channel and its riparian zone. Re-establishing the creek's natural drainage would improve flood control and water quality in the basin by increasing the creek's natural buffering and

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[5] USACE. 2001. Prado Basin and Vicinity, Including Reach 9 and Stabilization of the Bluff Toe at Norco Bluffs, Supplemental Final EIS/EIR, November 2001.

[6] SAWPA, Santa Ana Integrated Watershed Plan (SAIWP), June 2005.

[7] Chino Creek Wetlands and Habitat Restoration Feasibility Study, Final Report, Prepared by CH2M HILL for OCWD, April 2005.

storage capacity. The Surface Wetlands Project would restore wetlands along Chino Creek that would treat and further improve water quality in the basin.

Magnolia Channel

IEUA is planning another restoration project in Prado Basin along Magnolia Channel.[8] This restoration project would re-establish a natural drainage corridor and create managed wetlands in order to reduce the impacts of a 25-year flood event. Approximately 1,500 linear feet of stream bank and 12 acres of native riparian habitat would be restored.

5.1.3 WATER CONSERVATION (STORAGE) PROJECTS

Water conservation, or storage, within the SAR watershed is generally conducted by the USACE, local water supply and conservation districts, and local water retailers. Large storage facilities within the watershed include Seven Oaks Dam and Big Bear Lake. Smaller detention basins are used throughout the watershed to detain storm flow for percolation into the groundwater. Below Prado Dam, OCWD detains water in the river bed and diverts water to off-river recharge basins for percolation into the groundwater basin. Above Prado Reservoir, several water districts including the Chino Basin Water Conservation District and the San Bernardino Valley Water Conservation District divert water to storage for beneficial use.

In addition, several water districts (Orange County Water District, San Bernardino Valley Municipal Water District, Western Municipal Water District, the Chino Basin Water Conservation District, the San Bernardino Valley Water Conservation District, and the City of Riverside) have applied to the SWRCB for rights to divert SAR water for beneficial use.[9] OCWD has also prepared a recirculated draft Program EIR for its application to appropriate Santa Ana River water.

5.2 DISCUSSION OF CUMULATIVE EFFECTS

As summarized in the Executive Summary, the proposed project could have environmental impacts requiring mitigation in the following areas: water resources, biological resources, land use and recreation, cultural resources, and public health and safety (mosquito habitat creation). Although OCWD will adopt and implement mitigation measures to address impacts in each of these areas and reduce them to less than significant, the following discussion evaluates how the project might have cumulative effects in these same impact areas in combination with other projects.

In other environmental areas discussed in the EIR, the project would have no impact or effects that are clearly less than significant and do not warrant mitigation. In these environmental areas, the project would not make a cumulatively considerable contribution to cumulative effects. Areas where the project would not contribute to potential cumulative effects include: air quality,

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[8] SAWPA, Santa Ana Integrated Watershed Plan (SAIWP), June 2005.

[9] OCWD, *Application to Appropriate Santa Ana River Water Recirculated Draft Program Environmental Impact Report*, March 2006

aesthetics, geology and soils, noise, public services and utilities, energy and mineral resources, and transportation and circulation.

5.2.1 WATER RESOURCES

Water Quality

As noted in the project impact analysis, the proposed project would enhance water quality of SAR water through the deposition of sediment behind Prado Dam. As a result, the project would not contribute to cumulative water quality degradation. The project would contribute to overall water quality improvements in combination with the treatment wetland projects in Prado Basin.

Storage Capacity

The project would contribute to the long-term cumulative accumulation of sediment and debris in Prado Basin and slightly reduce water storage capacity of the basin over the 50-year life of the project. This is not considered a significant reduction and the project would therefore not contribute to any significant cumulative effects on storage capacity at the reservoir.

River Hydrology

Implementation of water conservation projects on the SAR result in capture and impoundment of river water throughout the SAR watershed. The existing and proposed water diversion, storage and use projects throughout the watershed could slightly reduce river flows, particularly peak storm flows. Urban development within the watershed has increased storm flow volumes due to the increased runoff created by paved surfaces. Dry weather flows have also increased due to increased discharges from wastewater treatment plants. The reduction in peak flows caused by conservation projects throughout the watershed has not significantly reduced overall storm flow volumes in the last thirty years.[10] The increased water conservation storage provided by the proposed project would not significantly reduce peak storm flows in the river downstream of Prado Dam.[11] Furthermore, water stored behind Prado Dam would be released during low flow periods. Therefore, the proposed project would not contribute significantly to cumulative reductions in river flows caused by conservation projects.

5.2.2 BIOLOGICAL RESOURCES

Repeated prolonged inundation of habitat in the lower elevations of Prado Basin is expected to damage or reduce some riparian habitat used by sensitive species such as the least Bell's vireo and the southwestern willow flycatcher. This impact of the project is mitigated with designated acreages of compensation habitat and monitoring requirements. With implementation of mitigation, no significant impacts to the viability of these bird species would result. Therefore, the project

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[10] Santa Ana River Watermaster, *Thirty-Third Annual Report of the Santa Ana River Watermaster for Water Year October 1, 2002 – September 30, 2003*, 2004

[11] See Section 4.2 Water Resources

would not contribute to a cumulatively significant decline in habitat for sensitive species.

Furthermore, management of the Prado Basin for habitat value has resulted in significantly enhanced vireo and flycatcher populations in the region. The cumulative condition within Prado Basin includes a substantial portion of the available habitat for the two identified sensitive bird species (vireo and flycatcher) as a result of past and ongoing habitat enhancement activities.

5.2.3 LAND USE AND RECREATION

The proposed project is not expected to significantly impede the use of existing recreational opportunities in the project vicinity or include any recreational uses as part of the project. Table 6-3 lists the existing recreational facilities currently within Prado Basin. No additional recreational facilities are planned for the basin. Recreational tenants within the basin could change in the future, but the composition and number of recreational facilities would be similar to existing conditions. The flood control projects and water quality projects would not be affected by the increased inundation area and would not affect existing or planned land uses. Therefore, the proposed project would not contribute to a cumulative reduction in recreation land use within Prado Basin.

5.2.4 PUBLIC HEALTH AND SAFETY

The flood control improvements within the Prado Basin are designed to increase public safety from floods. Planned uses of Prado Basin are limited to the existing lease areas. Although the proposed project could increase the need for mosquito abatement activities, none of the planned projects would significantly add to a cumulative increase in mosquitoes. Therefore, the project would not contribute to any cumulative impact on public health and safety.

6 ALTERNATIVES ANALYSIS

The 2005 EIS/EIR evaluated five alternatives in detail. The five alternatives are:

<u>Alternative 1 - No Action Alternative</u>: The No Action Alternative involves no change to existing operations at Prado Dam. During the flood season (October 1 through the end of February), water would continue to be impounded up to an elevation of 494 feet above mean sea level (msl). During the non-flood season (March 1 through September 30), water would be impounded up to an elevation of 505 feet msl.

For Alternative 1, and for all other Alternatives, prior to a forecasted storm event, the conservation pool could be drawn down or evacuated to an elevation of 490 feet msl within 24 hours to accommodate incoming storm flow volume and maintain the Reservoir's primary function as a flood control facility.

<u>Alternative 2: Preferred Project Alternative:</u> During the flood season, a greater volume of water could be impounded behind the dam, up to elevation 498 feet msl. During the non-flood season, water would continue to be impounded up to elevation 505 feet msl, as with existing operations.

Alternative 3: During the flood season, a greater volume of water could be impounded behind the dam, up to elevation 500 feet msl. During the non-flood season, water would continue to be impounded up to elevation 505 feet msl, as with existing operations.

Alternative 4: During the flood season, a greater volume of water could be impounded behind the dam, up to elevation 505 feet msl. During the non-flood season, water would continue to be impounded up to elevation 505 feet msl, as with existing operations.

Alternative 5: During the flood season, a greater volume of water could be impounded behind the dam, up to elevation 508 feet msl. Similarly, during the non-flood season, a greater volume of water could be impounded behind the dam, up to elevation 508 feet msl as well.

The evaluation in the February 2005 EIS/EIR included the potential downstream inundation from evacuating water stored at Prado Dam under each alternative and the duration of inundation within Prado Reservoir. For each alternative, the impact categories such as water quality and biological resources were evaluated (see Section 4 of the February 2005 EIS/EIR).

No significant and unavoidable impacts would result from Alternative 2, the preferred project alternative. Mitigation measures have been identified that would reduce potentially significant impacts to less than significant levels for the proposed project. No significant and unavoidable impacts would result from Alternative 1 (No Action) or Alternatives 3, 4, or 5. Alternatives 2, 3, 4, and 5 each have beneficial impacts on water resources.

Alternative 2 is determined to be the environmentally superior alternative based on the following factors:

- The lack of significant unavoidable impacts from Alternatives 2, 3, 4, and 5; and,
- The smaller amount of water that would have to be evacuated from Prado Dam for Alternative 2 compared to Alternatives 3, 4, and 5 when it would be necessary to lower the pool elevation to 490 feet msl to accommodate incoming storm flow volume and maintain the Reservoir's primary function as a flood control facility; and,
- The beneficial impacts on water resources from Alternatives 2, 3, 4, and 5.
- The lack of beneficial impacts on water resources from Alternative 1.

7 LIST OF PREPARERS

The following OCWD staff contributed to the preparation of this additional information to the Prado Basin Water Conservation Feasibility Study Environmental Impact Report:

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In addition, please refer to Section 9 of the February 2005 EIS/EIR for a comprehensive list of preparers of that document.

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United States Army Corps of Engineers, 2005

Prado Basin Water Conservation Feasibility Study, Main Report with Environmental Impact Statement/Environmental Impact Report, Los Angeles District Corps of Engineers Planning Division, Plan Formulation Branch, February, 2005.

PRADO BASIN WATER CONSERVATION FEASIBILITY STUDY

FINAL ENVIRONMENTAL IMPACT REPORT
Response to Comments

State Clearinghouse Number 2004051004

August 2006

PREPARED BY:

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CHAPTER 1

1 INTRODUCTION

The Orange County Water District (OCWD) prepared a Recirculated Draft Environmental Impact Report (EIR) for the Prado Basin Water Conservation Feasibility Study. The document was completed and released for public review on May 25, 2006 pursuant to the California Environmental Quality Act (CEQA) requirements. The public review period officially closed on July 12, 2006. A total of seven comment letters were received on the Recirculated Draft EIR.

This Response to Comments document provides copies of comments received and responses to these comments. Chapter 2 provides copies of all the comment letters. Chapter 3 includes responses to each comment. Chapter 4 compiles changes made to the Recirculated Draft EIR in response to comments received. The comments are referenced numerically by letter and comment number; the comment letters are numbered sequentially. For example, the first comment in Letter 1 (Riverside County Flood Control and Water Conservation District) is 1-1. Table 1 lists the comment letters.

The Final EIR for the Prado Basin Water Conservation Feasibility Study is comprised of the Recirculated Draft EIR as amended by this document (as compiled in Chapter 4) and this Response to Comments document.

Table 1
List of Comments Received on Recirculated Draft EIR

ID No.	Date of Letter	Commentor	Commentor's Agency/Organization	Response Page No.
1	6/15/2006	Teresa Tung	Riverside County Flood Control and Water Conservation District	3
2	6/19/2006	Brian Wallace	Southern California Association of Governments	3
3	7/11/2006	Adam Keats	Center for Biological Diversity	3
4	7/12/2006	Peggy Temple	City of Corona	3
5	7/12/2006	Jane Farwell	State Water Resources Control Board, Division of Water Rights	8
6	7/14/2006	Frank Molina	County of San Bernardino Department of Public Works	19
7	7/14/2006	Scott Dawson	California Department of Fish and Game	19

CHAPTER 2

2 COMMENT LETTERS

CHAPTER 3

3 RESPONSE TO COMMENTS

Comment Letter 1
Riverside County Flood Control and Water Conservation District

Comment 1-1

This comment states that the Riverside County Flood Control and Water Conservation District has no comment at this time. No additional response is necessary.

Comment Letter 2
Southern California Association of Governments

Comment 2-1

This comment states that the Southern California Association of Governments has no comments at this time. No additional response is necessary.

Comment Letter 3
Center of Biological Diversity

Comment 3-1

This comment discusses the mitigation of impacts for habitat loss and requests clarification of the amount of land to be acquired. The amount of land to be acquired for mitigation in relation to impacts above Prado Dam is 6.9 acres. Mitigation Measure BI-1 listed in Table 3-3 has been changed accordingly, as reflected in the Mitigation Monitoring and Reporting Program (please see Chapter 5 of this Final Recirculated EIR).

Comment Letter 4
City of Corona

Comment 4-1

This comment states that the draft EIR does not adequately recognize the benefits to water quality and the general improvement to management of the watershed that would result from the project. The Recirculated Draft EIR includes a discussion of water quality benefits from the proposed project (see the February 2005 EIS/EIR, page 4-8). The comment states that increased water storage will create new wetlands that will improve water quality. It is uncertain whether new wetlands that would provide significant water quality improvement would be created by increased water storage because of the relatively short time that water would be stored and because in some dry years, little or no additional water will be stored.

The comment also states that data regarding water quality improvement must be shared by way of a monitoring and reporting program that would report the results of the water treatment to the Riverside County Flood Control District. Measurement of specific water quality benefits from the project would be challenging due to the mixture of water from various sources in the Prado Basin, such as inflows from the Santa Ana River, Chino Creek, Temescal Creek, and groundwater discharge. In addition to the mixing of multiple water sources, the Prado Basin's large size, limited access, and lack of controlled monitoring locations cause it to be extremely difficult to collect the type of data suggested in the comment letter. Measurement of specific water quality benefits from the project is not required and is not planned at this time.

The comment also states that the EIR should recognize the current Water Quality Standards as set forth in the Santa Ana River Basin Plan and its permitted dischargers. The Santa Ana River Basin Plan does not contain specific numeric water quality objectives for the Prado Flood Control Basin. The narrative objectives listed in the Basin Plan apply to the Prado Flood Control Basin and are incorporated herein by reference (California Regional Water Quality Control Board, Santa Ana Region, Water Quality Control Plan, Santa Ana River Basin, 1995, as amended). Discharges into the Santa Ana River, some of which flow into the Prado Basin, are assigned discharge limits that are consistent with the Basin Plan's water quality objectives for the Santa Ana River and other relevant requirements as determined by the Regional Board.

The comment also states that the EIR should acknowledge that the current standard is set for recreational purposes not water supply reservoir purposes. The Basin Plan does not have a beneficial use designation of the Prado Flood Control Basin for water supply reservoir purposes. The Basin Plan does have a beneficial use designation of 'Groundwater Recharge' for Reach 2 and Reach 3 of the Santa Ana River. Reach 2 extends from 17th Street in Santa Ana to Prado Dam. Reach 3 extends from Prado Dam to Mission Blvd in Riverside. Discharge permits for water that flows into Prado Basin are assigned water quality objectives to protect the 'Groundwater Recharge' beneficial use. It is also noted that the United States Army Corps of Engineers (USACE) has operated Prado Dam for water conservation purposes since its completion in 1941 (see attached letter from the Department of the Army, Los Angeles District Corps of Engineers to Mr. Don Richardson dated October 24, 2005).

The comment also states that the EIR should recognize that Prado Basin will not be permanently designated as a water supply source. Any future change in the designation of Prado Basin is highly speculative. The beneficial uses specified in the Basin Plan guide water quality objectives and standards specified for permitted discharges. Prado Dam has been used for water conservation purposes since its completion and water conserved at Prado Dam is released and recharged downstream into the Orange County Groundwater Basin. Moreover, the storage of water at Prado Dam for subsequent release and recharge downstream is an important component of meeting the water supply needs of Orange County. Utilization of the Santa Ana River in supplying water needs is embodied in the groundwater recharge (or 'GWR') beneficial use designation specified for the Santa Ana River above and below Prado Dam in the Regional Board's *Basin Plan.*

Comment 4-2

This comment states that sediment and debris accumulation would occur at an increased rate as a result of the project and that increased maintenance costs will be incurred by the City and its landowners. The Recirculated Draft EIR includes an evaluation of increased sediment and debris accumulation from the proposed project (see the February 2005 EIS/EIR, page 4-3 and following). For the preferred project alternative (alternative 2), the February 2005 EIS/EIR documents that approximately 3 acre-feet per year of additional sediment and debris would settle within the Prado Basin. Over the 50-year period evaluated in the February 2005 EIS/EIR, approximately 150 acre-feet of additional sediment and debris would settle within the Prado Basin. As discussed on page 4-4 of the February 2005 EIS/EIR, this amount of sedimentation represents an approximately 0.04 percent reduction in water storage capacity at Prado Dam (up to elevation 563 feet). At elevation 520 feet, the storage volume is 70,120 acre-feet and the 150 acre-feet of additional sedimentation represents a 0.2 percent reduction in storage capacity. . Assuming that 150 acre-feet of additional sedimentation occurs and that the topography is similar in the area of sedimentation and the area of increased inundation, at a storage volume of 70,120 acre-feet, the area of inundation is estimated to increase by eight acres from 3,782 acres to 3,790 acres. The decreased storage capacity from additional sediment accumulation is not considered to be significant and will not contribute to a significant increase in inundation. This is particularly the case since the eight acres of increased inundation would be distributed around the entire perimeter of the 3,782-acre storage area.

The comment also states "The Report does not make sufficiently clear how many days or to what level the increased inundation will cause these effects." The number of days of projected increased inundation is documented on page 2-8 and 2-9 of the February 2005 EIS/EIR. For average annual conditions, four additional days of inundation under present conditions and 13 additional days under future conditions are projected to occur at elevation 498 feet (page 2-9 of February 2005 EIS/EIR).

Comment 4-3

This comment states that increased inundation will force habitats and sensitive species to be relocated to higher elevations, leading to harm to the species. This potential impact is mitigated to a less than significant level by Mitigation Measure BI-1, which includes 6.9 acres of mitigation land (see attached figure A).

Comment 4-4

This comment states that the project could result in sensitive species and habitat being relocated closer to developed areas such that the use of those properties could be impeded. Least Bell's vireo and Southwestern willow flycatcher will not be forced to higher elevations in a manner that will negatively affect developed properties in the City of Corona or affect the City of Corona because:

- The increased water conservation will occur during the flood season when vireo and flycatcher are not present in the area, and
- The 6.9-acre mitigation area is located such that it will not cause impacts to developed properties in the City of Corona due to relocation of vireo or flycatcher. The mitigation area is sufficiently removed from the City of Corona that the City will not be impacted.

The comment also states that sites selected for sensitive species use should be fenced and permanently delineated to limit wildlife encroachment into adjoining developed areas. Fencing of the mitigation area is not warranted for wildlife management purposes or to reduce human disturbance. The mitigation area is in a remote area with minimal human intrusion.

The comment also states "Moreover, it is imperative that an agreement be reached whereby the City can maintain its properties, including the airport and flood control channels, without undue restriction by the FWS." OCWD has a long history of working cooperatively with the USFWS without "undue restriction." Any issues regarding the relationship between the City of Corona and the USFWS should be addressed to the USFWS directly by the City.

Comment 4-5

This comment states that the additional inundation will cause additional costs to be incurred by the City of Corona and that these costs are associated with threats to the structural integrity of the City's facilities, including the Corona Municipal Airport and other facilities, and loss of revenue from cancellations of recreational events. The Recirculated Draft EIR includes a discussion of the Corona Municipal Airport, which is located at an elevation range from approximately 513 feet to 528 feet (see the February 2005 EIS/EIR, page 3-49 and following). Other land use features, such as the Butterfield Stage Trail Park, are also discussed in the February 2005 EIS/EIR. An analysis of additional water storage upon existing land uses, including the Corona Municipal Airport, is included in the February 2005 EIS/EIR. The February 2005 EIS/EIR concludes that potential impacts related to inundation of existing land uses is less than significant (see pages 4-50 through 4-53). This is primarily due to the water conservation occurring at lower elevations, the relatively higher elevations of the existing land uses, and the opportunity for the Corps to empty the storage pool prior to forecasted precipitation events. The analysis supports the conclusion that the City will not incur any significant costs associated with the structural integrity of City facilities by reason of this project.

Comment 4-6

This comment states that the possible effects of a major storm are inadequately addressed in the Draft EIR. The comment states that the operation of the project would last much longer than the 50-year planning period used in the Draft EIR. This comment was previously submitted by the City of Corona on the draft EIS/EIR for the project published by the USACE in 2004. The comment is addressed in the USACE's response to comment section of the February 2005 EIS/EIR (Appendix H of the 2005 document). With respect to operations beyond the 50-year planning period, it is important to note that:

- As the operator of Prado Dam for flood control purposes, the USACE determined that the 50-year planning period is appropriate (see the USACE's response to the City of Corona letter dated October 1, 2004 in Appendix H of the February 2005 EIS/EIR).
- The effects of a major storm are related to flood control, not water conservation. The life of the project is based on the life of Prado Dam (see the USACE's response to the City of Corona letter dated October 1, 2004 in Appendix H of the February 2005 EIS/EIR). The USACE plans to pre-release water stored for conservation prior to precipitation events, which will prevent an increase in the inundation area.

Comment 4-7

This comment states that improper baselines were used in the Draft EIR. This comment was also submitted by the City of Corona on the draft EIS/EIR for the project published by the USACE in 2004. The comment is addressed in the USACE's response to comment section of the February 2005 EIS/EIR (Appendix H of the 2005 document).

This comment also states that the EIR indicates an increase in liquefaction level would occur. As described in the February 2005 EIS/EIR, liquefaction is not considered to be a significant issue due to the temporary holding of water at elevation 498 feet.

Comment 4-8

This comment requests confirmation that under Alternative #2 the water level could be lowered from 498 to 490 feet within 24 hours. This subject is discussed on page 2-10 of the February 2005 EIS/EIR, where the following statement occurs:

> "During the flood season, the USACE has safety regulations for releases from Prado Dam. These regulations require that release rates accommodate the evacuation of the reservoir down to the Debris Pool (elevation 490 feet) within a 24-hour period to ensure there is storage available for flood control. To drain the reservoir from elevation 498 ft to 490 ft, a maximum release rate of 5,000 cfs from the Phase II gates would be attained by incrementally increasing the release rate by 625 cfs every half-hour, in accordance with the USACE Water Control Manual."

Comment 4-9

This comment states that the mitigation measure for vector control is insufficient to explain how the risk is mitigated to a less than significant level. This comment was also submitted by the City of Corona on the draft EIS/EIR for the project published by the USACE in 2004. The comment is addressed in the USACE's response to comment section of the February 2005 EIS/EIR (Appendix H of the 2005 document). In summary, vector control is conducted by the Northwest Mosquito and Vector Control District (for Riverside County areas in Prado Basin) and the West Valley Mosquito and Vector Control District (for San Bernardino County areas in Prado Basin).

The USACE and OCWD pay these costs. OCWD has a long history of working with the two vector control districts in the Prado Basin area and the vector control districts directly bill OCWD for their costs associated with controlling vectors related to OCWD activities. OCWD also works directly with the Orange County Vector Control District in Orange County. Mitigation Measure PU-1 (as provided in the Mitigation Monitoring and Reporting Program contained in Chapter 5) will extend this cooperative interagency relationship to address vector issues that may arise from the current project:

> *"The Corps shall notify the Northwest Mosquito Abatement District, West Valley Vector Control District and Orange County Vector Control District of the increased wetted area resulting from the conservation pool. In coordination with these districts, the Corps will contribute funds as necessary annually to ensure that mosquito nuisances to the public resulting from the increased wetted area are minimized."*

Comment 4-10

This comment states that the Draft EIR does not address significant impacts to recreation that would be caused by the increased inundation. This comment was also submitted by the City of Corona on the draft EIS/EIR for the project published by the USACE in 2004. The comment is addressed in the USACE's response to comment section of the February 2005 EIS/EIR (Appendix H of the 2005 document). The preferred project alternative would store water up to elevation 498 feet. The preferred project alternative will not cause significant effects to recreational lands within the Prado Basin as discussed on pages 4-50 and 4-51 of the February 2005 EIS/EIR.

Comment Letter 5
State Water Resources Control Board

As a general response to the State Board's comments, OCWD would like to clarify the scope of this project and its relationship to related projects and the environmental documents for those projects. The project covered by this EIR is merely the increase in storage capacity of the Prado basin conservation pool by raising the elevation level of water behind the dam from 494 to 498 feet during the 'flood season' period from October through February. The use of the conservation pool during the non-flood season is not anticipated by this project.

This project does not include any other change in diversion or diversion facilities, however the increased storage capacity at Prado from October through February will have the consequence of enabling OCWD to increase its capacity to recharge the Orange County Groundwater Basin with existing facilities.

The increased storage at the Prado Dam conservation pool will be achieved by a modification of release rates from the dam by the USACE. Because the USACE has operational control over the dam, review of this project is required under the National Environmental Protection Act ("NEPA"), as well as under CEQA. The USACE completed an EIS/EIR for this project in February 2005, referenced here in as "February 2005 EIS/EIR". The February 2005 EIS/EIR evaluated the same project as the Recirculated Draft EIR dated May 2006. The Recirculated Draft EIR incorporates and augments the February 2005 EIS/EIR.

On July 19, 2006, OCWD certified its Final Program Environmental Impact Report for the Application to Appropriate Santa Ana River Water, State Clearinghouse Number 2002081024, to support its pending application to appropriate water from the SAR. The Program EIR evaluates the diversion of up to 505,000 acre-feet per year, and two near-term recharge projects at a project level. It evaluates several other long-term projects to increase its diversion capacity, at a program level, including the project encompassed by this EIR (i.e., raising the conservation pool at Prado).

Comment 5-1

This comment states that no clear description of the time frame and physical conditions that constitute baseline conditions is provided in the Recirculated draft EIR. The baseline conditions for this project were established as part of the February 2005 EIS/EIR which noted, in the introduction to Section 3:

> *"This section provides a discussion of the existing environmental setting...The information that was used for each of the environmental topical areas was primarily [drawn] from the following documents:*
>
> - *U.S. Army Corps of Engineers, 1998. Santa Ana River memorandum No. 1 Phase II GDM on the Santa Ana River Maintain including Santiago Creek: Main Report and Supplemental Environmental Impact Statement."*
> - *U.S. Army Corps of Engineers. October 1992. Review of Prado Dam Operation for Water Conservation, Final Environmental Impact Statement.*
> - *U.S. Army Corps of Engineers. Water Control Manual, Prado Dam and Reservoir, Santa Ana River, California, September 1994.*

As described in the biological opinion from the USFWS, data from the May 2001 draft Biological Assessment, site visits, and related information were also utilized. The baseline incorporates estimated urbanization in year 2002 and inflow from eight upstream reclamation plants.

The comment also states that the final EIR should include mitigation measures required for any potentially significant environmental impacts of implementing the improvements associated with the General Design Manual for the SAR Mainstem Project. The mitigation measures for the SAR Mainstem Project are included in the environmental documents prepared for that project and are not the responsibility of OCWD. Furthermore, the mitigation measures for the Prado Water Conservation Project and the SAR Mainstem project are independent of each other. However, OCWD has taken these measures into account in developing its baseline for this project. It is important to note that Alternative 2, the preferred project alternative being pursued by OCWD at this time, is not dependent on the completion of improvements to Prado Dam and the Santa Ana River (see page 2-5 of the February 2005 EIS/EIR). Under present and future conditions used in the baseline for the EIR, it is assumed that all of the improvements associated with the Phase II General Design Manual for the SAR Mainstem Project are implemented. These improvements are anticipated to be completed by 2008.

Comment 5-2

This comment discusses the objectives of the proposed project and requests more information on the objectives sought by the proposed project. The Recirculated Draft EIR provides the project description (see page 15 of the May 2006 report and page 2-1 and 2-2 of the February 2005 EIS/EIR). The proposed project would capture additional surplus water behind Prado Dam during the flood season from October through February. As a consequence of the project, the water temporarily stored at Prado Dam would be used to recharge the Orange County Groundwater Basin.

Comment 5-3

This comment requests additional information regarding the intended uses of the EIR. Section 2.7 of the February 2005 EIS/EIR describes the Intended Uses as follows:

"2.7 INTENDED USES OF THE EIS/EIR

2.7.1 LEAD AGENCIES

The USACE is the NEPA lead agency for this EIS, while the OCWD is the CEQA lead agency for the EIR. The USACE and OCWD are expected to use this EIS/EIR in the consideration of the following project approval:

- *Certification of a Final EIS/EIR – 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.*

2.7.2 COOPERATING AGENCIES

The Council on Environmental Quality Regulations for Implementing NEPA ... 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.*

The USFWS is the only federal agency that has been identified as a cooperating agency. A subsequent action may be required by USFWS. The following approval may be required for the proposed action:

- *USFWS – A formal consultation with the USFWS may be required if significant effects occur on endangered species (i.e.,least Bell's vireo, southwewstern willow flycatcher, bald eagle, peregrine falcon, arroyo southwestern toad). A formal consultation is a process between the USFWS and the federal agency that commences with the federal agency's written request for consultation under Section 7(a)(2) of the Endangered Species Act and concludes with the USFWS issuance of a biological opinion under Section 7(b)(3) of the Endangered Species Act.*

As included in Appendix F of the February 2005 EIS/EIR, the USFWS has issued an opinion letter that clarifies significant effects and mitigation requirements. No additional approvals beyond those cited above are anticipated in order to accomplish the actions evaluated in the current Recirculated Final EIR. However, comments received from the California Department of Fish and Game (see Comment Letter #7 herein), indicate that a Streambed Alteration Agreement may be required under certain circumstances. In consideration of DFG's comments, the following additional statement is hereby incorporated into the Recirculated EIR:

"The California Department of Fish and Game (DFG) is the only state agency that has been identified as a potential responsible or trustee agency. A subsequent action may be required by DFG. The following approval may be required for the proposed action:

- *DFG – OCWD would be required to obtain a Lake and Streambed Alteration Agreement from DFG if project activities would divert, obstruct or change the natural flow or the bed, channel, or bank (which includes associated riparian resources) of a river, stream or lake, or use material from a streambed prior to the applicant's commencement of the activity."*

OCWD does not anticipate that project implementation will involve activities subject to a Streambed Alteration Agreement, but OCWD will notify DFG in advance in the event it is determined that such activities are required.

The comment also states that the draft EIR does not list the other CEQA documents for the overall project described under water right Application 31174. OCWD recognizes the necessity to obtain a water right to use the additional water that will be made available as the result of the increased capacity of the Prado conservation pool. However, the additional water that will be available as the result of such increase is anticipated by the Final Program Environmental Impact Report for the Orange County Water District Application to Appropriate Santa Ana River Water, State Clearinghouse Number 2002081024, which was certified by the Orange County Water District on July 19, 2006. This Program EIR evaluates OCWD's anticipated diversions of up to 505,000 acre-feet per year of water from the SAR, and evaluates the conservation pool project at a program level. The Draft Program EIR for the Application to Appropriate Santa Ana River Water was referenced on page 56 of the May 2006 report.

Alternative 2 of the Recirculated Draft EIR for the Prado Basin Water Conservation Feasibility Study is a scaled-down version of the near-term project described as 'Prado Dam (Conservation Elevation 508)' in the District's Application to Appropriate SAR Water and the EIR for the Application to Appropriate Santa Ana River water. The Recirculated Draft EIR contains a range of alternatives as required by CEQA. Each alternative is evaluated thoroughly in the EIR. Cost/benefit considerations resulted in the selection of Alternative 2 as the preferred project alternative and the recommended action is implementation of Alternative 2.

The comment also requests information regarding the quantity of water analyzed under the current CEQA document and its relationship to the quantity of water that OCWD has requested to appropriate under its Application No. 31174. For Alternative 2, the preferred project alternative, the flood-season water conservation elevation would be raised from 494 to 498 feet. This 4-foot increase in storage would allow up to 5,205 acre-feet additional storage at Prado Dam under current conditions and 4,025 acre-feet additional storage under future conditions (in 2052), as described on page 2-8 of the February 2005 EIS/EIR. The actual amount of storage will depend upon hydrologic conditions and operational conditions. In dry years, little to no additional storage may be achieved. In wet years, additional storage may be achieved and released five times or more. This anticipated increase in diversion capacity is included within the 505,000 acre-feet requested by OCWD's Application No.31174.

Comment 5-4

This comment discusses the meaning of 'project' with respect to CEQA, refers to portions of the CEQA guidelines, and requests information regarding the relationship of the project in relation to other CEQA documents. Because this project involves the operation of Prado Dam, a federal facility, the environmental documentation to comply with NEPA for this project is the February 2005 EIS/EIR. The project in the Prado Basin Water Conservation Feasibility Study is an element of the larger project evaluated in the Final Program Environmental Impact Report for the Orange County Water District Application to Appropriate Santa Ana River Water, State Clearinghouse Number 2002081024. Potential cumulative impacts of the project in the Prado Basin Water Conservation Feasibility Study were evaluated in the Final Program Environmental Impact Report for the Orange County Water District Application to Appropriate Santa Ana River Water, State Clearinghouse Number 2002081024. Diversions from the Santa Ana River, up to a total of 505,000 acre-feet per year, and two near-term recharge projects were also evaluated at a project level in the Final Program Environmental Impact Report for the Orange County Water District Application to Appropriate Santa Ana River Water. Other long-term projects were evaluated at a program level, including the project covered by the Prado Basin Water Conservation Feasibility Study EIR. As discussed above, because of the joint action with the USACE for this project, OCWD has evaluated this project in a separate project-level EIR.

Comment 5-5

This comment raises questions about the information in OCWD's Water Right Application No. 31174. The current condition for water conservation at Prado Dam during the flood season is 494 feet (see page 2-5 of the February 2005 EIS/EIR). This allows for up to 8,435 acre-feet of storage under current conditions. Due to sedimentation in the reservoir unrelated to the project, the future storage at 494 feet elevation would be 2,700 acre-feet (in 2052). The flood season is from October 1 through the end of February. The maximum increase in the amount of water that could be stored at one time if the elevation of the conservation pool is raised to the proposed 498 feet elevation is 5,205 acre-feet under current conditions and 4,025 acre-feet under future conditions (in 2052). This anticipated increase in diversion capacity is included within the 505,000 acre-feet requested by OCWD's Application No.31174. Although the Application anticipated the possibility of raising the conservation pool to elevations higher than the proposed 498 feet, as discussed above, these options are not presently being pursued by OCWD. They are evaluated as project alternatives as required under CEQA.

Comment 5-6

The comment also states that the Recirculated Draft EIR contains incorrect statements regarding existing water rights. The statement cited in the comment pertains to the February 2005 EIS/EIR prepared by USACE. Moreover, OCWD has judicially recognized water rights pursuant to the stipulated judgment resolving the case of *Orange County Water District v. City of Chino, et al.*, Orange County Superior Court No. 117628 (the "1969 Judgment"). Nevertheless, OCWD agreed many years ago to seek an appropriative water right from the State Water Resources Control Board, submitted Application No. 31174 in 1992, and is working with the State Water Resources Control Board to complete the process to perfect its rights to 505,000 acre-feet per year. OCWD recognizes that its anticipated appropriative water rights are distinct from the USACE's rights to store water at Prado Dam.

USACE's flood control authority at Prado Dam is authorized by the Flood Control Act of June 22, 1936, Public Law 74-738, as amended, and by HR 101-96, June 20, 1989. Additionally, section 301(b) of the Water Supply Act of 1958 (as amended) (43 USC 390b) provides authority for the USACE to include municipal and industrial water storage in reservoir projects such as Prado Dam.

Storage at Prado Dam is created by the USACE modifying the degree to which the outlet gates are open following precipitation events, and thereby temporarily modifying the rate at which water flows through the dam but not changing the total amount of water that flows through the dam (except for minor losses to evaporation).

Comment 5-7

This comment requests a description of the operation of Prado Dam as it relates to OCWD's water rights application and related information. The operation of Prado Dam is discussed in detail in the February 2005 EIS/EIR, which was prepared by the operator of Prado Dam, the USACE. The current operational control manual is described, along with the modifications to the control manual associated with the proposed increase in elevation of the conservation pool to 498 feet during flood season (for example, see pages 2-2 through 2-10 of the February 2005 EIS/EIR). The USACE's authority to operate Prado Dam is contained in the Flood Control Act of June 22, 1936.

OCWD submitted Application No. 31174 in 1992 to address the State Water Control Board's issue with respect to water rights on the Santa Ana River and is working with the State Water Resources Control Board to complete the process. OCWD will not undertake management or otherwise control operations at Prado Dam; such activities remain the responsibility of USACE. Any necessary modifications to operations manual for Prado will likewise be the responsibility of USACE.

Comment 5-8

The comment by the State Water Resources Control Board is noted.

Comment 5-9

This comment states there is a discrepancy between text in the February 2005 EIS/EIR and the May 2006 document. There is not a discrepancy between the two documents. The text quoted in comment letter 5 from page S-3 is not from the February 2005 EIS/EIR but from the Syllabus of the Feasibility Study. The confusion reflected in the comment is understandable, as the format of the February 2005 EIS/EIR was itself confusing (the Feasibility Study was bound in hard copy in front of the February 2005 EIS/EIR; the Feasibility Study and EIS/EIR are both dated February 2005). The mitigation measure for impact HY-4 is listed on page 9 of Table ES-1, and incorporated into the Mitigation Monitoring and Reporting Program provided in Chapter 5 of this Final EIR. Maintenance of the SAR channel is the responsibility of the County of Orange. OCWD is developing an agreement with the County of Orange whereby costs incurred by the County of Orange related to water conservation at Prado Dam are reimbursed by OCWD. The mitigation measure for impact HY-4 has been modified accordingly.

Comment 5-10

This comment states that impacts associated with increased sediment and pesticides in the SAR from erosion should be discussed. Sediment issues are discussed in the February 2005 EIS/EIR (see for example, page 4-4 and 4-5). With respect to pesticides, the available evidence indicates that increased, adverse concentrations of pesticides will not occur in the SAR due to erosion. OCWD maintains an ongoing water quality monitoring program for the SAR.

OCWD also conducted an extensive study of the SAR's water quality from 1996 to 2004. This study, which was reviewed by an independent panel appointed by the National Water Research Institute (NWRI), is called the Santa Ana River Water Quality and Health Study. NWRI's review of the Santa Ana River Water Quality and Health Study found that recharge of the Orange County Groundwater Basin with Santa Ana River water is protective of public health. NWRI's report published in 2004, "Report of the Scientific Advisory Panel, Orange County Water District's Santa Ana River Water Quality and Health Study" is incorporated by reference herein. As part of the Santa Ana River Water Quality and Health Study, OCWD and the United States Geological Survey conducted extensive monitoring of pesticides in the river. There were occasional detections of pesticides, but the detections were below the applicable regulatory levels. The Prado Dam release rates for Alternative 2 do not exceed historic release rates, and no significant impacts associated with erosion are anticipated.

The comment also requests identification of other permits required to repair eroded channels. Eroded channel repair, if needed, will be conducted by the USACE or by the County of Orange. The County of Orange has an existing permit under which repairs can be made.

Comment 5-11

This comment states that the EIR should identify any groundwater contaminant plumes in the vicinity of the project and address whether increased recharge will exacerbate any such plumes. There are no known contaminant plumes where the additional storage will occur. Upgradient of the area where temporary storage will occur, there are subsurface contaminant plumes in the Chino Groundwater Basin. These plumes are not anticipated to be affected by the additional surface water storage at Prado Dam due to the distance between the storage area and the subsurface plumes and the minimal amount of infiltration of stored water into the Chino Groundwater Basin.

The water temporarily stored at Prado Dam under the proposed project can be recharged at the District's existing facilities downstream of Prado Dam. The proposed project can be fully implemented without any new diversion structures or new recharge facilities. Studies indicate that recharge at the District's existing facilities does not exacerbate any existing groundwater contaminant plumes (for example, see NWRI's 2004 report "Report of the Scientific Advisory Panel, Orange County Water District's Santa Ana River Water Quality and Health Study"). New recharge facilities are not anticipated for this project, but if constructed, potential effects from the new recharge facilities related to exacerbating groundwater contaminant plumes would be appropriately evaluated in environmental documents for those new recharge facilities.

OCWD recently completed an evaluation of the potential environmental effects associated with a new recharge facility called the La Jolla Recharge Basin. The EIR for the La Jolla Recharge Basin was certified by OCWD in May 2006 ("La Jolla EIR"). The La Jolla EIR determined that there were no significant impacts to existing groundwater plumes in relation to construction and operation of the new recharge basin. Additionally, OCWD is actively involved in cleaning up groundwater contamination caused by others, and adopted a Mitigated Negative Declaration in November 2005 for the North Basin Groundwater Protection Project, which will cleanup volatile organic compound contamination in the shallow aquifer in portions of the cities of Anaheim and Fullerton.

There is no evidence that the proposed project to increase the water conservation elevation from 494 feet to 498 feet in the period from October through February would move or exacerbate existing groundwater plumes.

Comment 5-12

This comment raises issues relating to OCWD's Application to Appropriate SAR water, and states that the EIR should include a discussion of the project's impacts on the beneficial uses of Reaches 1 and 2 of the SAR. This issue was evaluated fully in the Final Program Environmental Impact Report for the Orange County Water District Application to Appropriate Santa Ana River Water, State Clearinghouse Number 2002081024. With respect to diversions of water from the SAR for groundwater recharge, it was determined that impacts on hydrology were not significant and there were no impacts in the other environmental impact categories. With respect to short-term elevated release rates from Prado Dam that may be associated with the proposed project, the February 2005 EIS/EIR determined that there were no significant impacts after mitigation (see pages 4-4 through 4-10, and related section of that report).

The comment also requests that the Final EIR include any mitigation measures necessary to protect the beneficial uses of the SAR below Prado Dam. The Mitigation Measures for impacts BI-21 and HY-4, which relate to protecting the beneficial uses of the SAR below Prado Dam, are included in the May 2006 Recirculated Draft EIR for the Prado Basin Water Conservation Feasibility Study and provided in the Mitigation Monitoring and Reporting Program contained in Chapter 5 of this Final EIR.

Comment 5-13

This comment states that the information that provides the basis for the biological impacts analysis in the Recirculated Draft EIR is incomplete. The information used in the Recirculated Draft EIR is adequate and provides a sound basis for the environmental evaluations. It is important to note that the U. S. Fish and Wildlife Service prepared a Fish and Wildlife Coordination Act Report for the project, and that the USACE also prepared a Biological Assessment for the project. These reports are included in Appendix C and Appendix D respectively of the February 2005 EIS/EIR. The U. S. Fish and Wildlife Service also prepared a biological opinion for the project (see Appendix F of the February 2005 EIS/EIR) based on information provided in the Biological Assessment for the Prado Dam Water Conservation and Supply Study, site visits, and other information. The biological opinion and related information in the February 2005 EIS/EIR demonstrate the sound basis for the biological resources evaluation. As noted on page 3-5 of the February 2005 EIS/EIR, "Surveys for endangered bird species in the Reservoir area are conducted annually for the U.S. Fish and Wildlife Service (hereafter FWS) (see Pike at el. 1998) and were not duplicated in this study." These annual studies, which are conducted through the watershed program implemented by the Santa Ana Watershed Association, confirm that there are no significant changes from the previous studies.

The comment requests that protocols of the USFWS, CDFG, and the CA Native Plant Society be utilized. The surveys conducted for the project are functionally equivalent to the protocols of the USFWS, CDFG, and CA Native Plant Society.

Comment 5-14

This comment states that the Recirculated Draft EIR fails to explain how possible significant environmental effects were determined to not be significant. The comment refers to information in the reports regarding the western spadefoot toad. As mentioned on page 4-23 of the February 2005 EIS/EIR, the western spadefoot toad has been identified as potentially occurring in the Prado Basin; however, it has not been recorded and may not be present. In Table 3-3 of the May 2006 Recirculated Draft EIR, it is stated that raising the conservation pool could directly affect the western spadefoot toad. This impact is found to be less than significant because this species has not been recorded in the Prado Basin. Monitoring conducted by the Santa Ana Watershed Association since the earlier studies used in the February 2005 EIS/EIR has verified that these data remain valid.

Comment 5-15

This comment requests clarification of Table 3-3 and discusses environmental impact BI-10. The Thresholds of Significance for biological resources are listed on page 4-12 and 4-13 of the February 2005 EIS/EIR. Seven different criteria are listed in the Thresholds of Significance. When the impact does not exceed the Thresholds of Significance, the impact is determined to be less than significant. The comment discusses pond turtles and that no mitigation measures are included for pond turtles. Table 3-3 (page 40) in the May 2006 Recirculated Draft EIR lists impact BI-10, which states "Sensitive Species: Raising the conservation pool could directly affect pond turtles above the dam." The 'X' marks in Table 3-3 indicate that pond turtles could be affected by alternatives 2, 3, 4, and 5; however, as described in the February 2005 EIS/EIR, increased inundation may interfere slightly with the reproductive success of this species (assuming it breeds in the Prado Basin), but this would not be considered a significant adverse impact. Monitoring conducted since the earlier studies used in the February 2005 EIS/EIR has verified that these data remain valid.

Comment 5-16

This comment regards the bioavailability of lead shot previously used in the proposed mitigation area and requests evidence regarding the lead shot being buried under sediment at the Pheasant Club area. The area identified for mitigation is shown on the attached Figure A, and is located at an elevation higher than the water conservation elevation. Therefore, the mitigation area will not be located within the conservation pool elevation. Mitigation Measures for impacts BI-1 and BI-17 have been updated accordingly and reference the location for the mitigation area shown on Figure A.

Comment 5-17

This comment states that text on page 57 of the Recirculated Draft EIR is misleading with respect to the discussion of diversions. The text on page 57 does not imply that there are no diversions from the river. The intent of the text is to discuss that there could be reductions in the amount of SAR storm flow that reaches the ocean but that there would be no cumulatively significant effects from the reduced flow. To clarify the meaning, the last sentence in Section 5.2.1 (on page 57) of the May 2006 Recirculated Draft EIR is amended to read:

> *Therefore, the proposed project could reduce the amount of future storm flow that would otherwise reach the ocean but would not contribute significantly to cumulative impacts.*

This issue in also evaluated in the Final Program Environmental Impact Report for the Orange County Water District Application to Appropriate Santa Ana River Water, State Clearinghouse Number 2002081024.

Comment 5-18

This comment states that providing a reliable water supply is growth inducing "because it removes the obstacle to growth." Pages 46 through 52 of the May 2006 Recirculated Draft EIR discusses the growth inducing impacts and the relation of water supply to growth inducement. As discussed in this section, the project will not have a direct growth inducing impact. Two important reasons to reiterate are that (1) Urban Water Management Plans prepared and approved in 2005 by agencies within OCWD's boundaries conclude that there are sufficient water supplies for planned growth in Orange County without regard to the proposed project, and (2) a review of several General Plans for cities in Orange County indicates that these communities have determined that water supply is not a significant constraint to planned growth.

The comment also states that the final EIR should analyze direct and indirect growth inducing impacts of having a more reliable water supply. Such an analysis is not required because there are no direct growth inducing impacts from the project.

Comment 5-19

This comment states that OCWD must consider the cumulative impacts of the entire project applied for under Application 31174 for a CEQA analysis sufficient for the State Water Board to determine the impacts of granting water right Application No. 31174. This comment does not apply to the proposed project; however, it was addressed in Section 7.2 of the Final Program Environmental Impact Report for the Orange County Water District Application to Appropriate Santa Ana River Water, State Clearinghouse Number 2002081024.

The comment also states that the final EIR should address the cumulative impacts from the USACE raising Prado Dam and projects applied for under Application No. 31174. The cumulative impacts analysis for the projects applied for in Application No. 31174 is included in the Final Program Environmental Impact Report for the Orange County Water District Application to Appropriate Santa Ana River Water, State Clearinghouse Number 2002081024. Other relevant non-OCWD projects in the watershed were included in this cumulative impacts analysis.

Comment 5-20

This comment regards reports that are referenced in the February 2005 EIS/EIR. These reports, the 'Economics Report' and the 'Hydrology and Hydraulic Report' (Santa Ana River Drainage Area Water Conservation Feasibility Study, Prado Dam Water Conservation, Hydrology Appendix Final, prepared by USACE, July 2004; and Prado Dam Water Conservation Study Hydraulics Appendix for AFB Documentation, prepared by USACE, August 1999) are referenced in the February 2005 EIS/EIR. These reports are on file with OCWD and available from OCWD upon request and are herein incorporated by reference.

Comment Letter 6
County of San Bernardino Department of Public Works

Comment 6-1

This comment states that the San Bernardino County Department of Public Works has no comments. No additional response is necessary.

Comment Letter 7
California Department of Fish and Game

Comment 7-1

This comment requests information regarding the relationship of the project to the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP), the designation of the project area as Public/Quasi-Public Lands, and coordination with the Western Riverside County Regional Conservation Authority.

Prado Basin is currently managed for natural resources including endangered species. Federal and OCWD lands were set aside to be jointly managed to benefit wildlife in 1995 when water conservation was permitted to an elevation of 505 feet in the non-flood season (spring and summer). The designation of the Prado Basin as a core area by the MSHCP is noted and is yet additional recognition of our widely heralded habitat and wildlife management success.

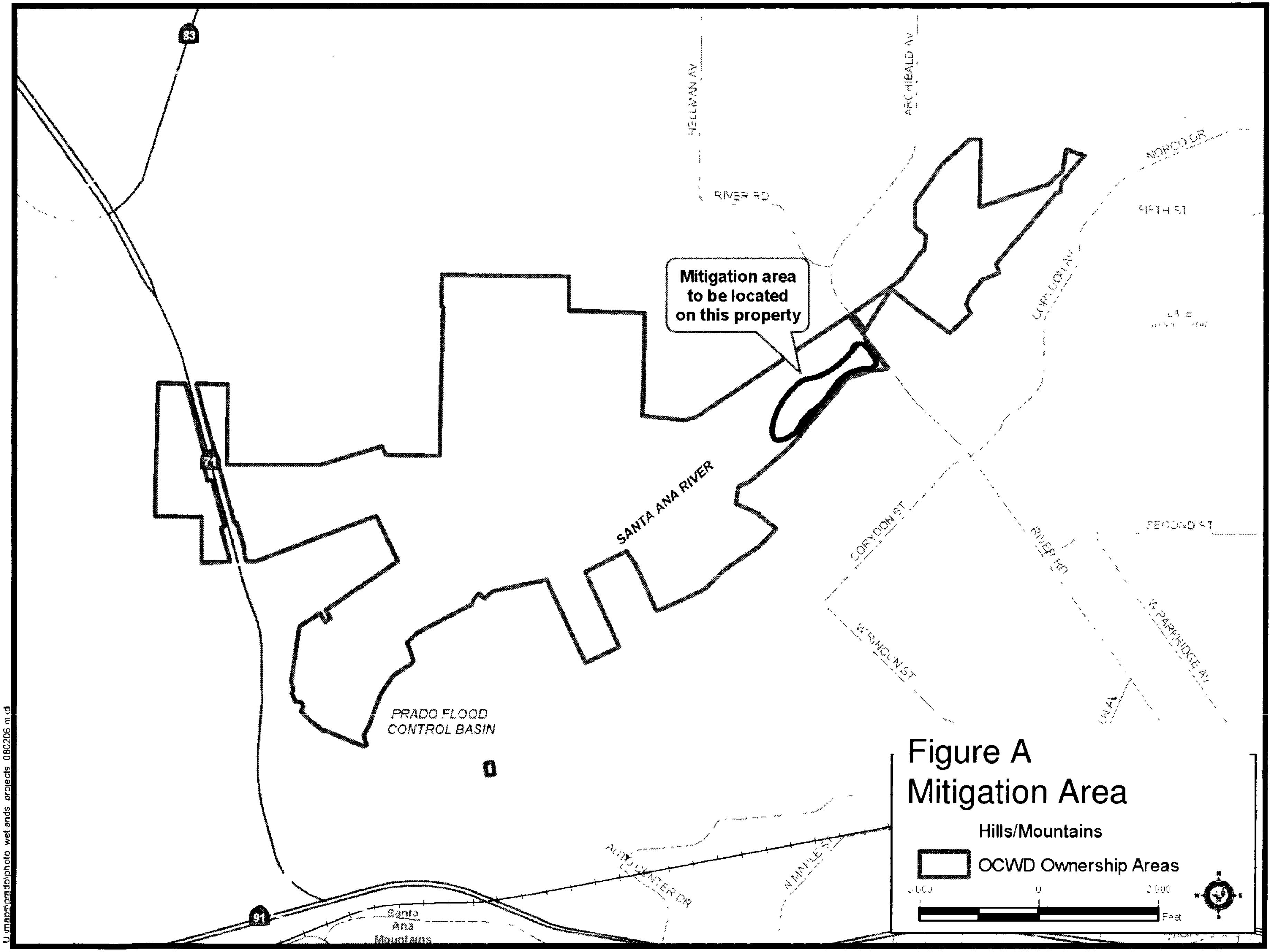
OCWD is a partner in the Santa Ana Watershed Association (SAWA) and MSHCP activities. Several of the MSHCP biologists are funded through SAWA and participate in wildlife survey and management efforts in the Prado Basin.

Comment 7-2

This comment states that the project may result in “take” of species listed as endangered under the California Endangered Species Act. The proposed water conservation to 498 feet would occur during the winter when the three endangered bird species are not present, so no “take” authorization would be requested. Habitat that could be affected is being mitigated through the Federal permit.

Comment 7-3

This comment states the conditions regarding issuance of a Streambed Alteration Agreement. OCWD does not anticipate that a Streambed Alteration Agreement will be required for the project because of the project’s lack of impact on a streambed. However, OCWD will notify the Department of Fish and Game if it appears that any of the listed activities may occur (also, please see our response to SWRCB comment 5-3.



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CHAPTER 4

4 SUMMARY OF MODIFICATIONS TO THE RECIRCULATED DRAFT EIR

The following modifications are incorporated into the Final EIR. Added language is shown as underlined text. Omitted language is shown as strike-out text.

Modification 1

The mitigation measure for impact BI-1 has been modified as follows:

> All Alternatives: To mitigate impacts to biological resources above the dam, the local sponsor shall acquire the following amounts of land for restoration to willow woodland and riparian habitat: Alt. 2: ~~6.2~~ 2.8 ha (~~5.2~~ 6.9 ac); Alt. 3 - 8.1 ha (20.1ac); Alt. 4: 38.5 ha (95.1 ac); Alt 5: 124.8 ha (308.1 ac). The land shall be obtained from a 45.4-ha (112-ac) parcel within Prado Basin that is available for restoration. If the total amount of land to be acquired exceeds 45.4 ha (112 ac), then the local sponsor also will provide compensation to the Trust Fund at a rate of $50,000 per acre for the loss of the remaining acreage. All Alternatives: To mitigate impacts to biological resources above the dam, the local sponsor will provide compensation to the Trust Fund for maintenance of the above-mentioned habitat acquired for restoration. The total compensation will be $25,000 per acre.

Modification 2

The last sentence in Section 5.2.1 of the May 2006 Recirculated Draft EIR (on page 57) is modified as follows:

> Therefore, the proposed project could reduce the amount of future storm flow that would otherwise reach the ocean but would not contribute significantly to cumulative impacts ~~reductions in river flows caused by conservation projects~~.

Modification 3

The mitigation measure for impact BI-1 is modified as follows:

> All Alternatives: To mitigate impacts to biological resources **above the dam**, the local sponsor shall acquire the following amounts of land for restoration to willow woodland and riparian habitat: Alt. 2: 6.2 ha (5.2 ac); Alt. 3 - 8.1 ha (20.1ac); Alt. 4: 38.5 ha (95.1 ac); Alt 5: 124.8 ha (308.1 ac). The land shall be obtained from ~~a 45.4-ha (112-ac)~~ a parcel within Prado Basin that is available for restoration as shown on Figure A. If the total amount of land to be acquired exceeds 45.4 ha (112 ac), then the local sponsor also will provide compensation to the Trust Fund at a rate of $50,000 per acre for the loss of the remaining acreage. All Alternatives: To mitigate impacts to biological resources **above the dam**, the local sponsor will provide compensation to the Trust Fund for maintenance of the

above-mentioned habitat acquired for restoration. The total compensation will be $25,000 per acre.

Modification 4

The mitigation measure for impact BI-17 is modified as follows:

All Alternatives: To mitigate impacts to biological resources **below the dam**, the local sponsor shall acquire the following amounts of land for restoration to willow woodland and riparian habitat: Alt. 2: 8.9 ha (22 ac); Alt. 3 - 10.6 ha (26.3 ac); Alt. 4: 17.0 ha (41.8 ac); Alt 5: 24.0 ha (59.2 ac). The land shall be obtained from a ~~45.4 ha (112 ac)~~ parcel within Prado Basin that is available for restoration as shown on Figure A.. If the total amount of land to be acquired exceeds 45.4 ha (112 ac), then the local sponsor also will provide compensation to the Trust Fund at a rate of $50,000 per acre for the loss of the remaining acreage. All Alternatives: To mitigate impacts to biological resources **below the dam**, the local sponsor will provide compensation to the Trust Fund for maintenance of the above-mentioned habitat acquired for restoration. The total compensation will be $25,000 per acre.

Modification 5

The mitigation measure for impact HY-4 is modified as follows:

All Alternatives: When maximum discharge rates are realized under the proposed water conservation operations, sediment material at the downstream River View Golf Course shall be replaced by the ~~Corps~~ County of Orange as needed to maintain flood protection values of the channel. In addition, the ~~Corps~~ County of Orange shall repair erosion damage at the Golf Course to the extent that such reconstruction requirements are specified in lease agreements.

CHAPTER 5

5 MITIGATION MONITORING AND REPORTING PROGRAM

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OCWD PRADO BASIN WATER CONSERVATION PROJECT MITIGATION MONITORING AND REPORTING PROGRAM

Orange County Water District Prado Basin Water Conservation Project Mitigation Monitoring and Reporting Program

Introduction

This Mitigation Monitoring and Reporting Program (MMRP) report includes mitigation measures identified in the Final Environmental Impact Report (FEIR) that are required to address impacts associated with the Prado Basin Water Conservation project. The impacts associated with this project and required mitigation measures are summarized in this program; the full text of the impact analysis and mitigation measures is presented in the OCWD Prado Basin Water Conservation Feasibility Study EIR.

As described in the Recirculated Draft EIR, the U.S. Army Corp of Engineers (USACE) and Orange County Water District (OCWD) published the Prado Basin Water Conservation Feasibility Study – Main Report with EIS/EIR in February 2005 pursuant to the National Environmental Protection Act (NEPA) and the California Environmental Quality Act (CEQA). USACE is the NEPA lead agency and OCWD is the CEQA lead agency for this project. The Recirculated Draft EIR consists of the February 2005 EIS/EIR in its entirety as well as the additional information necessary for OCWD to comply with CEQA environmental review requirements.

The proposed project would capture additional surplus water behind Prado Dam during winter months, thus raising the elevation of the conservation pool. The project would modify the USACE's operational control manual for Prado Dam, but would require no additional construction. The EIR analyzed the impacts for 5 alternatives including the no action alternative and 4 alternative flood season conservation pool elevations (498 feet above mean sea level [msl], 500 feet msl, 505 feet msl and 508 feet msl). Alternative 2 (with a flood season conservation pool elevation of 498 feet msl) is the preferred project alternative and Alternative 2 is also identified as the Environmentally Superior Alternative.

The MMRP is organized in a table format keyed to each impact and adopted mitigation measure. Each mitigation measure is set out in full, followed by a tabular summary of monitoring requirements. Monitoring requirements include implementation procedure, monitoring and reporting requirements, monitoring responsibility, and monitoring schedule. Implementation procedure is a checklist of actions required to successfully effectuate the mitigation measure. Monitoring and reporting action is a checklist of actions to successfully complete each implementation procedure. Monitoring responsibility names the responsible party for each implementation procedure and the associated monitoring and reporting action. Finally, the monitoring schedule outlines the phase of the project (e.g., project design, construction, operation, etc.) when each implementation procedure and associated monitoring and reporting action must occur.

Monitoring and Reporting Responsibilities

BIOLOGICAL RESOURCES ABOVE THE DAM

Impacts Above the Dam:

BI-1 Critical Habitat: Raising the conservation pool would increase the number of days critical habitat for least Bell's vireo and southwestern willow flycatcher would be inundated above the dam.
BI-2 Sensitive Habitat: Raising the conservation pool would affect willow woodland and mixed eucalyptus/willow woodland above the dam.
BI-4 Sensitive Habitat: Raising the conservation pool would affect freshwater marsh vegetation above the dam.
BI-5 Sensitive Species: Raising the conservation pool could directly affect southwestern willow flycatcher above the dam.
BI-8 Sensitive Species: Raising the conservation pool could directly affect yellow warbler and yellow-breasted chat above the dam.

Mitigation Measure for Impacts BI-1, BI-2, BI-4, BI-5 and BI-8:

Mitigation Measure M-BI-1a (Alternative 2): All Alternatives: To mitigate impacts to biological resources **above the dam**, the local sponsor shall acquire the following amounts of land for restoration to willow woodland and riparian habitat: Alt. 2: 2.8 ha (6.9 ac); Alt. 3 - 8.1 ha (20.1ac); Alt. 4: 38.5 ha (95.1 ac); Alt 5: 124.8 ha (308.1 ac). The land shall be obtained from a parcel within Prado Basin that is available for restoration. If the total amount of land to be acquired exceeds 45.4 ha (112 ac), then the local sponsor also will provide compensation to the Trust Fund at a rate of $50,000 per acre for the loss of the remaining acreage.

Mitigation Measures M-BI-1b (All Alternatives): To mitigate impacts to biological resources **above the dam**, the local sponsor will provide compensation to the Trust Fund for maintenance of the above-mentioned habitat acquired for restoration. Total compensation will be $25,000 per acre.

IMPLEMENTATION PROCEDURE	MONITORING AND REPORTING ACTION	MONITORING RESPONSIBILITY	MONITORING SCHEDULE
1. OCWD shall acquire the land from a parcel within Prado Basin (see attached Exhibit A) that is available for restoration.	1. OCWD shall maintain records of the acquisition in the OCWD project file (available for public inspection), with a copy to CDFG and the Corps.	1. OCWD	1. Parcel to be acquired prior to construction
2. To ensure long-term maintenance of the mitigation/restoration site, OCWD shall provide compensation to the Trust Fund in the amount of $25,000 per acre ($172,500).	2. Provide compensation to the Trust Fund in the amount specified, and maintain records of the compensation payment in the OCWD project file (available for public inspection), with a copy to CDFG and the Corps.	2. OCWD	2. Trust Fund to be compensated upon acquisition of the mitigation/ restoration site.

BIOLOGICAL RESOURCES BELOW THE DAM

Impacts Below the Dam:

BI-17 Nesting Habitat: Raising the conservation pool would increase the number of days nesting habitat for least Bell's vireo and southwestern willow flycatcher would be inundated.
BI-18 Sensitive Habitat: Raising the conservation pool would affect willow woodland and mixed eucalyptus/willow woodland.
BI-19 Sensitive Habitat: Raising the conservation pool would affect riparian scrub.
BI-22 Sensitive Species: Raising the conservation pool would directly affect the yellow warbler and yellow-breasted chat.
BI-24 Sensitive Species: Raising the conservation pool would directly affect the pond turtles.
BI-27 Wildlife Movement: Raising the conservation pool could destroy habitat necessary for shelter and foraging.
BI-29 Ruderal and Invasive Vegetation: Raising the conservation pool could affect ruderal and invasive vegetation.
BI-30 Non-Sensitive Species: Raising the conservation pool could affect non-sensitive wildlife.

Mitigation Measures:

Mitigation Measure M-BI-17a: All Alternatives: To mitigate impacts to biological resources **below the dam**, the local sponsor shall acquire the following amounts of land for restoration to willow woodland and riparian habitat: Alt. 2: 8.9 ha (22 ac); Alt. 3 - 10.6 ha (26.3 ac); Alt. 4: 17.0 ha (41.8 ac); Alt 5: 24.0 ha (59.2 ac). The land shall be obtained from a parcel within Prado Basin that is available for restoration. If the total amount of land to be acquired exceeds 45.4 ha (112 ac), then the local sponsor also will provide compensation to the Trust Fund at a rate of $50,000 per acre for the loss of the remaining acreage.

Mitigation Measure M-BI-17b: All Alternatives: To mitigate impacts to biological resources **below the dam**, the local sponsor will provide compensation to the Trust Fund for maintenance of the above-mentioned habitat acquired for restoration. The total compensation will be $25,000 per acre.

IMPLEMENTATION PROCEDURE	MONITORING AND REPORTING ACTION	MONITORING RESPONSIBILITY	MONITORING SCHEDULE
1. OCWD shall acquire the land from a parcel within Prado Basin (see attached Exhibit A) that is available for restoration.	1. OCWD shall maintain records of the acquisition in the OCWD project file (available for public inspection), with a copy to CDFG and the Corps.	1. OCWD	1. Parcel to be acquired prior to construction
2. To ensure long-term maintenance of the mitigation/restoration site, OCWD shall provide compensation to the Trust Fund in the amount of $25,000 per acre ($172,500).	2. Provide compensation to the Trust Fund in the amount specified, and maintain records of the compensation payment in the OCWD project file (available for public inspection), with a copy to CDFG and the Corps.	2. OCWD	2. Trust Fund to be compensated upon acquisition of the mitigation/ restoration site.

Impact Below the Dam:

BI-21 Sensitive Species: Raising the conservation pool would directly affect Santa Ana Suckers below the Dam.

Mitigation Measures:

Mitigation Measure M-BI-21: To mitigate impacts to biological resources to the Santa Ana Sucker, the local sponsor will prepare a Santa Ana Sucker Management Plan. This plan will be completed prior to the first winter of project implementation. The focus of the plan will be to manage the aquatic environment, not just the Santa Ana Sucker, to enhance habitat value throughout the Basin and Reach 9. The plan must be adaptive so that adjustments to the plan can be made as needed. OCWD will provide$25,000 annually for the first five years and $10,000 annually for 45 years toward the implementation of the Santa Ana Sucker Management Plan. The plan will require a periodic reporting to CDFG of the status and effectiveness of the plan with respect to Santa Ana sucker viability.

IMPLEMENTATION PROCEDURE	MONITORING AND REPORTING ACTION	MONITORING RESPONSIBILITY	MONITORING SCHEDULE
1. OCWD shall retain a qualified biologist to prepare a Santa Ana Sucker Management Plan that focuses on management of the overall aquatic environment.	1. Keep a record of the plan and all adjustments, as well as periodic communications with CDFG, in the project file.	1. OCWD shall be responsible for Plan oversight and CDFG consultation; a qualified biologist shall be responsible for Plan preparation.	1. Plan to be completed prior to the first winter of project implementation. 2. Periodic communications with CDFG to occur no less than annually.
2. OCWD shall provide $25,000 annually for the first five years of Plan implementation, and $10,000 annually for 45 years thereafter toward implementation of the Santa Ana Sucker Management Plan.	2. A record of annual contributions shall be kept in the project file and available for public inspection. A copy shall be provided annually to CDFG and the Corps.	2. OCWD	2. Records of annual funding payments to be filed at the time of payment.

CULTURAL RESOURCES

Impact CR-1:

Raising the conservation pool could affect National Register-eligible resources above the dam.

Mitigation Measure:

Mitigation Measure M-CR-1: Compliance with §106 of the National Historic Preservation Act (36 CFR 800) is required prior to implementation of Alternative 5. The four potentially National Register (NRHP) eligible historic sites will require a test excavation to determine their significance. The Corps will conduct test pits as required if Alternative 5 is pursued. If any of these excavations are determined to be NRHP-eligible, the Corps will consult with the SHPO and the Advisory Council on Historic Preservation to determine the appropriate course of action to comply with 36 CFR 800.11.

IMPLEMENTATION PROCEDURE	MONITORING AND REPORTING ACTION	MONITORING RESPONSIBILITY	MONITORING SCHEDULE
1. If Alternative 5 is approved, the Corps shall comply with §106 of 36 CFR 800 including a test excavation to determine significance at all four potentially National Register (NRHP)-eligible sites. If any site is deemed NRP-eligible, the Corps shall consult with SHPO and the Advisory Council regarding subsequent requirements to be fulfilled.	1. OCWD shall communicate with the Corps regularly regarding testing of the sites and subsequent consultation and remediation if required, and shall maintain a record of all such communication in the Project File, available for public inspection.	1. The Corps shall be responsible for compliance with Mitigation Measure M-CR-1; OCWD shall be responsible for maintaining communication with the Corps.	1. OCWD shall communicate with the Corps on no less than a semi-annual basis regarding compliance with Mitigation Measure M-CR-1 if Alternative 5 is approved. Such communication shall continue until all applicable requirements are fulfilled.

Impact CR-2:

Raising the conservation pool could affect National Register-eligible resources above the dam.

Mitigation Measure:

Mitigation Measure M-CR-2: Compliance with § 106 of the National Historic Preservation Act (36 CFR 800) is required prior to implementation of project alternatives. Test excavations shall be required at National Register-eligible sites to determine significance. Final mitigation measures shall then be developed in consultation with the SHPO and the Advisory Council on Historic Preservation.

IMPLEMENTATION PROCEDURE	MONITORING AND REPORTING ACTION	MONITORING RESPONSIBILITY	MONITORING SCHEDULE
1. The Corps shall comply with §106 of 36 CFR 800 prior to implementation of all alternatives, including a test excavation and consultation with SHPO and the Advisory Council regarding subsequent requirements if resources are determined to be NRHP-eligible.	1. OCWD shall maintain communication with the Corps regarding testing of the sites and subsequent consultation and remediation if required.	1. The Corps shall be responsible for compliance with Mitigation Measure M-CR-2; OCWD shall be responsible for maintaining communication with the Corps.	1. OCWD shall communicate with the Corps on no less than a semi-annual basis regarding compliance with Mitigation Measure M-CR-2. Such communication shall continue until all applicable requirements are fulfilled.

Impact CR-3:

Raising the conservation pool could affect unknown cultural resources.

Mitigation Measure:

Mitigation Measure M-CR-3: All Alternatives: In the event that previously unknown resources are uncovered during implementation of water conservation, the Corps will be required to comply with 36 CFR 800.11, *Properties Discovered During Implementation of an Undertaking*. This might occur if previously undisturbed landforms are eroded away to reveal buried cultural resources. In such an event, the Corps will consult with the SHPO and the Advisory Council on Historic Preservation to determine the appropriate course of action to comply with 36 CFR 800.11.

IMPLEMENTATION PROCEDURE	MONITORING AND REPORTING ACTION	MONITORING RESPONSIBILITY	MONITORING SCHEDULE
1. In the event previously unknown resources are uncovered during project implementation, the Corps shall comply with 36 CFR 800.11, *Properties Discovered During Implementation of an Undertaking*. In such an event, the Corps shall consult with SHPO and the Advisory Council regarding subsequent requirements.	1. OCWD shall maintain communication with the Corps throughout project implementation to determine whether unknown resources have been uncovered, and the course of subsequent consultation and remediation if required.	1. The Corps shall be responsible for compliance with Mitigation Measure M-CR-3; OCWD shall be responsible for maintaining communication with the Corps.	1. OCWD shall communicate with the Corps on no less than a semi-annual basis regarding compliance with Mitigation Measure M-CR-3 until all construction is completed

HYDROLOGY AND WATER QUALITY

Impact HY-4:

Sediment erosion would increase at the River View Golf Course downstream from Prado Reservoir.

Mitigation Measure:

Mitigation Measure M-HY-4: All Alternatives: When maximum discharge rates are realized under the proposed water conservation operations, sediment material at the downstream River View Golf Course shall be replaced by the County of Orange as needed to maintain flood protection values of the channel. In addition, the County of Orange shall repair erosion damage at the Golf Course to the extent that such reconstruction requirements are specified in lease agreements.

IMPLEMENTATION PROCEDURE	MONITORING AND REPORTING ACTION	MONITORING RESPONSIBILITY	MONITORING SCHEDULE
1. The County of Orange shall replace sediments at the River View Golf Course as needed to maintain flood protection values of the channel. 2. The County of Orange shall repair erosion damage at the Golf Course to the extent that such reconstruction requirements are specified in lease agreements.	1. OCWD shall communicate with the County regularly regarding County replacement of sediments and erosion damage repair at the River View Golf Course, and shall maintain a record of all such communication in the Project File, available for public inspection.	1. The County of Orange shall be responsible for compliance with Mitigation Measure M-HY-4; OCWD shall be responsible for maintaining communication with the County.	1. OCWD shall communicate with the Corps on no less than an annual basis regarding compliance with Mitigation Measure M-HY-4. Such communication shall continue through the life of the project.

RECREATION IMPACTS ABOVE THE DAM

Impact RE-2:

Raising the conservation pool would contribute to the physical degradation of existing recreational and other uses due to inundation above the dam.

Mitigation Measures:

Mitigation Measure M-RE-2: All Alternatives: The Corps shall restore inundated areas above Prado Dam to pre-inundation conditions to the extent that such reconstruction requirements are specified in lease agreements. Maintenance shall be limited to clean up efforts only and not the re-building of structures, as all recreational facilities within the Prado Basin are required to be floodable.

IMPLEMENTATION PROCEDURE	MONITORING AND REPORTING ACTION	MONITORING RESPONSIBILITY	MONITORING SCHEDULE
1. The Corps shall restore inundated areas above Prado Dam to pre-inundation conditions to the extent that such requirements are specified in lease agreements.	1. OCWD shall communicate with the Corps regularly regarding Corps' restoration of inundated areas, and shall maintain a record of all such communication in the Project File, available for public inspection.	1. The Corps shall be responsible for compliance with Mitigation Measure M-RE-2; OCWD shall be responsible for maintaining communication with the Corps.	1. OCWD shall communicate with the Corps on no less than an annual basis regarding compliance with Mitigation Measure M-RE-2. Such communication shall continue through the life of the project.

RECREATION IMPACTS BELOW THE DAM

Impact RE-4:

Raising the conservation pool would contribute to the physical degradation of existing recreational and other uses due to inundation below the dam.

Mitigation Measure:

Mitigation Measure M-RE-4: All Alternatives: The Corps shall restore inundated areas below Prado Dam to pre-inundation conditions to the extent that such reconstruction requirements are specified in lease agreements. Maintenance shall be limited to clean up efforts only and not the re-building of structures, as all recreational facilities within the Prado Basin are required to be floodable.

IMPLEMENTATION PROCEDURE	MONITORING AND REPORTING ACTION	MONITORING RESPONSIBILITY	MONITORING SCHEDULE
1. The Corps shall restore inundated areas below Prado Dam to pre-inundation conditions to the extent that such requirements are specified in lease agreements.	1. OCWD shall communicate with the Corps regularly regarding Corps' restoration of inundated areas, and shall maintain a record of all such communication in the Project File, available for public inspection.	1. The Corps shall be responsible for compliance with Mitigation Measure M-RE-4; OCWD shall be responsible for maintaining communication with the Corps.	1. OCWD shall communicate with the Corps on no less than an annual basis regarding compliance with Mitigation Measure M-RE-4. Such communication shall continue through the life of the project.

PUBLIC HEALTH AND SAFETY

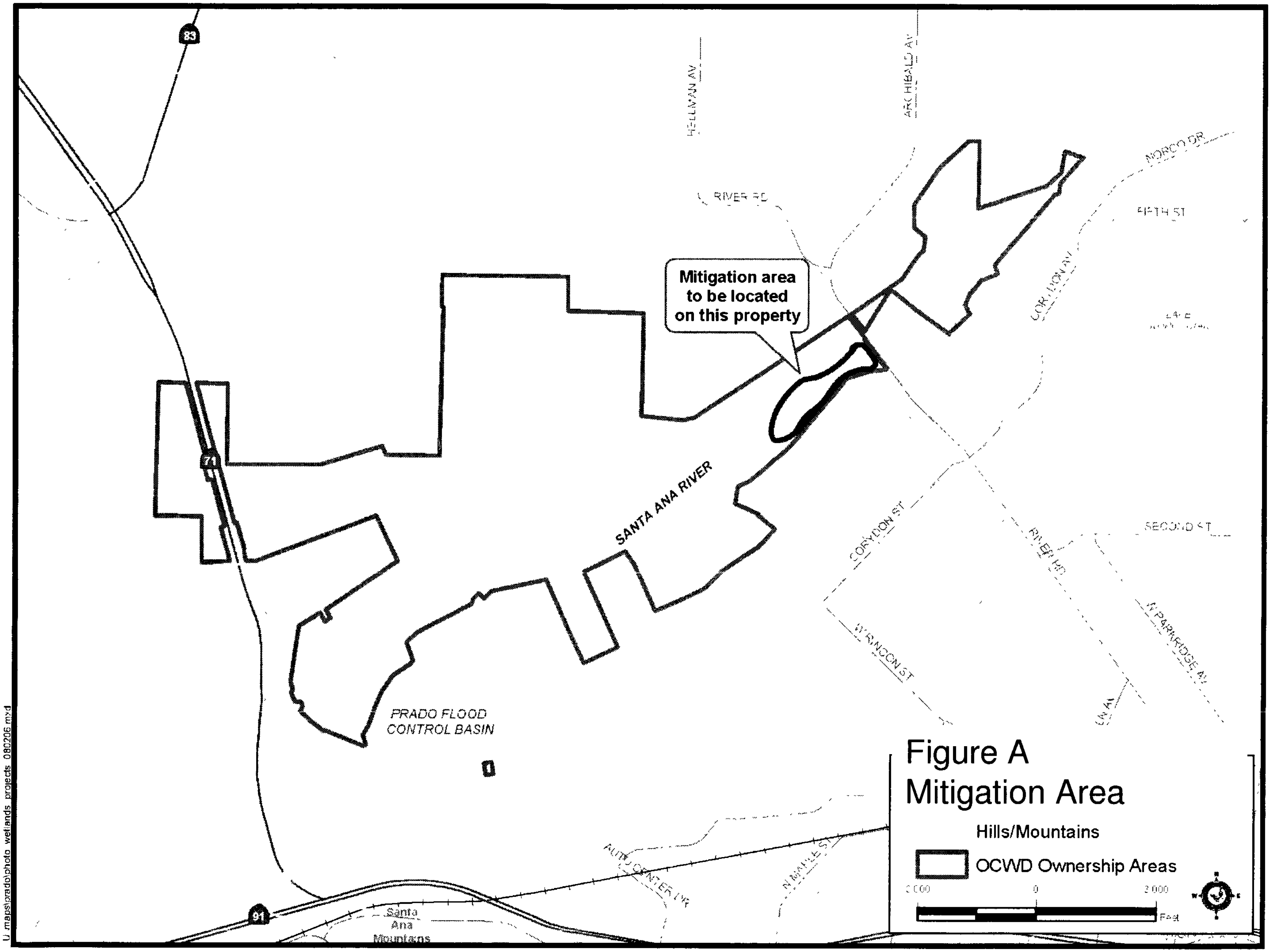
Impact PU-1:

Raising the conservation pool would increase the number of breeding mosquitoes.

Mitigation Measure:

Mitigation Measure M-PU-1: All Alternatives: The Corps shall notify the Northwest Mosquito Abatement District, West Valley Vector Control District, and Orange County Vector Control District of the increased wetted area resulting from the conservation pool. In coordination with these districts, the Corps will contribute funds as necessary annually to ensure that mosquito nuisances to the public resulting from the increased wetted area are minimized.

IMPLEMENTATION PROCEDURE	MONITORING AND REPORTING ACTION	MONITORING RESPONSIBILITY	MONITORING SCHEDULE
1. The Corps shall notify the Northwest Mosquito Abatement District, West Valley Vector Control District, and Orange County Vector Control District of the increased wetted area. 2. The Corps shall contribute funds as necessary to ensure that mosquito nuisances to the public resulting from the increased wetted area are minimized.	1. OCWD shall communicate with the Corps regularly regarding Corps' notification of impacted vector control agencies and regarding Corps funding contributions to ensure that mosquito nuisances are minimized, and OCWD shall maintain a record of all such communication in the Project File, available for public inspection.	1. The Corps shall be responsible for compliance with Mitigation Measure M-PU-1; OCWD shall be responsible for maintaining communication with the Corps.	1. OCWD shall communicate with the Corps on no less than an annual basis regarding compliance with Mitigation Measure M-PU-1. Such communication shall continue through the life of the project.



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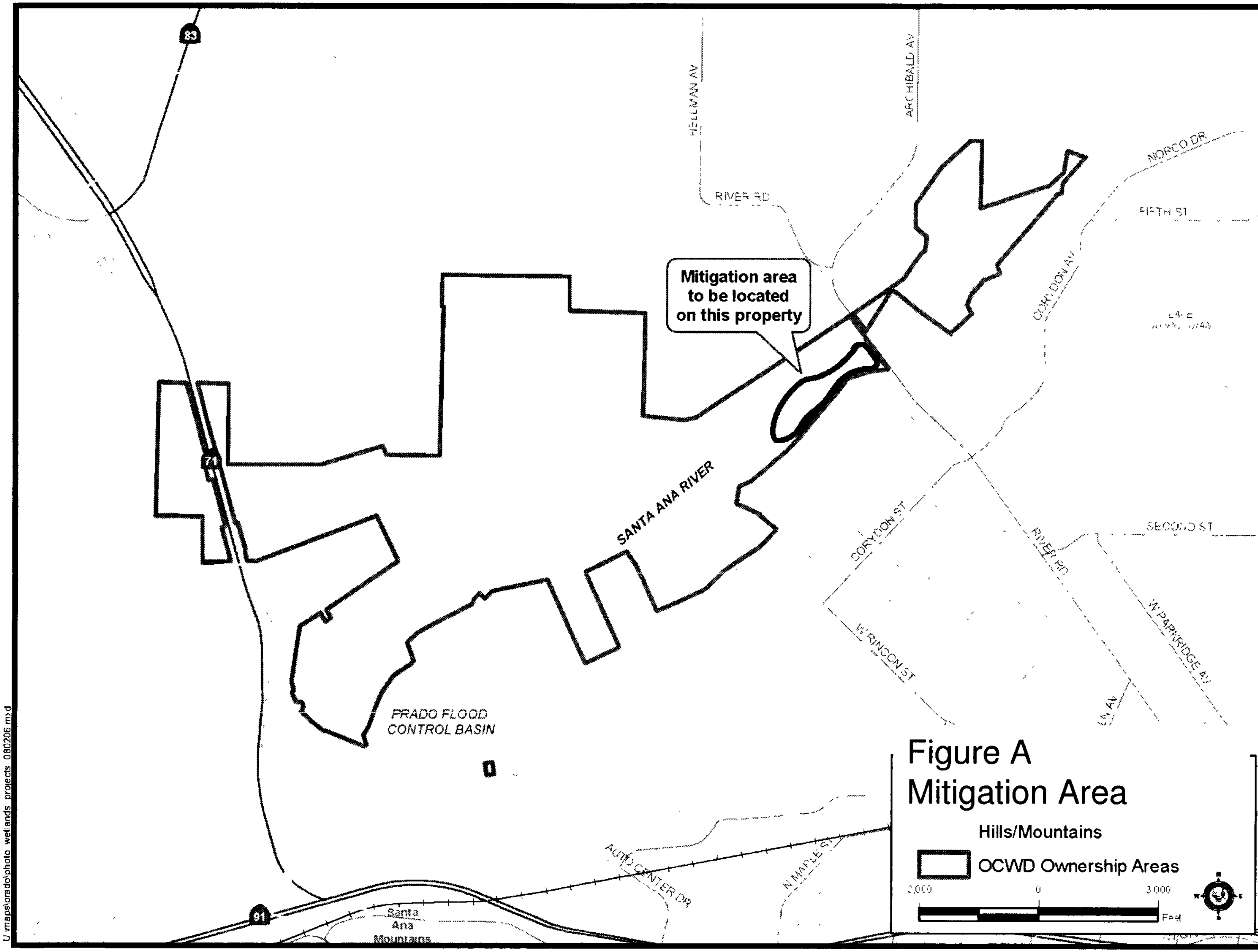

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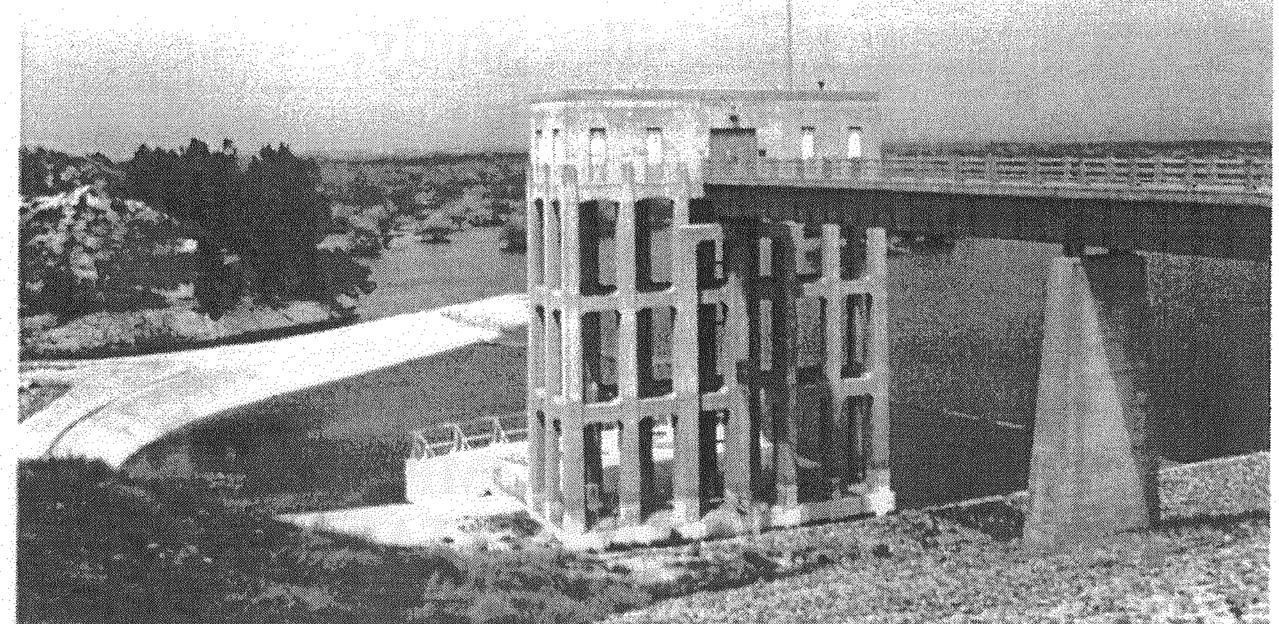
US Army Corps
Of Engineers
Los Angeles District

Feasibility Report



PRADO BASIN WATER CONSERVATION FEASIBILITY STUDY

MAIN REPORT WITH ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT

FEBRUARY 2005

US Army Corps
of Engineers
Los Angeles District

Prado Basin Water Conservation Feasibility Study,

Prado Dam

Riverside and San Bernardino Counties, California

MAIN REPORT WITH ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT

FEBRUARY 2005

Los Angeles District, Corps of Engineers
Planning Division, Plan Formulation Branch
P.O. Box 532711
Los Angeles, California 90053-2325

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SYLLABUS

This **Prado Basin Water Conservation Feasibility Study** is a cost-shared Feasibility Study conducted by the U.S. Army Corps of Engineers (Corps) and the Orange County Water District (OCWD) as cost-sharing partners, OCWD being termed the Local Sponsor. This report investigates the without- and with-project conditions related to the increased water conservation potential at Prado Dam. The Reconnaissance phase determined that there is a federal interest in water conservation at Prado Dam, as summarized in the report entitled Prado Basin Water Supply Reconnaissance Report dated July 1996. This report assumes that the authorized modifications to Prado Dam as described in the Phase II General Design Memorandum (GDM) for the Santa Ana River Mainstem Project (SARMP) are in place by 2006. The preferred alternative can and will be implemented prior to the modifications being completed.

The purpose of this study is to investigate the feasibility of expanded water supply and conservation opportunities at Prado Dam. The study area is defined as Prado Dam and Reservoir, Santa Ana River downstream of Prado Dam, and the downstream spreading grounds. Prado Dam is located in Riverside County, California near the border with Orange and San Bernardino Counties, California. Prado Dam is constructed at elevation 460 feet (ft) (140.2 m) national geodetic vertical datum (NGVD) at the head of the Santa Ana Canyon at the eastern end of Chino Hills. The extended study area is the watershed for the OCWD service area. OCWD owns all rights, title and interest in any and all waters flowing in the Santa Ana River into Prado Reservoir.

The study analyzes the water demands of the area, water supplies, and the potential for water conservation to meet supply deficiencies for both the existing and future conditions. Existing or base year conditions occur in the year 2004, and future conditions occur in the year 2053. Based on a supply and demand analysis conducted as part of this feasibility study, available normal-year local supplies for the study area currently meet only about 60 percent of demand; and this percentage will decrease as demand increases in the future. Thus, additional low-cost water supplies will be needed to meet demands. Re-operation of Prado Dam to increase the available flow during the flood and non-flood season would provide this additional local water supply.

The plan formulation process investigated five alternatives, one of them being the without-project condition. The without-project condition represents the condition that would be expected to occur during the period of analysis (50 years, 2004 through 2053) in lieu of project implementation, and it constitutes the basis against which all alternative plans are evaluated. All four with-project alternatives were evaluated individually. Tables S-1, S-2, and S-3 summarize the alternatives.

All alternatives look at conserving water up to different elevations during the flood and non-flood seasons. Water conservation during the flood season, October 1 to February 28, for the five alternatives varied from a maximum Water Surface Elevation (WSE) of 494 ft (150.6 meters [m]) to a maximum WSE of 508 ft (154.8 m). Water conservation during the non-flood season, March 1 to September 30, for the five alternatives varied from a maximum WSE of 505 ft (153.9 m) to a maximum WSE of 508 ft (154.8 m). Water conservation is currently authorized up to an elevation of 505 ft (153.9 m) NGVD from the beginning of March to the end of September. Releases from Prado to the downstream spreading grounds will lower the WSE while storm inflows will increase it. If the duration between storms is long enough, it is possible to completely drain the conservation pool. Therefore, water conservation up to the given maximum elevations for the alternatives will not result in a permanent lake with a permanent waterline. In addition, if a storm event is forecast, the pool will be evacuated to lower the WSE closer to the debris pool elevation of 490 feet, inasmuch as flood control is the primary function of the dam. Therefore, re-operation of Prado Dam for increased water conservation will essentially not decrease the level of protection afforded by the dam.

Seven Oaks Dam will also have an impact on Prado Dam and its operation. Since the Section 7 consultation with the U.S. Fish & Wildlife Service on the endangered San Bernardino Kangaroo Rat (SBKR) was completed in 2003, Seven Oaks Dam can now be operated according to the design flood control plan. The effect of Seven Oaks Dam on reducing the magnitude of floods downstream of Prado Dam is substantial. Considering this, spillway flow at Prado Dam will occur for an event between a 70 to 95-year frequency under present conditions. By closing the outlets as a spillway flow occurs and limiting the total outflow (spillway plus outlets) to less than 9,200 cubic feet per second (cfs), the level-of-protection can be raised to greater than 100-year frequency under present conditions. By accelerating releases above elevation 494.0 ft (150.6 m) up to the maximum outlet capacity through the two 13.5 ft by 13.5 ft (4.1 m by 4.1 m) outlet conduits, the level-of-protection can be raised to about 120-year frequency under present conditions. The significance of this discussion is that if a forecast is underestimated and the Water Conservation Pool is not completely evacuated prior to a large event, the outlet gates could be opened to make larger than scheduled flood releases. This would offset the underestimated inflow, recapture the flood control space, and still maintain the established level-of-protection. Once the Phase II GDM modifications are completed, including the outlets and the downstream channel, and assuming Seven Oaks is operated as planned, Prado Dam will provide about 333-year level-of-protection.

As stated earlier, one of the major premises of this study is that modifications to the operating plan for water conservation at Prado Dam will not have any significant impact on flood control, i.e., will not decrease the level-of-protection afforded by the dam. To assure this, the Water Conservation Pool, otherwise known as the buffer pool, must be evacuated prior to a major storm. Evacuation of the buffer pool is based on estimates of inflow to Prado Dam. Reservoir Operation staff at the Los Angeles District determine if an impending storm will bring significant inflow into the reservoir and how much the buffer pool will need to be evacuated to account for the estimated inflow volume. This predicted inflow volume may require the complete evacuation of the buffer pool. However, it does not require the entire buffer pool be evacuated if the predicted inflow amount is less than the volume in the buffer pool. If large inflows are not forecasted, rapid evacuation of the reservoir for flood control purposes is not necessary or desired. This is particularly relevant for water conservation purposes as the end of the flood season approaches.

The flood control release schedule for the current outlets does not maximize outflow through the outlet conduits. The current schedule's maximum non-damaging release of 5,000 cfs was established after downstream channel improvements were constructed to address deficiencies in channel performance observed during the 1978, 1980, and 1983 flood events. The planned Phase II GDM outlets also do not maximize outflow through the outlets. The future schedule was developed to maintain relatively low releases out of Prado Dam during small to moderate events. Larger releases (i.e., up to the future channel capacity of 30,000 cfs [currently 10,000 cfs]) will be reached by slowly increasing releases as the pool elevation rises during times when a significant flood event is actually occurring. Under either scenario (current or future outlets), if the severity of a storm is under-estimated and the buffer pool is not evacuated enough, releases from Prado Dam can be accelerated to recover the lost flood control space by opening the outlet gates wider.

To achieve evacuation of the buffer pool for water conservation within 24 hours prior to any flood event, especially for larger alternative pools, would also require adjustments to the gate settings under the current or proposed flood control release schedule. Emergency or critical maintenance, as determined by the Corps' Los Angeles District, may take place any time during the year and may require evacuation of the pool. The buffer pool is only meant for water to be held until it can be released for recharge. There is no intent to maintain a larger permanent pool at the reservoir. Mitigation for any and all damages to the downstream channel caused by evacuation of the buffer pool, and any and all damages or impacts to parties located within the reservoir area caused by the retention of water for conservation purposes are the sole responsibility of OCWD.

The average annual yield for Prado Dam for without-project conditions in the year 2004 is 238,000 acre-feet (AF) (293.4 million cubic meters [m^3]). Under future (year 2053) without-project conditions, the average annual yield is estimated to be 314,000 acre-feet (387.3 million m^3). The additional water for year 2053 will result from other projects that are expected to be constructed, by other entities, upstream of Prado Dam. These are estimates of the volume of surface water spread in the downstream OCWD spreading grounds. The average volume of water "lost" to the Pacific Ocean is approximately 48,000 AF (60.4 million m^3) per year.

The National Economic Development (NED) Plan is Alternative 2, which has a top of conservation storage during flood season at elevation 498 ft (151.8 m). During the non-flood season, the top of conservation storage would be at elevation 505 ft (153.9 m). The water conservation yield for this alternative is approximately 240,000 AF (296 million m^3) in the year 2004 and approximately 318,000 AF (392.2 million m^3) in the year 2053.

There is no Locally Preferred Plan (LPP), OCWD has decided that the NED Plan is the most viable alternative.

An Environmental Impact Statement/Environmental Impact Report (EIS/EIR) has been 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, have been met.

Table S-1. Hydrologic Summary of Alternatives

Alternative	**Water Surface Elevation (feet)**		**Annual Yield Increase Over Without Project Condition, acre-feet**	
	Flood Season	**Non-Flood Season**	**Present Condition**	**Future Condition**
Alternative 1 (Without Project)	494	505	0	0
2	498	505	2,000	4,000
3	500	505	3,000	5,000
4	505	505	4,000	8,000
5	508	508	6,000	10,000

Table S-2. Benefit/Cost Analysis

Alternative	Annual Benefits, $1,000	Annual Costs $1,000	Net Benefit, $1,000	Benefit/Cost Ratio
2	$612	$140	$472	4.4
3	$850	$1,325	-$475	0.6
4	$1,233	$4,848	-$3,625	0.3
5	$1,699	$5,782	-$4,083	.03

Notes:
(1) Annual costs and benefits are over 50 years and apply to years 2004 through 2053.
(2) Mitigation costs include environmental and cultural mitigation.

Table S-3. Prado Dam Water Conservation Biological Mitigation CostsTable S-3. Prado Dam Water Conservation Mitigation Costs

Alternative	Upstream Cost	Downstream Cost	Total Upstream and Downstream Cost	Total Annual Cost*
2	$223,000	$707,000	$930,000	$181,000**
3	$502,500	$657,000	$1,159,000	$87,000
4	$2,377,500	$1,543,000	$3,920,000	$259,000
5	$11,624,500	$2,664,000	$14,288,500	$905,000

*Annual costs based on economic calculation using a 5 5/8 percent discount rate.
**Includes $125,000 Santa Ana River sucker mitigation costs not reflected in total upstream and downstream costs. Sucker mitigation costs may vary somewhat from year to year.

1 INTRODUCTION

The Prado Basin Water Conservation Feasibility Study Report and the associated Environmental Impact Statement/ Impact Statement Report (EIS/EIR) is a document prepared to support the Record of Decision (ROD). The previously completed Reconnaissance Study Report was prepared to determine whether investigation should proceed further into the more detailed cost-shared feasibility phase study. Federal interest was identified during the reconnaissance phase, and the Corps planning process has moved into the feasibility phase. The purpose of the Report is to review alternative plans, the proposed recommended plan, and Federal and non-Federal requirements for implementation.

In this Report, alternatives for water conservation are investigated. The National Economic Development (NED) Plan, has been accepted by OCWD as the preferred alternative. While the reconnaissance study was 100 percent federally funded, the feasibility study is cost-shared 50 percent with OCWD).

An EIS/EIR has been prepared to satisfy the environmental review requirements of both the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The purpose of the EIS/EIR document is to identify the environmental effects of the proposed water conservation project and its various alternatives.

1.1 Study Authority

Prado Dam was authorized by the Flood Control Act of June 22, 1936, Public Law 74-738, as amended. This act authorized "*the construction of certain public works on rivers and harbors for flood control, and other purposes.*"

The authority to study the feasibility of Water Conservation at Prado Dam is provided by the Resolution of the Committee on Public Works of the House of Representatives dated May 8, 1964.

Further, the Corps conducted a "Prado Basin Water Conservation Reconnaissance Report" in July 1996, that was initiated in response to a request by OCWD and to HR 101-96, June 20, 1989, the latter of which states:

> *"Santa Ana River Project, California --The Committee continues to support conservation and recreation along the Santa Ana River. Of the funds appropriated for construction, up to $500,000 can be used for a water conservation reconnaissance study to review the feasibility of water conservation behind the Seven Oaks Dam and Prado Dam."*

The report recommended that this feasibility study be conducted to complete the plan formulation and evaluation process of water conservation along the Santa Ana River at Prado

Dam, as requested in a memorandum to the OCWD dated July 11, 1989.

1.2 Study Purpose and Scope

The purpose of the study is to investigate the feasibility of additional water conservation at Prado Dam. Prado Dam is currently being modified to increase its capacity for flood control. Both the existing and future flood control storage space behind the dam present an opportunity to modify the existing operating plan to capture additional runoff for water conservation. Some of the alternatives previously analyzed in this report are dependent on the raising of Prado Dam before additional water conservation under them can be implemented, while others are capable of being implemented prior to the completion of dam modifications. The preferred alternative, Alternative 2, can be implemented prior to the completion of dam modifications.

Specifically, the feasibility study completes the planning process of formulating and evaluating the array of alternative plans for water conservation identified in the reconnaissance study, and to recommend a plan that maximizes the net benefits or one preferred by the local OCWD while addressing water conservation and 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, guidelines, procedures, and policies, including the Corps "Planning Guidance Notebook" (ER 1105-2-100) dated April 2000.

1.3 Study Area Location

Prado Dam and Flood Control Basin are located on the Santa Ana River approximately 31 miles upstream from the mouth of the river at the Pacific Ocean. The dam is operated and maintained by the Corps and controls a drainage area of 2,250 square miles (5,827 km^2)
The dam and flood control basin are located in Riverside County approximately 3 miles upstream from the Riverside-Orange County line. An aerial view of the dam and flood control basin is shown in Figure 1-1.

1.4 Study Participants and Agency Coordination

The Corps and OCWD identified an array of alternatives for additional water conservation at Prado Dam and Flood Control Basin. During the course of the Feasibility Study, OCWD participated and contributed to development of the alternatives for additional water conservation. OCWD contributed 50 percent of the study cost, through both cash and in-kind services.

During the Feasibility Study, coordination with the U.S. Fish and Wildlife Service (USFWS) was conducted in accordance with the Fish and Wildlife Coordination Act. The USFWS provided the Corps with the Draft Coordination Act Report (DCAR) in November 1999, and a Biological Opinion (BO) in July 2002. The DCAR and BO evaluated the alternative plans studied. Since several issues materialized after the DCAR, the BO served to address these issues and, with the concurrence of USFWS, the DCAR should be considered as the Final CAR. All USFWS recommendations in these two documents have been given full consideration.

1.5 Prior Studies and Reports

Prior Federal and non-Federal documents that have been referenced in the course of conducting the present study include:

Definite Project Report of Prado Dam, L.A. District, Corps of Engineers. 1936.

Santa Ana River and Other Streams for Protection of the Metropolitan Area in Orange County, California, L.A. District, Corps of Engineers. 1937.

Phase I General Design Memorandum of the Santa Ana River Mainstem -- Including Santiago Creek, L.A. District, Corps of Engineers. 1980.

Prado Dam Water Conservation Study. Camp Dresser & McKee, Inc. October 1985

Prado Dam Basin Land Use Analysis Report, San Bernardino and Riverside Counties, California, L.A. District, Corps of Engineers. 1985.

Phase I General Design Memorandum and Supplemental Environmental Impact Statement on the Santa Ana River Mainstem, L.A. District, Corps of Engineers. 1985.

Water Conservation and Oil and Gas Development at Prado Dam, Bureau of Land Management (BLM). November 1987.

Operation of Prado Dam for Water Conservation, L.A. District, Corps of Engineers. June 1988.

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

Review of Prado Dam Operation for Water Conservation and Environmental Impact Statement, L.A. District, Corps of Engineers. October 1992.

Seven Oaks and Prado Dams Water Conservation Reconnaissance Study, L.A. District, Corps of Engineers. October 1992.

Water Control Manual, Prado Dam & Reservoir, Santa Ana River, California, L.A. District, Corps of Engineers. September 1994.

Prado Basin Water Supply Reconnaissance Report, L.A. District, Corps of Engineers. July 1996.

Prado Basin Supplemental Environmental Impact Statement, L.A. District, Corps of Engineers. November 2001.

1.6 Existing Corps of Engineers Water Projects and Facilities

1.6.1 Prado Dam and Reservoir

Prado Dam and Reservoir are located on the Santa Ana River adjacent to the junction of the Riverside Freeway (Route 91) and the Corona Expressway (Route 71) at the eastern end of the Chino Hills. Prado Dam, which is approximately 31 miles upstream from the mouth of the Santa Ana River at the Pacific Ocean, was constructed in 1941. The Dam is operated and maintained by the Corps and controls a drainage area of 2,250 square miles (5,827 km^2).

1.6.2 Lower Santa Ana River Basin from Prado Dam to the Pacific Ocean

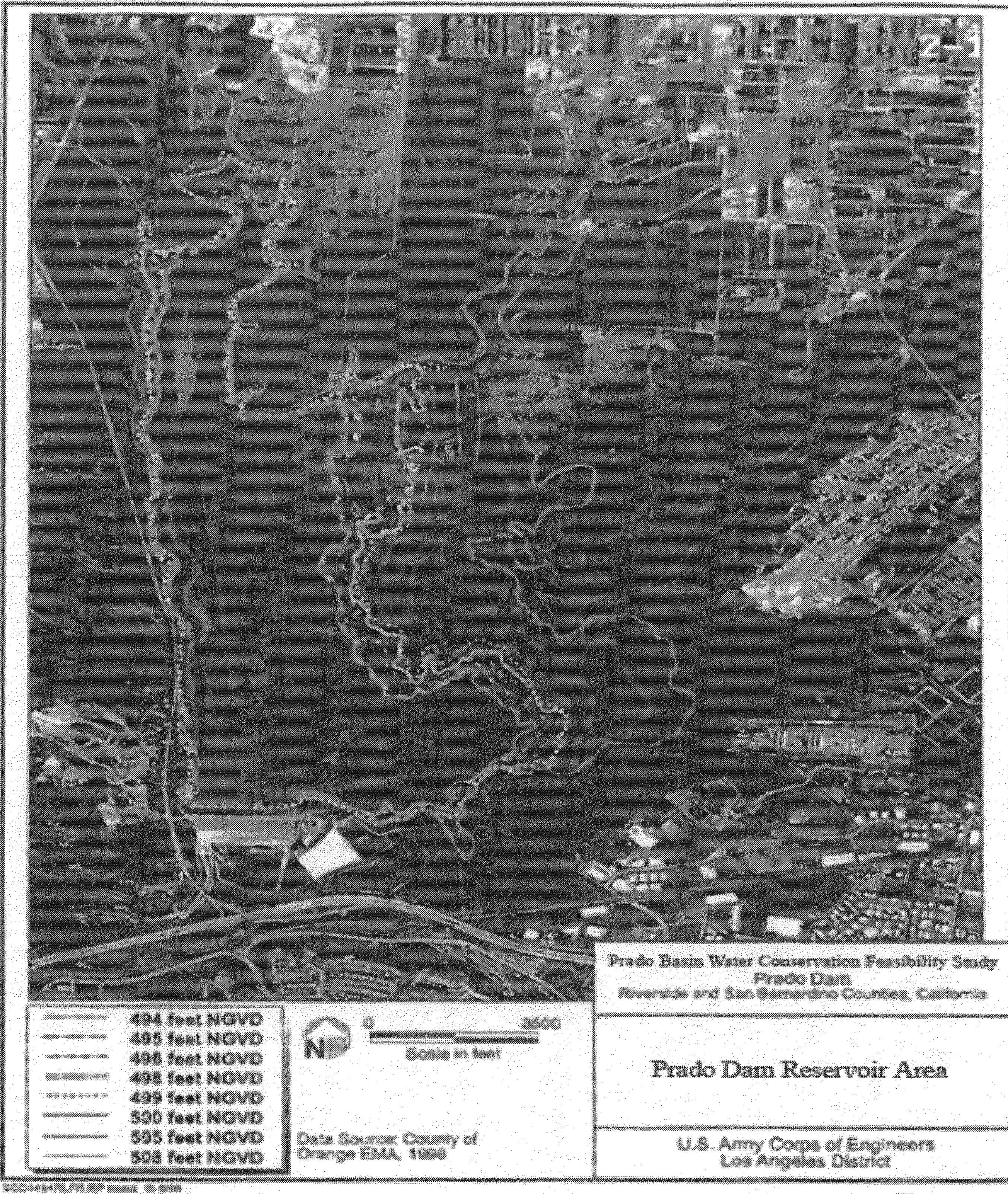
The Santa Ana River Mainstem Project (SARMP), a project for flood control on the Santa Ana River, was authorized by the Water Resources Development Act of 1986 (PL-99-662) on November 17, 1986. The authorized project consists of improvements to the channel downstream of Prado Dam to the Pacific Ocean, construction of Seven Oaks Dam and Reservoir on the upper Santa Ana River, and improvements to Prado Dam. Construction of the channel improvements on the Santa Ana River below Prado Dam commenced in 1991 and is still in progress; construction of Seven Oaks Dam commenced in 1994 and was completed in 1999; construction of the improvements to Prado Dam commenced in 2003 and are still in progress.

1.7 The Planning Process and Report Organization

The six planning steps presented in the U.S. Water Resources Council's Principles and Guidelines form the basis of organization for this Feasibility Report. Chapter II (Need for and Objectives of Action) presents the problems and opportunities associated with the Prado Basin Water Conservation Study. Chapter III (Study Area Description) provides an inventory of existing and future Without-Project Conditions. In Chapter IV (Plan Formulation) planning objectives and constraints are considered and alternative plans are formulated. Plans are next evaluated and compared in Chapter V; Chapter VI describes the Recommended Plan that emerges from the evaluation and comparison process. Chapters VII and VIII describe the Recommended Plan Implementation and the Study's Conclusions and Recommendations.

Associated with the main report are several technical reports/appendices completed for the various disciplines connected with this Feasibility Study, including the Environmental Impact Statement/Environmental Impact Report, the Hydrology and Hydraulics Appendix, the

Geotechnical Appendix, the Engineering Design Appendix, the Economics Appendix, and the Real Estate Appendix.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Scale in feet
Data Source: County of
Orange EMA, 1998
Prado Basin Water Conservation Feasibility Study
Prado Dam
Riverside and San Bernardino Counties, California
Prado Dam Reservoir Area
U.S. Army Corps of Engineers
Los Angeles District

Figure 1-1

2 NEED FOR AND OBJECTIVES FOR ACTION

The first step of the Corps' six-step planning process is to specify Problems and Opportunities. This chapter presents the water conservation problems and opportunities associated with Prado Dam and Flood Control Basin.

2.1 National Objective

Water conservation and supply is one of the missions of the Corps defined in the Flood Control Act of 1944 and the Water Supply Act of 1958, as amended. The current policy was defined by Congress in Section 932 of the Water Resources Development Act of 1986. Among the aspects of water conservation is modification of project operations to enhance groundwater replenishment, among other means to enhance project usage for Municipal and Industrial purposes. The Corps objective in water conservation and supply is to contribute to the National Economic Development (NED). NED benefits attributable to water conservation and supply are measured in terms of net changes in quantity of water conserved. The net changes are measured in the planning area and in the rest of the nation.

2.2 Study Objectives

The principal objective of the Feasibility Study is to determine if the operating plan for Prado Dam could be modified to maximize water conservation while being consistent with the flood control purpose, and also being environmentally acceptable and cost-effective.

2.3 Public Concerns

To announce the start of the Feasibility Phase, a public meeting notice was issued to residents, interest groups, and Federal, State and local agencies. The recipients were invited to provide input into the feasibility study process. The public meeting was held by the Corps and OCWD; this meeting also served as the Draft Environmental Impact Statement/Environmental Impact Report (DEIS/R) Scoping Meeting. The meeting was conducted on November 17, 1997 at the Corona Fundamental Intermediate School, Corona, California. Issues raised at the meeting included the following:

Effects on habitat and species:

- Why are you now concerned with endangered species that weren't originally resident in the reservoir area?
- If wildlife is displaced by the increased water pool, it will relocate and create the same kinds of environmental mitigation problems in a new place.
- You need to consider the Santa Ana Sucker.

Water Quality:

- Any increase in water storage capacity will increase the size of water impoundment and, therefore, will provide additional grounds for mosquito breeding that, in turn, will cause an increase in mosquito populations.
- You need to consider whether an increase in the pool will cause great evaporation and, thus, a higher salt content.
- Will dilution improve the quality of waste water percolating into the ground?

Socio/Economic:

- What is the projected timetable for increasing the water levels? It is important for those of us with businesses in the basin to know what to expect and when to expect it.
- You must consider the well being of people upstream of the dam, as well as downstream.
- Will the Corps act as a mediator between leaseholders and OCWD?

Other Issues/Concerns:

- What types of recreation are there currently in the basin, and what types of recreation do you envision in the future?.
- Are there equestrian trails in the basin? If so, where do they go?
- How long will it take for the reservoir to silt up and eliminate any extra conservation storage capacity?
- Is the purpose of Prado Dam being changed from flood control to water conservation?
- Who owns the land in Prado Basin? What kind of easement does the Corps have through the land? Are there any easements for water conservation?
- Who owns the Santa Ana River when it enters Riverside County from San Bernardino County?
- Do Riverside and San Bernardino counties have to agree to a new water conservation plan before it can be implemented?
- Information provided in the flier conflicts with the presentation on November 17, 1997, at the Corona Fundamental Intermediate School. That is, the flier indicates that this study will evaluate alternatives that would increase the water impoundment year-round up to an elevation of 508 feet and permit the development of holding ponds in the reservoir between elevation 556 and 566 feet. At the meeting you indicated an increase of water storage to 505 feet.

2.4 Problems and Opportunities

Analyses of projected supply and demand for the OCWD service area indicate that local groundwater and surface water supplies will meet proportionally less of the demand over the course of the study period. The increased demand would have to be made up by more costly reclaimed water and imported water. Recent court decisions and developments have significantly curtailed the water resources ultimately available to southern California through importation. Therefore, it is uncertain whether Metropolitan Water District of Southern California (MWD) will be able to meet OCWD demand in the future, due to the potential cutback of Colorado River water supply or decrease of water supply from the State Water Project. In virtually all cases wherein southern California water purveyors have sought additional import of water, responses through the courts and regulatory agencies have dictated that the need should be established only after all existing means have been exhausted. Therefore, although capture of additional flood runoff and thus greater groundwater recharge may result in fairly small additional capture against total need, it will greatly help to establish intent to use all available resources.

Reoperation of Prado Dam during both the flood season (October through February) and the non-flood season (March through September) presents an opportunity to provide an increment of additional local water supply, thereby reducing the need to find additional, costlier, imported and reclaimed water supplies.

2.5 Planning Constraints

2.5.1 General Constraints

National Constraints.
National constraints include policy constraints such as those contained in the Rivers and Harbor Act, the Clean Water Act and the National Environmental Policy Act. These constraints were considered throughout the course of the study.

Flood Control Constraints
Opportunities to provide additional water conservation are limited by the flood control requirements of Prado Dam. Plans were formulated to minimize impacting the authorized flood control purpose. Therefore, the alternatives considered were those that had minimal impacts on the frequency, duration, or severity of flooding downstream of Prado Dam. The preferred alternative does not increase the risk of potential dam failure.

Storage Capacity
Evaluation of any additional measures and/or controls for the dam and appurtenant structures beyond those required for flood control must take place when considering temporary reservoir storage for water conservation. The adequacy of the embankment while operating under water conservation storage scenarios requires seismic and geotechnical review, and this information will be used in the certification of the dam for temporary water conservation storage.

2.5.2 Project-Specific Constraints

Constraints specific to Prado Basin are identified below. These constraints place limitations on the proposed water conservation potential. The constraints include flood control issues, environmental resources, maintenance, and economics.

Flood Control
Alternatives that result in a significant increase in frequency, duration, or severity of flooding downstream from Prado Dam in urban Orange County or within the upper reaches of Prado Basin were considered. The 1987-1988 Reconnaissance Study determined that expanding the seasonal water conservation pool to above 505 ft (153.9 m) NGVD would increase the duration of flooding in the upper reaches of Prado Basin, thereby raising project costs. Additional flooding easements would be required for seasonal water conservation above elevation 505 ft (153.9 m) NGVD.

Environmental Issues
The endangered least Bell's vireo uses the fringe habitat surrounding the existing water conservation pool, currently extending to elevation 505 ft NGVD, for nesting and rearing young during the period from mid-March to late summer. Raising the water conservation pool elevation above 505 ft NGVD would flood this fringe habitat during the spring. Increasing the water conservation pool elevation in phases could allow for the creation of new fringe habitat without inundation of the current available habitat.

Economics
Maintenance within the reservoir is typically conducted during July through early October, which is usually the lowest runoff period. Seasonal water conservation programs normally end on September 30 annually, to allow a sufficient opportunity for reservoir maintenance to take place. NED benefits must exceed costs from re-operation for the Federal government to recommend and/or participate in a plan to increase water conservation at the reservoir.

3 STUDY AREA DESCRIPTION

The study area is defined as Prado Dam and Reservoir, the downstream spreading grounds, and the Santa Ana River downstream of Prado Dam. The extended study area is defined as the OCWD present and future service area. OCWD owns all rights, title, and interest in any and all waters flowing in the Santa Ana River into Prado Dam. Water conserved at Prado Dam would be used to replenish the lower Santa Ana groundwater basin, thereby reducing the need to use more expensive water from other sources. Prado Dam and Reservoir lie on the Santa Ana River at the head of Santa Ana Canyon 3 miles (4.8 km) upstream from Orange County and within both Riverside and San Bernardino Counties. The cities of Norco and Corona border the Prado Reservoir's east edge, and the City Chino borders the northern edge. The OCWD spreading grounds are situated on and adjacent to the Santa Ana River, approximately 6 miles (9.7 km) downstream from Prado Dam, within Orange County.

3.1 Drainage Basin Description

The Santa Ana River is the largest river system in southern California. The river's watershed basin is 2,450 square miles (6,345 km^2) in area, excluding a closed area of 32-square-mile tributary to Baldwin Lake and 10-square-mile tributary to Perris Reservoir (see figure 3-1). Upstream of Prado Dam are 2,250 square miles (5,827 km^2) of the watershed. The river originates in the San Bernardino Mountains approximately 80 miles (128.7 km) inland from the Pacific Ocean. Approximately 23 percent of the basin lies within the rugged San Gabriel and San Bernardino Mountains, 9 percent within the San Jacinto Mountains, and 5 percent within the Santa Ana Mountains. Most of the remaining area consists of lower-sloped valleys formed by a series of broad alluvial fan surfaces that abut the base of the mountain front. Numerous low foothills also rise above the alluvial fan surfaces.

Several tributary streams enter the Santa Ana River and the reservoir, including Temescal Wash, Cucamonga Creek, and Chino Creek. Precipitation is primarily during December through April, with a long, dry season generally from May through October. Precipitation is from both general storms and thunderstorms. Most of the streams in the basin are ephemeral with appreciable flow occurring only in response to heavy rainfall. Urban runoff, sewage plant effluent, imported flow, and naturally rising groundwater create a perennial flow from Riverside to Prado Dam and downstream through the Santa Ana Canyon to a set of recharge basins. Most low flow is intercepted at the recharge basins leaving the lower channel dry except during occasional periods of tributary storm flow and controlled releases from Prado, Villa Park, or Carbon Canyon Dams.

3.2 Prado Dam and Reservoir

Prado Dam and Reservoir are located on the Santa Ana River adjacent to the junction of the Riverside Freeway (Route 91) and the Corona Expressway (Route 71) at the eastern end of the Chino Hills. Prado Dam, which is approximately 31 miles upstream from the mouth of the Santa Ana River at the Pacific Ocean, was constructed in 1941. The Dam is operated and maintained by the Corps and controls a drainage area of 2,250 square miles (5,827 km^2).

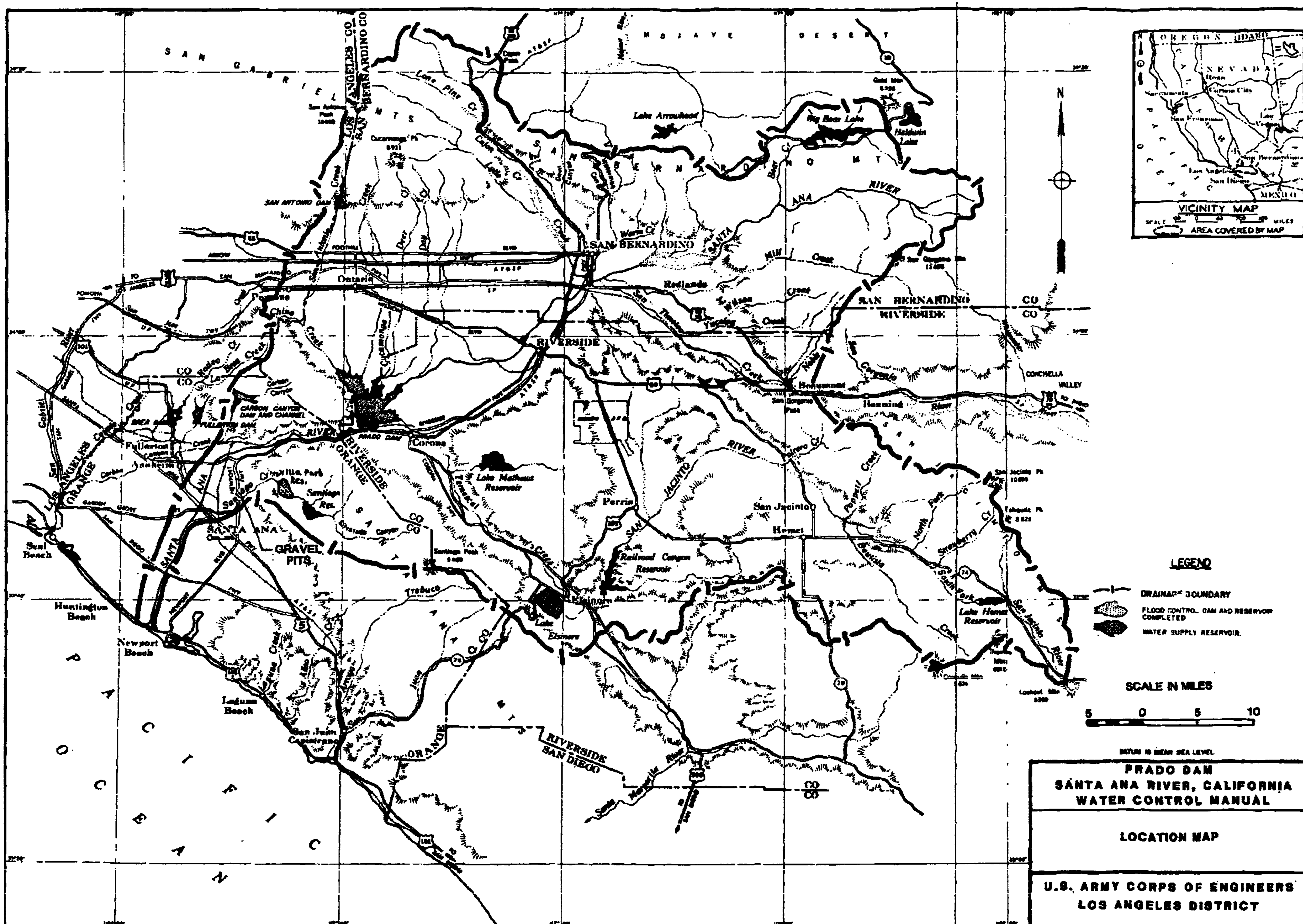
The Phase II GDM for Prado Dam lays out the configuration that the dam will have upon implementation of the Santa Ana River Mainstem Project, as authorized by the Water Resources Development Act of 1986. The GDM layout includes raising the existing earthfill embankment 28.4 ft (8.66 m) to elevation 594.4 ft (181.2 m) NGVD, rising 124 ft (37.8 m) above the streambed, with a crest length of 3,050 ft (929.6 m). The spillway crest will be raised 20 ft (6.1 m) to elevation 563 ft (171.6 m) and the boundaries of the reservoir basin will increase from elevation 556 ft (169.5 m) NGVD to elevation 566 ft (172.5 m) NGVD. The reservoir formed by the dam will hold approximately 351,700 AF (433.8 million m^3) of water at spillway crest (1988 survey), covering approximately 10,300 acres (4,168.3 hectares) of land. The reservoir outlet sill will be at elevation 470.0 ft (143.3 m) NGVD (the streambed elevation), and the peak controlled outflow will be 30,000 cubic feet per second (cfs) (849.5 m^3/second). The Debris Pool will be at elevation 490 ft (149.4 m) NGVD. The 2002 conditions for Reservoir Design Flood and Spillway Design Flood (Probable Maximum Flood) peak discharges at the dam site are 282,000 cfs (7,985.4 m^3/sec) and 670,000 cfs (18,972.3 m^3/sec), respectively.

The valley portion of the watershed above Prado Dam is rapidly urbanizing, resulting in the increase of average annual runoff. The extent of urbanization was not fully anticipated in the design of Prado Dam. This increased urbanization led the Corps to determine in 1975 that the reservoir does not provide protection from floods larger than a 70-year event. Thus the existing Prado Dam, as evaluated under 1988 conditions, does not provide the required flood protection and the modifications described in the above paragraph have been deemed necessary and authorized for implementation by Congress.

3.3 Lower Santa Ana River Basin from Prado Dam to the Pacific Ocean

Two major flood control dams are located in the Santa Ana River Basin below Prado Dam: Carbon Canyon Dam and Villa Park Dam. Carbon Canyon Dam, located on Carbon Canyon Creek, was built by the Corps in1961. Villa Park Dam was completed by the Orange County Flood Control District in January 1963. Other existing flood control improvements have been constructed by local interests. The principal existing water conservation improvements are spreading grounds in and along the Santa Ana River, the Burris Pit and Bond Pit recharge basins, Villa Park Dam and Reservoir, and Santiago Dam and Irvine Lake.

The without-project condition is defined as the baseline condition that will be the basis against which the proposed alternatives are measured to identify impacts, avoidance measures, mitigation, and benefits. The without-project condition is assessed in terms of the present (existing) and future conditions. The without-project condition assumes that the currently authorized water conservation operation of Prado Dam is unchanged.



PRADO DAM
SANTA ANA RIVER, CALIFORNIA
WATER CONTROL MANUAL
LOCATION MAP
U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT
LEGEND
DRAINAGE BOUNDARY
FLOOD CONTROL DAM AND RESERVOIR COMPLETED
WATER SUPPLY RESERVOIR
SCALE IN MILES
5
0
5
10
VICINITY MAP
AREA COVERED BY MAP
OREGON
IDAHO
NEVADA
MEXICO
N
PACIFIC OCEAN
SAN GABRIEL MTS
SAN BERNARDINO MTS
SANTA ANA MTS
MOJAVE DESERT
SANTA ANA RIVER
SAN JACINTO RIVER
SAN BERNARDINO
RIVERSIDE
LOS ANGELES CO
SAN BERNARDINO CO
ORANGE
SAN DIEGO
Lake Arrowhead
Big Bear Lake
Baldwin Lake
Ontario
Pomona
Chino
Redlands
Beaumont
Banning
Corona
PRADO DAM
Lake Mathews Reservoir
Perris
San Jacinto
Hemet
Railroad Canyon Reservoir
Lake Elsinore
Elsinore
Lake Hemet Reservoir
Fullerton
Anaheim
Santa Ana
GRAVEL PITS
Santiago Res.
Villa Park Res.
CARBON CANYON DAM AND CHANNEL
BREA DAM
FULLERTON DAM
SAN ANTONIO DAM
Seal Beach
Huntington Beach
Newport Beach
Laguna Beach
San Juan Capistrano
COACHELLA VALLEY

4 PLAN FORMULATION

Plan formulation is the process by which alternative plans are created to address specific planning objectives. Plan formulation typically begins with the identification of measures, the building blocks from which alternative plans are created. After alternative plans are created, they might be reformulated to make them more effective, efficient, reliable, or acceptable.

4.1 Planning Objectives

The National Objective (Section 2.1) is a general statement and not specific enough for direct use in plan formulation. Planning objectives are directly related to identifying the problems and opportunities, and represent desired positive changes in the Without-Project Condition.

The general planning objective for the Prado Basin Water Conservation Feasibility Study is to increase the amount of water that is delivered to OCWD's groundwater basins. This can be accomplished by storing the local storm runoff and releasing the water at a slower rate depending on the inflow capability of the recharge facilities. Water conservation practices such as this would reduce the amount of water that is lost to the ocean, and increase the local water supplies. Impacts to existing environmental resources must be considered, and when impacts are unavoidable, mitigation measures must be proposed.

4.2 Alternative Plans

4.2.1 Alternatives from Reconnaissance Study

The reconnaissance phase of the present water conservation study commenced in 1994 and culminated in a 1996 Reconnaissance Report. The Report included 15 alternatives, some of which had maximum permissible non-flood season water surface elevations up to 512 ft NGVD (156.1 m), since the Corps, from the *Review of Prado Dam Operation for Water Conservation and Environmental Impact Statement* (October 1992) study, had the authority to consider a 514 ft (153.9 m) NGVD maximum water surface elevation. The alternatives considered in the 1996 Reconnaissance Report are listed in Table 4-1.

Table 4-1 Alternatives Contained in 1996 Reconnaissance Report

Maximum Flood Season Water Surface Elevation (feet)	Maximum Non-Flood Season Water Surface Elevation (feet)
498	498
494	505
498	505
499	505
500	505
501	505
502	505
503	505
504	505
505	505
508	508
498	512
508	512
Santa Ana River Polishing Ponds	
Peripheral Water Conservation Holding Ponds between Elevations 556 and 566 feet.	

4.2.2 Alternatives Selected for Feasibility Study

During the course of the feasibility study, 10 of the original 15 alternatives were eliminated from further consideration because they were not feasible due to having prohibitively low benefit/cost ratios, leaving five stand alone alternatives. The alternatives that were dropped, along with the justification for being eliminated, were the following:

- Winter Flood Forecasting to Elevation 498 ft - Seasonal Pool to Elevation 512 ft.

This alternative was dropped as there was no desire to increase elevation of the Seasonal Pool above the current 505 feet.

- Winter Flood Forecasting to Elevation 508 ft - Seasonal Pool to Elevation 512 ft

This alternative was dropped as there was no desire to increase elevation of the Seasonal Pool above the current 505 feet.

- Winter Flood Forecasting to Elevation 498 ft - Seasonal Pool to Elevation 498 ft

This alternative was dropped as there was no desire to decrease elevation of the Seasonal Pool below the current 505 feet.

- Winter Flood Forecasting to Elevation 499 ft - Seasonal Pool to Elevation 505 ft

This alternative was dropped as the additional mitigation required to achieve the incremental increase in water stored compared to Alternative 2 was not considered acceptable to OCWD.

- Winter Flood Forecasting to Elevation 501 ft - Seasonal Pool to Elevation 505 ft

This alternative was dropped as the additional mitigation required to achieve the incremental increase in water stored compared to Alternative 3 was not considered acceptable to OCWD.

- Winter Flood Forecasting to Elevation 502 ft - Seasonal Pool to Elevation 505 ft

This alternative was dropped as the additional mitigation required to achieve the incremental increase in water stored compared to Alternative 3 was not considered acceptable to OCWD.

- Winter Flood Forecasting to Elevation 503 ft - Seasonal Pool to Elevation 505 ft

This alternative was dropped as the additional mitigation required to achieve the incremental difference in water stored compared to Alternative 4 was not considered acceptable to OCWD.

- Winter Flood Forecasting to Elevation 504 ft - Seasonal Pool to Elevation 505 ft

This alternative was dropped as the additional mitigation required to achieve the incremental difference in water stored compared to Alternative 4 was not considered acceptable to OCWD.

- Santa Ana River Polishing Ponds

This alternative was dropped as it would have required extensive construction within the lower elevations of the basin between elevations 500 and 530 feet.

- Peripheral Water Conservation Holding Ponds (Between Elevations 556 and 566 ft.)

This alternative was dropped as it required OCWD to purchase extensive farm lands above the existing flood pool, and complete extensive construction to create storage ponds.

The five remaining alternatives were selected principally on the basis that, for each, the reservoir water surface elevation could be drawn down to 490 feet (Debris Pool) within 24 hours without significant damage downstream and resultant environmental mitigation.

4.3 Screening Alternatives

The previous draft feasibility report contained ten proposed alternatives (Nos. 1, 1a, 2, 3, 4, 5, 6, 7, 8, and 9). Five of these alternatives (Nos. 1a, 6, 7, 8, and 9) were designated as "pre-construction" alternatives because they were intended for implementation prior to completion of the outlet works and downstream channel improvements only. Three of these alternatives (Nos. 3, 4 and 5) were designated as "post-construction" alternatives because they could only be implemented after completion of the outlet works and downstream channel improvements. One alternative (No. 2 – the preferred alternative) can be implemented both prior to and after the completion of the outlet works and downstream channel improvements. The economic analysis of alternatives requires the same 50-year time frame to be used for, analyzing all the alternatives, therefore, it was necessary to consider these "pre- construction" alternatives as commencing at the same date as those alternatives that could not be implemented prior to construction.

4.4 Reformulation of Alternatives

The final array of alternatives is described in the following paragraphs. Reference Figure 1-1 for areas within the Prado Flood Control Basin affected by the elevations cited.

4.4.1 Alternative 1: Flood Season Water Conservation to Elevation 494.0 ft, plus Non-flood Season Water Conservation to Elevation 505.0 ft (Without-Project Condition).
This is the existing operation at Prado Dam. When inflow to Prado Dam is greater than the percolation capacity of the downstream spreading grounds, the existing Debris Pool (elevation 490.0 ft) is utilized for water conservation anytime during the year. The existing operation schedule calls for controlled releases up to 600 cfs until the reservoir reaches elevation 490.0 ft.

During the flood season, encroachment into the Flood Control Pool up to elevation 494.0 ft (top of buffer pool) is allowed for water conservation purposes when weather conditions are favorable. When the threat of unfavorable weather is forecast, the reservoir is drawn down to the Debris Pool (if necessary) to accommodate the anticipated inflow volume from the storm(s) to ensure there is storage available for flood control operations.

During the non-flood season, water can be held up to elevation 505.0 ft (top of Seasonal Pool) for water conservation purposes. Beginning March 1 and continuing to March 10, the maximum allowable water surface elevation for conservation is linearly increased from elevation 494.0 ft to elevation 505.0 ft. The pool may be maintained as high as elevation 505.0 ft until September 30. However, if maintenance is required, the reservoir must be evacuated before September 1. If summer flood runoff occurs in September, the dam can be operated for water conservation up to elevation 505.0 ft, provided that the impoundment does not interfere with maintenance requirements.

Releases from Prado Dam during water conservation operations, will be based on the estimated rate that the downstream spreading channel can percolate. If hydrologic forecasts and reservoir conditions indicate that the water surface elevation will exceed elevation 505.0 ft, water control personnel at the Corps' Reservoir Operations Center (ROC) will match inflow with outflow. Above elevation 505.0 ft, the reservoir is put in full flood-control mode; and outflows can be made up to the downstream channel capacity of the Santa Ana River .

4.4.2 Alternative 2: Flood Season Water Conservation to Elevation 498.0 ft, plus Non-flood Season Water Conservation to Elevation 505.0 ft.

When inflow to Prado Dam is greater than the percolation capacity of the downstream spreading grounds, the existing Debris Pool (elevation 490.0 ft) is utilized for water conservation anytime during the year. The existing operation schedule calls for controlled releases up to 600 cfs until the reservoir reaches elevation 490.0 ft.

During the flood season, encroachment into the Flood Control Pool up to elevation 498.0 ft (top of buffer pool) is allowed for water conservation purposes when weather conditions are favorable. When the threat of unfavorable weather is forecast, the reservoir will be drawn down to the Debris Pool (if necessary) to accommodate the anticipated inflow volume from the storm(s) to ensure there is storage available for flood control operations.

During the non-flood season, water can be held up to elevation 505.0 ft (top of Seasonal Pool) for water conservation purposes. Beginning March 1, the maximum allowable water surface elevation for conservation is linearly increased from elevation 498.0 ft to elevation 505.0 ft on March 10. The pool may be maintained as high as elevation 505.0 ft until September 30. However, if maintenance is required, the reservoir must be evacuated before September 1. If summer flood runoff occurs in September, the dam can be operated for water conservation up to elevation 505.0 ft, provided that the impoundment does not interfere with maintenance requirements.

Releases from Prado Dam, during water conservation operations, will be based on the estimated rate that the downstream spreading channel can percolate. If hydrologic forecasts and reservoir conditions indicate that the water surface elevation will exceed elevation 505.0 ft, the water control personnel at the ROC will match inflow with outflow. Above elevation 505.0 ft, the reservoir is put in full flood-control mode; and outflows can be made up to the downstream channel capacity of the Santa Ana River.

4.4.3 Alternative 3: Flood Season Water Conservation to Elevation 500.0 ft, plus Non-flood Season Water Conservation to Elevation 505.0 ft.

When inflow to Prado Dam is greater than the percolation capacity of the downstream spreading grounds, the existing Debris Pool (elevation 490.0 ft) for water conservation is utilized anytime during the year. The existing operation schedule calls for controlled releases up to 600 cfs until the reservoir reaches elevation 490.0 ft.

During the flood season, encroachment into the flood-control pool up to elevation 500.0 ft (top of buffer pool) is allowed for water conservation purposes when weather conditions are favorable. When the threat of unfavorable weather is forecast, the reservoir will be drawn down to the Debris Pool (if necessary) to accommodate the anticipated inflow volume from the storm(s) to ensure there is storage available for flood control operations.

During the non-flood season, water can be held up to elevation 505.0 ft (top of Seasonal Pool) for water conservation purposes. Beginning March 1, the maximum allowable water surface elevation for conservation is linearly increased from elevation 500.0 ft to elevation 505.0 ft on March 10. The pool may be maintained as high as elevation 505.0 ft until September 30. However, if maintenance is required, the reservoir must be evacuated before September 1. If summer flood runoff occurs in September, the dam can be operated for water conservation up to elevation 505.0 ft, provided that the impoundment does not interfere with maintenance requirements.

Releases from Prado Dam, during water conservation operations, will be based on the estimated rate that the downstream spreading channel can percolate. If hydrologic forecasts and reservoir conditions indicate that the water surface elevation will exceed elevation 505.0 ft, the water control personnel at the ROC will match inflow with outflow. Above elevation 505.0 ft, the reservoir is put in full flood-control mode; and outflows can be made up to the downstream channel capacity of the Santa Ana River.

4.4.4 Alternative 4: Water Conservation to Elevation 505.0 ft Year-Round.
When inflow to Prado Dam is greater than the percolation capacity of the downstream spreading grounds, the existing Debris Pool (elevation 490.0 ft) is utilized for water conservation anytime during the year. The existing operation schedule calls for controlled releases up to 600 cfs until the reservoir reaches elevation 490.0 ft.

During the flood season, encroachment into the flood-control pool up to elevation 505.0 ft (top of buffer pool) is allowed for water conservation purposes when weather conditions are favorable. When the threat of unfavorable weather is forecast, the reservoir will be drawn down to the Debris Pool (if necessary) to accommodate the anticipated inflow volume from the storm(s) to ensure there is storage available for flood control operations.

During the non-flood season, water can also be held up to elevation 505.0 ft (top of Seasonal Pool) for water conservation purposes. The pool may be maintained as high as elevation 505.0 ft until September 30. However, if maintenance is required, the reservoir must be evacuated before September 1. If summer flood runoff occurs in September, the dam can be operated for water conservation up to elevation 505.0 ft, provided that the impoundment does not interfere with maintenance requirements.

Releases from Prado Dam, during water conservation operations, will be based on the estimated rate that the downstream spreading channel can percolate. If hydrologic forecasts and reservoir conditions indicate that the water surface elevation will exceed elevation 505.0 ft, the water control personnel at the ROC will match inflow with outflow. Above elevation 505.0 ft, the reservoir is put in full flood-control mode; and outflows can be made up to the downstream channel capacity of the Santa Ana River.

4.4.5 Alternative 5: Water Conservation to Elevation 508.0 ft Year-Round.

When inflow to Prado Dam is greater than the percolation capacity of the downstream spreading grounds, the existing Debris Pool (elevation 490.0 ft) for water conservation is utilized anytime during the year. The existing operation schedule calls for controlled releases up to 600 cfs until the reservoir reaches elevation 490.0 ft.

During the flood season, encroachment into the flood-control Pool up to elevation 508.0 ft (top of buffer pool) for water conservation purposes is allowed when weather conditions are favorable. When the threat of unfavorable weather is forecast, the reservoir will be drawn down to the Debris Pool (if necessary) to accommodate the anticipated inflow volume from the storm(s) to ensure there is storage available for flood control operations.
During the non-flood season, water can also be held up to elevation 508.0 ft (top of Seasonal Pool) for water conservation purposes. The pool may be maintained as high as elevation 508.0 ft until September 30. However, if maintenance is required, the reservoir must be evacuated before September 1. If summer flood runoff occurs in September, the dam can be operated for water conservation up to elevation 508.0 ft, provided that the impoundment does not interfere with maintenance requirements.

Releases from Prado Dam, during water conservation operations, will be based on the estimated rate that the downstream spreading channel can percolate. If hydrologic forecasts and reservoir conditions indicate that the water surface elevation will exceed elevation 508.0 ft, the water control personnel at the ROC will match inflow with outflow. Above elevation 508.0 ft, the reservoir is put in full flood-control mode; and outflows can be made up to the downstream channel capacity of the Santa Ana River.

4.5 Evaluation of Final Array of Alternatives

The alternatives described in section 4.4 are evaluated on how well they meet the following criteria:
(1) Feasibility of implementing the required modifications to the dam,
(2) Demonstration of Federal interest based on economic and environmental criteria,
(3) Support of OCWD
(4) Consistency with policies and budgetary priorities.

Detailed engineering, economic, environmental, and real estate analyses were performed in order to identify the required dam modifications, costs of modifications, real estate requirements, and the benefits resulting from water conservation yields of the various alternatives. The following sections summarize information from the technical reports and the EIS/EIR.

4.5.1 Hydrology

4.5.1.1 Flood Control

Formal incorporation of water conservation into the water control plan for Prado Dam must address the impact on the level of flood protection afforded by a proposed change in project operation. In this instance, all the alternatives can be implemented without a significant reduction of flood protection downstream. The reasons are as follows:

- From a design storm standpoint, Prado Dam can pass the reservoir design flood (RDF) under present conditions without exceeding the spillway crest for all five alternatives.

- For future conditions, the RDF does not induce spillway flow; however, the maximum water surface elevation is about 2.5 to 3 ft higher than under present conditions.

- Even with no advanced warning of an RDF at Prado Dam, the reservoir can still provide RDF protection for all five alternatives under present and future conditions.

From a discharge-frequency standpoint, the level of protection under present, interim, and future conditions does not change significantly from Alternative 1 (without-project condition) to Alternative 5 (highest elevation of buffer pool). The difference in maximum water surface elevation between Alternative 1 and Alternative 5 is only about 1 to 1.5 ft for floods in the 100- to 500-year range for both present and future conditions.

More detailed descriptions of how flood control impacts were evaluated are provided in the Hydrology and Hydraulics Report. Table 66 of the Hydrology and Hydraulics Report provides the frequency of spill at Prado Dam for all alternatives.

4.5.1.2 Duration and Frequency of Inundation

Duration of inundation is an important hydrologic parameter in this study. Each water conservation alternative will increase the duration of inundation at any given elevation up to elevation 505 ft. As the probability of a storm decreases (less frequent, larger storm event) the duration of inundation increases. Both duration and frequency of inundation are important parameters that help assess environmental and recreation impacts. Detailed inundation duration tables and inundation-duration-frequency curves for all alternatives are in the Hydrology and Hydraulics Report.

4.5.1.3 Water Conservation Yields

Water conservation yield is calculated by the amount of water that OCWD can use in its spreading basins. Under present conditions, the release rate from Prado Dam up to approximately 500 cfs can be utilized by OCWD in its spreading grounds. The average annual inflow to Prado Dam for the representative period of record, present conditions, including base flow and storm flows, is about 278,000 AF. The average annual flow from the local area between Prado Dam and the spreading facilities is about 7,900 AF. Of the total flow of 286,000 AF, OCWD can save about 83 percent of that runoff under present conditions, with 48,000 AF of water being lost to the Pacific Ocean.

Yields determined for the various alternatives at Prado Dam are presented in Table 4-2. The water yields were obtained from a hydrologic evaluation of the watershed and hydraulic evaluation of the facilities. For a description of how the data in Table 4-2 was obtained, refer to the Hydrology and Hydraulics Report.

Table 4-2 Water Conservation Yields at Prado Dam

Alternative	Condition	Yield (Acre-Feet)	Increase over Present Conditions (Acre-Feet)	Water "Lost" (Acre-Feet)
Alternative 1	Present	238,000	0	48,000
	Future	314,000	76,000	68,000
Alternative 2	Present	240,000	2,000	46,000
	Future	318,000	80,000	64,000
Alternative 3	Present	241,000	3,000	45,000
	Future	319,000	81,000	63,000
Alternative 4	Present	242,000	4,000	44,000
	Future	322,000	84,000	60,000
Alternative 5	Present	244,000	6,000	42,000
	Future	324,000	86,000	58,000

- Yield is the total volume of water delivered to the OCWD spreading grounds annually.
- Water "Lost" is the difference between the average annual flow in the Santa Ana River above the OCWD spreading facilities minus the yield for the downstream spreading grounds.
- Present Conditions for Alternatives 1 to 5 are conditions for water year 2004 in the watershed with the Phase II GDM design for Prado Dam in place.
- Future Conditions Alternatives 1 to 5 are for the year 2053. Urbanization adjustments were made to the daily inflows to represent changes over the 50-year period of analysis. Future Conditions yields presented in this report include the effects of sedimentation.
- Presented interim yields are at the beginning of the Interim Condition.
- For complete description of alternatives, see Section 4.7.

4.5.1.4 Impacts of Seven Oaks Dam on Prado Dam Yields

Runoff held at Seven Oaks Dam will not significantly affect the yields in Prado Reservoir. Flows generated in the Seven Oaks sub-watershed and routed to Prado Dam are subject mainly to channel percolation and evaporation losses. Based on estimated flow widths and wetted acres for the average daily discharges between Seven Oaks Dam and E Street in San Bernardino during the primary conservation period (March through May), and in conjunction with an estimated percolation loss of 1 cfs/day/wetted acre, flows reaching E Street are effectively reduced by 50 percent. From E Street to Prado Dam, discharges generated from sewage effluent continuously flow in the Santa Ana River commingling with the upper Santa Ana River discharges. Discharges are again reduced by 50 percent for losses.

At the OCWD spreading facilities downstream from Prado Dam under present conditions, the conservation operation at Prado Dam saves approximately 83 percent (238,000 AF out of 286,000 AF) of the flows with 17 percent (48,000 AF) "lost" to the ocean. Consequently, if conservation operations are conducted at Seven Oaks Dam, the yield at Prado Dam will be reduced by about 20 percent of the yield at Seven Oaks Dam for a given alternative. This reduction in the yield would probably be made up out of the 17 percent "lost" to the ocean. Estimates for water conservation yields at Seven Oaks are on the order of 2,500 to 5,000 AF per year. Twenty percent would be about 500 to 1,000 AF per year, which is less than 1 percent of the yield at the OCWD spreading facilities. These estimates indicate no significant impacts to yields at Prado Dam.

4.5.1.5 Downstream Impacts

The original premise of this study was that water conservation would have no adverse impact on the flood control function of the reservoir. To achieve this, the buffer pool must be evacuated prior to any major flood event or partially evacuated for lesser events. Water that is being held in the buffer pool awaiting recharge at the downstream spreading grounds is strictly a part of the proposed water conservation operation. Mitigation for any and all damages to the downstream channel caused by evacuation of the buffer pool in anticipation of a flood event is the responsibility of OCWD.

During and after the January and February 1969 floods, Prado Dam was operated to limit the discharges to a maximum of about 5,000 cfs after it was discovered that greater flows cause damages downstream. There are no significant damages for releases less than 5,000 cfs in the Santa Ana Canyon reach. There are some erosional damages to the Riverview Golf Course, located about 21 miles downstream from Prado Dam, with releases from Prado less than 5,000 cfs.

The Santa Ana River Project (SARP) Phase II GDM improvements to Prado Dam and the lower Santa Ana River are designed to allow flood control releases up to 30,000 cfs without significant damages. The Phase II channel improvements in the lower Santa Ana River have been completed in Reaches 1 through 8 (Pacific Ocean to Weir Canyon Road). Reach 9 (Prado Dam to Weir Canyon Road) is scheduled to be constructed in two phases. Phase I construction was initiated in February 2003. Phase II design and construction has been delayed due to lack of funding, however, there will be an attempt to start these activities in 2005.

Most of the damages in the downstream channel from releases exceeding 5,000 cfs occur in the

Santa Ana Canyon reach of the Santa Ana River (Reach 9). This reach is about 7 miles long and runs from Prado Dam to Weir Canyon Road. Reach 9 is mostly unimproved and even after Phase II modifications, will still sustain some damages, especially with higher releases. The Green River Golf Course is located within the Santa Ana Canyon reach and is subject to inundation and erosional damages.

As presented in Section 6.5 of the Hydrology and Hydraulics Report, the maximum discharge required to evacuate the buffer pool in 24 hours for each alternative is listed below.

Alternative 1	2,500 cfs
Alternative 2	5,000 cfs
Alternative 3	7,400 cfs
Alternative 4	14,900 cfs
Alternative 5	25,900 cfs

Since the maximum release required to evacuate the buffer pool for alternatives 1 and 2 is 5,000 cfs or less, there would be no significant damages in the Santa Ana Canyon reach for these alternatives. The total area of inundation for a flow of 5,000 cfs is 260 acres in the canyon area. For flows of 7,400 cfs, 14,900 cfs, and 25,900 cfs, the total areas of inundation are 361 acres, 770 acres, and 915 acres, respectively. Average velocities though the canyon area range from 6.5 fps for a release of 5,000 cfs, to 7.4 fps for a release of 7,400 cfs, to 8.5 fps for a release of 14,900 cfs, and to 9.9 fps for a release of 25,900 cfs. Damages for alternatives 2, 3, 4, and 5 are presented in the Economics Report.

The potentially large releases required to evacuate the buffer pool may impact the downstream channel in two ways: an increase in frequency of inundation and an increase in frequency of erosion. Since releases of the same magnitude required for flood control purposes would cause the same damages, an effort was made to differentiate large releases attributed to water conservation operation from those which would happen under flood control operations.

Average daily inflows for the representative period of record for Prado Dam were plotted on time series graphs and evaluated on a water year-by-water year basis to determine if the buffer pool for each water conservation alternative would have been evacuated ("dumped") assuming the buffer pool had been approved and in place for the entire period. Consideration was given to the status of the buffer pool (i.e., did it have water in it at the time of the event). The maximum discharge required to evacuate the buffer pool for each alternative listed above was assigned for each evacuation. Using this method does not completely account for false alarms or releases based on partially-full pools. This approach is highly subjective, but the results are based on the best engineering judgement of Corps engineers experienced with the flood season operation of Prado Dam and is considered a "worst case" scenario that is used as a basis for determining environmental impacts. This subjective evaluation was performed with the buffer pool for all five Alternatives. The number of "dumps" per water year and a summary for each alternative are summarized in Table 67 of the Hydrology and Hydraulics Report. Since the buffer pools for

Alternatives 1 and 2 can be evacuated in less than 24 hours at maximum discharges less than 5,000 cfs, the estimated number of "dumps" is the same.

The frequency of releases attributed to flood control was determined using the outflow-frequency curves shown on Plate 33 of the Hydrology and Hydraulics Report. The With-Existing Outlets curve is from the 1994 Water Control Manual for Prado Dam. The With-Phase II GDM Outlets curve is from Table 7-9 of DM No. 1, Volume 7, Phase II GDM on the Santa Ana River; for Post-Construction Present Conditions. Results are shown in Table 68 of the Hydrology and Hydraulics Report.

The frequency of releases attributed to both water conservation and flood control was converted to frequency of occurrence in the 50-year period of economic analysis by dividing the outflow-frequency by 50 for each alternative. These results are shown in Table 69 of the Hydrology and Hydraulics Report. Finally, the maximum releases in each of the 50 years are summarized in Table 70 of the Hydrology and Hydraulics Report.

4.5.1.6 Operation and Maintenance

As per the recommended plan, the current operation plan for Prado Dam will be modified to allow the outlet gates to be set to maximize water conservation at the downstream spreading facilities when the water surface behind the dam is below the designated buffer pool or Seasonal Pool elevation. A conceptual plan has been developed and is described in the Hydrology and Hydraulics Appendix, Sections 6 and 8. Under the conceptual plan, the Corps' ROC, will have full discretion over when the reservoir will be placed in water conservation mode. The determination will be made based on water surface elevation, inflow to the dam, and meteorological forecasts. Gate changes will be performed by the Corps dam tender. When favorable conditions exist, personnel from OCWD will estimate the current infiltration capacity at the spreading grounds and request a release rate from Prado Dam. If weather conditions change or the water surface exceeds a certain elevation, the operation will switch to Debris Pool, buffer pool, Flood Control, or Seasonal Pool operation depending on impending weather forecasts and anticipated runoff. Releases from Prado Dam during the non-flood season while the reservoir is in Seasonal Pool operation will be made so as to maintain a 500 cfs running average, as required, to minimize environmental impacts.

Several factors, in addition to environmental impacts, weather conditions and inflow forecasting, may affect the water conservation operation at Prado Dam including: maintenance of the outlet gates or downstream channel; any other required maintenance; condition of the water itself (turbidity, debris); and condition of the downstream spreading facilities.

Maintenance of the operations area is performed by the Corps. Maintenance of the recreational facilities is performed by San Bernardino and Riverside Counties under supervision and approval of the Corps. Accumulated sediment and debris within the basin area is removed by the Corps (or Corps contractor) to assure the proper flood control function of the dam.

Presently the trap efficiency of sediment at Prado Dam is over 97%. With the addition of an increased Buffer and/or Seasonal Pools at Prado Dam, sediment accumulation would be insignificantly increased. Removal of sediment and debris from the reservoir that is directly attributable to water conservation operations is the responsibility of OCWD. Coordination with OCWD is a requisite for water conservation operations. This coordination in the reservoir operation will allow for the highest volume of captured flows for recharge. It should be noted that if multiple daily adjustments of gate settings are required, after-hour adjustments, or weekend and/or holiday gate changes are requested, additional Corps manpower will be needed and funding from OCWD will be required to cover these costs.

4.5.2 Hydraulics

Hydraulic Analysis included the potential for additional sediment to deposit behind Prado Dam. Evaluation of existing sediment deposition behind Prado Dam indicates that the deposition rate of 700 AF per year used in this report for existing condition is conservative. Historical data for the last 48 years indicates that the average deposition was about 580 AF per year.
Future sediment depositions will be based on sediment inflow and the reservoir's trap efficiency. Table 4-3 shows the results of sediment deposition evaluation for the five alternatives. As shown in the table, the trap efficiency increases slightly as a result of the increase in the water conservation pool elevation due to the increase in detention time and reduction of the flow velocity associated with the increase in the mean operating level. Detailed analysis is located in the Hydrology and Hydraulics Appendices.

Table 4-3. Average Annual Sediment Deposition Rates for with-Project Conditions

	Average Annual Sediment Inflow (AF/yr)	Average Trap Efficiency (percent)	Average Annual Sediment Deposition (AF/yr)
1	720	97.1	700
2	720	97.6	703
3	720	97.8	705
4	720	98.2	707
5	720	98.4	709

4.5.3 Civil Design

No additional changes are proposed for the with-project alternatives beyond those that are being implemented by the Corps as described in the Phase II GDM for Prado Dam. The water conservation operation assumes that the design has been constructed for the alternatives.

Modifications to Prado Dam are scheduled in three phases. Phase I consists of construction of the new outlets and raising the dam embankment. Construction on the outlets and embankment commenced in 2003. The total time for construction of the outlets and embankment will be about 3 1/2 years. At the start of construction, a cofferdam was built to protect the construction area. The base of the cofferdam is at 505 ft elevation (approximate) and the top at about elevation 525 ft. After completion of the new outlet works, the cofferdam will be removed and excavation of the approach channel will commence. Simultaneously, work on demobilization of the original outlet works is expected to commence. During this period, the reservoir will need to be dry and water conservation activities will need to be suspended. Phase II includes construction of the interior dikes and auxiliary dike. Phase III involves raising the spillway. The schedule is not set and will change as Congress appropriates funding.

Due to the phasing of the construction described above, an interim condition has been incorporated into the study. The interim condition occurs for 4 years and assumes that the outlet, embankment, and downstream channel from the Phase II GDM are constructed. The interim condition ends when all the improvements are completed. The Phase II GDM improvements to the dam consist of raising the spillway crest, raising the top of the dam, a new gated outlet structure, dikes, and improvements to the downstream channel. These improvements are described in detail in the Civil Design Appendix to this report.

The Phase II GDM improvements are part of the Santa Ana River Mainstem Project (SARMP). The SARMP also includes improvements to the river channel downstream of Prado Dam. The channel improvements to the lower Santa Ana River have been completed in Reaches 1 through 8 (Pacific Ocean up to Weir Canyon Road). Reach 9 (Prado Dam down to Weir Canyon Road), Phase 1 construction started in 2003; Reach 9, Phase 2 design and construction is scheduled to start in 2005, pending acquisition of funding.

4.5.4 Spreading Facilities

Based on meetings with OCWD staff, there are no plans in the near future to increase the area of the existing spreading grounds or acquire additional land for spreading. While the increased spreading area would increase the long-term infiltration capacity, it should be the same for all alternatives and would not significantly affect the incremental yield for each alternative pool level. The County or OCWD may increase the volume of imported water spread at their facilities; however, this is normally done during drier periods when surface water is not available for spreading.

4.5.5 Climate

Significant climatic changes are not predicted for the period of evaluation for this project. It is assumed that climatic patterns, especially precipitation, will remain similar to those historically experienced, and established forecasting methods can be used to assist in operation of the dam.

4.5.6 Geotechnical (Geology and Soils)

Prado Dam is situated at the southwestern corner of the Upper Santa Ana Valley, a broad inland alluvial plain that is part of the larger South Coastal Basin of southern California. Elevations in the Upper Santa Ana Valley range from about 470 feet at Prado Dam to over 11,000 feet in the San Bernardino Mountains. The dam is located at the eastern tip of the Chino Hills at the head of Santa Ana Canyon. These hills are composed of Tertiary sediments of the Puente Formation. These sediments consist of poorly consolidated sandstone with hard siltstone and shale interbeds and scattered lenses of conglomerate. The Chino Hills and the Puente Hills to the northwest are a structural unit that has been uplifted between the Whittier fault, which forms the southwest margin, and the Chino fault which forms the east margin of these hills. Uplift of the region has occurred during the past 2 to 3 million years (Quaternary time) and has deformed the Puente Formation with extensive warping and faulting. Between the Whittier and Chino faults, numerous minor bedrock faults exist.

The abutments, spillway and outlet works are founded on the same Puente Formation exposed in the Chino Hills. At the dam, the formation strikes near parallel with the dam and dips 65 to 70 degrees upstream. Holocene (Recent) alluvial materials occur in the Santa Ana River channel, the reservoir floor, and other active watercourses. These deposits reach a known maximum thickness of 90 feet under the embankment and consist of saturated sands with lenses of silt, gravel, and clay. In general, the alluvium becomes coarser with depth. Older alluvial deposits consist of terraces and other deposits occurring at elevations above the Recent alluvium. At the dam, older alluvium caps the high ground between the dam and spillway and occurs in the spillway approach and beyond the spillway to the southeast. The older alluvium includes a thick, basal, sand and gravel unit that is overlain by a thin and discontinuous fine-grained sand and silt deposit. The older alluvial sediments range from 10 to 70 feet thick and average about 50 feet thick at the left abutment of the dam. The Santa Ana River is a perennial stream at the dam and generally intermittent upstream and downstream of the dam. The groundwater rise is due to the bedrock narrows at the dam site and is accentuated by the sheet piling cutoff beneath the embankment.

The materials in the reservoir basin are predominantly alluvial floodplain deposits of the Santa Ana River, Chino Creek and Cucamonga Creek. Locally, older terrace deposits and shallow bedrock of the Perris block are exposed. Portions of the Prado Basin, have been mapped as prime farmland or statewide important farmland. In addition, the United States Department of Agriculture, Natural Resources Conservation Service (USDA, NRCS) has rated the soils of the area for recreation uses. Soils within the basin have recreational limitations that have been rated as Slight to Moderate, with a small portion rated as Severe. A Slight rating means the soil has few, if any limitations for the specified use. A Severe rating means the soil has one or more properties that seriously limit its use.

In southern California, the prominent San Andreas fault can be considered as a boundary line in which the land west of it is drifting north relative to the east side. This drift builds up stresses throughout the region that are eventually relieved by movement along the San Andreas and other faults. Prado Dam is located at the juncture of three of these other faults, the Whittier, Elsinore, and Chino faults. The Whittier-Elsinore fault zone is a northwest trending structure extending from the Coyote Mountains in the south to Whittier Narrows in the north. The fault zone separates into the Chino and Whittier faults near Corona. The San Andreas fault zone, the most dominant seismotectonic structure in California, is located approximately 27 miles (44 km) from the dam. Significant surface fault rupture beneath the dam during the design life would be remote due to the apparent absence of major faulting beneath existing structures and the relative inactivity of the northern segments of the Elsinore fault zone. The results of a 1996 re-valuation of the seismic design parameters for Prado Dam by Dr. I. M. Idriss and the earthquake liquefaction potential are presented in the Geotechnical Appendix to this report.

4.5.7 Real Estate (Land Use)

Acreage, Estate, and Ownerships

The property to be affected by the proposed project is already owned by the Corps or OCWD; as a result, no estates are required for the proposed project. The acreage of land that would be flooded depends on the chosen alternative. Table 4-4 shows the amount of acreage per alternative.

Table 4-4. Summary of Acres Flooded by Alternatives (in Acres)

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Total Acres Inundated					
Oct. 1 to Feb. 28	1,139.146	1,492.979	1,685.664	2,131.606*	2,579.820*
Mar. 1 to Aug. 31	2,131.606	2,131.606	2,131.606	---	---
OCWD-Owned					
Oct. 1 to Feb. 28	368.864	466.914	540.244	731.735*	933.775*
Mar. 1 to Aug. 31	731.735	731.735	731.735	---	---
Corps -Owned					
Oct. 1 to Feb. 28	770.282	1,026.065	1,145.420	1,399.871*	1,646.045
Mar. 1 to Aug. 31	1,399.871	1,399.871	1,399.871	---	---

*Year-Round

Leases and subleases within the Prado Basin that would be affected by the proposed project are described in the Real Estate Appendix. The affected leases contain provisions allowing the Corps to inundate the leased lands. There are no relocations of homes required, no minerals and no relocations of facilities or utilities.

HTRW Sites

No HTRW sites are located within the project area. There are, however, potential environmental concerns, as summarized in the HTRW Study prepared as part of the Prado Basin Water Conservation Feasibility Study for Orange County Water District (June 1998). The HTRW study recommended several actions to safeguard the area and prevent any of the environmental concerns from becoming HTRW sites. None of these recommendations affected the value of the land or the findings in the Real Estate Appendix.

4.5.8 Biological Resources

Alternative 1 (the no action alternative) has no increased impacts on biological resources. However, Alternatives 2 through 5 impact biological resources in a variety of ways. The following sections discuss the impacts to critical and sensitive habitats, and to sensitive and non-sensitive wildlife. The EIS/EIR gives a complete description of the impacts and mitigation measures associated with water conservation at Prado Dam.

Within the basin, the environmental consequences of storing more water behind Prado Dam for water conservation are primarily the result of alterations in the amounts and distribution of riparian vegetation types in the basin, and in the spring, the potential flooding of least Bell's vireo nests following a major storm event late in the season. Downstream of Prado Dam, the environmental consequences are mostly due to increased frequency of higher flow releases as a result of increased water conservation.

4.5.8.1 *Environmental Consequences Upstream of Prado Dam*

Impacts to Critical and Sensitive Habitats

The predominant vegetation type in the basin between elevations 494 and 508 ft is willow woodland (approximately 920 acres), which is a major component of least Bell's vireo and southwestern willow flycatcher critical habitat. An important part of the critical habitat for these bird species is the understory vegetation that develops along the edges of the mature willow woodland and along the banks of stream channels. Any overall reduction in the amount of understory vegetation may have a significant adverse effect on the breeding success of these two species.

Under Alternative 1, no additional direct impacts on least Bell's vireo or southwestern willow flycatcher critical habitat would result due to the existing operations, which are to keep the water conservation pool levels in the reservoir at or below elevation 494 ft during flood season and at or below elevation 505 ft in the non-flood season.

Willow woodland, riparian scrub, and freshwater marsh plant associations in the Basin are considered sensitive vegetation types. Willow woodland and riparian scrub are important components of the least Bell's vireo and southwestern willow flycatcher critical habitat. They are also an important component of breeding habitat for the State Endangered Species, the western yellow-billed cuckoo, and two California Species of Special Concern, the yellow warbler and the yellow-breasted chat. Freshwater marsh vegetation serves as nesting, roosting, and sheltering habitat for several Species of Special Concern, including the white-faced ibis and a number of other waterfowl.

Under Alternative 1, no additional direct impacts to sensitive habitats would result due to the existing operations, which are to keep the water conservation pool levels in the reservoir at or below elevation 494 ft during flood season and at or below elevation 505 ft in the non-flood season.

Table 4-5 gives a summary of impacts to critical habitats within the basin, and Table 4-6 gives a summary of impacts to other sensitive habitats. Detailed descriptions of these impacts can be found in the EIS/EIR.

Table 4-5. Summary of Impacts to Critical Habitats within Prado Basin

Critical Habitat Supporting:	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Least Bell's Vireo	Direct, adverse, but less than significant	Direct, adverse, but less than significant	Direct, adverse, significant	Direct, adverse, significant
Southwestern Willow Flycatcher	Direct, adverse, but less than significant	Direct, adverse, but less than significant	Direct, adverse, significant	Direct, adverse, significant

Table 4-6 Summary of Impacts to Other Sensitive Habitats within Prado Basin

Habitat Type	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Willow Woodland	Direct, adverse, but less than significant	Direct, adverse, but less than significant	Direct, adverse, significant	Direct, adverse, significant
Riparian Scrub	Direct, adverse, but less than significant	Direct, adverse, but less than significant	Direct, adverse, but less than significant	Direct, adverse, but less than significant
Freshwater Marsh Vegetation	No impact	No impact	Direct, adverse, significant	Direct, adverse, significant

Impacts to Sensitive Wildlife

A number of Species of Special Concern occur or potentially occur in the Basin or in the areas immediately surrounding the Basin. Impacts range from no direct impact, Alternative 1, to adverse, but less than significant impact. Impacts on these species are summarized in Table 4-7 under the group headings, Mammals, Birds, Reptiles, Amphibians and Fishes.

Table 4-7. Impacts to Species of Special Concern within Prado Basin

Wildlife	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Mammals	Direct, adverse, but less than significant	Direct, adverse, but less than significant	Direct, adverse, but less than significant	Direct, adverse, but less than significant
Birds	Direct, adverse, but less than significant	Direct, adverse, but less than significant	Direct, adverse, but less than significant	Direct, adverse, significant
Reptiles	Direct, adverse, but less than significant	Direct, adverse, but less than significant	Direct, adverse, but less than significant	Direct, adverse, but less than significant
Amphibians	Direct, adverse, but less than significant	Direct, adverse, but less than significant	Direct, adverse, but less than significant	Direct, adverse, but less than significant
Fishes	Direct, adverse, but less than significant	Direct, adverse, but less than significant	Direct, adverse, but less than significant	Direct, adverse, but less than significant

Under Alternative 1, no additional direct impacts on Federally Endangered or Threatened Species, State Endangered or Threatened Species, Fully Protected Species, or Species of Special Concern would result due to the existing operations, which are to keep the water conservation pool levels in the reservoir at or below elevation 494 ft during the flood season and at or below elevation 505 ft in the non-flood season.

The impacts of the alternatives to Federal or State Endangered and Threatened Species, and Fully Protected Species are summarized in Table 4-8. Potential operational impacts on the least Bell's vireo and the southwestern willow flycatcher are most likely to be the inundation of nests that may occur following major storm events late in the flood season. Additionally, the Santa Ana sucker is a Federally Threatened Species. The western yellow-billed cuckoo is the only State Endangered Species that occurs in the basin. The Swainson's hawk, a rare visitor to the basin during migration, is a State Threatened Species. Two Fully Protected Species, the white-tailed kite and golden eagle, occur in the basin. The white-tailed kite breeds in the basin, and the eagle nests in the hills surrounding the basin and forages on the site.

Table 4-8. Impacts to Federal/State Endangered and Threatened, and Fully Protected Species within Prado Basin

Wildlife/Listing Status	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Least Bell's Vireo/FE/SE	Direct, adverse, significant	Direct, adverse, significant	Direct, adverse, significant	Direct, adverse, significant
Southwestern Willow Flycatcher/FE/SE	No impact	No impact	Direct adverse, but less than significant	Direct adverse, significant
Santa Ana Sucker/FT	Direct adverse, but less than significant	Direct adverse, but less than significant	Direct adverse, but less than significant	Direct adverse, but less than significant
Bald Eagle/FE and Peregrine Falcon/FE	No impact	No impact	No impact	No impact
Arroyo Southwestern Toad/FE and California Red-Legged Frog/FT	No impact	No impact	No impact	No impact
Western Yellow-billed Cuckoo/SE	No impact	No impact	No impact	No impact
Swainson's Hawk/ST	No impact	No impact	No impact	No impact
White-tailed Kite/CFP and Golden Eagle/CFP	Direct adverse, but less than significant	Direct adverse, but less than significant	Direct adverse, but less than significant	Direct adverse, but less than significant

FE=Federal Endangered Species, FT=Federal Threatened Species, SE=State Endangered Species, ST=State Threatened Species, CFP=California Fully Protected Species.

In addition, only one sensitive plant species, the many-stemmed dudleya, has been identified within the Prado Basin. Two small populations have been located near the perimeter of the basin, as defined by the 566-ft elevation contour line. There is not expected to be any impact on this plant species resulting from Alternatives 1 through 5.

Impacts to Non-sensitive Vegetation or Wildlife and Wildlife Movement Corridors

No additional direct impacts on non-sensitive vegetation or wildlife and wildlife movement corridors would result under Alternative 1. The impacts of Alternatives 2 through 5 on non-sensitive native vegetation would be Direct, Adverse, But Less Than Significant. The impacts of Alternatives 2 through 5 to ruderal and invasive nonnative vegetation is projected to be Direct, Adverse to Beneficial, But Less Than Significant. The impacts of Alternatives 2 through 5 on non-sensitive native wildlife species would be Direct, Adverse, But Less Than Significant. The impacts of Alternatives 2 through 5 on wildlife movement corridors would be Direct, Adverse, But Less Than Significant.

4.5.8.2 ***Environmental Consequences Downstream of Prado Dam***

Before Prado Dam was constructed in 1941, Santa Ana River flood flows passed through the narrow canyon below present-day SR-71 with enough force to remove most of the riparian floodplain vegetation approximately once every 20-30 years, returning the vegetation to an early successional stage. Since construction of the dam, water releases have been regulated, up to 600 cfs when flood-flow releases are not necessary. Flood-flow releases generally have not exceeded 2,500 cfs. These releases maintain the high water table in the canyon and the thick phreatophytic cottonwood and willow forests along the margins of the stream course. The result, however, is a smaller but more stable and mature riparian habitat than was originally present. On five occasions since 1941, releases have reached or exceeded 5,000 cfs: in 1969, 6,000 cfs in 1980, 5,100 cfs in 1983, and 5,300 cfs in 1993, and 10,000 cfs in 2005, an average of once every 12.8 years.

The frequency of releases from Prado Dam will increase dramatically over present conditions for some alternatives. For moderate releases that remain within the existing channel, as under Alternative 2, the increase in frequency should have little adverse impact in the short run, but may have a significant adverse impact on a cumulative basis as sediments in the channel are washed away over time and not replenished.

Major releases, as under Alternatives 4 and 5, and to a lesser extent Alternative 3, will have immediate significant adverse impacts because small to moderate amounts of critical endangered species habitat will be lost. Because of the high frequency of these releases with the proposed water conservation objectives, this vegetation often will not have sufficient time to regenerate before the next major relèase, resulting in a steady deterioration of critical habitat in the streambed.

Impacts to Critical and Sensitive Habitats Downstream of Prado Dam

The predominant vegetation downstream of Prado Dam and upstream of Weir Canyon Road is cottonwood and cottonwood/willow woodland, a major component of least Bell's vireo and southwestern willow flycatcher critical habitat. Small amounts of riparian scrub contribute to the total amount of critical habitat downstream of Prado Dam and upstream of Weir Canyon Road. Under Alternative 1, no additional direct impact in least Bell's vireo or southwestern willow flycatcher critical habitat or other sensitive habitats would result under existing operations. Tables 4-9 and 4-10 summarize the impact to critical and other sensitive habitats below Prado Dam.

Table 4-9. Summary of Impacts to Critical Habitats Downstream of Prado Dam

Critical Habitat Supporting:	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Least Bell's Vireo	Direct, adverse, but less than significant	Direct, adverse, significant	Direct, adverse, significant	Direct, adverse, significant
Southwestern Willow Flycatcher	Direct, adverse, but less than significant	Direct, adverse, significant	Direct, adverse, significant	Direct, adverse, significant

Table 4-10. Summary of Impacts to Other Sensitive Habitats Downstream of Prado Dam

Habitat Type	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Cottonwood/Willow Woodland	Direct, adverse, but less than significant	Direct, adverse, significant	Direct, adverse, significant	Direct, adverse, significant
Riparian Scrub	Direct, adverse, but less than significant	Direct, adverse, but less than significant	Direct, adverse, significant	Direct, adverse, significant

Impacts to Sensitive Wildlife Downstream of Prado Dam

A number of Species of Special Concern occur or potentially occur in the basin or in the areas immediately surrounding the basin. Impacts range from no direct impact, Alternative 1, to adverse, significant impact. Impacts on these species are summarized in Table 4-11 under the group headings, Mammals, Birds, Reptiles, Amphibians and Fishes.

Under Alternative 1, no additional direct impacts on Federally Endangered or Threatened Species, State Endangered or Threatened Species, Fully Protected Species, or Species of Special Concern would result due to the existing operations, which are to keep the water conservation pool levels in the reservoir at or below elevation 494 ft during the flood season and at or below elevation 505 ft in the non-flood season.

The impacts of the alternatives to Federal or State Endangered and Threatened Species, and Fully Protected Species are summarized in Table 4-12. Potential operational impacts on the least Bell's vireo and the southwestern willow flycatcher are most likely to be the inundation of nesting habitat that may occur following major storm events late in the flood season. The western yellow-billed cuckoo, a State Endangered Species, and the Swainson's hawk, a State Threatened Species, have not been documented in this section of the river. Only one Fully Protected Species, the white-tailed kite, is likely to occur in this portion of the Santa Ana River, with any regularity. Additional impacts to threatened and endangered species include increased scouring of vegetation and sediment during the flood season, due to increased frequency and velocity of discharges.

Table 4-11. Impacts to Species of Special Concern Downstream of Prado Dam

Wildlife	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Mammals	No impact	No impact	Direct, adverse, but less than significant	Direct, adverse, but less than significant
Birds	No impact	Direct, adverse, but less than significant	Direct, adverse, but less than significant	Direct, adverse, significant
Reptiles	Direct, adverse, but less than significant	Direct, adverse, but less than significant	Direct, adverse, significant	Direct, adverse, significant
Amphibians	No impact	No impact	No impact	No impact
Fishes	Direct, adverse, but less than significant	Direct, adverse, but less than significant	Direct, adverse, but less than significant	Direct, adverse, but less than significant

Table 4-12. Impacts to Protected Species Downstream of Prado Dam

Wildlife/Listing Status	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Least Bell's Vireo/FE/SE	No impact	No impact	Direct, adverse, but less than significant	Direct, adverse, but less than significant
Southwestern Willow Flycatcher/FE/SE	No impact	No impact	No impact	No impact
Santa Ana Sucker/FT	Direct, adverse, significant	Direct, adverse, significant	Direct, adverse, significant	Direct, adverse, significant
Bald Eagle/FE and Peregrine Falcon/FE	No impact	No impact	No impact	No impact
Arroyo Southwestern Toad/FE and California Red-legged Frog/FT	No impact	No impact	No impact	No impact
Western Yellow-billed Cuckoo/SE	No impact	No impact	No impact	No impact
Swainson's Hawk/ST	No impact	No impact	No impact	No impact
White-tailed Kite/CFP and Golden Eagle/CFP	No impact	No impact	Direct, adverse, but less than significant	Direct, adverse, but less than significant

FE=Federal Endangered Species, FT=Federal Threatened Species, SE=State Endangered Species, ST=State Threatened Species, CFP=California Fully Protected Species.

Impacts to Non-sensitive Vegetation or Wildlife or Wildlife Movement Corridors Downstream of Prado Dam

No additional direct impacts on non-sensitive vegetation, non-sensitive wildlife, and wildlife movement corridors would result under Alternatives 1, 2 and 3. The impacts of Alternatives 4 and 5 on non-sensitive native vegetation, would be Direct, Adverse, But Less Than Significant. The impacts of Alternatives 4 and 5 to ruderal and invasive nonnative vegetation is projected to be Direct, Beneficial and Significant to Adverse and Significant. The impacts of Alternatives 4 and 5 on non-sensitive native wildlife species would be Direct, Adverse, But Less Than Significant. The impacts of Alternatives 4 and 5 on wildlife movement corridors could be indirect and adverse, but less than significantly, if major releases destroy habitat necessary for shelter and foraging.

4.5.8.3 *Mitigation Measures*

The Corps recognizes the necessity of a least Bell's vireo management strategy and necessary habitat compensation to achieve restoration and maintenance of habitat that may be altered, diminished in value, or lost as a result of this project. The Corps continued to coordinate with the USFWS (through the July 2002 Biological Opinion) and other resource agencies on the implementation management strategies designed to reduce or eliminate potential impacts on listed species from continuing water conservation planning in Prado Basin.

Mitigation for maintaining a water conservation pool at elevation 494 ft during the flood season and a water conservation pool elevation at 505 ft during the non-flood season has already been negotiated under the Review of Prado Dam Operation for Water Conservation and Environmental Impact Statement (Corps of Engineers, 1992). Additional mitigation has been outlined for Alternatives 2, 3, 4, and 5 in the EIS/EIR. The Corps' mitigation goal for water conservation at Prado Basin is 100 percent replacement of lost wildlife habitat values through a combination of land acquisition for habitat replacement and a cash contribution to the Santa Ana River Conservation Trust Fund to support their continuing arundo removal and cowbird trapping programs. Table 4-13 summarizes mitigation costs for all alternatives.

Table 4-13. Prado Dam Water Conservation Biological Mitigation Costs

Alternative	Upstream Cost	Downstream Cost	Total Upstream and Downstream Cost	Total Annual Cost*
2	$223,000	$707,000	$930,000	$181,000**
3	$502,500	$657,000	$1,159,500	$87,000
4	$2,377,500	$1,543,000	$3,920,500	$259,000
5	$11,624,500	$2,664,000	$14,288,500	$905,500

*Annual costs based on economic calculation using a 5 5/8 percent discount rate.
**Includes $125,000 Santa Ana Sucker mitigation cost not reflected in total upstream and downstream costs. Sucker mitigation cost may vary somewhat from year to year.

4.5.9 Cultural Resources

4.5.9.1 Potential Impacts to Cultural Resources

Impacts to cultural resources are analyzed in the EIS/EIR. Impacts may occur as a result of erosion and inundation caused by elevated water levels and more frequent and higher flow releases. This erosion may result in the uncovering of previously unknown cultural resources or the inundation of known areas not previously subject to regular inundation. Alternative 1 has no impact on known cultural resources and will have no impact on unknown cultural resources. Alternatives 2, 3 and 4 will have no new impacts to known cultural resources upstream of Prado Dam, but could affect known resources downstream of Prado Dam and unknown resources both up- and downstream of Prado Dam. Alternative 5 may affect both unknown and known cultural resources.

Under Alternatives 2, 3 and 4 there is the potential for known cultural resources to be uncovered downstream of Prado Dam. Increased outflows from Prado Dam have the potential to cause additional erosion in downstream areas and may damage know cultural resources, including sites which may be eligible for the National Register. Any adverse impacts to these sites would be considered significant.

Under Alternatives 2, 3 and 4 there is the potential for unknown cultural resources to be uncovered both up- and downstream of Prado Dam. If uncovered, there is the potential that these resources could be eligible for the National Register of Historic Places (National Register) and that any adverse impact would be considered significant.

Under Alternative 5 there is the possibility for four known historic archeological sites to be adversely affected upstream of Prado Dam. These sites could be potentially eligible for listing on the National Register., None of the sites has been formally evaluated for listing on the NATIONAL REGISTER. Assuming that one or more is eligible, short- and long-term inundation would result in the loss of any significant information these sites might contain.

There is also the potential for unknown cultural resources to be uncovered under Alternative 5. If uncovered, there is the potential that these resources could be eligible for the National Register and that any adverse impact would be considered significant.

4.5.9.2 Mitigation Measures

For areas downstream of Prado Dam compliance with Section 106 of the National Historic Preservation Act is required prior to implementation of all project alternatives. In any National Register eligible historic sites are determined to be National Register eligible, specific mitigation measures will than be developed in accordance with the procedures in 36 CFR 800. Final mitigation shall be developed in consultation with the State Historic Preservation Officer

(SHPO) and the Advisory Council on Historic Preservation (ACHP).

In the event that unknown resources are uncovered upstream of Prado Dam during implementation of water conservation for Alternatives 2 through 5, the Corps must comply with 36 CFR 800.11, Properties Discovered During Implementation of an Undertaking. This regulation requires implementation of additional mitigation measures as developed in consultation with the SHPO and the ACHP.

For Alternative 5, compliance with Section 106 of the National Historic Preservation Act is required prior to implementation. The four potential National Register sites will require a test excavation to determine their significance. If any are determined to be National Register eligible, then specific mitigation measures would be developed in accordance with procedures in 36 CFR 800. Final mitigation shall be developed in consultation with the SHPO and the Advisory Council on Historic Preservation.

After the implementation of the above mitigation measures, implementation of Alternatives 2 through 5 would not significantly affect cultural resources.

4.5.10 Water Quality

Water quality effects for each alternative were evaluated in the EIS/EIR based on the potential for impacts to surface water quality downstream of Prado Dam, surface water quality within Prado Dam Basin area, and the potential for the release of toxic materials from maintenance equipment.

Alternative 1 will not result in any impacts to water quality because there is no action under this alternative. Alternatives 2 through 5 should improve surface water quality both downstream and within Prado Dam basin area. The improvement in surface water quality is a result of both an increase in quantity of water stored (resulting in an increase in dilution of pollutants) and an increase in the duration of impoundment (resulting in increased sedimentation of fines and debris).

Implementation of Alternatives 2 through 5 may result in indirect and potentially adverse significant impacts to water quality because of periodic maintenance activities. These activities present an opportunity for the release of oil products, fuel, and chemicals (including lime) from maintenance equipment to discharge to surface waters.

Mitigation Measures

The maintenance contractor is required to properly maintain vehicles and implement "good housekeeping" practices, requirements, and procedures for controlling surface fluids. Implementation of these mitigation measures during maintenance activities would reduce all adverse impacts to a level that is considered less than significant.

4.5.11 Air Quality

The Clean Air Act (CAA) requires that projects receiving federal funds prove conformity with the approved State Implementation Plan (SIP)/local air quality attainment plan for the region. The South Coast Air Quality Management District (SCAQMD) adopted the 1994 Air Quality Management Plan (AQMP) on September 9, 1994. The 1994 AQMP is the regionally approved air quality plan that states a project may have significant environmental effects if it is not consistent with locally adopted environmental plans. However, guidelines for the 1994 AQMP also contain requirements for project conformity to the policies and measures contained in the 1989 and 1991 AQMPs.

The project would include occasional repairs that would nominally increase long-term operational emissions. These are expected to fall well below the federal de minimis levels for PM10 and NOx. PM10 and NOx federal de minimis levels are 70 tons per year and 50 tons per year, respectively. In addition, the project would not affect any local sensitive receptor and would be consistent with the approved AQMP. The project would, therefore, meet the federal conformity screening requirements.

Because the project does not necessitate construction or demolition of any kind, no short-term construction related emissions will occur. Potential long-term, intermittent air quality impacts associated with the Prado Dam facilities may occur and were analyzed in the EIS/EIR. The three areas of long-term maintenance analyzed were: increased sediment and debris removal activities at the outlet structure, increased mechanized levee reconstruction as a result of failure due to increased flooding, and increased mechanized maintenance activities downstream of Prado Dam.

Alternative 1 will have no change from the existing operational characteristics or maintenance activities within Prado Basin, therefore no impacts to air quality will occur.

Under Alternatives 2 through 5 there will be a nominal increase in emissions from maintenance-related activities and levee reconstruction activities. These increases are not expected to result in any long-term exhaust emission impacts. Each of these four alternatives would have direct and adverse, but less than significant impacts on air quality. No change to the existing operational characteristics or maintenance activities within Prado Basin would occur under these alternatives. Therefore, no impacts on air quality would result.

4.5.12 Hazardous, Toxic and Radioactive Waste

An HTRW study was performed in the Prado Basin area to elevation 508 ft (OCWD, June 1998). No HTRW sites were identified that have the potential to adversely affect the proposed area of inundation for any of the project alternatives. The study identified five potential areas of concern and recommended actions as described below.

Thirteen oil wells within the study area were previously operated by Prado Petroleum. Oil spills resulted from these wells on at least two occasions. However, these wells were abandoned in place and capped in 1996. The Bureau of Land Management has jurisdiction over these wells and any resumption of operation will have to be authorized by that agency.

An oil pipeline near the southeast corner of the basin recently leaked and spilled oil into a basin tributary. However, this pipeline is no longer in service. Other pipelines within Prado Basin are considered to be in compliance with existing regulations.

Animal waste from dairy farms washes into Prado Basin during certain periods of high precipitation and runoff. However, current regulations require that all dairies that are considered concentrated animal feed operations have plans for containment to prevent waste flows from leaving diary property. The timing on these plans is over the next several years, with each dairy on a different schedule. In addition, many of the dairies are ceasing operations because the "Dairy Preserve" status of the area has been removed, with much of the land being rezoned as residential or commercial.

Occasional illegal dumping reportedly occurs in the basin, predominantly from illegal drug manufacturers. The only way to prevent this activity is to put the entire basin off limits to the public. This is not feasible because the Corps leases much of the basin area to local entities for recreation facilities. However, any illegal dumpsites that are discovered are cleaned up. In addition, any illegal dumping activity observed by Corps personnel is reported to the appropriate authorities.

The above recommendations are not proposed mitigation measures for project impacts and that neither the Corps nor Orange County Water District has the authority to implement these recommendations.

The foregoing areas of contamination occur at elevations significantly above the elevations where water conservation operations will reach. If a problem occurs with regards to each area, said problem is rectified upon discovery.

4.5.13 Recreation

The effects of water conservation on existing and future recreation uses were analyzed in the EIS/EIR. Both the effect on the availability of existing and future uses and the effect relating to physical degradation of existing and future uses were analyzed.

Alternative 1 would not result in any change in operations and would therefore not affect the existing or future recreation uses within Prado Basin and downstream of Prado Dam.

4.5.13.1 Existing Recreation Uses Upstream of Prado Dam

Alternatives 2 through 5 will result in an increase in duration of inundation and in increase in the inundation elevation up to elevation 505 ft. Above elevation 505 ft., the reservoir is in flood control mode and there is no significant change in inundation frequency. Recreation and other uses that are below elevation 505 ft. would experience from 6 additional days (Alternative 2) to 25 additional days of inundation (Alternative 5) per year under present conditions. Uses that are below elevation 505 ft would experience from 20 days (Alternatives 2 and 3) to 54 days (Alternative 5) additional inundation per year under future conditions.

Alternatives 2 through 5 would result in increased physical degradation to a portion of existing recreational uses. The Prado Petroleum Company (elevation 493 to 505 ft), agricultural leases (elevation 490 to 510 ft), Raahauge's Hunting Club (elevation 485 to 514 ft), the Flyway Foundation (elevation 485 to 520 ft) and Richardson's Dog Training facility (elevation 490 to 554 ft) would experience significantly more inundation under the 5-year and 100-year frequency flood events compared to existing operations. This increased inundation could physically degrade these facilities.

4.5.13.2 Existing Recreation Uses Downstream of Prado Dam

Impacts on the availability of existing recreation uses and physical degradation of these uses downstream of Prado Dam would mostly be a result of increased frequency of flooding and higher flows. Three recreational facilities downstream of Prado Dam could be impacted; Green River Golf Club, Featherly Regional Park, and River View Golf Course. Flow releases of 6,400 cfs and less have not had significant impacts on availability downstream recreation uses and less than significant impacts on physical degradation of these uses. Physical degradation would be mostly erosion of river channel, which could have some impacts on River View Golf Course. Alternative 2 has maximum releases less than 6,400 cfs and therefore would have no significant impacts on availability of recreation uses and less than significant impacts on degradation of these uses. Alternatives 3, 4, and 5 with maximum releases of 7,400, 14,900, and 25,000 cfs respectively would have less than significant impacts on availability of existing recreation uses and significant impacts on degradation of these uses.

4.5.13.3 Future Recreation Uses Upstream of Prado Dam

Future recreation uses within Prado Basin were based on the Conceptual Planning Areas as mapped and described in the Prado Flood Control Basin Project Master Plan (U.S. Army Corps of Engineers 1993). The current applicability of the Conceptual Planning Areas has been recently confirmed by the County of Riverside and the City of Corona.

As described above for Existing Recreation Uses, Alternatives 2, 3, 4, and 5 would have direct and potentially adverse, but less than significant impacts at elevations lower than 505 ft. on those Conceptual Planning Areas lower than elevation 505 ft. for recreational development. Similar to the Existing Recreation Uses, Alternatives 2, 3, 4, and 5 would result in increased duration and elevation of inundation, which could result in additional physical degradation of future uses.

This physical degradation is considered to be direct and a potentially adverse significant impact.

4.5.13.4 Future Land Uses Downstream of Prado Dam

Since no new uses are anticipated in the substantially built-out area within the downstream study area, implementation of the project alternatives would not result in any effect on future land uses.

4.5.13.5 Mitigation Measures

Inundation of existing recreational and other uses within Prado Basin will not require mitigation measures to be taken, as these uses are floodable per the terms of existing real estate instruments, and no new recreational facilities will be constructed at the lower elevations within Prado Basin. Following inundation of existing recreational and other uses downstream of Prado Basin, maintenance activities to restore these uses to their pre-inundation condition will be required. Similarly, future recreational uses designated within county and city plans that are proposed to be located within the project alternatives' inundation areas shall be designed to allow periodic inundation or else located outside of inundation areas within Prado Basin. No significant impacts are anticipated after implementation of the mitigation measures for downstream uses. Implementation of these mitigation measures will be the responsibility of OCWD.

4.5.14 Public Health and Safety

According to the EIS/EIR, with an increase in inundation duration there is the potential for greater numbers of mosquitoes to breed and pose a human health risk.

Alternative 1 would not change water conservation operations and no increased nuisance from mosquitoes would occur.

Alternatives 2 through 5 would change the water conservation operations and would likely increase mosquito breeding resulting in an increased nuisance to humans. This potential increase is considered adverse and significant.

To mitigate the adverse significant impacts associated with Alternatives 2 through 5, an increase in mosquito abatement will occur if an increase in mosquito nuisance occurs. A contribution of funds will be made by OCWD to the Northwest Mosquito Abatement District, West Valley Vector Control District, or Orange County Vector Control District to control mosquitoes is one method of increasing abatement so that mosquito nuisances to the public are reduced to less than significant. No significant impacts are anticipated after the implementation of the above mitigation measure.

4.5.15 Noise

Because the project does not necessitate construction or demolition of any kind, no short-term construction related noise will occur. Potential long-term, intermittent noise impacts associated with the Prado Dam and Santa Ana River facilities may occur and were analyzed in the EIS/EIR. The three areas of long-term maintenance that could cause noise impacts were: increased sediment and debris removal activities at the outlet structure, increased mechanized levee reconstruction as a result of failure due to increased flooding, and increased repair of possible structural damage and increased debris due to increased frequency of high velocities in the channel.

Alternative 1 will have no change from the existing operational characteristics or maintenance activities within Prado Basin, therefore no noise impacts will occur.

Under Alternatives 2 through 5, there will be a nominal increase in noise from maintenance-related activities and levee reconstruction activities. However, the nearest residences are well over 0.5-mile from the project boundaries. If all maintenance activities occur in accordance with applicable local noise ordinances, less than significant adverse noise impacts would occur. No mitigation is required.

4.5.16 Water Rights

Currently, OCWD owns all rights, title, and interest in any and all waters flowing in the Santa Ana River into Prado Basin. In addition, by virtue of the judgment, *OCWD v. City of Chino, et al.*, Riverside County Superior Court No. 117628, dated 17 April 1969, that stipulated the rights to waters within the Santa Ana River basin, OCWD has the annual right to receive a minimum of 42,000 AF of "base flow" waters at Prado Dam, together with the right to all storm flows reaching Prado Dam. In 1989, the Santa Ana River was included in the Declaration of Fully Appropriated Streams by the California State Water Resources Control Board (SWRCB), concluding that no unappropriated water was available. However, due to increased urbanization and other activities in the upper Santa Ana River watershed, the volume of runoff reaching Prado Dam has increased. SWRCB recommended that OCWD submit an application to SWRCB's Water Rights Division for the purpose of confirming existing water rights and establishing rights to these increased volumes. It is hard to predict potential future litigation over water rights on the Santa Ana River. For the purpose of this study, it was assumed that changes, if any, in water rights will not have any significant effects on the available flows to OCWD as described by the 1969 judgment.

4.6 Trade-off Analysis

4.6.1 Water Conservation Yield

The average annual water conservation yield was determined based on each alternative's specific operation according to the hydrologic methodology identified elsewhere in this chapter. Results are shown in Table 4-14.

Table 4-14. Prado Basin Water Conservation Feasibility Study. Increase in Yield of Alternatives Relative to Alternative 1 (Without-Project) in AF

Alternative	Yield Increase Present Condition	Yield Increase Future Condition
2	2,000	4,000
3	3,000	5,000
4	4,000	8,000
5	6,000	10,000

4.6.2 Benefits

Benefits of Prado Dam water conservation alternatives are water supply cost savings. It is assumed that new water supplies from conservation operations in the alternatives will replace untreated MWD supplies. Untreated MWD supplies were chosen because OCWD does not purchase treated water, and water reclamation plans would not be affected by the additional yield from water conservation operations. Additional supplies from the Santa Ana River operations and untreated MWD supplies would be recharged before use, so the net savings from conservation operations are equal to the raw untreated MWD costs of $233 per AF. A more detailed description and explanation of the benefits are located in the Economics Appendix.

The annual benefit is simply the projected yield from the alternative multiplied by the projected cost of the water that the conserved water will replace -- in this case, the cost of untreated MWD water. Table 4-15 shows the results of this analysis. As shown below, annual benefits range from $599,000 for Alternative 2 to $1,664,000 for Alternative 5.

Table 4-15. Prado Basin Water Conservation Feasibility Study. Annualized Benefits by Alternative[1]

Alternative Number	Annual Benefits
2	$599,000
3	$832,000
4	$1,198,000
5	$1,664,000

[1]Base year is 2004. Benefits annualized over 50 years (2004-2053) at a discount rate of 5 5/8 percent.

4.6.3 Costs

Costs of the water conservation alternatives include environmental mitigation and compensation costs, recreation/business costs associated with economic activities occurring within the basin and downstream of Prado Dam, and increased operations and maintenance costs.

The with-project alternatives would result in increased frequency and duration of inundation of habitat within the basin and increased frequency and severity of flooding of habitat downstream of Prado Dam to Weir Canyon. As a result, environmental mitigation would be required. Mitigation would be performed through establishing habitat on property already owned by OCWD and through contributions to the Santa Ana River Conservation Trust Fund.

Recreation and other economic costs are associated with a number of economic activities in Prado Basin and downstream of Prado Dam that might be adversely affected by the water conservation operations. Losses were differentiated into two types: loss of use and damages/cleanup/repair costs.

Table 4-16 presents costs by category and total costs used in the NED analysis. Two cost components, environmental mitigation and downstream flooding, have the largest contributions to the total cost.

Table 4-16. Costs of Alternatives in Comparison to Alternative 1

	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Recreation Use Losses	$500	$1,000	$1,600	$4,100
Recreation Damage, Repair & Clean-up	$5,000	$8,000	$10,100	$14,200
Environmental Mitigation	$181,000	$87,000	$259,100	$905,500
Maintenance and Dump Fees	$9,800	$21,300	$31,300	$37,300
Cultural Mitigation	$0	$0	$0	$0
Downstream Flooding Costs*	$67,000	$1,208,000	$4,545,000	$4,820,000
Total Annualized Costs, 50 years	$140,300	$1,325,000	$4,847,500	$5,781,800

****Note that Some Downstream Flooding Costs Occur under Alternative 2, but the Increase Relative to Without Project Conditions is Assumed to be Insignificant***

The magnitude of downstream flooding cost is mostly due to damage replacement requirements for Green River Golf Club, River View Golf Course, and Featherly Regional Park. The physical characteristics of these facilities are described in section 4.5.13 and in the Economics Report. The costs stem from mitigation of damages to such items as fairways, greens, snack bars, ponds, rest rooms, cart paths, septic systems, wells, pumping plants, drinking water systems, and irrigation systems at the Green River Golf Club; fairways, greens, cart paths, cart bridges, irrigation systems, and refill of eroded areas at River View Golf Course; and camping sites, hiking trails, and access roads at the Featherly Regional Park. Replacement cost estimates for the two golf courses have been prepared by the Corps utilizing Microcomputer Aided Cost Engineering System software, and are shown in the Economics Report. Damages at these facilities start to occur when flows in the Santa Ana River exceed about 5,000 cfs. Flow releases for Alternative 2 are not predicted to exceed 5,000 cfs at any significant frequency and their incremental downstream flooding costs are assumed to be zero. Table 4-17 lists the damages occurring at each facility at five different flow rates, the probabilities of occurrence of these flow rates for Alternatives 3, 4, and 5 and the product of costs and probabilities.

Table 4-17. Downstream Flooding Damages at Five Flow Rates, Incremental Probabilities of Flow, and Damages by Alternative

Damages for Event	**Rate of flow, cfs**				
	<<2,500	5000	7400	14000	25900
Featherly Park	0	0	$96,000	$223,000	$286,000
River View Golf Course	0	$101,000	$253,000	$402,000	$758,000
Green River Golf Course	0	$33,000	$3,141,000	$14,784,000	$15,424,000
Total Damages at Rate of Flow	0	$134,000	$3,490,000	$15,409,000	$16,468,000
Annual Probabilities of Rate of Flow (Expressed as percentage)*					
Alternative 1 (Without Project)	100	0	0	0	0
Alternative 2	50	50	0	0	0
Alternative 3	50	16	34	0	0
Alternative 4	50	16	6	28	0
Alternative 5	50	16	6	2	26
Product of Damage at Flow and Incremental Probability.					
	Weighted Damage				Expected Annual Damages
Alternative 1	$0	$0	$0	$0	$0
Alternative 2	$0	$67,000	$0	$0	$67,000
Alternative 3	$0	$21,440	$1,186,000	$0	$1,208,000
Alternative 4	$0	$21,440	$209,400	$4,314,520	$4,454,360
Alternative 5	$0	$21,440	$209,400	$308,180	$4,820,700

*For water conservation. Does not include potential damages from flood control releases.

4.6.4 Benefits/Cost Analysis

Benefits include reductions in projected water supply costs resulting from increased water yields with Prado Dam conservation, and economic costs are increased losses to economic activities within the basin, plus increases in mitigation, sediment removal, downstream damages, and operations and maintenance costs. Table 4-18 summarizes costs and benefits for each alternative.

Table 4-18. Benefit/Cost Analysis

Alternative	Annual Benefits, ($1,000s)	Annual Costs ($1,000s)	Net Benefit, ($1,000s)	Benefit/Cost Ratio
2	$599	$140	$459	4.3
3	$832	$1,325	-$493	0.6
4	$1,198	$4,848	-$3,650	0.2
5	$1,664	$5,782	-$4,118	0.3

Alternative 2 is the optimum alternative. Alternative 2 consists of increasing the target elevation of the flood season conservation pool to 498 feet. Alternative 3 is also marginally economically justified. This alternative would increase the frequency of damaging releases downstream of the dam, resulting in substantially higher costs than Alternative 2.

Based upon the results of the analysis, the NED Plan consists of maintaining the non-flood season conservation pool target elevation at 505 feet. During the flood season, the conservation pool target elevation would increase to 498 feet.

4.6.5 Optimal Timing Analysis

Net benefits for each alternative increase over time because benefits are anticipated to increase significantly in real terms while costs are not. This is attributable to: 1) the assumption that the economic value of the conserved water will increase in real terms; and 2) the yields also increase over time. Accordingly, an analysis was conducted to determine whether the NED Plan would change over time.

Alternative 2 is easily justified in the Base Year, and net benefits increase substantially thereafter. While net benefits increase over time for Alternatives 3 through 5, they never become positive. Therefore, the NED plan would not change regardless of the timing of project implementation.

4.6.6 Risk and Uncertainty Analysis

A sensitivity analysis was performed to measure the potential variability in the annual benefits for the water conservation alternatives. The analysis used probability distributions and Monte Carlo simulations. Monte Carlo simulation generates a distribution of numbers that incorporates specified parameters of the distribution or its component distributions. In this case, a distribution of economic benefits is simulated from the component distributions of the water conservation yields and the economic value per acre-foot of the conserved water. Since the projected yields are relatively extremely small compared to overall demand and supply from other sources, there is no doubt that the conserved water would be fully utilized. In addition, the conserved water is relatively cheap compared to alternative sources of supply. Therefore, a detailed Risk and

Uncertainty simulation of total demand and various supply sources was not warranted. A simplified model was developed with two variables subject to uncertainty:

Water Conservation Yields -- An analysis of total yields by alternative (not difference between alternatives) shows ranges of as high as 42 percent above the mean and as low as 19 percent below the mean. Standard deviations under Base Year conditions represent about 13%-15% of the mean values. For purposes of this analysis, the projected water conservation yield increases for each alternative for each year were replaced with a probability distribution with a mean equal to the expected annual increased yield and a 20 percent standard deviation. For example, for Alternative 5 under future conditions, the expected annual yield is 10,000 acre-feet, with a standard deviation of 2,000 acre-feet.

Economic Value of Conserved Water -- The economic value of the conserved water is projected to increase from $272 at the Base Year to $419 by the end of the period of analysis. These figures represent the cost of untreated MWD water used to recharge the aquifer in the OCWD service area. Since there is a fairly significant uncertainty regarding projected costs for MWD water, a 25 percent standard deviation was applied.

The Monte Carlo simulation used the @Risk 7 simulation package for Excel®. The model was adjusted to continue with the simulation until the percent change in both the mean and standard deviation of annual benefits for each alternative were less than 0.5 percent. Table 4-19 shows the results of this analysis.

Table 4-19. Prado Basin Water Conservation Feasibility Study.
Results of Monte Carlo Simulation for With-Project Alternatives

	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Mean Annual Benefit	$599,000	$832,000	$1,198,000	$1,165,000
Standard Deviation	$32,000	$45,000	$64,000	$91,000
5% Exceedance	$547,000	$760,000	$1,110,000	$1,517,000
95% Exceedance	$651,000	$907,000	$1,303,000	$1,817,000

Discount Rate = 5.875%, Period of Analysis = 50 Years

4.6.7 Economic Analysis Summary

The annual benefits and costs for water conservation alternatives have been computed. Analyzing the alternatives for the periods independently, the NED alternative is Alternative 2.

4.6.8 System of Accounts

The U.S. Water Resource Council System of Accounts was used as a method of displaying the positive and negative effects of the proposed alternatives. The accounts are categories of long-term environmental, economic, and other social impacts of alternatives. These accounts are displayed in Tables 4-20 through 4-22; they allow efficient consideration of comparative effects. The Water Resources Council suggests using four accounts to compare proposed water resource development plans. These are the NED, environmental quality (EQ), regional development (RD), and other social effects (OSE) accounts.

4.6.8.1 National Economic Development

This account identifies the economic effect 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 Prado Dam alternatives under consideration, the increases in NED reflect the results of the benefit/cost analysis. For this project, benefits are derived from the additional groundwater yields provided by water conservation. The benefits are measured by the difference in cost of substitution groundwater in place of MWD water. Adverse NED effects are the costs of the project and represent the opportunity cost of investing funds on the project rather than other potential economic development opportunities. Table 4-20, "System of Accounts - National Economic Development Account," compares the alternative plans under consideration using the NED account.

Table 4-20. System of Accounts: National Economic Development Account (2002 Price Levels; Costs are in $1,000

Category	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
I Average Annual Benefits	n/a	$599	$832	$1,198	$1,665
II Project Costs					
First Cost	n/a	n/a	n/a	n/a	n/a
Annual Cost	n/a	$140	$1,325	$4,848	$5,782
III Net Benefits (Total Benefits Less Costs)	n/a	$459	-$493	-$3,650	-$4,118
IV B/C Ratio	n/a	4.3	0.6	0.2	0.3

4.6.8.2 Environmental Quality Account

The EQ account displays the long-term 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 decisionmaking process of plan selection. Table 4-21, "System of Accounts Environmental Quality Account," compares the effect that the alternative plans would have on EQ resources. The impacts, especially significant impacts, would be mitigated according to discussion found in Section 4.5.8.

Table 4-21. System of Accounts: Environmental Quality Account

Category	Alternative 2	Alternative 3	Alternative 4	Alternative 5
I. Physical Environment				
a. Water Quality	Long-term beneficial impacts to surface water & short-term adverse impacts due to maintenance vehicle operation	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
b. Air Quality	Short-term adverse, less than significant impacts due to maintenance vehicle operation	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
c. Noise	Short-term adverse, less than significant impacts due to maintenance vehicle operation	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
d. Hazardous, Toxic and Radioactive Waste	No Impact	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
II. Biological Environment				
a. Vegetation	Adverse, less than significant impacts to willow woodlands	Same as Alternative 2	Adverse, significant impacts to willow woodlands	Same as Alternative 4
b. Wildlife	Adverse, less than significant impacts to mammals, birds, reptiles, amphibians and fishes	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2, but adverse significant impacts to birds
c. Endangered Species	Adverse, significant impacts to least Bell's vireo	Same as Alternative 2	Same as Alternative 2	Adverse, significant impacts to least Bell's vireo and southwestern willow flycatcher

Table 4-21 (Continued)

III. Cultural Environment

a. Cultural Resources	Adverse, potentially significant impacts to unknown resources	Same as Alternative 2	Same as Alternative 2	Adverse, potentially significant impacts to known and unknown resources
b. Aesthetics	Adverse, but less than significant alteration of	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2

4.6.8.3 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. This account was not considered for this analysis because OCWD did not request a regional evaluation and because the effects on the regional economy are expected to be similar to those of NED.

4.6.8.4 Other Social Effects

This 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 4-22, "System of Accounts - Other Social Effects Account," compares the effects the proposed alternatives would have on OSE resources.

Table 4-22. System of Accounts A Other Social Effects Account

Category	Alternative 2	Alternative 3	Alternative 4	Alternative 5
a. Public Health and Safety	No decrease in flood protection; greater number of mosquitoes	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
b. Public Facilities and Service	See impacts to recreation.	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
c. Recreation and Public Access	Significant impact due to lost visitor days and increased maintenance	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
d. Traffic/Transportation	Minor impact due to maintenance	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
e. Man-made Resources	None	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
f. Natural Resources	Increase in available groundwater	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2

4.6.9 Additional Evaluation Criteria

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

4.6.9.1 Completeness

Completeness is the determination of whether or not the plan includes all elements necessary to achieve the national objectives of the plan. Alternative 2 satisfies the criterion. This alternative is considered cost-effective as a means of increasing water supply through water conservation measures at Prado Dam.

4.6.9.2 Effectiveness

Effectiveness is defined as a measure of the extent to which a plan achieves its objectives. All alternatives achieve the objective of increased water conservation. However, the degree to which the plans address this objective differs. Alternative 2 provides the least amount of water yield due to conservation, while Alternative 5 provides the most yield. All other Alternatives produce a yield between Alternatives 2 and 5. Therefore, Alternative 5 is the most effective alternative.

4.6.9.3 Efficiency

Efficiency is the cost effectiveness of the plan expressed in net economic benefits. Alternative 2 produces the greatest net economic benefits and is therefore the most efficient plan.

4.6.9.4 Acceptability

Acceptability is defined as acceptance of the plan by OCWD and the concerned public. OCWD has chosen Alternative 2 as its preferred alternative. The public commented on this study during the circulation of the Draft EIS/EIR.

4.6.10 Public Coordination

The Public Workshop and Environmental Scoping Meeting, as referenced in Section 2.3, was held 17 November 1997 in the City of Corona. The public review period of the Draft Report and DEIS/EIR was from 20 August through 18 October 2004. The public meeting for the Draft Report and DEIS/EIR was held 22 September 2004 at the OCWD headquarters in the City of Fountain Valley. Minutes from both the Scoping Meeting and the Public Review Period (including the public meeting) are contained in appendix G of the EIS/EIR.

5 DESCRIPTION OF THE SELECTED PLAN

5.1 NED Plan

The NED plan presented in Chapter IV, "Plan Formulation," is Alternative 2. Under this alternative, flood season water conservation would occur to elevation 498 ft (151.8 m) NGVD plus non-flood season water conservation to elevation 505 ft (153.9 m). This alternative combination would provide average annual water conservation yield of 240,000 AF (296.1 million m^3) in years 2000, 2001, and 2002, and 318,000 AF (392.2 million m^3) at future condition (by year 2052). The future condition yield represents an increase of about 34 percent over current yield. If the yield for Alternative 2 is compared to the without-project future condition, then the increase in yield is about 4,000 AF (4.9 million m^3). The project would produce $459,000 in net annual NED benefits and would have a benefit/cost ratio of 4.3.

Operation and Maintenance

The operational changes associated with the NED Plan include allowing water for water conservation to be temporarily impounded in the buffer pool during the flood season and maintaining a Seasonal Pool during non-flood season above the Debris Pool. If unfavorable weather is forecast, the reservoir will be drawn down to a required water surface elevation, even as low as the Debris Pool, to provide adequate flood protection to downstream areas. Water conservation releases from the dam will correspond with the capacity of the downstream spreading grounds up to 600 cfs (17 m^3/s). Flood control releases will be performed up to the capacity of the downstream channel. Maintenance intervals for the facility would increase due to the increase in sediment trapped due to water conservation. Maintenance will be performed on an "as-needed basis" and has an estimated life cycle cost increase from the without project condition of $9,800 annually. Maintenance would most likely be performed in September prior to start of the flood season, if necessary. The annual costs associated with cleanup and damage repairs due to increased maximum water surface elevation as compared to the without project alternative would be about $5,000.

Environmental Commitments

Mitigation is required to reduce adverse impacts of the project to less than significant. Mitigation commitments for the NED plan include: replenishing sediment eroded at River View Golf Course, water quality best management practices, compensation for lost habitat, increased mosquito abatement to protect public health and safety, and potential cultural resources mitigation. The following identifies in more detail the required environmental mitigation commitments of the NED plan.

Sediment Erosion

When maximum discharge rates are realized under the proposed water conservation operations, sediment material at the downstream River View Golf Course will need to be replaced more frequently compared to existing conditions and any required reconstruction at the golf course will need to occur. The increased cost of this repair and maintenance will be borne by the Orange County Water District.

Water Quality

Sediment removal activities within Prado Basin may occur more frequently, due to increased sediment and debris deposition than under existing conditions. Maintenance vehicles used in sediment removal activities will be serviced in a manner that contains fluids, such as lubricants, within impervious areas. Any water pollution permits, such as for dewatering discharges, will be acquired by the contractor(s).

The contractor(s) 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, and gasoline, may include using 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 maintenance equipment, and properly designing concrete equipment cleaning areas.

Biological Resources

OCWD will dedicate 37 acres (15.4 ha) of land within the Prado Basin that they already own as required upstream mitigation. This land is above elevation 508 feet, and thereby will not be impacted by water conservation operations under the recommended plan.

Cultural Resources

In the event that unknown resources are uncovered during implementation of water conservation, the Corps must comply with 36 CFR 800.11, *Properties Discovered During Implementation of an Undertaking*. This CFR requires additional mitigation measures as developed in consultation with the SHPO and the ACHP.

Public Health and Safety

If an increase in mosquitoes and nuisances to the public results from increased water impoundment levels behind Prado Dam or water releases from Prado Dam, OCWD will provide an increase in mosquito abatement in the Prado Basin area. Increase in mosquito abatement will be provided through contributions of funds by OCWD to the Northwest Mosquito Abatement District, West Valley Vector Control District, or Orange County Vector Control District so that mosquito nuisances to the public are reduced to less than significant.

Real Estate Impacts

The property to be affected by the NED Plan is already owned by the Corps or OCWD; as a result, no estates are required for the proposed project. Leases and subleases within the Prado Basin that would be affected by the proposed project are described in the Real Estate Appendix. The affected leases contain provisions allowing the Corps to inundate the leased lands. There are no relocations of homes required, no minerals and no relocations of facilities or utilities.

Recreational Impacts

The NED Plan will also impact existing and future recreation activities within the Prado Dam Basin. Specifically the NED Plan would result in increased physical degradation to a portion of existing recreational uses. Recreation and other uses that are below elevation 505 ft. would experience an average of 6 additional days of inundation per year under present conditions and 20 days additional inundation per year under future conditions. The Prado Petroleum Company (elevation 493 to 505 ft), agricultural leases (elevation 490 to 510 ft), Raahauge's Hunting Club (elevation 485 to 514 ft), the Flyway Foundation (elevation 485 to 520 ft), and Richardson's Dog Training facility (elevation 490 to 554 ft) would experience significantly more inundation under the 5-year and 100-year frequency flood events compared to existing operations. This increased inundation could physically degrade these facilities.

Inundation of existing recreational and other uses within Prado Basin will not require mitigation measures to be taken, as these uses are floodable per the terms of existing real estate instruments, and no new recreational facilities will be constructed at the lower elevations within Prado Basin. Following inundation of existing recreational and other uses downstream of Prado Basin, maintenance activities to restore these uses to their pre-inundation condition will be required. Similarly, future recreational uses designated within county and city plans that are proposed to be located within the project alternatives' inundation areas shall be designed to allow periodic inundation or else located outside of inundation areas within Prado Basin. No significant impacts are anticipated after implementation of the mitigation measures for downstream uses. Implementation of these mitigation measures will be the responsibility of OCWD.

5.2 Locally Preferred Plan

There is no Locally Preferred Plan as OCWD has decided that the NED Plan (Alternative 2) is the most viable alternative.

5.3 Plan Selection

The plan selected for implementation is Alternative 2, the NED Plan. The NED Plan provides the greatest net economic benefits, while at the same time requiring the least amount in mitigation costs compared to the other "action" alternatives. While Alternatives 3 through 5 result in greater water conservation opportunities, the release rates required to draw the water pool down to elevation 490 feet (top of Debris Pool) in 24-hours are greater than 5,000 cfs for all of these alternatives. As mentioned in section 4.5.1, releases greater than 5,000 cfs have resulted in damages downstream. Alternative 2 is, therefore, similar to Alternative 1 (the "no-action" alternative) in that no downstream damages occur. Alternative 2 results in an annual increase of 4,000 acre-feet of water conservation yield (future conditions) over Alternative 1.

6 PLAN IMPLEMENTATION

6.1 Introduction

This chapter presents the Federal and non-Federal responsibilities and procedures for implementation of the Selected Plan.

6.2 Water Conservation Plan

The implementation of the NED plan is expected to begin before the improvements to the outlet structure and the downstream channel are completed as discussed in the Phase II GDM. The requirements for increasing water conservation based on the NED plan include the following.

6.2.1. Real Estate Requirements

Of the many leases and subleases within the Prado Basin, only two leases would be adversely affected by the proposed project:

1. County of San Bernardino lease with the Corps
2. Richardson's Dog Training Facility Sublease with the County of San Bernardino

The parent lease between San Bernardino County and the Corps grants the rights, privileges and protections to the Federal Government to flood and inundate these lands. San Bernardino County would be responsible for any arrangements or revisions to their sublease agreement with the dog training facility.

OCWD understands that it is responsible for any and all damages resulting from inundation to these lands that occurs solely as a result of water conservation. OCWD already has a compensation in place with the owner of Richardson's Dog Training Facility, and this arrangement will continue.

6.2.2. Environmental Mitigation Requirements

The NED, Alternative 2, will require environmental mitigation. In Alternative 2, the water conservation pool would be at elevation 498 ft (151.8 m) during flood season and at 505 ft (153.9 m) during non-flood season in years 2004 through 2053. Impacts within the basin would include the following: 216.1 ac (87.6 ha) of willow woodland and 3.5 ac (1.4 ha) of mixed eucalyptus and willow woodland for a total of 219.6 ac (89.0 ha). To reduce these impacts, the following measures are recommended.

1. The entire 89.0 ha (219.6 ac) have already been mitigated at 50 percent. An additional 6.3 percent mitigation (or 6.9 ac [2.8 ha]) for impacts on the remaining 109.8 ac (44.5 ha) is

all that is required based on the additional number of days of inundation at 498 ft in a 100-year flood event. OCWD has acquired 6.9 ac (2.8 ha) for restoration. This land was parceled out from a 112-ac (45.4-ha) parcel within Prado Basin that is available for restoration.

2. OCWD will provide compensation to the Santa Ana River Conservation Trust Fund for maintenance of the 6.9 ac (2.9 ha) of riparian habitat that has been acquired for restoration. The total compensation will be $25,000/ac for a total of $172,500.

Impacts downstream of the Basin include the understory associated with 146.4 ac (59.3 ha) of native riparian vegetation. Understory is assumed to occupy 30 percent of the total area, or 43.9 ac (17.8 ha). Only about 50 percent of the understory, or about 22.0 ac (8.9 ha) will be impacted.

3. OCWD has acquired 22.0 ac (8.9 ha) from the remaining 105.1 ac (42.5 ha) of the original 112-ac (45.4-ha) parcel within the Prado Basin that is available for mitigation.

4. OCWD has provided compensation to the Santa Ana River Conservation Trust Fund for maintenance of the 22.0 ac (8.9 ha) of riparian habitat that has been acquired for restoration. The total compensation will be $25,000/ac for a total of $550,000.

6.2.3. Operation, Maintenance, Repair, Replacement, and Rehabilitation (OMRR&R) Requirements.

The Corps will direct OMRR&R activities. The Corps will conduct normal OMRR&R flood control activities with additional funds for water conservation related costs to be provided by OCWD paid in advance of activities.

The water conservation operations under the proposed project will be carried out by the Corps' Reservoir Operation Center (ROC) in coordination with the OCWD depending on the water surface elevation behind the dam, inflow to the dam, and meteorological forecasts. The Corps will retain full discretion over when the reservoir is placed in water conservation mode. An agreement between the Corps and OCWD, which incorporates the above requirements, will have to be reached following the completion of the Feasibility Study.

Change in OMRR Requirements

The operations, maintenance, repair, and replacement (OMRR) requirements for the flood control project would need to be modified in the Water Control Manual for Prado Dam to reflect any new requirements associated with increasing water conservation.

Water Rights

The SWRCB has jurisdiction over issuing permits for water rights. It needs to be investigated if a new permit will need to be filed for the potential increase in conservation yield.

6.3 Institutional Requirements

In order to implement the selected plan, the OCWD would be required to comply with Section 110 of the Consolidated Appropriations Act, 2005 (Public Law 108-447). Said Section reads as follows: "The Assistant Secretary of the Army for Civil Works shall enter into an agreement with the Orange County Water District, Orange County, California for purposes of water conservation storage and operations to provide at a minimum a conservation level up to elevation 498 feet mean sea level during the flood season, and up to elevation 505 feet mean sea level during the non-flood season at Prado Dam, California. The Orange County Water District shall pay to the Government only the separable costs associated with implementation and operation and maintenance of Prado Dam for water conservation."

The separable costs mentioned in Section 110 above are in addition to those costs associated with the formulation of the NED plan. The NED costs, listed tables S-2 and 4-16 of this report, were derived using the traditional plan formulation method of benefit/cost analysis. The NED costs are associated solely with the increase of four feet in the flood season water conservation elevation (494 to 498 ft.) from the current 490-494 ft. flood season water conservation elevation range. The separable costs are associated with the operation and maintenance for all water conservation operations (i.e., flood season operations to elevations 494 and 498 feet, and non-flood season operations to elevation 505 feet) OMRR&R costs, were derived from actual operation and maintenance records for Prado Dam. The OMRR&R costs are presented in table 6-1 and will be incorporated into the memorandum of agreement described in paragraph (2) herein.

Specifically, Orange County Water District would be required to accomplish the following:

(1) Assume responsibility for all separable costs associated with implementation of the selected plan and increased Federal operation and maintenance costs. The estimates of these separable costs are contained in table 6-1 at the end of this section.

(2) Sign a memorandum of agreement with the Corps that includes the following indemnification clause: "OCWD shall hold and save the government, including its officers, agents and employees, harmless from damages and claims for damages, including costs of defending such claims, that may arise by reason of operation and maintenance of the project pursuant t to this agreement, and that would not have arisen if the operation and maintenance of the project had not been pursuant to this agreement. Upon written notice from the Government, OCWD shall take over the defense of any such claim. This Article shall not apply to damages caused exclusively by negligence of the Government or its employees. This Article shall apply to claims that arise after termination of this agreement, from operations as described in this agreement, regardless of whether such operations occurred before or after the termination of this agreement. The Government does not warrant delivery of any quantity of water and the failure of reservoir regulation, in accordance with this agreement, to produce water for conservation in any quantity shall not be grounds for a claim for damages against the Government." This memorandum of agreement will replace the existing memorandum of agreement dated 15 December 1993.

(3) Obtain and secure all permits, licenses, and water rights necessary to utilize the increased safe yield created by the project.

(4) Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project to the extent and in such detail as will properly reflect total project costs.

(5) Perform, or cause to be performed, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601-9675, that may exist in, on, or under lands, easements or rights-of-way necessary for the construction, operation, and maintenance of the project; except that OCWD shall not perform such investigations on lands, easements, or rights-of-way that the Government determines to be subject to the navigational servitude without prior specific written direction by the Government.

(6) Assume complete financial responsibility for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the Government determines necessary for the construction, operation, or maintenance of the project.

(7) To the maximum extent practicable, fulfill its non-Federal cooperation responsibilities in a manner that will not cause liability to arise under CERCLA.

(8) Prevent future encroachments on project lands, easements, and rights-of-way that might interfere with the proper functioning of the project.

(9) Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public law 91-646, as amended (42 U.S.C. 4601-4655), by title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR part 24, in acquiring lands, easements, and rights-of-way, and performing relocations for construction, operation, and maintenance of the project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act.

(10) Comply with all applicable Federal and State laws and regulations, including Section 601 of the Civil Rights Act of 1964, Public Law 88-352, and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army," and Section 402 of the Water Resources Development Act of 1986, as amended (33 U.S.C. 701b-12), requiring non-Federal preparation and implementation of flood plain management plans.

(11) Implement an annual mitigation plan in accordance with the environmental commitments in the Environmental Impact Statement (EIS) that accompanies this report or an environmental mitigation plan approved by the Corps. The mitigation measures, including those for mosquito abatement and cultural resources, must be implemented prior to commencing any seasonal additional water conservation.

(12) Provide all cultural resource preservation mitigation and data recovery costs attributable to the project's purpose that are in excess of one percent of the total amount authorized to be appropriated for the project's purpose.

(13) Enter into an agreement that includes, but is not limited to, the forgoing requirements.

(14) Pay all costs to the Government necessary to allow water conservation operation of the reservoir to an elevation of 498 feet NGVD during the flood season and an elevation of 505 feet NGVD during the non-flood season.

(15) Acquire and pay all costs of acquiring water rights in accordance with State laws and regulations, and if necessary to establish or defend, such water rights needed for utilization of the additional water conservation measures provided.

(16) Pay for 100 percent of the project costs, as shown in Section 4.6 of this report, since water conservation is a 100 percent local cost. This is in accordance with project

planning, engineering, and design (PED) cost-sharing principles provided by the Corps' Planning Guidance Notebook, Engineering Regulation (ER) 1105-2-100, as modified by Section 110 of the Consolidated Appropriations Act, 2005 (Public Law 108-447). Section 110 of the Consolidated Appropriations Act, 2005 (Public Law 108-447) is the appropriate authority for this action.

(17) Enter into an agreement with Orange County Flood Control District (OCFCD) to address the relationship and impact of the proposed water conservation plan to the OCFCD's responsibilities for operation and maintenance of the Santa Ana River Mainstem, and the impacts of the proposed water conservation on lands downstream of Prado Basin owned by Orange County and the OCFCD.

Table 6-1. OMRR&R Requirements for Water Conservation

OMRR&R ACTIVITY	FISCAL RESPONSIBILITY	ESTIMATED COST
Dam Tenders	OCWD	$36,000
Maintenance	OCWD	$20,400
Engineering	OCWD	$83,400
Equipment Rentals	OCWD	$12,000
Dump Fees	OCWD	$2,100
Total	**OCWD**	**$153,900**

6.4 Federal Responsibility for Implementing the Selected Plan

6.4.1 Water Control Manual

Following the approval of the report, a water control plan for the approved alternative will be developed by the Corps. The water control plan will be reviewed by the Reservoir Regulation Section to ensure that it is feasible for implementation on a real-time basis. The Water Control Plan will include information on: (1) how the Quantitative Precipitation forecast will be accomplished, (2) how the runoff forecast will be done, and (3) how sediment inflow will be measured and removed. The Water Control Plan will contain the applicable operation plan depending on the construction status of the dam. The adapted water control plan will be documented in a revised water control manual that will also contain pertinent information on the dam, watershed, downstream channels, related upstream and downstream structures, hydrologic instrumentation, hydrologic forecasts, and other information related to reservoir operation. Creation of the water control manual will be funded (100 percent) by OCWD. Costs for the Water Control Manual could approximate $100,000. The preparation and approval of a new Water Control Manual may take about 1-1/2 years.

6.4.2 Memorandum of Agreement

An agreement between OCWD and the Corps will be developed identifying requirements and responsibilities of the parties. This agreement will incorporate elements of the existing 1993 water conservation agreement, primarily with respect to operation and maintenance responsibility amongst the parties, and the existing 1993 agreement will be terminated. The existing agreement, titled "Memorandum of Agreement between the Department of the Army and the Orange County Water District for the Operation of Prado Dam for Seasonal Additional Water Conservation" and executed 15 December 1993, is appended to this report.

7 CONCLUSION AND RECOMMENDATION

Implementation of a plan to increase water conservation at Prado Dam presents an opportunity to increase the groundwater supply in the Orange County Groundwater Basin. Although the alternatives presented in this study do not ensure that water supplies will remain adequate following implementation, they do help to establish the intent of using alternative water supplies (those other than the Colorado River or State Water Project) by local water agencies. This Feasibility Study has identified the water surface elevation of 498 ft (151.8 m) NGVD as a feasible means of increasing groundwater supply.

The NED Plan would provide additional groundwater yields of approximately 4,000 AF per year (4.9 million m^3 per year) in the future. Currently, it appears that the NED Plan is economically, engineeringly, and environmentally feasible. The NED Plan would generate an annual net benefit of about $459,000.

An agreement shall be entered into between the Corps and OCWD regarding the responsibilities for plan implementation, additional incremental O&M costs, and renegotiation of lease or compensation to Richardson's Dog Training, Inc. due to water conservation. A new operation plan must be completed. The recommendations contained herein reflect the information available at this time and current Department policies governing formulation of individual projects.

5 April 2005
Date

Lieutenant Colonel John V. Guenther, USACE
Acting District Engineer

8 ABBREVIATIONS AND ACRONYMS

ACHP	Advisory Council of Historic Preservation
AF	acre-feet
APE	area of potential effect
ARB	Air Resources Board
B/C	benefits to cost ratio
BLM	Bureau of Land Management
BMP	Best Management Practice
Cal EPA	California Environmental Protection Agency
CAR	Coordination Act Report
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
cuffs	cubic feet per second
CRWQCB	California Regional Water Quality Control Board
DDT	dichlorodiphenyl-trichloroethane
DOSD	Division of Safety of Dams
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EQ	environmental quality
°F	degrees Fahrenheit
fps	feet per second
ft	feet
GAP	Green Acres Project
GDM	General Design Memorandum
GWRS	Groundwater Replenishment System
H	horizontal
HTRW	hazardous, toxic and radioactive waste
IRWD	Irvine Ranch Water District
km	kilometers
km^2	square kilometers
LPP	Locally Preferred Plan
LUST	leaking underground storage tanks
m	meters
m^3	cubic meters
MCE	maximum credible earthquake
MWD	Metropolitan Water District of Southern California
mg/L	milligrams per liter
mi^2	square mile
M&I	municipal and industrial

MOA	Memorandum of Agreement
MOL	mean operating level
MWDOC	Municipal Water District of Orange County
NED	National Economic Development
NEPA	National Environmental Policy Act
NGVD	National Geodetic Vertical Datum
NPV	net present value
NWS	National Weather Service
OBE	operating basis earthquake
OCPF&RD	Orange County Public Facilities and Resources Department
OCWD	Orange County Water District
O&M	operations and maintenance
OMRR	operations, maintenance, repair, and replacement
OSE	other social effects
PCB	polychorinated biphenyls
PED	planning, engineering, and design
RD	regional development
RDF	reservoir design flood
RED	regional economic development
RGM	Reconnaissance Guidance Memorandum
ROC	Reservoir Operation Center
Route 71	Corona Expressway
Route 91	Riverside Freeway
RWQCB	Regional Water Quality Control Board
SAR	Santa Ana River
SARDCO	Santa Ana River Development Company
SARMP	Santa Ana River Mainstem Project
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
sec	second
SHPO	State Historic Preservation Officer
SPT	Standard Penetration Test
SR	State Route
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
USDA, SCS	United States Department of Agriculture, Soil Conservation Service
USFWS	United States Fish and Wildlife Service
V	vertical
WSE	Water Surface Elevation
WWTP	wastewater treatment plant

Environmental Impact Statement/
Environmental Impact Report

PRADO BASIN
WATER CONSERVATION
FEASIBILITY STUDY
Orange County, California

State Clearinghouse Number: 2004051004

Prepared for:

U.S. Army Corps of Engineers
Los Angeles District
Planning Division, Environmental Resources Branch
Los Angeles, California

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Tustin, California
(Revised by Corps in house)

February 2005

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LIST OF EXHIBITS

S SUMMARY

Following is a summary of the characteristics and environmental impacts of each project alternative. A detailed discussion of the characteristics of each project alternative is provided in Section 2. A detailed discussion of the impacts of each project alternative is provided in Section 4.

S.1 PROJECT SITE LOCATION

The Prado Basin is located in the western portion of Riverside County, California. The Prado Basin, as defined by the 169.6-meter (m) (566 foot [ft]) contour, encompasses approximately 3,925 hectares (ha) (9,700 acres [ac]) surrounding the Santa Ana River northeast of the junction of the Riverside Freeway (SR-91) and the Corona Expressway (SR-71), and west of Interstate 15 (I-15). The Prado Basin falls within both the County of Riverside and County of San Bernardino, and is bordered by the Cities of Corona to the south and east, and Norco to the east. The U.S. Army Corps of Engineers administers approximately 2,950 ha (7,300 ac) of federally owned lands in the basin, most of which is leased out for recreation purposes. The Orange County Water District administers approximately 970 ha (2,400 ac) in the Basin. The Santa Ana River drainage area includes the southwestern slopes of the San Gabriel, San Bernardino, and San Jacinto Mountains, as well as the broad alluvial valleys of Riverside and San Bernardino Counties. The total drainage area covers 5,838 square kilometers (km^2) (2,255 square miles [mi^2]), ranging in elevation from sea level to 3,650 m (11,985 ft) at Mount San Gorgonio.

S.2 DESCRIPTION OF PROJECT ALTERNATIVES

The purpose of this Environmental Impact Statement/Environmental Impact Report (EIS/EIR) is to identify the environmental consequences associated with the implementation of the proposed action. The EIS/EIR assesses the potential project-specific and cumulative impacts associated with implementing nine project alternatives. Implementation of these alternatives (Alternatives 2, 3, 4, and 5) is dependent upon the completion of modifications along the Santa Ana River. For Prado Dam, this includes the outlets and downstream channel components of the *Phase II General Design Memorandum for the Santa Ana River Mainstem Project*. The estimated timeframe for completion of these improvements is the year 2002.

S.2.1 ALTERNATIVE 1: NO ACTION ALTERNATIVE

This alternative involves no change in existing operations. During the flood season from October 1 through the end of February, water can be impounded up to elevation 494 ft. If unfavorable weather is forecast, water is drawn down as low as the 490-ft level within 24 hours to accommodate the anticipated inflow volume and thus ensure sufficient capacity for flood control purposes. During the non-flood season from March 1 through September 30, the water impoundment level can rise to elevation 505 ft. If maintenance is required on the Prado outlet structure and gates, the reservoir is evacuated before the 1st of September to allow for necessary maintenance activities.

S.2.2 ALTERNATIVE 2: FLOOD SEASON WATER CONSERVATION UP TO ELEVATION 498 FEET AND NON-FLOOD SEASON WATER CONSERVATION UP TO ELEVATION 505 FEET

During the flood season from October 1 through the end of February, water could be impounded up to elevation 498 ft. If unfavorable weather were forecast, water could be drawn down as low as elevation 490 ft within 24 hours to accommodate anticipated inflow volume and ensure sufficient capacity for flood control purposes. As with current operations during the non-flood season from March 1 through September 30, the water impoundment level could rise up to elevation 505 ft. If maintenance were required on the Prado outlet structure and gates, the reservoir could be evacuated before the 1st of September to allow for necessary maintenance activities.

S.2.3 ALTERNATIVE 3: FLOOD SEASON WATER CONSERVATION UP TO ELEVATION 500 FEET AND NON-FLOOD SEASON WATER CONSERVATION UP TO ELEVATION 505 FEET

During the flood season from October 1 through the end of February, water could be impounded up to elevation 500 ft. If unfavorable weather were forecast, water could be drawn down as low as elevation 490 ft within 24 hours to accommodate anticipated inflow volume and ensure sufficient capacity for flood control purposes. As with current operations during the non-flood season from March 1 through September 30, the water impoundment level could rise up to elevation 505 ft. If maintenance were required on the Prado outlet structure and gates, the reservoir could be evacuated before the 1st of September to allow for necessary maintenance activities.

S.2.4 ALTERNATIVE 4: FLOOD SEASON WATER CONSERVATION UP TO ELEVATION 505 FEET AND NON-FLOOD SEASON WATER CONSERVATION UP TO 505 FEET

During the flood season from October 1 through the end of February, water could be impounded up to elevation 505 ft. If unfavorable weather were forecast, water could be drawn down as low as elevation 490 ft within 24 hours to accommodate anticipated inflow volume and ensure sufficient capacity for flood control purposes. As with current operations during the non-flood season from March 1 through September 30, the water impoundment level could also be impounded to elevation 505 ft. If maintenance were required on the Prado outlet structure and gates, the reservoir could be evacuated before the 1st of September to allow for necessary maintenance activities.

S.2.5 ALTERNATIVE 5: FLOOD SEASON WATER CONSERVATION UP TO ELEVATION 508 FEET AND NON-FLOOD SEASON WATER CONSERVATION UP TO 508 FEET

During the flood season from October 1 through the end of February, water could be impounded up to elevation 508 ft. If unfavorable weather were forecast, water could be drawn down as low as elevation 490 ft within 24 hours to accommodate anticipated inflow volume and ensure sufficient capacity for flood control purposes'. During the non-flood season from March 1 through September 30, the water impoundment level could also be impounded to elevation 508 ft, which is 3 ft higher than under current operations. If maintenance were required on the Prado outlet structure and gates, the reservoir could be evacuated before the 1st of September to allow for necessary maintenance activities.

S.3 SUMMARY OF IMPACTS

The summary of impacts provided in Table S-1 is derived from Section 4. Impacts of the project are categorized as: (1) NI, no impact; (2) NS, not significant (impact that falls below the established threshold of significance); (3) SM, significant but mitigated (potentially significant adverse change, however mitigation measure(s) provided to reduce impact to level considered less than significant); (4) SU, significant unavoidable adverse (significant adverse changes that cannot be mitigated to level considered less than significant); (5) B, Beneficial impact.

S.4 SUMMARY OF MITIGATION MEASURES

The following summary of mitigation measures is derived from Section 4.

S.4.1 EARTH RESOURCES

Alternatives 1

No mitigation is required.

Alternatives 2, 3, 4, and 5

Issue 4.1.1: Increased Underseepage Through Dam Foundation.

No mitigation is required.

Issue 4.1.2: Alteration of the Existing Topography.

No mitigation is required.

Issue 4.1.3: Effect of Groundshaking from Nearby Faults.

No mitigation is required.

Issue 4.1.4: Induced Seismicity from Increased Water Impoundment Levels.

No mitigation is required.

S.4.2 WATER RESOURCES

Hydrology

Alternative 1

No mitigation is required.

TABLE S-1
SUMMARY OF ENVIRONMENTAL IMPACTS

Issue/Impact	Level of Significance				
	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
EARTH RESOURCES					
Geology and Soils					
Issue 4.1.1 Increased Underseepage Through Dam Foundation	NI	NS	NS	NS	NS
Topography					
Issue 4.1.2: Alteration of the Existing Topography Seismicity	NI	NS	NS	NS	NS
WATER RESOURCES					
Hydrology					
Issue 4.2.1: Accumulation of Sediment Within Prado Dam Basin Area	NI	NS	NS	NS	NS
Issue 4.2.2: Potential Impacts to Existing Downstream Flood Control Facilities	NI	B	B	B	B
Issue 4.2.3: Increased Yields of Groundwater Recharge	NI	B	B	B	B
Issue 4.2.4: Increased Sediment Erosion at the Downstream River View Golf Course	NI	SM	SM	SM	SM
Water Quality					
Issue 4.2.5: Impacts of Surface Water Quality Downstream of Prado Dam	NI	B	B	B	B
Issue 4.2.6: Impacts of Surface Water Quality within the Prado Dam Basin Area	NI	B	B	B	B
BIOLOGICAL RESOURCES					
Impacts on Critical/Nesting Habitat					
Issue 4.3.1: Impacts on Least Bell's Vireo Critical/Nesting Habitat	NI	SM	SM	SM	SM
Issue 4.3.2: Impacts on Southwestern Willow Flycatcher Critical/Nesting Habitat	NI	SM	SM	SM	SM
Impacts on Other Sensitive Habitats					
Issue 4.3.3: Impacts on Willow Woodland	NI	SM	SM	SM	SM
Issue 4.3.4: Impacts on Riparian Scrub	NI	NI/NS	NI/NS	SM	SM
Issue 4.3.5: Impacts on Freshwater Marsh Vegetation	NI	NI	NI	NS	SM
Issue 4.3.24: Impacts on Cottonwood/Willow Woodland	NI	NS	SM	SM	SM

TABLE S-1 (continued)

Issue/Impact	Level of Significance				
	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
<u>Impacts on Federally Endangered and Threatened Species</u>					
Issue 4.3.6: Impacts on Least Bell's Vireo	NI	SM	SM/NI	SM/NS	SM/NS
Issue 4.3.7: Impacts on the Southwestern Willow Flycatcher	NI	NI	NI	NS/NI	SM/NI
Issue 4.3.8: Impacts on the Santa Ana Sucker	NI	NI/SM	NS/SM	NS/SM	NS/SM
Issue 4.3.9: Impacts on Arroyo Southwestern Toad and California Red-legged Frog	NI	NI	NI	NI	NI
<u>Impacts on State Endangered and Threatened Species</u>					
Issue 4.3.10: Impacts on Bald Eagle and Peregrine Falcon	NI	NI	NI	NI	NI
Issue 4.3.11: Impacts on Western Yellow-billed Cuckoo	NI	NI	NI	NI	NI
Issue 4.3.12: Impacts on Swaison's Hawk	NI	NI	NI	NI	NI
<u>Impacts on Species of Special Concern</u>					
Issue 4.3.13: Impacts on Birds of Special Concern	NI	NS/NI	NS	SM	SM
Issue 4.3.14: Impacts on Mammals of Special Concern	NI	NS/NI	NS/NI	NS	NS
Issue 4.3.15: Impacts on Reptiles of Special Concern	NI	NS	NS	SM	SM
Issue 4.3.16: Impacts on Amphibians of Special Concern	NI	NS/NI	NS/NI	NS/NI	NS/NI
Issue 4.3.17: Impacts on Fishes of Special Concern	NI	NS	NS	NS	NS
<u>Impacts on Fully Protected Species</u>					
Issue 4.3.18: Impacts on Fully Protected Species	NI	NS/NI	NS/NI	NS	NS
<u>Impacts on Sensitive Plant Species</u>					
Issue 4.3.19: Impacts on Many-stemmed Dudleya	NI	NI	NI	NI	NI
<u>Impacts on Wildlife Movement Corridors</u>					
Issue 4.3.20: Impacts on Wildlife Movement Corridors	NI	NS/NI	NS/NI	NS/NI	NS/NI
<u>Impacts on Non-Sensitive Vegetation</u>					
Issue 4.3.21: Impacts on Non-Sensitive Native Vegetation	NI	NS/NI	NS/NI	NS	NS
Issue 4.3.22: Impacts on Ruderal and Invasive Non-Native Vegetation	NI	NS/NI	NS/NI	NS/SM	NS/SM
<u>Impacts on Non-Sensitive Wildlife</u>					
Issue 4.3.23: Impacts on Non-Sensitive Wildlife Species	NI	NS/NI	NS/NI	SM	SM

TABLE S-1 (continued)

Issue/Impact	Level of Significance				
	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
AIR QUALITY					
Issue 4.4.1: Exhaust and Fugitive Dust Emissions from Maintenance-Related Activities Downstream of Prado Dam	NI	NI	NI	NI	NI
NOISE					
Issue 4.5.1: Noise Emissions from Periodic Maintenance Activities Downstream of Prado Dam	NI	NI	NI	NI	NI
LAND USE AND RECREATION					
Existing Onsite and Surrounding Land Uses					
Issue 4.6.1: Effects on the Availability of Existing Recreational and Other Uses Resulting from Inundation Within the Prado Basin Area	NI	NS	NS	NS	NS
Issue 4.6.2: Effects Relating to the Physical Degradation of Existing Recreational and Other Uses Resulting from Inundation Within the Prado Basin Area	NI	NS	NS	NS	NS
Issue 4.6.3: Effects on the Availability of Existing Recreational and Other Uses Resulting from Inundation Below Prado Dam	NI	NS	NS	NS	NS
Issue 4.6.4: Effects Relating to the Physical Degradation of Existing Recreational and Other Uses Resulting from Inundation Below Prado Dam	NI	NS	SM	SM	SM
Future Land Uses					
Issue 4.6.5: Effects on the Availability of Future Recreational Uses Resulting from Inundation Within the Prado Basin Area	NI	NS	NS	NS	NS
Issue 4.6.6: Effects Relating to the Physical Degradation of Future Recreational Uses Resulting from Inundation Within the Prado Basin Area	NI	NS	NS	NS	NS
AESTHETICS					
Views from Visually Sensitive Land Uses					
Issue 4.7.1: Alteration of Existing Views from Surrounding Residences	NI	NS	NS	NS	NS
Views from Scenic Highways					
Issue 4.7.2: Alteration Of Existing Views From State Route 71	NI	NS	NS	NS	NS

TABLE S-1 (continued)

Issue/Impact	Level of Significance				
	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
CULTURAL RESOURCES					
Issue 4.8.1: Known National Register Eligible Resources	NI	NS	NS	NS	S
Issue 4.8.2: Unknown Cultural Resources	NI	SM	SM	SM	SM
PUBLIC HEALTH AND SAFETY					
Issue 4.9.1: Effects from Increases in Mosquitoes	NI	SM	SM	SM	SM

Alternatives 2, 3, 4, and 5

Issue 4.2.1: Accumulation of Sediment or Debris Within the Prado Dam Basin Area.

No mitigation is required.

Issue 4.2.2: Potential Impacts on Existing Downstream Flood Control Facilities.

No mitigation is required.

Issue 4.2.3: Increased Yields of Groundwater Recharge.

No mitigation is required.

Issue 4.2.4: Increased Sediment Erosion at the Downstream River View Golf Course

When maximum discharge rates are realized under the proposed water conservation operations, sediment material at the downstream River View Golf Course will need to be replaced more frequently compared to existing conditions and any required reconstruction at the golf course will need to occur.

Water Quality

Alternative 1

No mitigation is required.

Alternatives 2, 3, 4, and 5

Issue 4.2.5: Impacts of Surface Water Quality Downstream of Prado Dam.

No mitigation is required.

Issue 4.2.6: Impacts of Surface Water Quality Within the Prado Dam Basin Area.

No mitigation is required.

1.

S.4.3 BIOLOGICAL RESOURCES

Alternative 1

No mitigation is required.

Alternative 2

Impacts within the Basin would include the following: 87.6 ha (216.1 ac) of willow woodland and 1.4 ha (3.5 ac) of mixed eucalyptus and willow woodland for a total of 89.0 ha (219.6 ac). To reduce these impacts, the following measures are recommended.

1. The entire 89.0 ha (219.6 ac) have already been mitigated at 50 percent. To phrase it another way, 44.5 ha (109.8 ac) have already been mitigated at 100%. An additional 6.3 percent mitigation (or 2.8 ha [6.9 ac]) for impacts on the remaining 44.5 ha (109.8 ac) is all that is required based on the additional number of days of inundation at 498 ft in a 100-year flood event. The local sponsor will acquire 2.8 ha (6.9 ac) for restoration. This land will be obtained from a 45.4-ha (112-ac) parcel within Prado Basin that is available for restoration.

2. The local sponsor will provide compensation to the Trust Fund for maintenance of the 2.9 ha (6.9 ac) of riparian habitat that will be acquired for restoration. The total compensation will be $25,000/ac for a total of $172,500.

Impacts downstream of the Basin include the understory associated with 59.3 ha (146.4 ac) of native riparian vegetation. Understory is assumed to occupy 30 percent of the total area, or 17.8 ha (43.9 ac). Only about 50 percent of the understory, or about 8.9 ha (22.0 ac) will be impacted.

3. The local sponsor will acquire 8.9 ha (22.0 ac) from the remaining 42.5 ha (105.1 ac) of the original 45.4-ha (112-ac) parcel within the Prado Basin that is available for mitigation.

4. The local sponsor will provide compensation to the Trust Fund for maintenance of the 8.9 ha (22.0 ac) of riparian habitat that will be acquired for restoration. The total compensation will be $25,000/ac for a total of $550,000.

Alternative 3

Impacts within the Basin would include the following: 138.5 ha (341.7 ac) of willow woodland and 2.1 ha (5.2 ac) of mixed eucalyptus and willow woodland for a total of 140.6 ha (346.9 ac). To reduce these impacts, the following measures are recommended.

1. The entire 140.6 ha (346.9 ac) have already been mitigated at 50 percent; an additional 11.6 percent mitigation for the remaining 70.2 ha (173.5 ac), or 8.1 ha (20.1 ac), is all that is required based on the additional number of days of inundation at 500 ft in a 100-year flood event. The local sponsor will acquire 8.1 ha (20.1 ac) for restoration. This land will be obtained from a 45.4-ha (112-ac) parcel within Prado Basin that is available for restoration.

2. The local sponsor will provide compensation to the Trust Fund for maintenance of the 8.1 ha (20.1 ac) of riparian habitat that will be acquired for restoration. The total compensation will be $25,000/ac for a total of $502,500.

Impacts downstream of the Basin include the understory associated with 71.0 ha (175.3 ac) of native riparian vegetation. Understory is assumed to occupy 30 percent of the total area, or 21.3 ha (52.6 ac). Only about 50 percent of the understory, or about 10.7 ha (26.3 ac), will be impacted.

3. The local sponsor will acquire 10.6 ha (26.3 ac) from the remaining 37.2 ha (91.9 ac) of the original 45.4-ha (112-ac) parcel within the Prado Basin that is available for mitigation.

4. The local sponsor will provide compensation to the Trust Fund for maintenance of the 10.6 ha (26.3 ac) of riparian habitat that will be acquired for restoration. The total compensation will be $25,000/ac for a total of $657,500.

Alternative 4

Impacts within the Basin would include the following: 256.1 ha (632.7 ac) of willow woodland and 3.9 ha (9.7 ac) of mixed eucalyptus and willow woodland for a total of 260.0 ha (642.4 ac). To reduce these impacts, the following measures are recommended.

1. The entire 260.0 ha (642.4 ac) have already been mitigated at 50 percent; an additional 29.6 percent mitigation for the remaining 130.0 ha (321.2 ac), or 38.5 ha 95.1 ac), is all that is required based on the additional number of days of inundation at 505 ft in a 100-year flood event. The local sponsor will acquire 38.5 ha (95.1 ac) for restoration from a 45.4-ha (112-ac) parcel within Prado Basin that is available for restoration.

2. The local sponsor will provide compensation to the Trust Fund for maintenance of the 38.5 ha (95.1 ac) of riparian habitat that will be acquired for restoration. The total compensation will be $25,000/ac for a total of $2,377,500.

Impacts downstream of the Basin include the understory associated with 112.9 ha (278.6 ac) of native riparian vegetation. Understory is assumed to occupy 30 percent of the total area, or 33.9 ha (83.6 ac). Only about 50 percent of the understory, or about 17.0 ha (41.8 ac) will be impacted.

3. The local sponsor will acquire the remaining 6.8 ha (16.9 ac) of the original 45.4-ha (112-ac) parcel within the Prado Basin that is available for mitigation.

4. The local sponsor will provide compensation to the Trust Fund for maintenance of the 6.8 ha (16.9 ac) of riparian habitat that will be acquired for restoration. The total compensation will be $25,000/ac for a total of $422,500.

5. The local sponsor will provide compensation for the loss of an additional 10.1 ha (24.9 ac) of native riparian woodland understory. This compensation will be $50,000/ac for a total of $1,245,000.

Alternative 5

Impacts within the Basin would include the following: 370.7 ha (914.8 ac) of willow woodland, 1.9 ha (4.8 ac) of riparian scrub, and 5.4 ha (13.4 ac) of mixed eucalyptus and willow woodland, for a total of 378.0 ha (933.0 ac). Of this 378.0 ha (933.0 ac), 260.3 ha (642.4 ac) is between elevations 494 and 505 ft. The remaining 117.7 ha (290.6 ac) are between 505 and 508 ft elevation. To reduce these impacts, the following measures are recommended.

1. There are 260.3 ha (642.4 ac) that are located between elevations 494 and 505 ft that have already been mitigated at 50 percent. The remaining 130.2 ha (321.2 ac) will be mitigated at 29.6 percent, for a total of 38.5 ha (95.1 ac). The remaining 117.7 ha (290.6 ac) that are between 505 and 508 ft elevation will be mitigated at 73.3 percent of its habitat value, or 86.3 ha (213.0 ac), based on the additional number of days of inundation at 508 ft in a 100-year flood event. Therefore, a total of 124.8 ha (308.1 ac) will be required to be mitigated. The local sponsor will acquire a 45.4-ha (112-ac) parcel within the Prado Basin that is available for restoration. This acquisition will provide partial mitigation.

2. The local sponsor will provide compensation to the Trust Fund for the loss of an additional 74.9 ha (196.1 ac) of riparian habitat. This compensation will be $50,000/ac for a total of $9,805,000.

3. The local sponsor will provide compensation to the Trust Fund for maintenance of the riparian habitat on the 112-ac parcel that will be acquired for restoration. This compensation will be $25,000/ac for a total of $2,800,000.

Impacts downstream of the Basin include the understory associated with 159.8 ha (394.3 ac) of native riparian vegetation. Understory is assumed to occupy 30 percent of the total area, or 47.9 ha (118.3 ac). Only about 50 percent of the understory, or about 24.0 ha (59.2 ac) will be impacted.

4. The local sponsor will provide compensation for the loss of 24.0 ha (59.2 ac) of native riparian woodland understory. This compensation will be $50,000/ac for a total of $2,960,000.

S.4.4 AIR QUALITY

<u>Alternative 1</u>

No mitigation is required.

<u>Alternatives 2, 3, 4, and 5</u>

Issue 4.4.1: Exhaust and Fugitive Dust Emissions from Maintenance-Related Activities Downstream of Prado Dam.

No mitigation is required.

S.4.5 NOISE

<u>Alternative 1</u>

No mitigation is required.

<u>Alternatives 2, 3, 4, and 5</u>

Issue 4.5.1: Noise Emissions from Periodic Maintenance Activities Downstream of Prado Dam

No mitigation is required.

S.4.6 LAND USE AND RECREATION

<u>Alternative 1</u>

No mitigation is required.

Alternatives 2, 3, 4, and 5

Issue 4.6.1: Effects on the Availability of Existing Recreational and Other Uses Resulting from Inundation Within the Prado Basin Area.

No mitigation is required.

Issue 4.6.2: Effects Relating to the Physical Degradation of Existing Recreational and Other Uses Resulting from Inundation Within the Prado Basin Area.

All recreation facilities within Prado Basin are required to be floodable. Following inundation of existing recreational and other uses within the Prado Basin area, maintenance activities to restore these uses to their pre-inundation condition may be required.

Issue 4.6.3: Effects on the Availability of Existing Recreational and Other Uses Resulting from Inundation Below Prado Dam.

No mitigation is required.

Issue 4.6.4: Effects Relating to the Physical Degradation of Existing Recreational and Other Uses Resulting from Inundation Below Prado Dam.

Following inundation of existing recreational and other uses downstream of Prado Dam, maintenance activities to restore these uses to their pre-inundation condition may be required.

S.4.7 AESTHETICS

Alternative 1

No mitigation is required.

Alternatives 2, 3, 4, and 5

Issue 4.7.1: Alteration of Existing Views from Residences Surrounding Prado Basin.

No mitigation is required.

Issue 4.7.2: Alteration of Existing Views from State Route 71.

No mitigation is required.

Issue 4.7.3: Alteration of Views from Downstream Land Uses

No mitigation is required.

S.4.8 CULTURAL RESOURCES

Alternative 1

No mitigation is required.

Alternatives 2, 3, and 4

Issue 4.8.1: Known National Register Eligible Resources Within Prado Basin.

No mitigation is required.

Issue 4.8.2: Known National Register Resources Downstream of Prado Dam

Compliance with Section 106 of the National Historic Preservation Act (36 CFR 800) is required prior to implementation of the project alternatives. The National Register eligible historic sites will require a test excavation to determine their significance. If any of these are determined to be NRHP eligible, specific mitigation measures would than be developed in accordance with the procedures in 36 CFR 800. The final mitigation measures would be developed in consultation with the State Historic Preservation Office, and the Advisory Council on Historic Preservation.

Issue 4.8.3: Unknown Cultural Resources.

In the event that previously unknown resources are uncovered during implementation of water conservation, the U.S. Army Corps of Engineers will be required to comply with 36 CFR 800.11, *Properties Discovered During Implementation of an Undertaking*. This might occur if previously undisturbed landforms are eroded away to reveal buried cultural resources. In such an event, additional mitigation measures will be required. These additional mitigation measures will be developed in consultation with the State Historic Preservation Office, and the Advisory Council on Historic Preservation.

Alternative 5

Issue 4.8.1: Known National Register Eligible Resources Within Prado Basin.

Compliance with Section 106 of the National Historic Preservation Act (36 CFR 800) is required prior to implementation of this alternative. The four potentially National Register (NRHP) eligible historic sites will require a test excavation to determine their significance. If any of these are determined to be NRHP eligible, specific mitigation measures will than be developed in accordance with the procedures in 36 CFR 800. The final mitigation measures will be developed in consultation with the State Historic Preservation Office, and the Advisory Council on Historic Preservation. It is likely that data recovery will be the most feasible mitigation option.

Issue 4.8.2: Known National Register Resources Downstream of Prado Dam.

Compliance with Section 106 of the National Historic Preservation Act (36 (CFR 800) is required prior to implementation of the project alternatives. The National Register eligible historic sites will require a test excavation to determine their significance. If any of these are determined to be NRHP eligible, specific mitigation measures would than be developed in accordance with the procedures in 36 CFR 800. The final mitigation measures would be developed in consultation with the State Historic Preservation Office, and the Advisory Council on Historic Preservation.

Issue 4.8.3: Unknown Cultural Resources.

In the event that previously unknown resources are uncovered during implementation of water conservation to elevation 508 ft, the U.S. Army Corps of Engineers will be required to comply with 36 CFR 800.11, *Properties Discovered During Implementation of an Undertaking*. This might occur if previously undisturbed landforms are eroded away to reveal buried cultural resources. In such an event, additional mitigation measures will be required. These additional mitigation measures will be developed in consultation with the State Historic Preservation Office, and the Advisory Council on Historic Preservation.

S.4.9 PUBLIC HEALTH AND SAFETY

Alternative 1

No mitigation is required

Alternatives 2, 3, 4, and 5

Issue 4.9.1: Effects from Increases in Mosquitoes.

If an increase in mosquitoes and nuisances to the public results from increased water impoundment levels behind Prado Dam or water releases from Prado Dam, an increase in mosquito abatement will be provided in the Prado Basin area. Increases in mosquito abatement will be provided through contribution of funds to the Northwest Mosquito Abatement District, West Valley Vector Control District, or Orange County Vector Control District so that mosquito nuisances to the public are reduced to less than significant.

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 California Environmental Quality Act [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 Orange County.

The U.S. Army Corps of Engineers (USACE) is the federal agency with jurisdiction over the proposed water conservation practices at the Prado Flood Control Basin (Prado Basin). The Orange County Water District (OCWD) is the local sponsor and has jurisdiction over the proposed alternatives.

This EIS/EIR is intended to serve as the primary environmental document for all actions associated with the project, including all discretionary approvals requested or required to implement the project.

1.1 PURPOSE AND NEED FOR PROJECT

It is the USACE's policy to balance the use of reservoir resources by conserving as much water as possible consistent with other environmental and fiscal constraints. The USACE regulation entitled Water Control Management states in its policy section (33 CFR 222.7, 6d) that 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.

The purpose of the proposed action is to increase conservation of surplus water at Prado Dam. Water demands within the OCWD service area have resulted in a relatively constant drawdown of the local aquifer by approximately 400,000 acre–feet per year over the past few years. The last time the aquifer was full was in 1983, however the level of water in the OCWD aquifers has dropped to approximately 65 million acre-feet as a result of reduced rainfall. The County of Orange is planning for growth and the inevitable population increase will demand more water. To reduce the need for expensive imported water supplies, OCWD has initiated several water management projects to enhance groundwater supplies, including water conservation at Prado Dam. Although the Dam's primary operation function is for flood control, changes have occurred in the operation to allow water from the Santa Ana River to be held back during the flood and non-flood seasons. By releasing the floodwater slowly to OCWD's recharge facilities, the water is conserved before it runs into the ocean.

1.2 PURPOSE OF EIS/EIR

This draft EIS/EIR for the proposed Prado Basin Water Conservation Feasibility Study (State Clearinghouse Number: 2004051004) has been prepared to evaluate the potential environmental impacts associated with the implementation of the 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 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. The lead agency supervises the preparation of the environmental documentation for a proposed action and has the specific responsibility for carrying out or approving a project that may have a significant effect upon the environment. The Orange County Water District (OCWD) is the CEQA lead agency for the EIR.

The U.S. Fish and Wildlife Service (USFWS) is the only federal agency that is identified as a cooperating agency. The USFWS has jurisdiction over the Endangered Species Act (ESA) and may use this EIS/EIR along with other information that may be presented during the NEPA process in the decision-making regarding the ESA. USFWS's anticipated responsibilities are addressed in Section 2 of this EIS/EIR.

1.3 BACKGROUND

The USACE prepared a reconnaissance report entitled *Seven Oaks and Prado Dams Water Conservation Study*, 1992 that evaluated water conservation potential at the two dams. The study recommended that the Seven Oaks Dam portion of the study move into the feasibility phase, and that a re-operation study be conducted for Prado Dam to optimize water conservation benefits. The USACE prepared a supplemental reconnaissance report in July 1996 that incorporated new information and conditions to determine if a feasibility study is warranted for Prado Dam. The reconnaissance study prepared in 1996, was conducted under the direction provided in the House of Representatives Report 101-96 dated June 20, 1989.

Water conservation at Prado Dam has been part of the dam design since its construction in 1941. In 1985, a hydrology and water conservation study of Prado Reservoir was prepared. In 1988, an analysis for the operation of Prado Dam for water conservation was conducted. In 1990, the water control plan was revised to introduce a buffer pool from elevations 490 to 494 ft. The buffer pool allowed the water control manager to limit releases from Prado Dam. This allowed the water control manager to coordinate with OCWD to release water downstream at rates that facilitated OCWD's groundwater recharge activities. In 1993, the current operation for water conservation at Prado Dam was approved which allowed the buffer pool elevation to increase from elevation 494 ft to elevation 505 ft during the non-flood season (March 1 to September 30). During the flood season (October 1 to February 28), the buffer pool at Prado Dam is at elevation 494 ft. This current operation is within the *Water Control Manual, Prado Dam and Reservoir, Santa Ana River, California*, prepared in 1994.

1.4 SCOPE OF EIS/EIR

1.4.1 PUBLIC INVOLVEMENT

The scoping process is a key component of 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 the proposed action. During the preparation of an EIS, federal agencies must make diligent efforts to involve the public by: providing notice of public meetings; holding or sponsoring public meetings or hearings; soliciting information from the public; explaining where interested persons can receive information; and making EIS's available to the public (40 CFR 1506.6). In compliance with the NEPA and the state CEQA Guidelines, the USACE and the OCWD 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 November 20, 1997. The NOI is included in this document 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 EIS's 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 November 17, 1997 in the City of Corona, California. At this scoping meeting, the USACE and OCWD 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 Prado Dam Water Conservation Study. Input provided by attendees covered such topics as flooding of existing land uses, siltation, project phasing, water quality, fish and wildlife species, vectors, and economic impacts. The full transcript of the scoping meeting is attached in Appendix B of this document.

1.4.2 ORGANIZATION AND FORMAT OF THIS EIS/EIR

This EIS/EIR addresses the potential environmental effects of the project alternatives. The scope of the EIS/EIR includes issues raised by the USACE, the OCWD, and issues raised in response to the NOI and public scoping meeting as well as environmental issues raised by agencies and the general public in response to the project.

This draft EIS/EIR provides a detailed description of the alternatives. 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 each alternative (study area), is provided in Section 3. A detailed impact analysis for each alternative, as well as mitigation measures to reduce the adversity of the impacts identified for each alternative is provided in Section 4. Section 5 identifies the public involvement associated with the proposed action. Section 6 identifies growth-inducing and cumulative impacts. Section 7 identifies the relationship between short-term uses of the environment and long-term environmental productivity. Section 8 identifies irreversible and irretrievable commitments of resources. Section 9 lists those individuals and organizations that participated in the preparation of the EIS/EIR. Section 10 and 11 are the references used in the preparation of the draft EIS/EIR and index to the draft 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."

1.4.3 EFFECTS NOT FOUND TO BE SIGNIFICANT

Through the NOI and public scoping process, the USACE determined that there was no evidence that the project would cause significant effects in the following resource areas and determined that no further environmental analysis or review of these resource areas was necessary:

- Population and Housing
- Public Services and Utilities
- Energy and Mineral Resources
- Transportation/Circulation

1.4.4 REVIEW OF THE DRAFT EIS/EIR

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
Attention: Alex Watt

Upon completion of the public review period, responses to comments received on the draft EIS/EIR will be prepared in writing and incorporated into the final EIS/EIR. All parties commenting on the EIS/EIR will receive responses. These responses may modify alternatives including the proposed action; develop and evaluate alternatives not previously given serious consideration; supplement, improve, or modify analysis in the EIS/EIR; make factual corrections; or may explain why comments do not warrant further response.

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. The ROD will be published in the Federal Register. Should the project be approved, the OCWD will need to issue a Notice of Determination (NOD) in accordance with the CEQA.

1.4.5 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.

1.5 RELATIONSHIP TO ENVIRONMENTAL PROTECTION STATUTES AND OTHER REQUIREMENTS

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

1.5.1 FEDERAL

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

The Prado Basin Water Conservation Feasibility Study has been evaluated 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 USACE, 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 project alternatives, and all procedural review requirements of the aforementioned rules and regulations will have been met as part of the EIS/EIR process. State and agency review have been completed, and the ROD will be signed at the close of this process.

1.5.1.2 Clean Air Act

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. No emissions will occur as a result of the proposed project, as there is no constsruction associated with the conservation of water at Prado Basin. The only potential impacts resulting from the implementation of the proposed alternatives are that repairs of downstream facilities may be required if larger releases as a result of Alternatives 3, 4, or 5, occur. If one of these alternatives is selected, and damages occur, a supplemental environmental document would be prepared for the necessary repairs. Any potential impacts are considered short term and insignificant. The upgrading of the downstream area as part of the Santa Ana River Mainstem Project will include upgrading the bank protection at areas that may be subject to erosion from flows up to 30,000cfs. This protection will be in place by 2007, and at that point in time all the water conservation alternatives will be considered non-damaging. The proposed project is in compliance with the Clean Air Act. Compliance for air quality included state review through the State Clearinghouse process. No comments were received based on this review. The U.S. EPA provided no comments on air quality in their required review of this document, which included a Lack of Objections (LO) rating.

1.5.1.3 Clean Water Act of 1977

The project alternatives will be in compliance with the guidelines in 40 CFR 230.10(c), promulgated by the EPA under Section 404(b) of the Clean Water Act (CWA). 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 project alternatives do not involve the discharge or dredged or fill material, therefore, Section 404(b) of the CWA is not applicable to the project alternative. Other sections of the CWA, such as Sections 401 and 402, had no substantive effect on the project formulation or project costs.

1.5.1.4 Endangered Species Act (ESA) of 1973, as Amended

The ESA states that various species of fish, wildlife, and plants in the United States have been rendered extinct, depleted in numbers so that they are in danger of or threatened with extinction, or are of aesthetic, ecological, educational, historical, recreational, and scientific value to the United States. The purposes of the ESA are to provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved and to provide a program for the conservation of such endangered species and threatened species.

The federally endangered and threatened species that occur or may occur within Prado Basin and downstream of Prado Dam include the least Bell's vireo, southwestern willow flycatcher, bald eagle, arroyo southwestern toad, California red-legged frog, and the Santa Ana sucker.. Potential impacts associated with the endangered species are discussed in Section 4.3. Informal consultation was initiated in November 1997, and USFWS was included in the project delivery team meetings that were held between the Corps and the local sponsor for the duration of project development. The Service was included in the project formulation process. Formal consultation with USFWS under the ESA has been completed, and mitigation measures have been accomplished and, or, negotiated to include: acquisition of land for restoration, compensation to the Trust Fund for maintenance of restored habitat, compensation at $50,000/ac for hoss of native riparian woodland understory to be used for arundo removal, creation and enhancement of Santa Ana Sucker habitat, and support and implementation of a Santa Ana Sucker Recovery Plan.

1.5.1.5 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 multipurpose). 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 that are appropriate for federal administration because of other federal programs.

The project alternatives do not include the addition of recreational facilities due to the anticipated constant fluctuation of water surface elevations within the Prado Basin.

1.5.1.6 Fish and Wildlife Coordination Act, as Amended

The Prado Basin Water Conservation Feasibility Study is in compliance with the Fish and Wildlife Coordination Act. In response to the requirements of the Act, the USACE has and will continue to coordinate with the USFWS and CDFG during all phases of the project. The USFWS's Coordination Act Report (CAR) provides a detailed discussion of the effects associated with the project's preferred alternatives. The Draft CAR is provided in Appendix C of this EIS/EIR with a current letter from the Service requesting that the subject DCAR serve as the Final CAR for this project. The draft EIS/EIR was sent to the USFWS during the public review period. Based on continuous, seamless consultation between the USACE and the Service, there are no outstanding issues on this project.

1.5.1.7 Migratory Bird Treaty Act

The analyses of the project alternatives addressed in this EIS/EIR were performed in conjunction with the USFWS. The alternatives will not entail the deliberate taking, killing, or possession of any migratory birds; however, incidental to project implementation, some birds' nests may be inundated in years of heavy late-season rainfall by the rising reservoir pool. Because no deliberate take is involved, the project alternatives are in compliance with the Migratory Bird Treaty Act.

1.5.1.8 National Historic Preservation Act of 1966, as Amended

The Prado Basin Water Conservation Feasibility Study is in the process of complying 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 has been performed by USACE. Mitigation measures for the project alternatives have been identified to comply with the Section 106 requirements.

1.5.1.9 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 parks 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.

Due to the anticipated constant fluctuations of water surface elevations within the Prado Basin, no recreational facilities are proposed as part of the project alternatives.

1.5.1.10 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 portions of the Santa Ana River immediately upstream and downstream of Prado Dam are not classified as a wild and scenic river.

1.5.1.11 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 the proposed water conservation and supply project has considered the objectives of the Executive Order. The primary purpose of Prado Dam is to assist in providing flood protection for communities downstream of the dam. The objective of the currently proposed water conservation and supply project is to use water retention areas behind the dam to conserve runoff. The proposed action would not adversely affect the purpose of the Prado Dam to provide flood protection. Therefore, this action is considered to be consistent with Executive Order 11988.

1.5.1.12 Executive Order 11990, Protection of Wetlands

In developing alternatives, the USACE considered the effects of the project alternatives 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 proposed project will affect wetlands within the Prado Basin. Implementation of mitigation measures in association with the proposed water conservation and supply project will compensate for impacts on wetlands, thus satisfying the goals of this Executive Order.

1.5.1.13 Farmlands Protection Policy Act

This Act requires federal agencies to coordinate with the National Resources Conservation Service (NRCS) and to consider impacts on prime, unique, statewide and local important farmlands in the project planning process. Compliance with the Act had no substantive affect on the project formulation or project costs. The entire footprint for the proposed action is either within the footprint of the current flood pool within Prado Basin, or within the floodway downstream of Prado Basin. Compliance with the FPPA has had no substantive effect on project formulation or project costs.

1.5.1.14 Executive Order 12898, Environmental Justice

Executive Order 12898 requires that proposed Federal actions address environmental justice in minority populations and low-income populations. Specifically, this Executive Order requires identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of Federal programs, policies, and activities on minority populations and low-income populations. Implementation of the project alternatives would not result in any significant human health or environmental effects, subsequent to implementation of appropriate mitigation measures. Further, no low-income or minority populations would be directly impacted by the project and disproportionately high effects would not occur on any population because the project is taking place within Prado Basin and no persons reside in the Basin.

1.5.1.15 Resource Conservation and Recovery Act of 1976 (Public Law 94-580)

No chemicals or pesticides will be used as part of the proposed action. The project is in full compliance with the act.

1.5.1.16 Comprehensive Environmental Response, Compensation, and Liability Act of 1980

The proposed project will not result in the release or discharge of any substances that are covered under this act. The proposed action is in full compliance with the act.

1.5.1.17 Bald Eagle Protection Act

The proposed project will not result in any violation of the act, as eagles do not nest within the project footprint. The project is in full compliance with the act.

1.5.1.18 Coastal Zone Management Act (CZMA)

The Prado Basin and the reach of the river downstream to the recharge facilities are not within the Coastal Zone. CZMA is not applicable.

1.5.2 STATE AND REGIONAL

1.5.2.1 State

California Environmental Quality Act (CEQA)

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

California Endangered Species Act

The California Endangered Species Act (CESA) (Fish & Game Code §§ 2050, et seq.) recognizes that certain species of fish, wildlife, and plants have been rendered extinct as a consequence of man's activities, untempered by adequate concern and conservation and that other species of fish, wildlife, and plants are in danger of, or threatened with, extinction because of a variety of causes. CESA further states that California policy is to conserve, protect, restore, and enhance any endangered species or any threatened species and its habitat and that it intends to acquire lands for habitat for these species. CESA generally parallels the main provisions of the Federal Endangered Species Act and is administered by the California Department of Fish and Game (CDFG). Compliance with this Act was subsumed under activities required under the federal Endangered Species Act, and is complete. Compliance with the CESA, therefore, has had no substantive effect on project formulation or project costs.

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 Elimination System permit (NPDES) would be required for any project construction activities that would result in the disturbance of five or more acres. Compliance with the subject requirements has had no substantive effect on project formulation or project costs.

California Clean Air Act Requirements

The California Clean Air Act of 1988 (CCAA), as amended in 1992, requires all air districts in the state to endear 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 same pollutants. California also has established its own standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. Compliance with the CCAA has had no substantive effect on project formulation or project costs.

1.5.2.2 Regional

South Coast Air Quality Management District

Air Quality in the South Coast Air Basin (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 2529) set air quality planning and regulatory responsibilities for the basin. The California Air Resources (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 South Coast Air Quality Management District (SCAQMD) and the Southern California Association of Governments (SCAG) have responsibility for preparing 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 o analyze their impacts on SCAG's regional plans. Compliance with the South Coast Air Quality Management District has resulted in no comments on the project, and has had no substantive effect on project formulation or project costs. There are no emissions that will occur as a result of the proposed project. If repairs of the downstream area are required as a result of releases, an environmental document will be prepared for the necessary repairs. No mitigation is required because there are no impacts to mitigate.

2 DESCRIPTION OF PROJECT ALTERNATIVES

Pursuant to 40 CFR 1502.14 and California Resources Code Section 21000 et seq., this EIS/EIR includes the analyses of four alternatives for water conservation at Prado Dam, as well as the NEPA mandated No Action Alternative. 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, operational and maintenance characteristics, and a discussion of those alternatives that have been eliminated from further analysis and the reasons for their elimination.

2.1 PROJECT SITE LOCATION

Prado Dam and Reservoir are located in the western portion of Riverside County (see Exhibit 2-1). Prado Reservoir, as defined by the 169.6 meter (m) (556 foot [ft]) contour, encompasses approximately 3,925 hectares (ha) (9,700 acres [ac]) surrounding the Santa Ana River northeast of the junction of the Riverside Freeway (SR-91) and the Corona Expressway (SR-71) and west of Interstate 15 (I-15) (see Exhibit 2-2 and 2-3). Prado Reservoir falls within both the County of Riverside and County of San Bernardino, and is bordered by the Cities of Corona to the south and east, and Norco to the east. The USACE administers approximately 2,950 ha (7,300 ac) of federally owned lands in the basin, most of which is leased out for recreation purposes. The OCWD administers approximately 970 ha (2,400 ac) in the Reservoir. The Santa Ana River drainage area includes the southwestern slopes of the San Gabriel, San Bernardino, and San Jacinto Mountains, as well as the broad alluvial valleys of Riverside and San Bernardino Counties. The total drainage area above Prado Dam covers 5,838 km^2 (2,255 mi^2), ranging in elevation from sea level to 11,985 ft at Mount San Gorgonio.

The study area also includes an approximately 8-mile portion of the Santa Ana River extending downstream from Prado Dam to Weir Canyon Road. This area of the Santa Ana River lies within the County of Riverside, County of Orange, and a small portion of the County of San Bernardino. Downstream of Prado Dam, the Santa Ana River meanders naturally through the Santa Ana Canyon, except for about three miles of revetment. The entire flood plain downstream of Prado Basin consists of approximately 1,300 square miles, including about 70 square miles of coastal plain.

2.2 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 from Prado Reservoir.

Water conservation and supply is one of the missions of the Corps defined in the Flood Control Act of 1944 and the Water Supply Act of 1958, as amended. The current policy was defined by Congress in Section 932 of the Water Resources Development Act of 1986. Among the aspects of water conservation is modification of project operations to enhance groundwater replenishment, among other means to enhance project usage for Municipal and Industrial purposes. The Corps objective in water conservation and supply is to contribute to the National Economic Development (NED). NED benefits attributable to water conservation and supply are measured in terms of net changes in quantity of water conserved. The net changes are measured in the planning area and in the rest of the Nation.

Prado Reservoir is proposed to allow for a greater amount of water conservation in response to local concerns regarding future water supply sources, continued regional population growth, dwindling imported water supplies, and continued increases in the cost of water. More specifically, the objective of the currently proposed water conservation and supply study is to increase maximum pool elevation for water conservation behind the dam between storms and after the flood season. During the flood and non-flood seasons, the water levels behind the dam would be drawn down by releasing water at a rate commensurate with downstream diversion and groundwater recharge needs. However, during the flood season when unfavorable weather is forecast, the water level behind the dam would be drawn down, if necessary, to accommodate anticipated flood flows. The main purpose of Prado Dam is for flood protection for communities downstream of the dam. However, between storms and after the flood season, the Reservoir could be used to temporarily store water with outflow no greater than the capacity of the groundwater recharge basins downstream of the dam. When the dam output is regulated in this manner, the water can be used to recharge the groundwater aquifer, one of the major sources of water supply for people in Orange County.

The principal objective of the Feasibility Study is to determine if the operating plan for Prado Dam could be modified to maximize water conservation while being consistent with the flood control purpose, and also being environmentally acceptable and cost-effective.

2.3 EXISTING PRADO DAM AND ANCILLARY FACILITIES DESIGN FEATURES AND OPERATIONAL CHARACTERISTICS

Prado Dam is a compacted multi-zoned earth-filled embankment with a crest length of approximately 670 m (2,200 ft), and a height of approximately 32 m (106 ft) above the original streambed. The top of the embankment is 9.5 m (30 ft) wide and paved with asphaltic concrete, forming a roadway across the dam. The top of the spillway crest is at elevation 543 feet and the top of the dam is at elevation 566 feet. The Phase II General Design Memorandum (GDM), which included structural revisions to Prado Dam, was approved in 1988; however, the improvements to the dam have not been completed. The improvements would result in raising the spillway crest 6.1 m (20 ft) and the top of the dam 8.7 m (28.4 ft) to elevation 563 and 594.4 ft, respectively. The outlet works are located in the west abutment of the dam and consist of (1) an approach channel, (2) a 59.5 m (195 ft) long intake structure, (3) a 180.3 m (591 ft) long double box conduit, and (4) a 111.6 m (366 ft) long rectangular concrete outlet channel. The additional Phase II GDM features that have not been completed include modification of the floodgates and changes to the maximum release rates from Prado Dam due to improvement in Reach 9.

The long term recharge capacity for the facilities downstream from Prado Dam averages 500 cubic feet per second (cfs). OCWD has estimated that the average discharge will increase to 580 cfs in the future. During the flood season, under the current operation plan for Prado Dam, when the water surface is below elevation 494 ft, the release varies from 0 to 600 cfs, depending on the capacity at the downstream spreading grounds. When the water surface elevation exceeds elevation 494 ft, releases are stepped up to a maximum of 5000 cfs. During the non-flood season, when the water surface is below elevation 505 ft, releases vary between 0 and 650 cfs, while maintaining a running average of 500 cfs as long as water remains behind the dam.

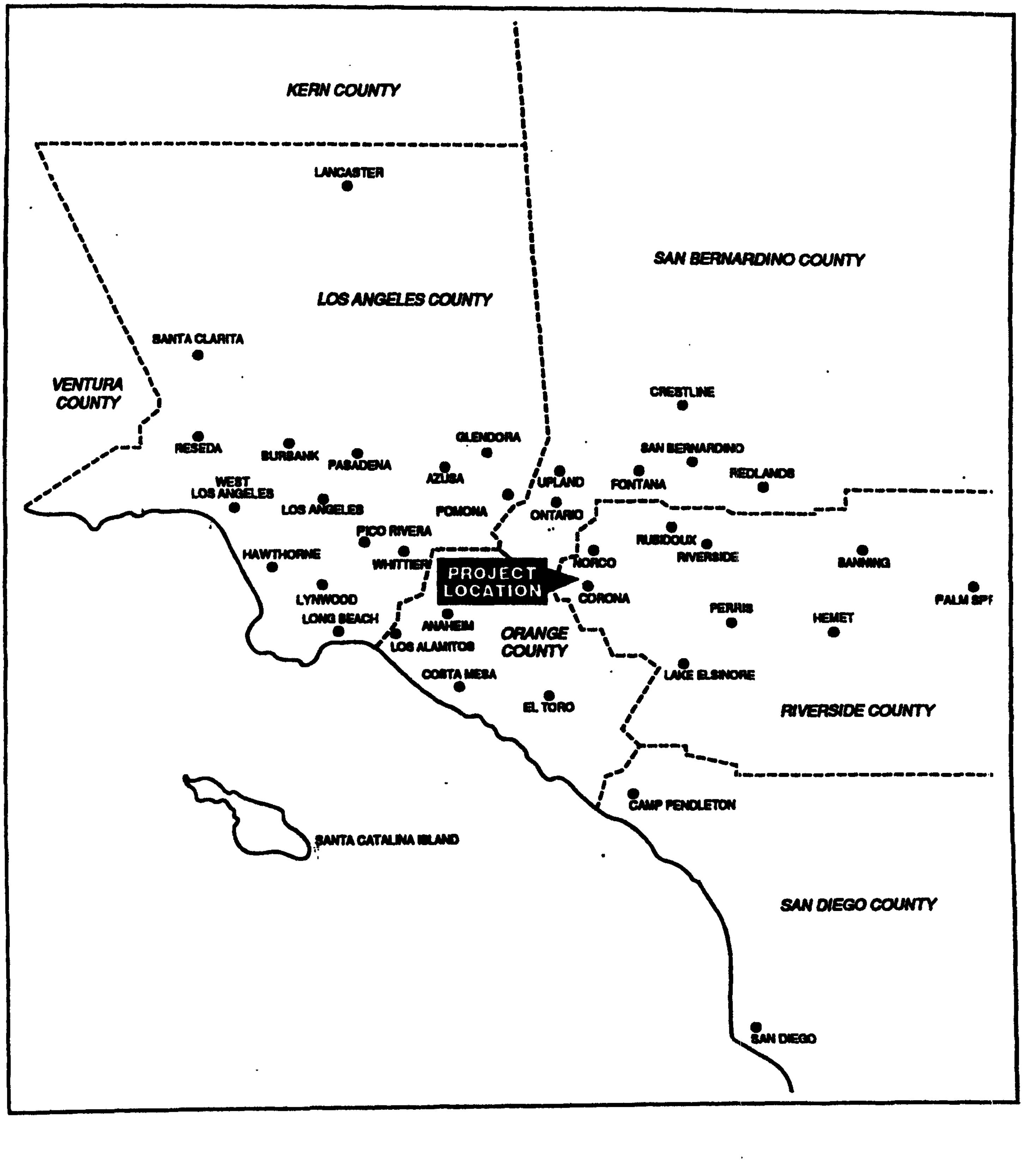


exhibit 2-1

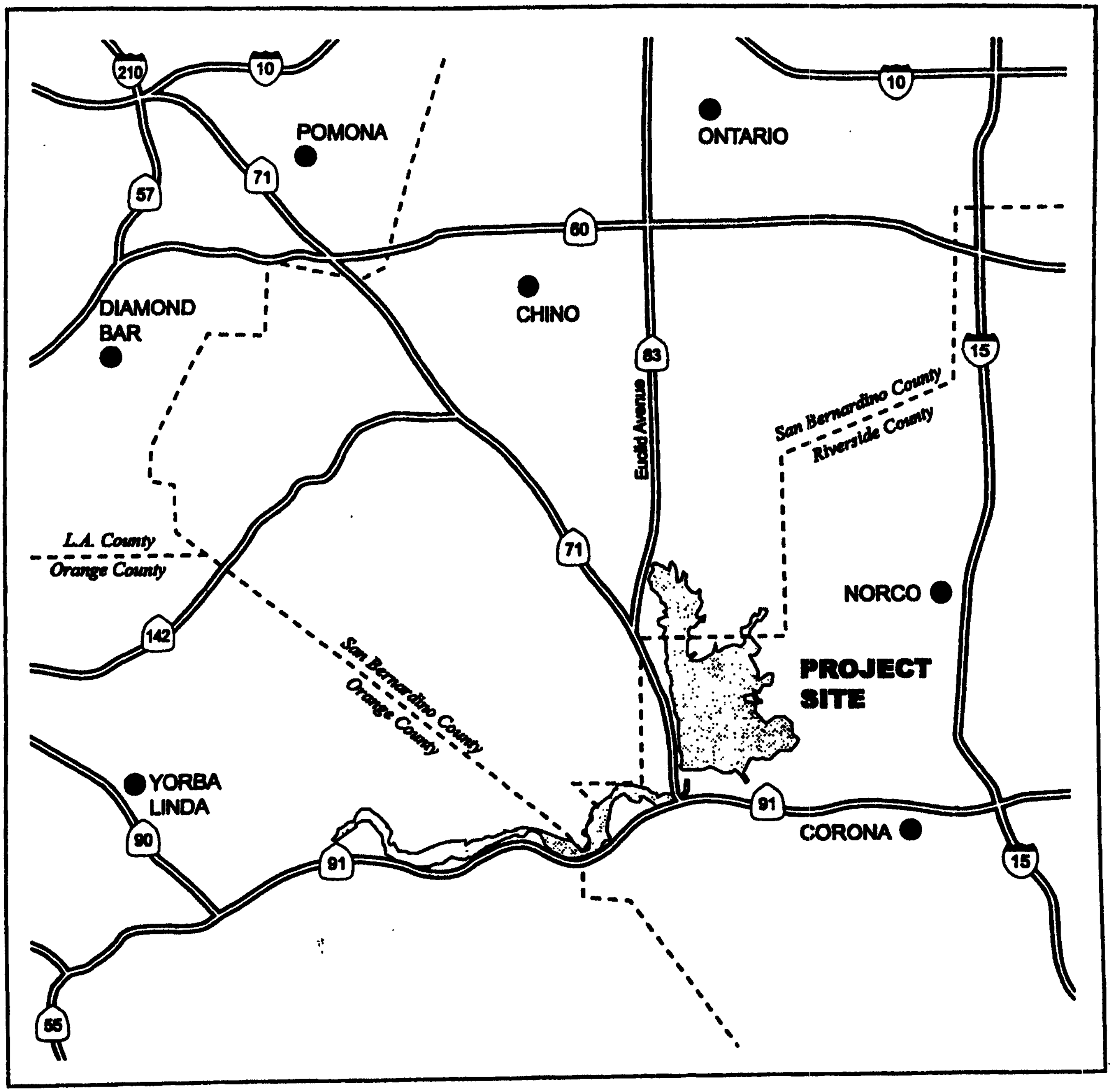
Regional Location Map

LMI
Larry Munsey International

Prado Dam Water Conservation and Supply Study EIS

NORTH

00210002 • 11/00



LMI
Larry Munsey International

NORTH
2.5 1.25 0 2.5
SCALE IN MILES

00210002 ● 11/00

exhibit **2-2**

Local Vicinity Map

Prado Dam Water Conservation and Supply Study EIS

LMI
Larry Munsey International

NORTH

Feet	3144	1572	0	3144
Meters	958.5	479	0	958.5

00210002 • 11/00

exhibit **2-3**
Project Study Area

Prado Dam Water Conservation and Supply Study EIS

2.4 ALTERNATIVES FORMULATION PROCESS

This EIS/EIR includes an evaluation of five alternatives. One of the alternatives is a no action alternative and the other four alternatives include varying options of water conservation. The federal objective of this study is to provide the maximum water conservation benefits for the citizens of Orange County. Opportunities to provide additional water conservation are limited by the flood control function of Prado Dam as well as environmental constraints.

There were a number of water conservation alternatives that were addressed during the preparation of the reconnaissance studies for Prado Dam. The 1992 reconnaissance study entitled *Seven Oaks and Prado Dams Water Conservation Study* evaluated five alternatives and the *Prado Basin Water Conservation Reconnaissance Report* that was prepared in 1996 evaluated nine alternatives. One of the alternatives (Winter Flood Forecasting to Elevation 498 ft – Seasonal Pool to Elevation 505 ft) evaluated in the 1992 reconnaissance study was the same alternative evaluated in the reconnaissance study prepared in 1996. Following is the list of the 13 alternatives that were evaluated during the reconnaissance phase.

- Winter Flood Forecasting to Elevation 498 ft - Seasonal Pool to Elevation 498 ft
- Winter Flood Forecasting to Elevation 508 ft - Seasonal Pool to Elevation 508 ft
- Winter Flood Forecasting to Elevation 498 ft - Seasonal Pool to Elevation 512 ft
- Winter Flood Forecasting to Elevation 508 ft - Seasonal Pool to Elevation 512 ft
- Winter Flood Forecasting to Elevation 494 ft - Seasonal Pool to Elevation 505 ft
- Winter Flood Forecasting to Elevation 498 ft - Seasonal Pool to Elevation 505 ft
- Winter Flood Forecasting to Elevation 499 ft - Seasonal Pool to Elevation 505 ft
- Winter Flood Forecasting to Elevation 500 ft - Seasonal Pool to Elevation 505 ft
- Winter Flood Forecasting to Elevation 501 ft - Seasonal Pool to Elevation 505 ft
- Winter Flood Forecasting to Elevation 502 ft - Seasonal Pool to Elevation 505 ft
- Winter Flood Forecasting to Elevation 503 ft - Seasonal Pool to Elevation 505 ft
- Winter Flood Forecasting to Elevation 504 ft - Seasonal Pool to Elevation 505 ft
- Winter Flood Forecasting to Elevation 505 ft - Seasonal Pool to Elevation 505 ft

During the preparation of the 1996 reconnaissance report, two additional alternatives were identified, but no detailed evaluation was conducted. These alternatives included:

- Santa Ana River Polishing Ponds
- Peripheral Water Conservation Holding Ponds (Between Elevations 556 and 566 ft)

2.5 ALTERNATIVES ELIMINATED FROM FURTHER ANALYSIS

Subsequent to the preparation of the reconnaissance reports during the course of the feasibility study, 10 of the 15 alternatives were eliminated from further consideration because they were not considered to be economically feasible. Following are the 10 alternatives.

- Winter Flood Forecasting to Elevation 498 ft - Seasonal Pool to Elevation 512 ft

This alternative was eliminated from further consideration as there was no desire to increase elevation of the Seasonal Pool above the current 505 feet.

- Winter Flood Forecasting to Elevation 508 ft - Seasonal Pool to Elevation 512 ft
  This alternative was eliminated from further consideration as there was no desire to increase elevation of the Seasonal Pool above the current 505 feet.
- Winter Flood Forecasting to Elevation 498 ft - Seasonal Pool to Elevation 498 ft
  This alternative was eliminated from further consideration as there was no desire to decrease elevation of the Seasonal Pool below the current 505 feet.
- Winter Flood Forecasting to Elevation 499 ft - Seasonal Pool to Elevation 505 ft
  This alternative was eliminated from further consideration as the incremental increase in water stored compared to Alternative 2 was not considered acceptable to the local sponsor
- Winter Flood Forecasting to Elevation 501 ft - Seasonal Pool to Elevation 505 ft
  This alternative was eliminated from further consideration as the incremental increase in water stored compared to Alternative 3 was not considered acceptable to the local sponsor
- Winter Flood Forecasting to Elevation 502 ft - Seasonal Pool to Elevation 505 ft
  This alternative was eliminated from further consideration as the incremental increase in water stored compared to Alternative 3 was not considered acceptable to the local sponsor
- Winter Flood Forecasting to Elevation 503 ft - Seasonal Pool to Elevation 505 ft
  This alternative was eliminated from further consideration as the incremental difference in water stored compared to Alternative 4 was not considered acceptable to the local sponsor
- Winter Flood Forecasting to Elevation 504 ft - Seasonal Pool to Elevation 505 ft
  This alternative was eliminated from further consideration as the incremental difference in water stored compared to Alternative 4 was not considered acceptable to the local sponsor
- Santa Ana River Polishing Ponds
  This alternative was eliminated from further consideration as it would have required extensive construction within the lower elevations of the basin between elevations 500 and 530 feet.

Peripheral Water Conservation Holding Ponds (Between Elevations 556 and 566 ft.)

This alternative was eliminated from further consideration as it would require the local sponsor to purchase extensive farm lands above the existing flood pool, and complete extensive construction to create storage ponds.

2.6 ALTERNATIVES CARRIED FORWARD FOR DETAILED ANALYSIS

Four water conservation alternatives and the No Action Alternative are being considered for Prado Dam in this EIS/EIR. The alternatives analyzed in this EIS/EIR are referred to below as Alternative 1: No Action Alternative; Alternative 2: Flood Season Water Conservation up to Elevation 498 ft and Non-Flood Season Water Conservation up to Elevation 505 ft; Alternative 3: Flood Season Water Conservation up to 500 ft and Non-Flood Season Water Conservation up to Elevation 505 ft; Alternative 4: Flood Season Water Conservation Up To Elevation 505 Feet and Non-Flood Season Water Conservation up to Elevation 505 Feet; Alternative 5: Flood Season Water Conservation up to

Elevation 508 Feet and Non-Flood Season Water Conservation up to Elevation 508 Feet. **The alternative that contributes most to the national economic development (NED) is Alternative 2. The locally preferred alternative is Alternative 3.**

2.6.1 PROJECT ASSUMPTIONS

Alternative 1 (No Action) and Alternative 2 are not dependent on the completion of improvements to Prado Dam and the Santa Ana River. Implementation of project alternatives 3 through 5 are dependent upon the completion of improvements along the Santa Ana River as these alternatives require the capability to release flows in excess of 5,000 cfs, which is greater than the current non-damaging release rate of 5,000 cfs. For the proposed water conservation project at Prado Dam, these improvements include the outlets and downstream channel components of the *Phase II General Design Memorandum (GDM) for the Santa Ana River Mainstem Project.* These improvements are anticipated to be completed by the year 2005.

Analysis of project alternatives 2 through 5 is based on present and future conditions. Under present and future conditions it is assumed that all of the improvements associated with the Phase II GDM for the Santa Ana River Mainstem Project are implemented. Under present conditions also include estimated urbanization for the year 2002 and inflow from eight upstream reclamation plants. Future conditions include estimated urbanization for the year 2052 and inflow from eleven upstream reclamation plants.

The impoundment capacity assumptions for the water conservation pool under present conditions are based on the 1988 survey for Prado Reservoir (*i.e.*, 25,750 ac-ft at elevation 505 ft). The impoundment capacity for the water conservation pool under future conditions assumes sediment accumulation of approximately 35,000 ac-ft throughout Prado Reservoir (distributed up to elevation 566 ft). Due to sediment accumulation, the impoundment capacity will be less under future conditions (*i.e.*, 15,772 ac-ft at elevation 505 ft) compared to present conditions (*i.e.*, 25,750 ac-ft at elevation 505 ft). Table 2-1 shows area and storage capacities at various elevations within Prado Reservoir for present and future conditions.

Analysis of the project alternatives also involves assumptions regarding conditions immediately downstream of Prado Dam to the Weir Canyon area of the Santa Ana River. Existing conditions are based on the current, mainly naturalized condition of the River downstream of Prado Dam to Weir Canyon. Future conditions downstream assume that the Santa Ana River has been modified with structural improvements that provide protection from the 190-year flood.

Certain operational characteristics are common to each alternative. Inundation remains the same as future conditions/existing operations, or the same as alternatives 2 and 3, including the No Action Alternative. The basin is filled prior to flood control releases up to elevation 490 ft (Debris Pool) in order to prevent debris from entering and plugging the outlet works. There are no seasonal restrictions on inundation in the debris pool. During the flood season (October 1 through the end of February), water can be stored in the Buffer Pool (currently up to elevation 494 ft), when weather conditions are favorable. Releases from the Debris Pool and the Buffer Pool occur at a rate that the downstream recharge facilities can accommodate (usually 0-600 cfs). During the non-flood season (March 1 through September 30), water can be stored in the Seasonal Pool (currently up to elevation 505 ft). The Seasonal Pool is expanded linearly from the Buffer Pool level from March 1 to March 10, up to the maximum Seasonal Pool elevation. Releases from the reservoir during the non-flood season are limited to the intake capacity of the downstream spreading facilities or 500 cfs, whichever is larger.

TABLE 2-1
AREA AND STORAGE CAPACITIES
WITHIN PRADO RESERVOIR

Alternative	Elevation[a]	Area (acres)		Storage (acre-feet)	
		Present Conditions	Future Conditions	Present Conditions	Future Conditions
1	494	1,081	686	8,435	2,700
2	498	1,433	987	13,640	6,725
3	500	1,593	1,161	16,520	8,764
4	505	2,123	1,667	25,750	15,772
5	508	2,426	1,959	32,580	21,216

N/A – Not applicable because these alternatives are only temporary.
[a] Elevation of water conservation during the flood season.
Source: USACE 1998

Routine maintenance of the dam and embankment usually takes place during July, August, and September (usually the lowest runoff months of the year). For maintenance activities requiring a dry reservoir area, a release schedule that provides for outflow equal to inflow will be implemented. A Memorandum of Agreement, signed by USACE and the OCWD and approved in 1993, designates September as the month for this type of maintenance.

2.6.2 ALTERNATIVES

2.6.2.1 Alternative 1: No Action Alternative

This alternative is the existing operation at Prado Dam. When inflow to Prado Dam is greater than the percolation capacity of the downstream spreading grounds, the existing Debris Pool (elevation 490 ft) can be utilized for water conservation at any time during the year. The existing operation schedule calls for controlled releases up to 600 cfs until the reservoir reaches elevation 490 ft. During the flood season, encroachment into the Flood-Control Pool can occur up to elevation 494 ft (Buffer Pool) for water conservation purposes, when weather conditions are favorable. When the threat of unfavorable weather is forecast, the reservoir will be drawn down enough as low as 490 ft to accommodate the anticipated inflow volume from the storm(s) to ensure there is storage available for flood control operations.

During the non-flood season, water can be held up to elevation 505 ft (Seasonal Pool) for water conservation purposes. Beginning the 1st of March, the maximum allowable water surface elevation for conservation is linearly increased at approximately 1.1 feet per day from elevation 494 ft to elevation 505 ft on the 10th of March. The pool may be maintained as high as elevation 505 ft until the 30th of September (see Exhibit 2-4). However, if maintenance is required, the reservoir must be evacuated before the 1st of September. If summer flood runoff occurs in the month of September, the dam can be operated for water conservation up to elevation 505 ft, provided that the impoundment doesn't interfere with maintenance requirements. Releases from Prado Dam during water conservation operations are based on the estimated rate that the downstream spreading channel can percolate while maintaining the minimum release criteria. If hydrologic forecasts and reservoir conditions indicate that the water surface elevation will exceed elevation 505 ft, water control personnel at the Reservoir Operation Center (ROC) will match inflow with outflow. Above elevation 505 ft, the reservoir is put in full flood control mode and outflows can be made up to the downstream channel capacity of the Santa Ana River (approximately 30,000 cfs).

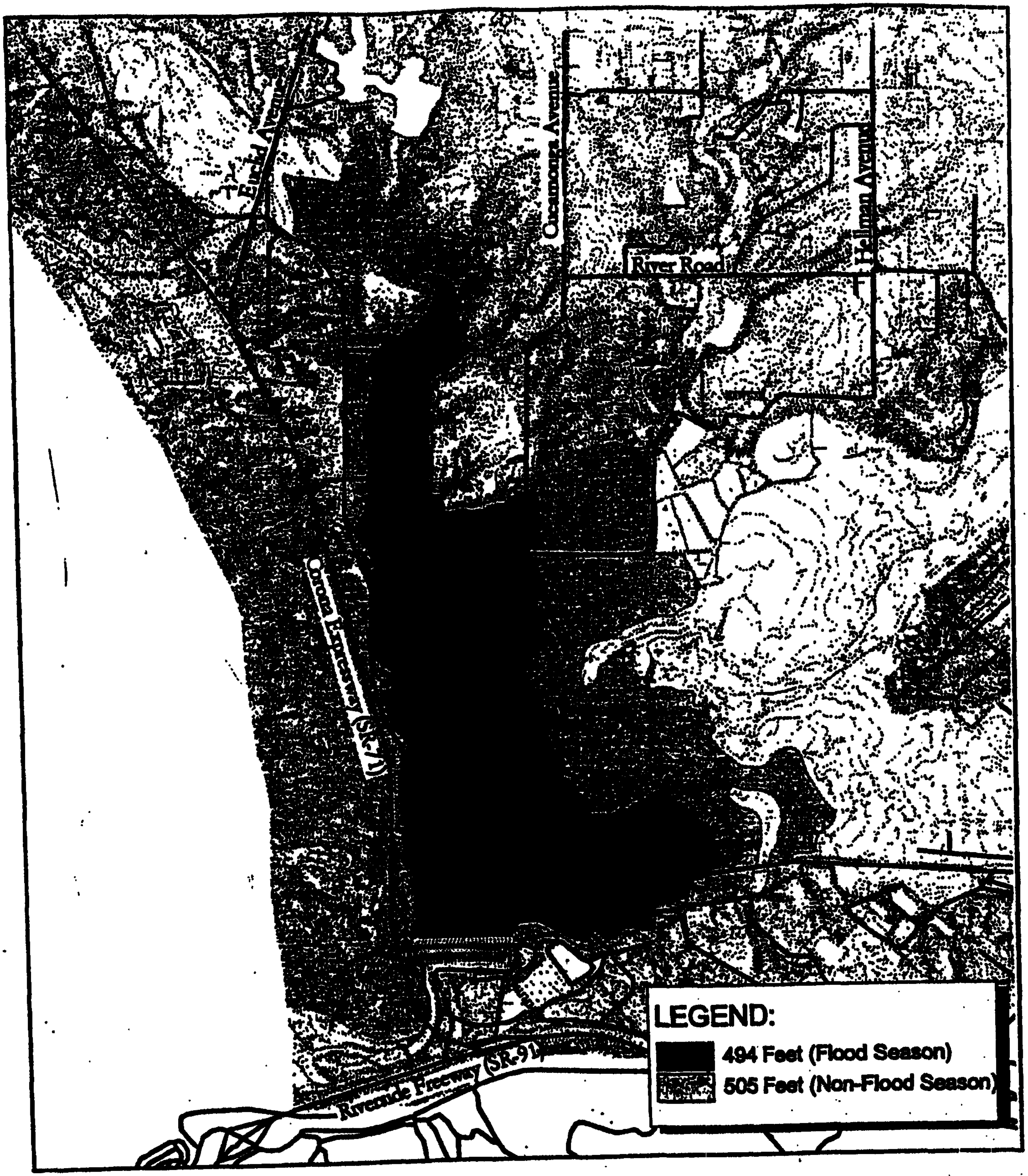


exhibit **2-4**

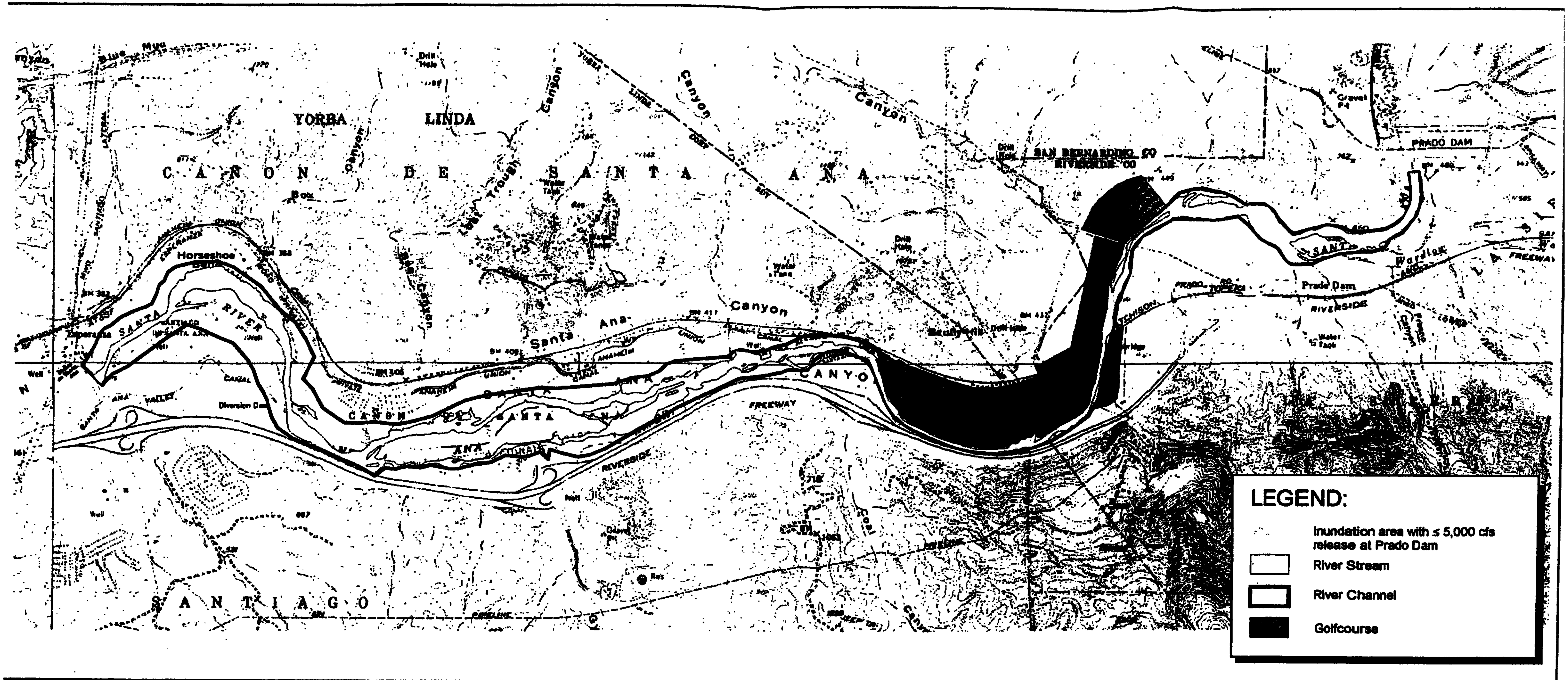
LMI
Larry Munsey International

Alternative 1 - Long-Term Water Conservation Levels

Prado Dam Water Conservation and Supply Study EIS

NORTH
Feet 3348 1674 0 3348
Meters 1021 510 0 1021

00210002 • 11/00



Source: Sure! Raster Maps 1999.

LMI
Larry Munsey International

NORTH
Feet 2500 1250 0 2500
Meters 700 350 0 700

00210002 • 11/00

exhibit 2-5

Maximum Downstream Inundation Areas Under Alternatives 1, 2, 6, 7, and 8

Prado Dam Water Conservation and Supply Study EIS

Under this alternative, the water conservation pool encompasses approximately 1,080 ac during the flood season up to elevation 494 ft, and 2,125 ac during the non-flood season up to elevation 505 ft. This alternative presently allows for up to 8,435 ac-ft of water storage during the flood season and 25,750 ac-ft during the non-flood season. For future conditions, water storage would be 2,700 ac-ft during the flood season and 15,770 ac-ft during the non-flood season. Tables 2-2 (present conditions) and 2-3 (future conditions) show the duration of inundation at various elevations within the Prado Reservoir during 2-, 5-, 10-, 25-, 50-, and 100-year storm events. As an example, during a 100-year flood event, elevation 505 ft would be inundated with water for approximately 135 days under the present condition and 165 days under the future conditions. Tables 2-2 and 2-3 also show that the average number of days of per year at elevation 505 ft is 9 days for present conditions and 12 days for future conditions.

During the flood season, the USACE has safety regulations for release rates from Prado Dam. These regulations require that release rates accommodate the evacuation of the reservoir down to the Debris Pool (elevation 490 ft) within a 24-hour period to ensure there is storage available for flood control. To drain the reservoir from elevation 494 ft to 490 ft within 24 hours, a maximum release rate of 2,500 cfs from the Phase II gates would be attained by incrementally increasing the release rate of 625 cfs every half-hour, in accordance with the USACE Water Control Manual. The downstream inundation area associated with a maximum release rate of 2,500 cfs is shown on Exhibit 2-5. The frequency of inundation of this downstream area with this alternative would remain at the existing inundation frequency that is once every 2 years.

TABLE 2-2
INUNDATION DURATIONS FOR PRADO RESERVOIR
WITH ALTERNATIVE 1 - PRESENT CONDITIONS
Flood Season Water Conservation with Forecasting to 494.0 ft +
Non-Flood Season Water Conservation to 505.0 ft

Frequency (Years)	Duration of Inundation (Days) at Various Elevations (ft)										
	470	480	490	494	498	500	505	510	520	530	540
2	115	55	25	8	0	0	0	0	0	0	0
5	160	140	103	80	45	23	3	0	0	0	0
10	210	190	155	125	88	70	25	6.5	0	0	0
25	270	240	210	190	160	145	80	11	4	0	0
50	340	310	290	250	205	180	100	14	6.5	1.5	0
100	360	330	310	275	240	215	135	16	8.5	4	1
Annual Average	87	70	54	42	29	22	9	1.5	0.5	0	0

Source: USACE 1998

TABLE 2-3
INUNDATION DURATIONS FOR PRADO RESERVOIR
WITH ALTERNATIVE 1 - FUTURE CONDITIONS
Flood Season Water Conservation with Forecasting to 494.0 ft +
Non-Flood Season Water Conservation to 505.0 ft

Frequency (Years)	Duration of Inundation (Days) at Various Elevations (ft)										
	470	480	490	494	498	500	505	510	520	530	540
2	185	150	110	60	5	0	0	0	0	0	0
5	230	205	180	140	100	75	5.5	1.5	0	0	0
10	260	235	210	175	130	105	40	7	2	0	0
25	310	265	245	225	190	170	100	12	6.5	0	0
50	350	335	310	290	255	225	130	15	8.5	3.5	0
100	360	350	335	315	275	255	165	18	11	6	2.5
Annual Average	117	103	88	68	46	37	12	2	1	0	0

Source: USACE 1998

2.6.2.2 Alternative 2: Flood Season Water Conservation Up To Elevation 498 Feet And Non-Flood Season Water Conservation Up To Elevation 505 Feet (NED PLAN)

This alternative could increase the water conservation level within Prado Reservoir to elevation 498 feet during the flood season. Under present conditions, this increase could inundate up to 352 additional acres (33 percent increase) and impound up to 5,205 additional acre-feet (62 percent increase) of water for conservation purposes during the flood season, compared to existing operations. Under future conditions, this alternative could inundate up to 301 additional acres (44 percent increase) and impound up to 4,025 additional acre-feet (149 percent increase) of water for conservation purposes during the flood season. No increase in the water conservation level is proposed during the non-flood season. Inundation and impoundment values during the non-flood season could be greater than the No Action Alternative under both present and future conditions. The greater inundation and impound values could occur because the flood pool under this alternative (i.e. elevation 498 ft.) could have more water going into the non-flood season than the flood pool under the No Action Alternative (i.e. 494 ft. elevation).

When inflow to Prado Reservoir is greater than the percolation capacity of the downstream spreading grounds, the existing Debris Pool (elevation 490 ft) can be utilized for water conservation at any time during the year. The existing operation schedule calls for controlled releases up to 600 cfs until the reservoir reaches elevation 490 ft. During the flood season, encroachment into the Flood-Control Pool could occur up to elevation 498 ft (Buffer Pool) for water conservation purposes, when weather conditions are favorable. When the threat of unfavorable weather is forecast, the reservoir could be drawn down as low as 490 ft to accommodate the anticipated inflow volume from the storm(s) (as low as 490 ft.) to ensure there is storage available for flood control operations.

TABLE 2-4
INUNDATION DURATIONS FOR PRADO RESERVOIR
WITH ALTERNATIVE 2 - PRESENT CONDITIONS
Flood Season Water Conservation with Forecasting to 498.0 ft +
Non-Flood Season Water Conservation to 505.0 ft

Frequency (Years)	Duration of Inundation (Days) at Various Elevations (ft) *(Increase from Alt. 1 - Present Conditions)*										
	470	**480**	**490**	**494**	**498**	**500**	**505**	**510**	**520**	**530**	**540**
2	115	65	35	18	0	0	0	0	0	0	0
	0	*10*	*10*	*10*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
5	170	150	113	90	55	33	4	0	0	0	0
	10	*10*	*10*	*10*	*10*	*10*	*1*	*0*	*0*	*0*	*0*
10	210	190	170	145	108	90	25	6.5	0	0	0
	0	*0*	*15*	*20*	*20*	*20*	*0*	*0*	*0*	*0*	*0*
25	270	240	210	195	170	155	80	11	4	0	0
	0	*0*	*0*	*5*	*10*	*10*	*0*	*0*	*0*	*0*	*0*
50	340	315	305	290	235	195	105	15	7	2	0
	0	*5*	*15*	*40*	*30*	*15*	*5*	*1*	*0.5*	*0.5*	*0*
100	360	330	325	305	255	225	140	19	9	4	1
	0	*0*	*15*	*30*	*15*	*10*	*5*	*3*	*0.5*	*0*	*0*
Annual Average	89	74	59	48	33	26	9.5	1.5	0.5	0	0
	2	*4*	*5*	*6*	*4*	*4*	*0.5*	*0*	*0*	*0*	*0*

Source: USACE 1998

TABLE 2-5
INUNDATION DURATIONS FOR PRADO RESERVOIR
WITH ALTERNATIVE 2 - FUTURE CONDITIONS
Flood Season Water Conservation with Forecasting to 498.0 ft +
Non-Flood Season Water Conservation to 505.0 ft

Frequency (Years)	Duration of Inundation (Days) at Various Elevations (ft) *(Increase from Alt. 1 - Future Conditions)*										
	470	**480**	**490**	**494**	**498**	**500**	**505**	**510**	**520**	**530**	**540**
2	185	160	145	110	40	3	0	0	0	0	0
	0	*10*	*35*	*50*	*35*	*3*	*0*	*0*	*0*	*0*	*0*
5	240	230	210	180	125	95	8.5	2.5	0	0	0
	10	*25*	*30*	*40*	*25*	*20*	*3*	*1*	*0*	*0*	*0*
10	270	255	240	200	145	120	45	8	2	0	0
	10	*20*	*30*	*25*	*15*	*15*	*5*	*1*	*0*	*0*	*0*
25	310	290	270	245	210	185	105	14	6.5	0	0
	0	*25*	*25*	*20*	*20*	*15*	*5*	*2*	*0*	*0*	*0*
50	350	340	335	330	295	260	140	16	9	3.5	0
	0	*5*	*25*	*40*	*40*	*35*	*10*	*1*	*0.5*	*0*	*0*
100	360	350	345	340	305	285	170	20	11	6	2.5
	0	*0*	*10*	*25*	*30*	*30*	*5*	*2*	*0*	*0*	*0*
Annual Average	120	112	103	88	59	44	14	2	1	0	0
	3	*9*	*15*	*20*	*13*	*7*	*2*	*0*	*0*	*0*	*0*

Source: USACE 1998

As with current operations during the non-flood season, water can be held up to elevation 505 ft (Seasonal Pool) for water conservation purposes. Beginning the 1st of March, the maximum allowable water surface elevation for conservation is linearly increased from elevation 498 ft to elevation 505 ft on the 10th of March (see Exhibit 2-6). The pool may be maintained as high as elevation 505 ft until the 30th of September. However, if maintenance is required, the reservoir must be evacuated before the 1st of September. If summer flood runoff occurs in the month of September, the dam can be operated for water conservation up to elevation 505 ft, provided that the impoundment doesn't interfere with maintenance requirements. Releases from Prado Dam (350-650/500 cfs running average), during water conservation operations, would be based on the estimated rate that the downstream spreading channel can percolate while maintaining minimum release criteria. If hydrologic forecasts and reservoir conditions indicate that the water surface elevation will exceed elevation 505.0 ft, water control personnel at the ROC would match inflow with outflow. Above elevation 505.0 ft, the reservoir is in full flood control mode and outflows can be made up to the downstream capacity of the Santa Ana River channel (which is approximately 30,000 cfs).

During the flood season, the USACE has safety regulations for release rates from Prado Dam. These regulations require that release rates accommodate the evacuation of the reservoir down to the Debris Pool (elevation 490 ft) within a 24-hour period to ensure there is storage available for flood control. To drain the reservoir from elevation 498 ft to 490 ft, a maximum release rate of 5,000 cfs from the Phase II gates would be attained by incrementally increasing the release rate by 625 cfs every half-hour, in accordance with the USACE Water Control Manual. The downstream inundation area associated with a maximum release rate of 5,000 cfs is shown on Exhibit 2-5. The frequency of inundation of this downstream area with this alternative would increase from once every 12 years without the project to once every 2 years with the project.

2.6.2.3 Alternative 3: Flood Season Water Conservation Up To Elevation 500 Feet And Non-Flood Season Water Conservation Up To Elevation 505 Feet (Locally Preferred Plan)

This alternative could increase the water conservation level within Prado Reservoir to elevation 500 feet during the flood season. Under present conditions, this increase could inundate up to 512 additional acres (47 percent increase) and impound up to 8,085 additional acre-feet (96 percent increase) of water for conservation purposes during the flood season, compared to existing operations. Under future conditions, this alternative could inundate up to 475 additional acres (70 percent increase) and impound up to 6,064 additional acre-feet (225 percent increase) of water for conservation purposes during the flood season. No increase in the water conservation level is proposed during the non-flood season. Inundation and impound values during the non-flood season would be the same as the No Project Alternative under both present and future conditions. Tables 2-6 (present conditions) and 2-7 (future conditions) show the duration of inundation at various elevations within the Prado Reservoir during 2-, 5-, 10-, 25-, 50-, and 100-year events.

When inflow to Prado Dam is greater than the percolation capacity of the downstream spreading grounds, the existing Debris Pool (elevation 490 ft) can be utilized for water conservation at any time during the year. The existing operation schedule calls for controlled releases up to 600 cfs until the reservoir reaches elevation 490 ft. During the flood season, encroachment into the Flood-Control Pool could occur up to elevation 500 ft (Buffer Pool) for water conservation purposes, when weather conditions are favorable. When the threat of unfavorable weather is forecast, the reservoir could be drawn down as low as 490 ft to accommodate the anticipated inflow volume from the storm(s) (as low as 490 ft.) to ensure there is storage available for flood control operations.

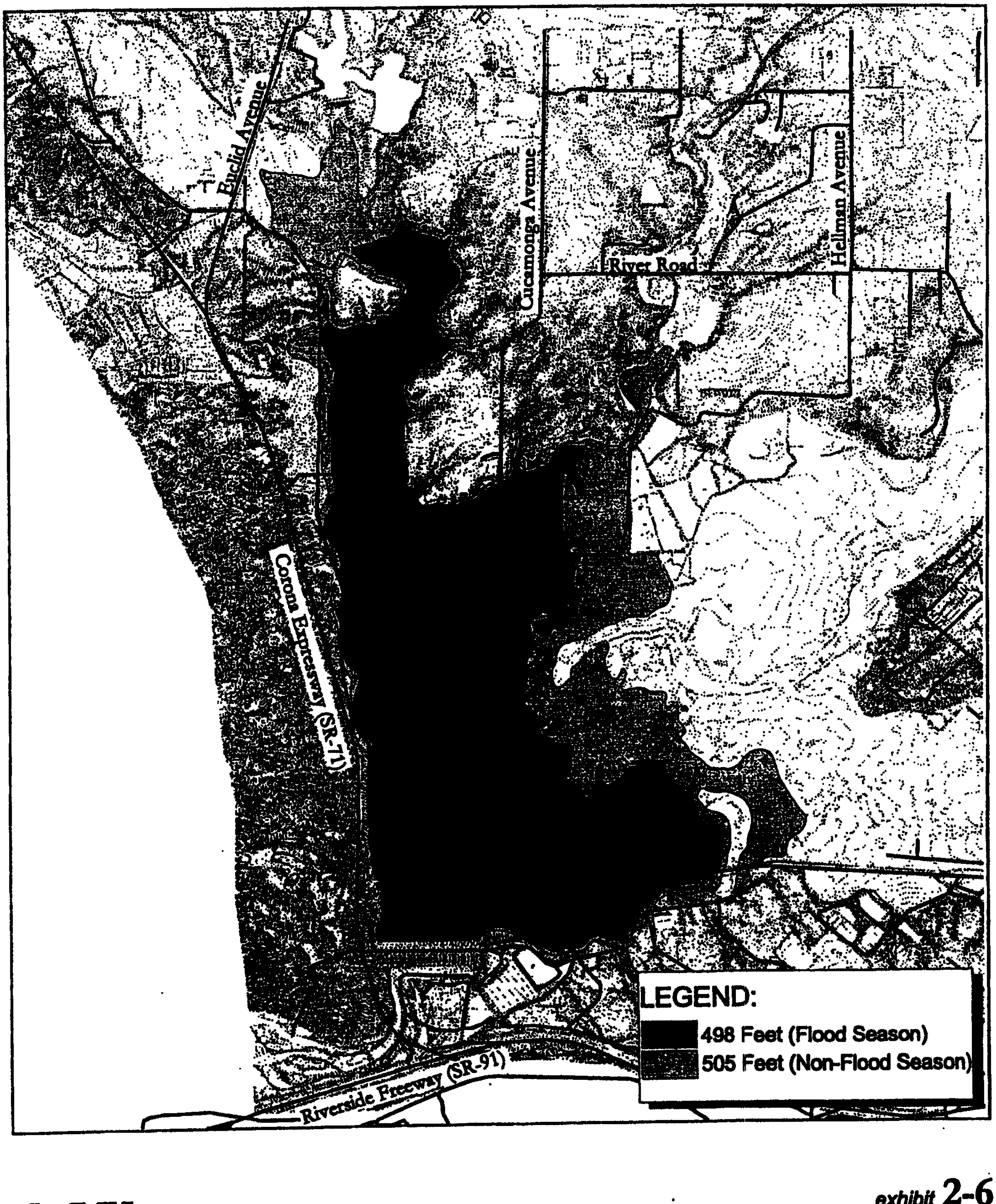


exhibit **2-6**

LMI
Larry Munsey International

Alternative 2 - Long-Term Water Conservation Levels

Prado Dam Water Conservation and Supply Study EIS

NORTH

Feet 3348 1674 0 3348

Meters 1021 510 0 1021

00210002 • 10/98

TABLE 2-6
INUNDATION DURATIONS FOR PRADO RESERVOIR
WITH ALTERNATIVE 3 - PRESENT CONDITIONS
Flood Season Water Conservation with Forecasting to 500.0 ft +
Non-Flood Season Water Conservation to 505.0 ft

Frequency (Years)	Duration of Inundation (Days) at Various Elevations (ft) *(Increase from Alt. 1 - Present Conditions)*										
	470	480	490	494	498	500	505	510	520	530	540
2	120	65	40	23	4	0	0	0	0	0	0
	5	*10*	*15*	*15*	*4*	*0*	*0*	*0*	*0*	*0*	*0*
5	175	155	118	100	75	63	11	0	0	0	0
	15	*15*	*15*	*20*	*30*	*40*	*8*	*0*	*0*	*0*	*0*
10	210	190	170	145	113	100	35	7	0	0	0
	0	*0*	*15*	*20*	*25*	*30*	*10*	*0.5*	*0*	*0*	*0*
25	270	240	215	200	180	160	90	11	4	0	0
	0	*0*	*5*	*10*	*20*	*15*	*10*	*0*	*0*	*0*	*0*
50	340	315	305	290	240	210	115	15	6.5	1.5	0
	0	*5*	*15*	*40*	*35*	*30*	*15*	*1*	*0*	*0*	*0*
100	360	330	325	305	270	240	145	19	8.5	4	1
	0	*0*	*15*	*30*	*30*	*25*	*10*	*3*	*0*	*0*	*0*
Annual Average	90	75	61	51	39	33	12	1.5	0.5	0	0
	3	*5*	*7*	*9*	*10*	*11*	*3*	*0*	*0*	*0*	*0*

Source: USACE 1998

TABLE 2-7
INUNDATION DURATIONS FOR PRADO RESERVOIR
WITH ALTERNATIVE 3 - FUTURE CONDITIONS
Flood Season Water Conservation with Forecasting to 500.0 ft +
Non-Flood Season Water Conservation to 505.0 ft

Frequency (Years)	Duration of Inundation (Days) at Various Elevations (ft) *(Increase from Alt. 1 - Future Conditions)*										
	470	480	490	494	498	500	505	510	520	530	540
2	185	170	145	110	40	3	0	0	0	0	0
	0	*20*	*35*	*50*	*35*	*3*	*0*	*0*	*0*	*0*	*0*
5	240	230	210	180	130	105	20	3	0	0	0
	10	*25*	*30*	*40*	*30*	*30*	*15*	*1.5*	*0*	*0*	*0*
10	270	255	240	200	150	125	55	9	2.5	0	0
	10	*20*	*30*	*25*	*20*	*20*	*15*	*2*	*0.5*	*0*	*0*
25	310	290	270	245	210	190	120	15	7	0	0
	0	*25*	*25*	*20*	*20*	*20*	*20*	*3*	*0.5*	*0*	*0*
50	350	340	335	330	295	265	150	18	9.5	3.5	0
	0	*5*	*25*	*40*	*40*	*40*	*20*	*3*	*1*	*0*	*0*
100	360	350	345	340	305	290	180	21	11	6	2.5
	0	*0*	*10*	*25*	*30*	*35*	*15*	*3*	*0*	*0*	*0*
Annual Average	120	113	103	88	61	47	18	2.5	1	0	0
	3	*10*	*15*	*20*	*15*	*10*	*6*	*0.5*	*0*	*0*	*0*

Source: USACE 1998

As with current operations during the non-flood season, water can be held up to elevation 505 ft (Seasonal Pool) for water conservation purposes. Beginning the 1st of March, the maximum allowable water surface elevation for conservation is linearly increased from elevation 500 ft to elevation 505 ft on the 10th of March (see Exhibit 2-7). The pool may be maintained as high as elevation 505 ft until the 30th of September. However, if maintenance is required, the reservoir must be evacuated before the 1st of September. If summer flood runoff occurs in the month of September, the dam can be operated for water conservation up to elevation 505 ft, provided that the impoundment does not interfere with maintenance requirements. Releases from Prado Dam, during water conservation operations, would be based on the estimated rate that the downstream spreading channel can percolate while maintaining the minimum release criteria. If hydrologic forecasts and reservoir conditions indicate that the water surface elevation will exceed elevation 505 ft, water control personnel at the ROC would match inflow with outflow. Above elevation 505 ft, the reservoir is in full flood control mode and outflows can be made up to the downstream capacity of the Santa Ana River channel (which is approximately 30,000 cfs).

During the flood season, the USACE has safety regulations for release rates from Prado Dam. These regulations require that release rates accommodate the evacuation of the reservoir down to the Debris Pool (elevation 490 ft) within a 24-hour period to ensure there is storage available for flood control. To drain the reservoir from elevation 500 ft to 490 ft, a maximum release rate of 7,400 cfs from the Phase II gates would be attained by incrementally increasing the release rate by 625 cfs every half-hour, in accordance with the USACE 1994 Water Control Manual. The downstream inundation area associated with a maximum release rate of 7,400 cfs is shown on Exhibit 2-8. The maximum release rate of 7,400 cfs is correlated with a maximum water velocity of 14 feet per second (ft/s) and a minimum water velocity of 4 ft/s in the downstream area of the Santa Ana River. The frequency of inundation of this downstream area with this alternative would increase from once every 18 years without the project to once every 3 years with the project.

2.6.2.4 Alternative 4: Flood season Water Conservation up to Elevation 505 ft. and Non-Flood Season Water Conservation up to 505 ft

This alternative could increase the water conservation level within Prado Reservoir to elevation 505 feet during the flood season. Under present conditions, this increase could inundate up to 1,042 additional acres (70 percent increase) and impound up to 17,315 additional acre-feet (205 percent increase) of water for conservation purposes during the flood season, compared to existing operations. Under future conditions, this alternative could inundate up to 981 additional acres (143 percent increase) and impound up to 13,072 additional acre-feet (484 percent increase) of water for conservation purposes during the flood season. No increase in the water conservation level is proposed during the non-flood season. Inundation and impound values during the non-flood season would be the same as the No Project Alternative under both present and future conditions. Tables 2-8 (present conditions) and 2-9 (future conditions) show the duration of inundation at various elevations within the Prado Reservoir during 2-, 5-, 10-, 25-, 50-, and 100-year events.

When inflow to Prado Dam is greater than the percolation capacity of the downstream spreading grounds, the existing Debris Pool (elevation 490 ft) can be utilized for water conservation at any time during the year. The existing operation schedule calls for controlled releases up to 600 cfs until the reservoir reaches elevation 490 ft. During the flood season, encroachment into the Flood-Control Pool could occur up to elevation 505 ft (Buffer Pool) for water conservation purposes, when weather conditions are favorable. When the threat of unfavorable weather is forecast, the reservoir could be drawn down as low as 490 ft to accommodate the anticipated inflow volume from the storm(s) (as low as 490 ft.) to ensure there is storage available for flood control operations.

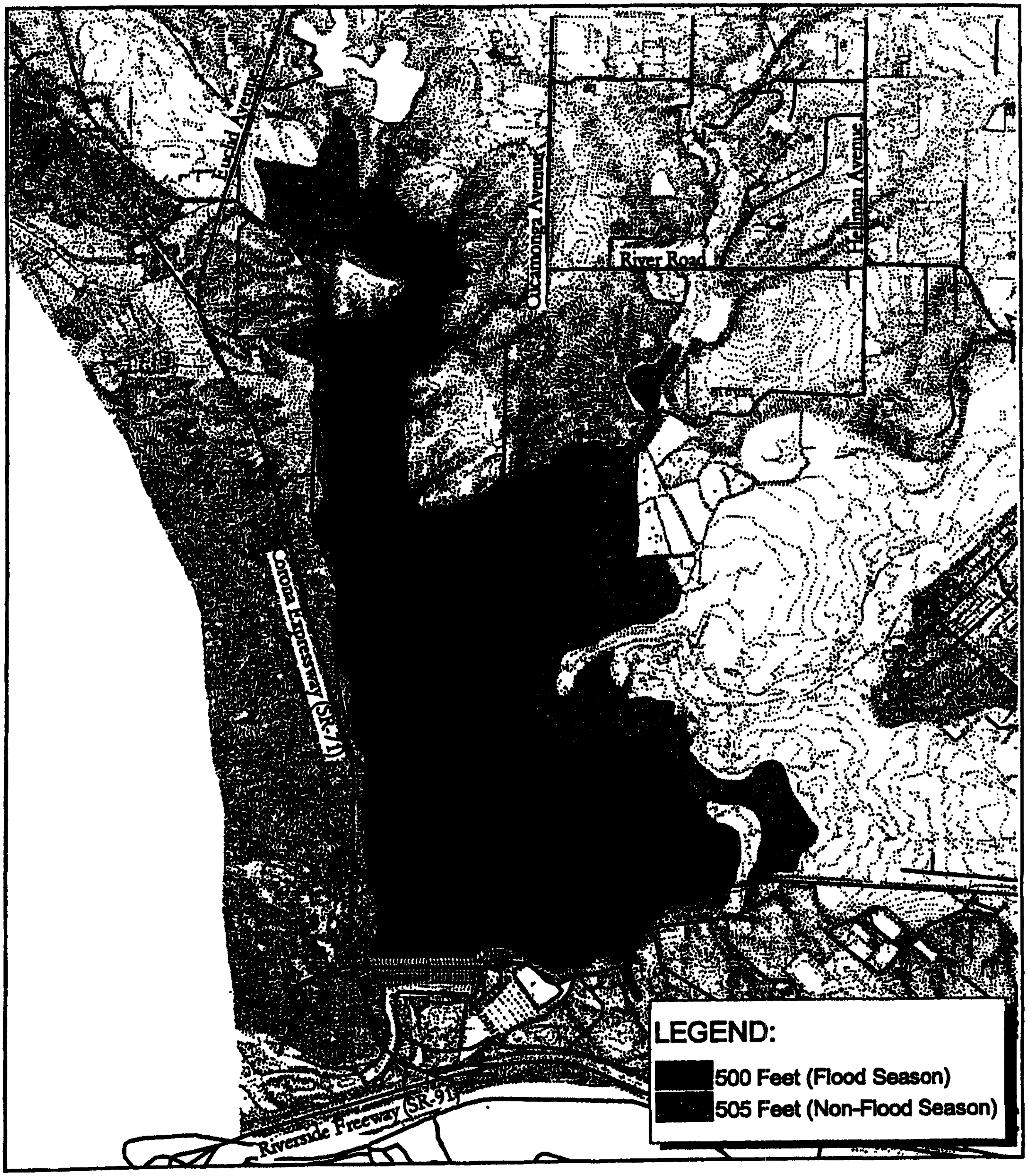


exhibit **2-7**

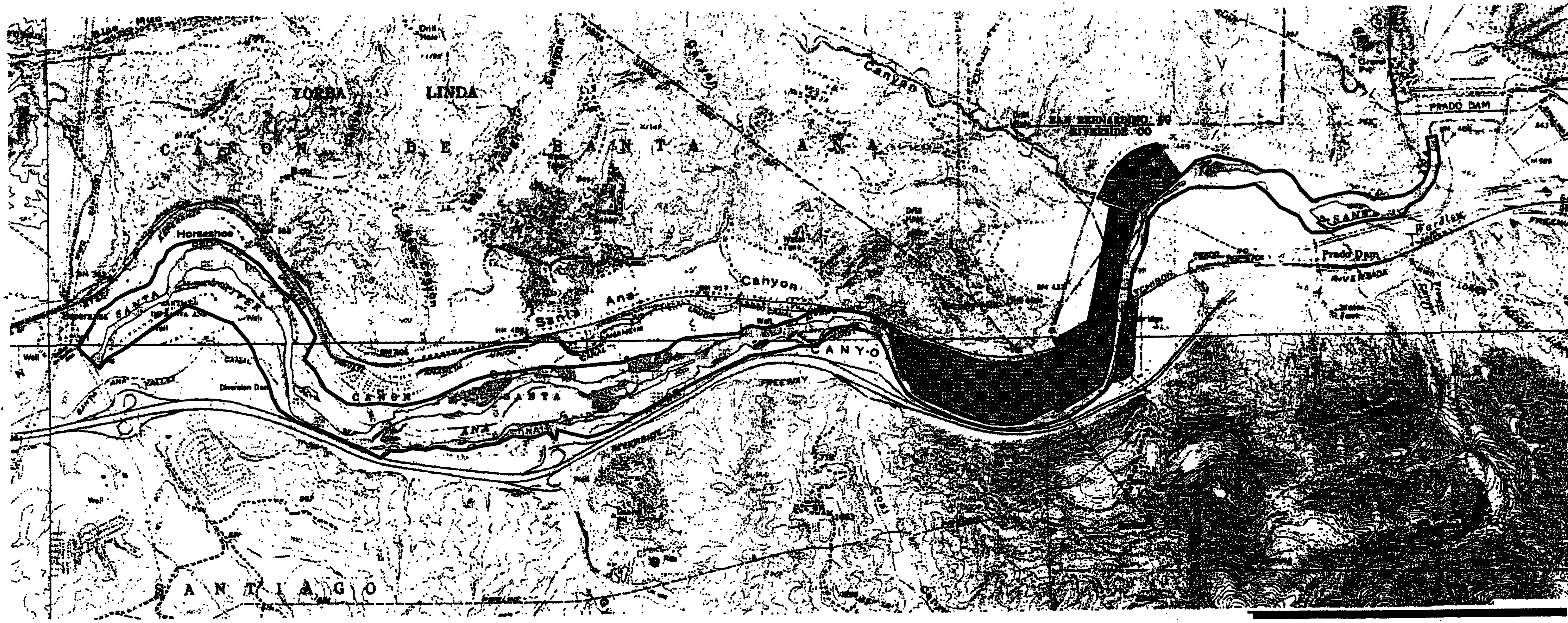
LMI
Larry Munsey International

Alternative 3 - Long-Term Water Conservation Levels

Prado Dam Water Conservation and Supply Study EIS

NORTH
Feet 3348 1674 0 3348
Meters 1021 510 0 1021

00210002 • 11/00



ource: Surel Raster Maps 1999.

LMI
Larry Munsey International

Feet	2500	1250	0	2500
Meters	700	350	0	700

NORTH

00210002 • 11/00

exhibit **2-8**

Maximum Downstream Inundation Areas Under Alternative 3

Prado Dam Water Conservation and Supply Study EIS

TABLE 2-8
INUNDATION DURATIONS FOR PRADO RESERVOIR
WITH ALTERNATIVE 4 - PRESENT CONDITIONS
Flood Season Water Conservation with Forecasting to 505.0 ft +
Non-Flood Season Water Conservation to 505.0 ft

Frequency (Years)	Duration of Inundation (Days) at Various Elevations (ft) *(Increase from Alt. 1 - Present Conditions)*										
	470	480	490	494	498	500	505	510	520	530	540
2	120	70	50	28	4	0	0	0	0	0	0
	5	*15*	*25*	*20*	*4*	*0*	*0*	*0*	*0*	*0*	*0*
5	210	160	123	110	95	80	15	0	0	0	0
	50	*20*	*20*	*30*	*50*	*57*	*12*	*0*	*0*	*0*	*0*
10	235	215	185	170	148	130	50	7	0	0	0
	25	*25*	*30*	*45*	*60*	*60*	*25*	*0.5*	*0*	*0*	*0*
25	270	240	220	210	190	170	90	11	4	0	0
	0	*0*	*10*	*20*	*30*	*25*	*10*	*0*	*0*	*0*	*0*
50	340	315	310	300	260	240	115	15	6.5	1.5	0
	0	*5*	*20*	*50*	*55*	*60*	*15*	*1*	*0*	*0*	*0*
100	360	340	335	325	300	270	175	19	8.5	4	1
	0	*10*	*25*	*50*	*60*	*55*	*40*	*3*	*0*	*0*	*0*
Annual Average	99	78	65	57	47	40	15	1.5	0.5	0	0
	12	*8*	*11*	*15*	*18*	*18*	*6*	*0*	*0*	*0*	*0*

Source: USACE 1998

TABLE 2-9
INUNDATION DURATIONS FOR PRADO RESERVOIR
WITH ALTERNATIVE 4 - FUTURE CONDITIONS
Flood Season Water Conservation with Forecasting to 505.0 ft +
Non-Flood Season Water Conservation to 505.0 ft

Frequency (Years)	Duration of Inundation (Days) at Various Elevations (ft) *(Increase from Alt. 1 - Future Conditions)*										
	470	480	490	494	498	500	505	510	520	530	540
2	200	180	145	110	50	35	5	0	0	0	0
	15	*30*	*35*	*50*	*45*	*35*	*5*	*0*	*0*	*0*	*0*
5	240	230	210	180	130	105	30	3	0	0	0
	10	*25*	*30*	*40*	*30*	*30*	*25*	*1.5*	*0*	*0*	*0*
10	300	275	250	215	180	150	80	9	2.5	0	0
	40	*40*	*40*	*40*	*50*	*45*	*40*	*2*	*0.5*	*0*	*0*
25	340	320	275	245	210	190	120	15	7	0	0
	30	*55*	*30*	*20*	*20*	*20*	*20*	*3*	*0.5*	*0*	*0*
50	350	340	335	330	295	265	150	18	9.5	3.5	0
	0	*5*	*25*	*40*	*40*	*40*	*20*	*3*	*1*	*0*	*0*
100	360	350	345	340	310	290	180	21	11	6	2.5
	0	*0*	*10*	*25*	*35*	*35*	*15*	*3*	*0*	*0*	*0*
Annual Average	126	118	104	89	65	54	23	2.5	1	0	0
	9	*15*	*16*	*21*	*19*	*17*	*11*	*0.5*	*0*	*0*	*0*

Source: USACE 1998

As with current operations during the non-flood season, water can also be held up to elevation 505 ft (Seasonal Pool) for water conservation purposes. The pool may be maintained as high as elevation 505 ft until the 30th of September (see Exhibit 2-9). However, if maintenance is required, the reservoir must be evacuated before the 1st of September. If summer flood runoff occurs in the month of September, the dam can be operated for water conservation up to elevation 505 ft, provided that the impoundment does not interfere with maintenance requirements. Releases from Prado Dam, during water conservation operations, would be based on the estimated rate that the downstream spreading channel can percolate while maintaining release criteria. If hydrologic forecasts and reservoir conditions indicate that the water surface elevation would exceed elevation 505 ft, the water control personnel at the ROC will match inflow with outflow. Above elevation 505 ft, the reservoir is put in full flood control mode and outflows can be made up to the downstream capacity of the Santa Ana River channel (which is approximately 30,000 cfs).

During the flood season, the USACE has safety regulations for release rates from Prado Dam. These regulations require that release rates accommodate the evacuation of the reservoir down to the Debris Pool (elevation 490 ft) within a 24-hour period to ensure there is storage available for flood control. To drain the reservoir from elevation 505 ft to 490 ft, a maximum release rate of 14,900 cfs from the Phase II gates would be attained by incrementally increasing the release rate of 625 cfs every half-hour, in accordance with the USACE 1994 Water Control Manual. The downstream inundation area associated with a maximum release rate of 14,900 cfs is shown on Exhibit 2-10. The maximum release rate of 14,900 cfs is correlated with a maximum water velocity of 17 ft/s and a minimum water velocity of 4 ft/s in the downstream area of the Santa Ana River. The frequency of inundation of this downstream area with this alternative would increase from once every 33 years without the project to once every 3.5 years with the project.

2.6.2.5 Alternative 5: Flood season Water Conservation up to Elevation 508 ft. and Non-Flood Season Water Conservation up to Elevation 508 ft

This alternative could increase the water conservation level within Prado Reservoir to elevation 508 feet during the flood season and non-flood season. Under present conditions, this increase could inundate up to 1,345 additional acres (124 percent increase) and impound up to 24,145 additional acre-feet (286 percent increase) of water for conservation purposes, compared to existing operations during the flood season. Under future conditions, this alternative could inundate up to 1,273 additional acres (185 percent increase) and impound up to 18,172 additional acre-feet (685 percent increase) of water for conservation purposes during the flood season. During the non-flood season, this alternative would inundate up to 303 additional acres (14 percent increase) and impound up to 6,830 additional acre-feet, compared to existing operations. Under future conditions, up to 292 additional acres (17 percent increase) would be inundated and up to 5,444 additional acre-feet (34 percent increase) would be impounded for water conservation purposes. Tables 2-10 (present conditions) and 2-11 (future conditions) show the duration of inundation at various elevations within the Prado Reservoir during 2-, 5-, 10-, 25-, 50-, and 100-year events.

When inflow to Prado Dam is greater than the percolation capacity of the downstream spreading grounds, the existing Debris Pool (elev. 490 ft) would be utilized for water conservation at any time during the year. The existing operation schedule calls for controlled releases up to 600 cfs until the reservoir reaches elevation 490 ft. During the flood season, encroachment into the Flood-Control Pool could occur up to elevation 508 ft (Buffer Pool) for water conservation purposes, when weather conditions are favorable. When the threat of unfavorable weather is forecast, the reservoir could be drawn down as low as 490 ft to accommodate the anticipated inflow volume from the storm(s) (as low as 490 ft.) to ensure there is storage available for flood control operations.

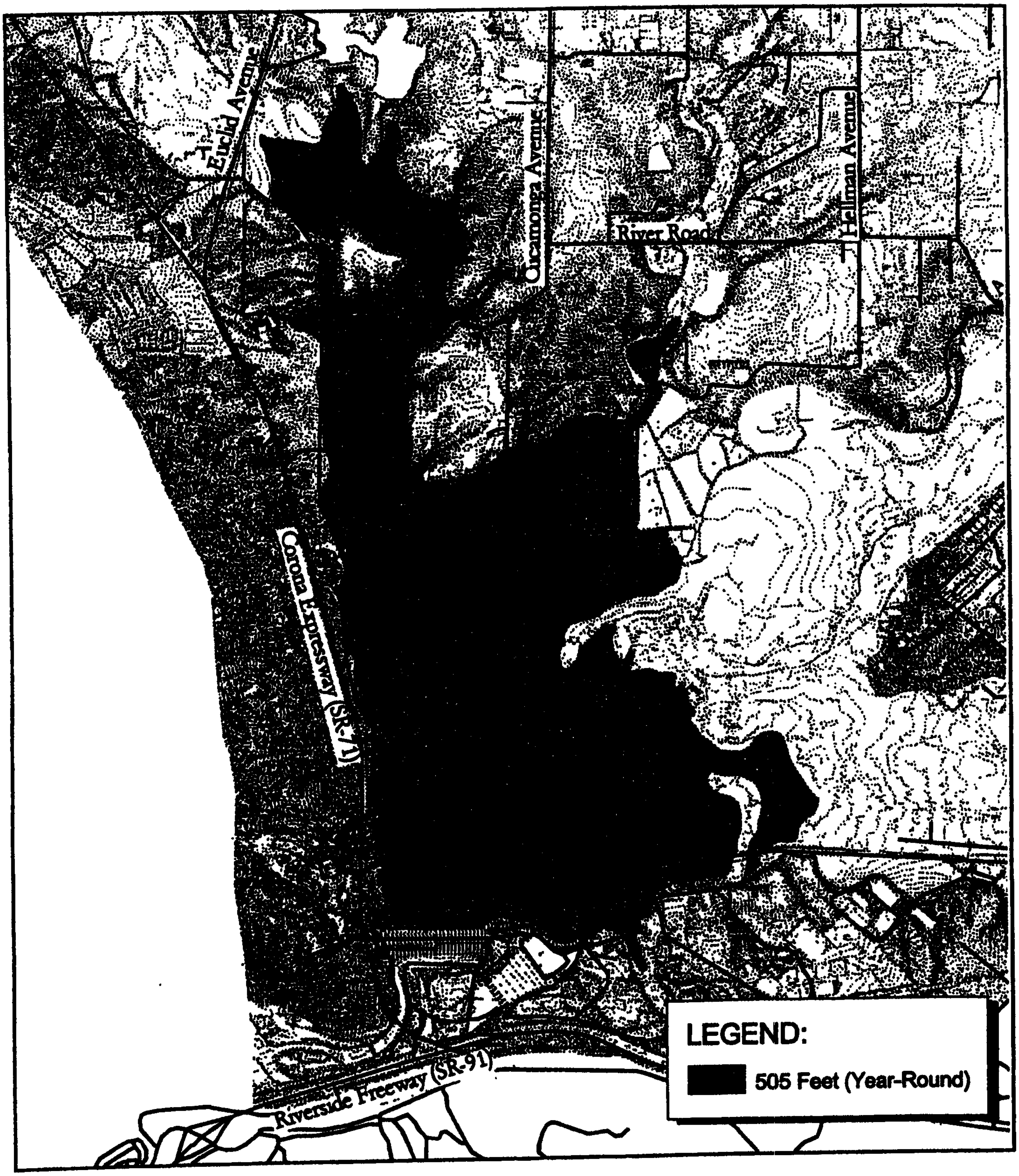


exhibit **2-9**

LMI
Larry Munsey International

Alternative 4 - Long-Term Water Conservation Levels

Prado Dam Water Conservation and Supply Study EIS

NORTH
Feet 3348 1674 0 3348
Meters 1021 510 0 1021

00210002 • 11/00

Source: Surel Raster Maps 1999.

LMI
Larry Murasey International

00210002 • 11/00

exhibit 2-10

Maximum Downstream Inundation Areas Under Alternative 4

Prado Dam Water Conservation and Supply Study EIS

TABLE 2-10
INUNDATION DURATIONS FOR PRADO RESERVOIR
WITH ALTERNATIVE 5 - PRESENT CONDITIONS
Flood Season Water Conservation with Forecasting to 508.0 ft +
Non-Flood Season Water Conservation to 508.0 ft

Frequency (Years)	Duration of Inundation (Days) at Various Elevations (ft) *(Increase from Alt. 1 - Present Conditions)*										
	470	**480**	**490**	**494**	**498**	**500**	**508**	**510**	**520**	**530**	**540**
2	120	70	50	28	4	0	0	0	0	0	0
	5	*15*	*25*	*20*	*4*	*0*	*0*	*0*	*0*	*0*	*0*
5	210	190	153	140	115	100	10	2.5	0	0	0
	50	*50*	*50*	*60*	*70*	*77*	*9*	*2.5*	*0*	*0*	*0*
10	235	215	185	170	153	150	50	8	0	0	0
	25	*25*	*30*	*45*	*65*	*80*	*35*	*1.5*	*0*	*0*	*0*
25	275	245	220	210	195	185	110	15	5	0	0
	5	*5*	*10*	*20*	*35*	*40*	*60*	*4*	*1*	*0*	*0*
50	345	315	310	300	280	260	120	19	7.5	2	0
	5	*5*	*20*	*50*	*75*	*80*	*70*	*5*	*1*	*0.5*	*0*
100	360	340	335	325	300	285	130	23	10	4	1
	0	*10*	*25*	*50*	*60*	*70*	*55*	*7*	*1.5*	*0*	*0*
Annual Average	100	85	71	63	52	47	14	2.5	0.5	0	0
	13	*15*	*17*	*21*	*23*	*25*	*NA*	*1*	*0*	*0*	*0*

Source: USACE 1998

TABLE 2-11
INUNDATION DURATIONS FOR PRADO RESERVOIR
WITH ALTERNATIVE 5 - FUTURE CONDITIONS
Flood Season Water Conservation with Forecasting to 508.0 ft +
Non-Flood Season Water Conservation to 508.0 ft

Frequency (Years)	Duration of Inundation (Days) at Various Elevations (ft) *(Increase from Alt. 1 - Future Conditions)*										
	470	**480**	**490**	**494**	**498**	**500**	**508**	**510**	**520**	**530**	**540**
2	290	260	225	175	140	120	1	0	0	0	0
	105	*110*	*115*	*115*	*135*	*120*	*1*	*0*	*0*	*0*	*0*
5	300	285	260	225	200	185	35	4.5	0	0	0
	70	*80*	*80*	*85*	*100*	*110*	*32*	*3*	*0*	*0*	*0*
10	310	295	280	255	230	210	100	10	2.5	0	0
	50	*60*	*70*	*80*	*100*	*105*	*78*	*3*	*0.5*	*0*	*0*
25	340	315	295	275	250	235	125	18	7	0	0
	30	*50*	*50*	*50*	*60*	*65*	*70*	*6*	*0.5*	*0*	*0*
50	350	340	335	330	310	295	150	21	9.5	3.5	0
	0	*5*	*25*	*40*	*55*	*70*	*75*	*6*	*1*	*0*	*0*
100	360	350	345	340	325	310	170	26	11	6	2.5
	0	*0*	*10*	*25*	*50*	*55*	*80*	*8*	*0*	*0*	*0*
Annual Average	152	142	130	112	98	90	25	3	1	0	0
	35	*39*	*42*	*44*	*52*	*53*	*NA*	*1*	*0*	*0*	*0*

Source: USACE 1998

Unlike current operations during the non-flood season, water can also be held up to elevation 508 ft (Seasonal Pool) for water conservation purposes. The pool may be maintained as high as elevation 508 ft until the 30th of September (see Exhibit 2-11). However, if maintenance is required, the reservoir must be evacuated before the 1st of September. If summer flood runoff occurs in the month of September, the dam can be operated for water conservation up to elevation 508 ft, provided that the impoundment doesn't interfere with maintenance requirements. Releases from Prado Dam, during water conservation operations, would be based on the estimated rate that the downstream spreading channel can percolate while maintaining minimum release criteria. If hydrologic forecasts and reservoir conditions indicate that the water surface elevation would exceed elevation 508 ft, water control personnel at the ROC will match inflow with outflow. Above elevation 508 ft, the reservoir is in full flood control mode and outflows can be made up to the downstream capacity of the Santa Ana River channel (which is approximately 30,000 cfs).

During the flood season, the USACE has safety regulations for release rates from Prado Dam. These regulations require that release rates accommodate the evacuation of the reservoir down to the Debris Pool (elevation 490 ft) within a 24-hour period to ensure there is storage available for flood control. To drain the reservoir from elevation 508 ft to 490 ft, a maximum release rate of 25,900 cfs from the Phase II gates would be attained by incrementally increasing the release rate by 650 cfs every half-hour. Because the approved release rate of change is 625 cfs every half-hour, this alternative would require altering the existing Water Control Manual to allow for a rate of change by 650 cfs per half hour. The downstream inundation area associated with a maximum release rate of 25,900 cfs is shown on Exhibit 2-12. The maximum release rate of 25,900 cfs is correlated with a maximum water velocity of 20 ft/s and a minimum water velocity of 4 ft/s in the downstream area of the Santa Ana River. The frequency of inundation of this downstream area with this alternative would increase from once every 83 years without the project to once every 4 years with the project.

2.7 INTENDED USES OF EIS/EIR

2.7.1 LEAD AGENCIES

The USACE is the NEPA lead agency for this EIS, while the Orange County Water District (OCWD) is the CEQA lead agency for the EIR. The USACE and OCWD are expected to use this EIS/EIR in the consideration of the following project approval:

- 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.

2.7.2 COOPERATING 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.

The USFWS is the only federal agency that has been identified as a cooperating agency. A subsequent action may be required by USFWS. The following approval may be required for the proposed action:

- U.S. Fish and Wildlife Service – A formal consultation with the USFWS maybe required if significant effects occur on endangered species (*i.e.*, least Bell's vireo, southwestern willow flycatcher, bald eagle, peregrine falcon, arroyo southwestern toad). A formal consultation is a process between the USFWS and the federal agency that commences with the federal agency's written request for consultation under Section 7(a)(2) of the Endangered Species Act and concludes with the USFWS issuance of a biological opinion under Section 7(b)(3) of the Endangered Species Act.

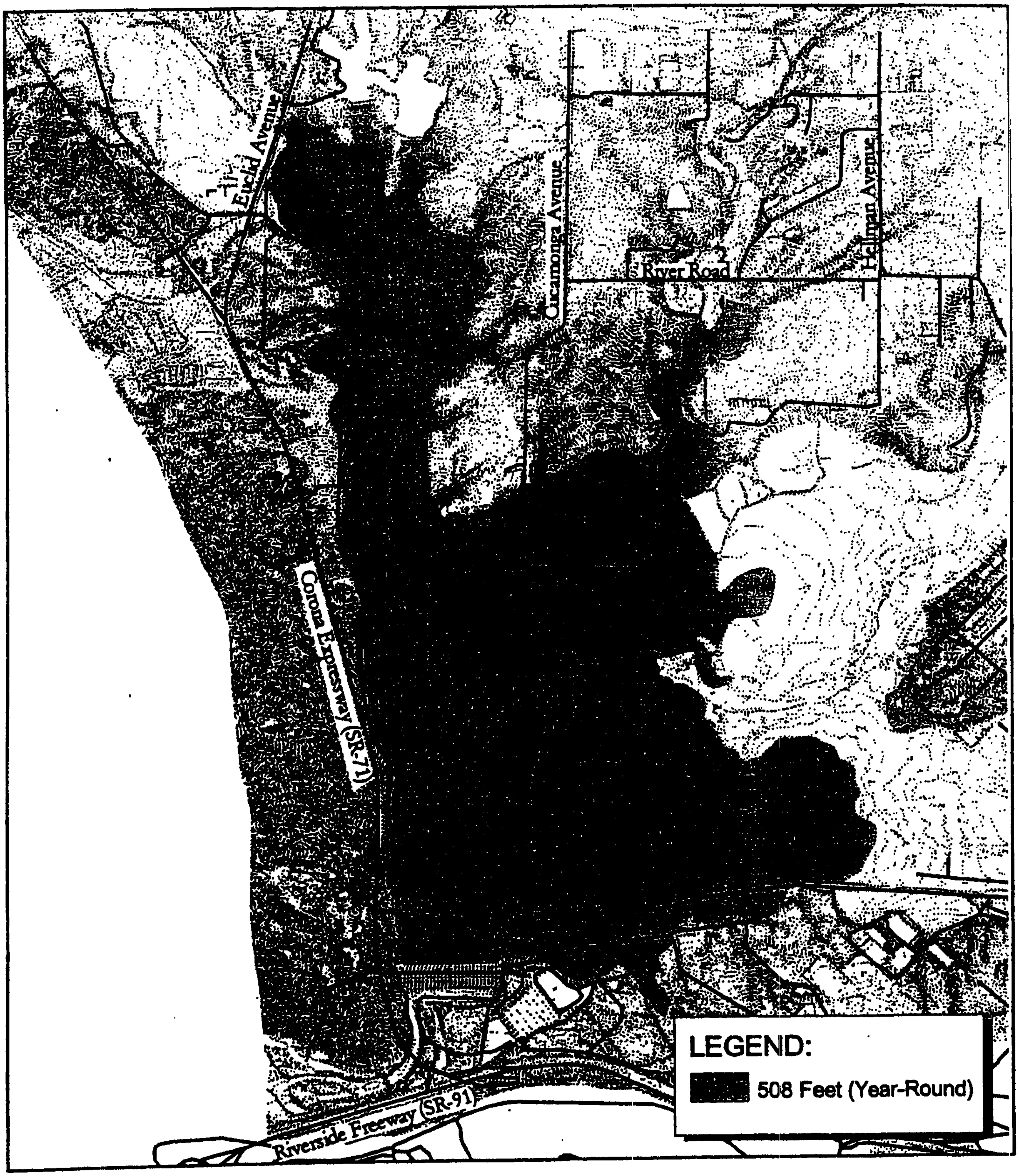


exhibit **2-11**

LMI
Larry Munsey International

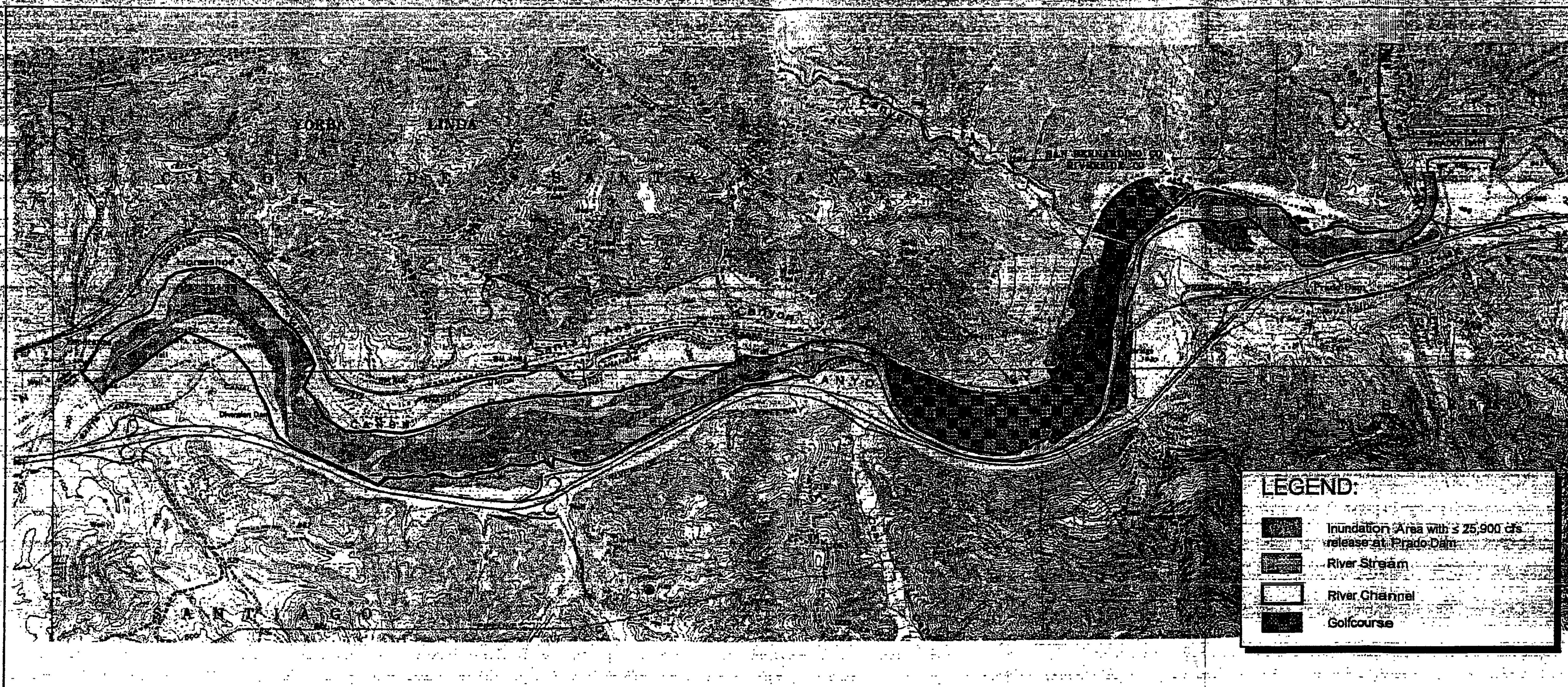
Alternative 5 - Long-Term Water Conservation Levels

NORTH

Feet	3348	1674	0	3348
Meters	1021	510	0	1021

Prado Dam Water Conservation and Supply Study EIS

00210002 • 11/00



Source: Surel Raster Maps 1999.

LMI
Larry Munsey International

00210002 • 11/00

exhibit **2-12**

Maximum Downstream Inundation Areas Under Alternative 5

Prado Dam Water Conservation and Supply Study EIS

3 AFFECTED ENVIRONMENT

This section provides a discussion of the existing environmental setting of Prado Reservoir as well as the area downstream of Prado Dam to Weir Canyon Road based on previous documentation that has been prepared for this area as well as limited field studies. The information that was used for each of the environmental topical areas was primarily from the following documents:

U.S. Army Corps of Engineers. 1998. *Santa Ana River memorandum No. 1 Phase II GDM on the Santa Ana River Maintain including Santiago Creek: Main Report and Supplement Environmental Impact Statement.*

U.S. Army Corps of Engineers. October 1992. *Review of Prado Dam Operation for Water Conservation, Final Environmental Impact Statement.*

U.S. Army Corps of Engineers. *Water Control Manual, Prado Dam and Reservoir, Santa Ana River, California, September 1994*

3.1 EARTH RESOURCES

3.1.1 GEOLOGY AND SOILS

The Prado Reservoir is composed of sediments from the Tertiary, Miocene, and lower Pliocene age (10 to 25 million years old). The sediment consists primarily of friable sandstones with hard siltstone, shale interbeds, and scattered lenses of conglomerate. The Reservoir area is referred to as the Puente formation and was formed during uplift of the region over the past two to three millions years. This uplifting deformed the Puente formation with extensive warping and faulting of the area.

Recent (Holocene) alluvium that contain saturated sands with smaller lenses of silt, gravel, and clay is present in the Santa Ana River channel and in the Reservoir. Soils in the Prado Reservoir consist mainly of Recent alluvial deposits from the Santa Ana River, Temescal Wash, Chino Creek, and Cucamonga Creek along with Lacustrine deposits in the reservoir. The deposits fill the bottoms of the canyons along the edge of the Chino Hills, as well as some of the narrow hillside gullies. Recent alluvial deposits reach a known maximum thickness of 27.5 m (90 ft) under the dam embankment. Soil deposits from Tertiary sediments (marine and non-marine sandstones, siltstones and conglomerates) and Cretaceous materials (granite rocks) also occur in minor amounts in the Reservoir. Tertiary deposits are found mainly in the hills west of the Reservoir while Cretaceous deposits occur in scattered locations in the east part of the Reservoir.

Downstream from Prado Dam, the river meanders naturally along a 9-mile course through Santa Ana Canyon, except for about three miles of revetment. Sedimentation in this area is a dynamic process due to irregular flood events. Sediment consists mainly of coarse materials in this portion of the River, as opposed to a higher predominance of fine and grained materials (silts and clays) near the mouth of the River (i.e., at Pacific Ocean).

Portions of the Prado Reservoir have been mapped as prime farmland or statewide important farmland The United States Department of Agriculture, Natural Resources Conservation Service (USDA, NRCS) has rated the soils of the area for recreation uses. Soils within the Reservoir have recreational limitations that have been rated by USDA, SCS as Slight to Moderate, with a small portion rated as Severe. A Slight rating means the soil has few, if any, limitations for the specified use. A Moderate rating means the soil has one or more properties that limit its use, such as poor drainage or slopes greater than five percent. A Severe rating means the soil has one or more properties that seriously limit its use. Soils in Prado Reservoir with Severe limitations due to slopes are discussed in the topography section below.

3.1.2 TOPOGRAPHY

Prado Reservoir mainly consists of areas of low slope (0 to 2 percent). Low slope areas are generally suitable for the most intense development uses since there is a minimum need to create large, open, buildable areas. Portions of the Reservoir contain moderate slopes (3 to 15 percent). Moderate slope areas are generally considered suitable for a large number of uses without the need to alter present landforms (*e.g.*, bicycle and equestrian trails, golf course, agriculture). A small part of Prado Reservoir contains high slopes steeper than 15 percent. The bordering hills on the east and minor fringe areas within the Reservoir contain high slope areas. Land uses suitable for high slope areas typically include wildlife habitat and interpretive trails. Downstream from Prado Dam, elevations within the Santa Ana River range from approximately 450 ft just below Prado Dam to approximately 315 ft at Weir Canyon Road.

3.1.3 SEISMICITY

Prado Dam and Reservoir are subject to severe groundshaking due to the proximity of several faults in the area. Two fault zones dominate the seismic environment of the Prado Reservoir; the San Andreas and the Whittier-Elsinore. The San Andreas Fault zone is the most dominant seismic feature in California, and is located 43.5 km (27 mi) northeast of the project study area. The Whittier-Elsinore Fault zone separates into the Chino, Central Avenue, and Whittier Faults near Corona. The Whittier Fault is within 2.4 kilometers (km) (1.5 miles [mi]) of the project study area. The Chino and Central Avenue Faults pass through the southwest part of the Prado Basin. The Chino Fault has been historically seismic. The Central Avenue Fault is also historically seismic and is concealed at the ground surface.

According to USACE, post earthquake stability analysis indicated that the embankment and materials would have sufficient strength to preclude instability when subject to either the regional (8+ magnitude) or local (6.5 to 7.0 magnitude) design earthquake. Further, a dynamic stability analysis of Prado Dam for a year-round water conservation pool at elevation 500 ft indicated that excessive strains do not develop within the embankment or within the embankment foundation (USACE 1988). Prado Dam would also exhibit stability under conditions of a water conservation pool at elevation 514 ft. Downstream of Prado Dam, the Santa Ana River Channel, as designed, has been analyzed in the EIS/EIR for the Phase II GDM and is considered stable, even during periods of the maximum seismic event.

3.2 WATER RESOURCES

3.2.1 HYDROLOGY/SURFACE DRAINAGE

The drainage area tributary to Prado Dam comprises approximately 5,838 km^2 (2,255 mi^2) of mountainous and moderately sloping valley terrain. Elevations within the watershed range from 460 ft above mean sea level (msl) at the base of the Prado Dam, to 3,655.4 m (11,985 ft) above msl (Mt. San Gorgonio) at the upper edge of the drainage area.

Several mountain streams in the upper Santa Ana River watershed are perennial and nearly all of this water is diverted for groundwater recharge purposes prior to reaching Prado Reservoir. The water reaching Prado Reservoir is the product of inflows from Cucamonga Creek, Chino Creek, Temescal Wash, rising groundwater, municipal sewage effluent, and non-point discharges from urban and agricultural runoff. Inflows into Prado Reservoir remain perennial during the dry summer months due to discharges from sewer treatment plants, which at such times supply nearly all the water flowing into the Reservoir.

Below Prado Dam, the Santa Ana River flows are percolated into sandy soils overlying the Orange County Groundwater Basin. Directly downstream from Prado Dam, the river meanders naturally through a 9-mile course through Santa Ana Canyon, except for approximately 3 miles with channel revetment. The total drainage area downstream from Prado Basin consists of approximately 208 square miles.

An analysis of hydrologic conditions at Prado Dam was performed utilizing the period 1950 through 1988. Mean daily flows for all years were adjusted to account for changes in the watershed characteristics through year 2001 (urbanization and recent increases in treatment plant effluent). The mean annual inflow was estimated at approximately (278,000 ac-ft). The current average annual downstream recharge basin capacity is estimated at 500 cfs year-round.

Watershed conditions in the year 2000 reflect the increase in population and development in upstream communities as well as increases in wastewater treatment capacity. The average annual inflow to Prado Dam under future conditions was estimated as 374,000 ac-ft per year. The future conditions downstream recharge capacity is expected to reach 580 cfs.

3.2.2 GROUNDWATER

3.2.2.1 <u>Flow</u>

Surface and subsurface flows within the upper Santa Ana Valley funnel into a natural bedrock construction at the intersection of the Eastern Puente Hills and the Santa Ana Mountains. Groundwater flows have been forced to the ground surface in this region. The area above Prado Dam experienced a rise in ground water levels during the period of heavy precipitation in 1978-1980 with the peak groundwater levels measured in 1981 in the vicinity of Corona Airport. These were the highest levels recorded in the last 50 years.

Plots of annual precipitation and annual peak groundwater levels in two state wells located in the area just southwest of the City of Corona wastewater percolation ponds near the Corona Airport show a definite time lag interval. Over the entire Reservoir, the time lag interval is on the order of four years between a peak period of high annual precipitation and a period of high annual peak groundwater levels (USACE 1997).

3.2.2.2 <u>Levels</u>

Previous USACE investigations have shown that the lowest regions in the reservoir area have saturated soils. Areas up to elevation 505 ft experience surface flow from seepage from near the surface aquifer. Groundwater flows in the southeast part of the reservoir are generally oriented in a northwesterly direction towards the lowest part of the Reservoir. Previous USACE investigations of reservoir pool elevations in this area indicated groundwater levels upstream of a well at elevation 498 ft remained essentially stable.

High groundwater has affected Corona Municipal Airport and the City of Corona's sewage percolation ponds. A double aquifer groundwater system exists in the vicinity of both these facilities. The lower aquifer is isolated and is not influenced by surface water activity in the Basin. The upper aquifer system, consisting of sands and gravels to a depth of 16.8 to 21.4 m (55 to 70 ft) below the ground surface, is directly impacted by site surface conditions. These aquifers do not directly connect to aquifers downstream of the Prado Basin (USACE 1997).

3.2.3 WATER QUALITY

Water quality in the Prado Reservoir is a function of the various inflows into the area: the Santa Ana River, Cucamonga Creek, Chino Creek, Temescal Creek, rising groundwater, municipal wastewater treatment plant (WTP) effluent, mountain and lowland runoff, storm discharge, State Water Project discharges, and non-point source discharges (*e.g.*, urban and agricultural runoff).

An indication of the overall quality in water is given by total dissolved solids (TDS). TDS content varies from less than 200 milligram per liter (mg/l) during some winter storm runoff to more than 1,000 mg/l during occasional low flow or initial flushing conditions. An average observed concentration value (dam output) of 641 mg/l is just below the Regional Water Quality Control Board (RWQCB) objective of 650 mg/l; however, the RWQCB requirement is for summer base flow. OCWD sampling for a 36-month period in 1984-1987 below the dam averaged 683 mg/l TDS. This would be considered marginal to poor in quality for domestic use. The Prado water is not directly used for drinking, but is recharged into Orange County's aquifer for groundwater withdrawal, and subsequently withdrawn for domestic and other uses.

Wastewater treatment plant releases increase TDS because chemicals are added for the treatment processes. In the later summer months when inflows from rainfall are at a minimum, the baseflow of the Santa Ana River is comprised almost entirely of discharges from WTPs. This baseflow tends to be high in total dissolved solids. Future plans call for three additional wastewater treatment plants to discharge tertiary treated water into the Prado Reservoir. It is estimated that this flow will equal the current flow from the Santa Ana River. Continued development in the surrounding and upstream areas implies a lasting increase in poorer quality water into the Reservoir from increased WTP flow and urban runoff.

Prado outflows of dissolved metal concentrations are generally low. Drinking water standards are occasionally exceeded for toxic heavy metals in the outflow; iron and manganese nearly always exceed those standards. Effects in drinking water at those levels are primarily aesthetic. Nitrogen values are sometimes high, reflecting fertilizer use and discharges from WTPs. Organics, pesticides, and PCB's are detected at very low concentrations in Prado water and sediments. However, they are often of concern even at any detectable concentration because they may bioaccumulate in organisms. There is a potential for anaerobic conditions to occur during extended summer impoundment in the reservoir. Finally, coliform values are variable, with very high concentrations occasionally reported.

The California Department of Fish and Game (CDFG) and State Water Resources Control Board (SWRCB) as part of the Toxic Substances Monitoring Program have sampled fish in the Santa Ana River below the Prado Dam and analyzed them for trace metals and organic compounds such as PCB's. During 1978-1984, several organic compounds (DDT, PCB's, chlordane, and dieldrin) were detected in fish tissue below Prado Dam. Selenium and lead were also detected at levels above typical values found in fish elsewhere in the state. The concentrations of these contaminants are below the Food and Drug Administration warning levels as well as the National Academy of Sciences recommended guidelines.

3.2.4 FLOOD CONTROL/WATER STORAGE OPERATIONS

During most of the year, water flowing through the Prado Dam is not detained and passes immediately downstream. The Dam has a minimal impact on water quality in such cases. The current function of Prado Dam is primarily flood control purposes. During the rainy winter months, impoundment of water in the Reservoir minimizés flooding potential while facilitating incidental groundwater recharge downstream.

The storage of water within the Reservoir can have an impact on water quality. Water storage under the existing water conservation practices at Prado Reservoir occur for short periods as well as long periods of time during the flood season depending on flood forecasts. Typically, impoundments of water that occur for short periods of time at Prado Reservoir experience. Rapid drawdown that results in a minimal affect on water quality as the floodwaters contain a minimum concentration of TDS, thus diluting baseflows. When water is detained for longer periods of time at Prado Reservoir, concentrations of solids tend to be reduced through settling. In addition, extended impoundment will decrease nitrates as they are utilized by organisms. Thus in either case (short or long periods of impoundment time), the affect of detention within the Reservoir tends to reduce nitrates and total suspended solids (TSS) concentrations and, therefore, enhance overall water quality.

3.3 BIOLOGICAL RESOURCES

The following discussion of existing conditions in Prado Reservoir and the Santa Ana River below Prado Dam to Weir Canyon is based largely on previous documentation for this area. A complete biological assessment is provided in Appendix D. Information was obtained primarily from the following sources: Orange County Flood Control District (hereafter OCFCD) (1997) Hays (1987), Pike *et al.* (1998), U. S. Army Corps of Engineers (hereafter USACE) (1988, 1992b, 1997), and Zembal *et al.* (1985). Focused surveys for endangered species were conducted in both Prado Reservoir and the Santa Ana River between Prado Dam and Weir Canyon in 1999, and Santa Ana sucker surveys were completed in 1998. In the Reservoir, surveys for terrestrial vertebrates were restricted to two species, the federally threatened California red-legged frog and federally endangered arroyo southwestern toad. Surveys for endangered bird species in the Reservoir are conducted annually for the U. S. Fish and Wildlife Service (hereafter FWS) (see Pike *et al.* 1998) and were not duplicated in this study. The areal extent of riparian habitats in the Basin and the Santa Ana River between Prado Dam and Weir Canyon was determined from recent aerial photographs and ground-truthing.

The Prado Reservoir includes the watercourses upstream of the Dam to an elevation of 566 ft, comprising an area estimated at 11,400 ac. About 4,400 ac consists of riparian habitats, mostly willow woodland. The present biological condition of the Reservoir was created by the construction of Prado Dam in 1941. Prado Dam was built where Chino Creek, Cucamonga Creek (known as Mill Creek south of Pine Avenue) and Temescal Wash converge with the Santa Ana River. Due to a combination of the high groundwater table, storm flow accumulation held in the reservoir, sewage treatment plant effluent and irrigation runoff, a resultant perennial river flows that has created and sustains the extensive wetland habitat in the Reservoir. Presently, the riparian woodlands in the Reservoir comprise the largest single stand of this habitat in Southern California.

The portion of Prado Reservoir principally affected by this project and its alternatives is that area between the 494 ft elevation and 505 ft elevation. Most of the following discussion is focused on this elevational zone within the Reservoir. The Santa Ana River within the project footprint includes the active stream channel and associated wetlands from immediately below Prado Dam downstream 12.0 km (7.4 mi.) to the drop structure at the Weir Canyon Road crossing.

3.3.1 VEGETATION

Vegetation in the Prado Basin and in the Santa Ana River between Prado Dam and Weir Canyon are discussed separately, as vegetation composition and the nature of impacts on this vegetation differ significantly in the two areas.

3.3.1.1 Vegetation in Prado Basin

The portion of the Prado Basin directly affected floristically by this project comprises willow riparian forest in various seral stages, mulefat and other riparian scrubland, herbaceous riparian, freshwater ponds with scattered dense stands of emergent freshwater marsh, flowing streams (riverine) and adjacent sandy washes, periodically flooded fallow fields, and small amounts of ruderal vegetation in highly disturbed areas. Other portions of the Basin, primarily at higher elevations, have additional upland habitats such as coastal sage scrub and agricultural fields.

Eleven plant communities are recognized in this analysis. Of these, four are classified as riparian, four as freshwater aquatic, three as manufactured and ruderal. Flood plain riparian plant communities dominate the Basin, with upland habitats primarily restricted to the perimeter of the Basin, essentially outside the affected area of this project.

An estimated 311 species representing 65 families of vascular plants have been identified in the Prado Basin and surrounding areas (Zembal *et al.* 1985). Approximately 32 percent (99 species) are typically associated with floodplain and riparian habitats; 64 percent (200 species) are usually found on the slopes and in upland habitats; and the remaining 4 percent (12 species) are found in both riparian and upland communities. About 100 species are non-native plants, a small number of which are remnants of previous cultivation in the area. A similar breakdown is not available for the subset of Prado between elevations 494 and 508 ft. The dominant plant community in the Basin and within the affected area in the Basin is willow woodland. A small number of riparian woodland species are responsible for much of the plant cover in the Basin, chief among them Goodding's black willow (*Salix gooddingii*).

The primary vegetation types in the affected area of the Basin as shown in Exhibit 3-1 are discussed below. Table 3-1 provides estimates of the area occupied by each of the vegetation types in the affected areas between elevations 494 and 508 ft.

3.3.1.1.1 Riparian Plant Communities

Riparian plant communities are characterized by hydrophytic vegetation and periodic inundation. Soils may or may not be hydric. Riparian communities may consist of woodland, scrub, or herbaceous vegetation.

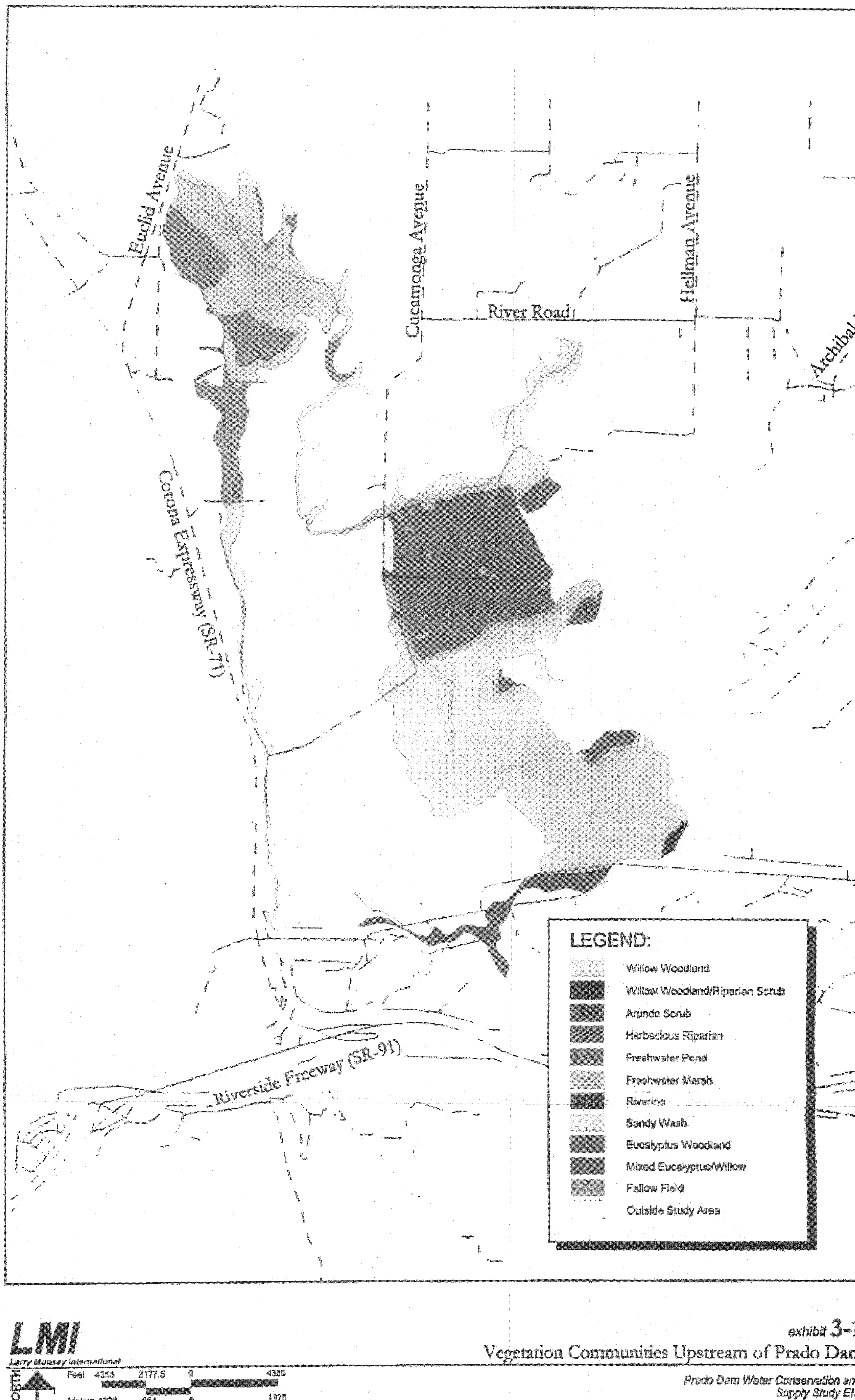


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exhibit 3-1
Vegetation Communities Upstream of Prado Dam

Prado Dam Water Conservation and Supply Study EIS

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TABLE 3-1
AREAL EXTENT OF VEGETATION COMMUNITIES BETWEEN 494 AND 508 FEET IN THE PRADO BASIN

Vegetation Communities	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
	Flood 494 ft	Non-Flood 505 ft	Flood 498 ft	Non-Flood 505 ft	Flood 500 ft	Non-Flood 505 ft	Flood 505 ft	Non-Flood 505 ft	Flood 508 ft	Non-Flood 508 ft
Willow Woodland	0 ha 0 ac	256.4 ha 632.7 ac	87.6 ha 216.1 ac	256.4 ha 632.7 ac	138.5 ha 341.7 ac	256.4 ha 632.7 ac	256.4 ha 632.7 ac	256.4 ha 632.7 ac	370.7 ha 914.8 ac	370.7 ha 914.8 ac
Willow Woodlabd/ Riparian Scrub	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	1.9 ha 4.8 ac	1.9 ha 4.8 ac
Arundo	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	4.7 ha 11.5 ac	4.7 ha 11.5 ac
Herbaceous Riparian	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	5.1 ha 12.6 ac	5.1 ha 12.6 ac
Freshwater Pond	0 ha 0 ac	89.7 ha 221.3 ac	37.4 ha 92.2 ac	89.7 ha 221.3 ac	58.1 ha 143.5 ac	89.7 ha 221.3 ac	89.7 ha 221.3 ac	89.7 ha 221.3 ac	114.7 ha 283.1 ac	114.7 ha 283.1 ac
Freshwater Marsh	0 ha 0 ac	4.1 ha 10.1 ac	3.2 ha 8.0 ac	4.1 ha 10.1 ac	3.6 ha 8.9 ac	4.1 ha 10.1 ac	4.1 ha 10.1 ac	4.1 ha 10.1 ac	4.3 ha 10.6 ac	4.3 ha 10.6 ac
Riverine (Fresh-water Aquatic)	0 ha 0 ac	1.9 ha 4.8 ac	0.9 ha 2.2 ac	1.9 ha 4.8 ac	1.2 ha 2.9 ac	1.9 ha 4.8 ac	1.9 ha 4.8 ac	1.9 ha 4.8 ac	2.8 ha 6.9 ac	2.8 ha 6.9 ac
Sandy Wash	0 ha 0 ac	1.5 ha 3.8 ac	0.1 ha 0.3 ac	1.5 ha 3.8 ac	0.5 ha 1.3 ac	1.5 ha 3.8 ac	1.5 ha 3.8 ac	1.5 ha 3.8 ac	3.3 ha 8.1 ac	3.3 ha 8.1 ac
Eucalyptus Woodland	0 ha 0 ac	11.3 ha 28.0 ac	4.7 ha 11.5 ac	11.3 ha 28.0 ac	6.1 ha 15.1 ac	11.3 ha 28.0 ac	11.3 ha 28.0 ac	11.3 ha 28.0 ac	16.2 ha 40.0 ac	16.2 ha 40.0 ac
Eucalyptus/ Willow Woodland	0 ha 0 ac	3.9 ha 9.7 ac	1.4 ha 3.5 ac	3.9 ha 9.7 ac	2.1 ha 5.2 ac	3.9 ha 9.7 ac	3.9 ha 9.7 ac	3.9 ha 9.7 ac	5.4 ha 13.4 ac	5.4 ha 13.4 ac
Fallow Field	0 ha 0 ac	33.3 ha 82.1 ac	8.0 ha 19.8 ac	33.3 ha 82.1 ac	11.3 ha 28.0 ac	33.3 ha 82.1 ac	33.3 ha 82.1 ac	33.3 ha 82.1 ac	54.6 ha 134.8 ac	54.6 ha 134.8 ac
TOTAL:	0 ha 0 ac	402.1 ha 992.5 ac	143.3 ha 353.6 ac	402.1 ha 992.5 ac	221.4 ha 546.6 ac	402.1 ha 992.5 ac	402.1 ha 992.5 ac	402.1 ha 992.5 ac	583.7 ha 1440.6 ac	583.7 ha 1440.6 ac

Willow Woodland

The dominant plant community at all elevations in the Prado Basin is willow woodland. Gooding's black willow is the dominant species, probably because of its tolerance of prolonged inundation. Black willows cover about 60 percent of land below elevation 514 ft. Scattered arroyo willows (*Salix lasiolepis*) and Fremont cottonwoods (*Populus fremontii*) are also significant components of the overstory in a few areas. The understory is generally sparse, particularly at the lower elevations in the Basin near the dam (elevation 490 ft and below) where frequent inundation precludes a well-developed understory. Scattered small stands of mulefat (*Baccharis salicifolia*), cocklebur (*Xanthium strumarium*) and hoary nettle (*Urtica dioica* ssp. *holosericea*) are some of the components of this sparse understory.

Most willow woodland within this and lower elevational zones in the Basin has little understory because it is frequently flooded or scoured during the winter rainy season. On slightly higher ground and near the woodland edge, but also at lower elevations along stream banks, an understory community develops. The predominant understory plant in this community is mulefat. Most of the understory in the Basin is located in narrow bands and pockets along side draws, the watercourse channels, and artificially maintained edges starting from approximately elevation 490 ft (Zembal *et al.* 1985). Because of the variable amounts of inundation and scour from one winter to the next, the percentage of the willow woodland in the Basin possessing a well-layered structure with a shrubby understory is variable from year to year.

Mature willow woodland comprises about 371 ha (915 ac) between elevations 494 and 508 ft (see Table 3-1). Because willow woodland with understory and willow woodland without understory intergrade in complex ways and change from year to year depending on flood intensities and duration, these two sub-communities have been mapped as one in this study (see Exhibit 3-1).

Riparian Scrub

Riparian scrub refers to the lower growing vegetation that occurs in large openings in the forest with no overstory plants. Common species in this habitat include arroyo willow, mulefat, tree tobacco (*Nicotiana glauca*), sedges (*Cyperus* spp.) and mugwort (*Artemisia douglasiana*). Within the 494-508 ft elevation zone riparian scrub is mixed with mature black willows and is shown in Exhibit 3-1 as mixed willow woodland/riparian scrub. Only about 1.9 ha (4.8 ac) of mixed willow woodland and riparian scrub is found in the affected area, southwest of the Corona airstrip between elevations 505 and 508 ft (see Table 3-1).

Arundo scrub

Giant reed or arundo (*Arundo donax*) is a highly invasive non-native grass similar in growth form to bamboo. It is fast growing and hard to eradicate, once established. Arundo forms essentially monotypic stands and will entirely replace willows and other native riparian vegetation in wetland areas that are frequently disturbed. Once a small patch of arundo is established it may spread rapidly to other areas. Large sections along the banks of the Santa Ana River, mostly upriver of the affected area, have been converted from willow woodland to arundo; however, between elevations 494 and 508 ft, little arundo has become established. Only above elevation 505 ft is arundo found in significant amounts, and only in one general area where about 4.7 ha (11.6 ac) have become established (see Table 3-1).

Herbaceous Riparian

Many frequently inundated areas in the lower part of the Basin support little or no perennial vegetation. These areas are often surrounded by trees on slightly higher ground. Inundation in combination with soil type is conducive to the growth of herbaceous riparian communities. Scoured areas are often quickly revegetated with herbaceous or short-lived biennial and perennial species, notably cocklebur, immediately following the rainy season. Only about 5.1 ha (12.7 ac) of the herbaceous riparian plant association is found between elevations 494 and 508 ft (see Table 3-1), and these areas are predominantly cocklebur.

3.3.1.1.2 Freshwater Aquatic Plant Communities

Freshwater aquatic plant communities are characterized by vegetation that may be submerged, suspended, or emergent. Soils are hydric and the vegetation is hydrophytic. The land is inundated most or all of the year.

Freshwater Ponds

Seven hundred ac of water impoundments are maintained in the Basin as approximately 50 ponds and interconnecting channels. Of this, 113 ha (280 ac) are located between elevations 494 and 508 ft (see Table 3-1). Water is supplied to these ponds by a partial diversion of the Santa Ana River at River Road. The ponds in the Basin are mostly seasonal, created and maintained for groundwater recharging and duck hunting operations. The majority of the ponds are operated by the OCWD, which seasonally drains and clears vegetation within the ponds. This results in a large percentage of open water at the expense of freshwater marsh. Cattails and reeds, however, quickly return, particularly along the margins of the ponds.

Freshwater Marsh

Small pockets of freshwater marsh are found in scattered locations in the Basin, primarily within the artificially maintained duck and groundwater recharge ponds. Cattails (*Typha* spp.) and reeds (principally *Scirpus californicus*) are the dominant species, with occasional slender aster (*Aster subulatus*), mulefat, western goldenrod (*Euthamia occidentalis*), bur-reed (*Sparganium eurycarpum*) and tule-potato (*Sagittaria latifolia*) along the edges or in areas that are drying out. Duckweed (*Lemna* sp.) comprises the predominant floating vegetation in these ponds, with water fern (*Azolla* sp.) also found in some areas. Within the freshwater pond habitat are found 4.0 ha (10.0 ac) of emergent freshwater marsh vegetation (see Table 3-1).

Riverine

The only riverine community in the Basin is that portion of the four drainages (Santa Ana River, Temescal Creek, Chino Creek, and Mill Creek) that is actively flowing year-round or nearly year-round. These areas are characterized by open, flowing water with no significant emergent or floating vegetation except along the edges. Actively flowing streams comprise only about 2.5 ha (6.1 ac) during the low water season (see Table 3-1). This represents about 4.0 linear km (2.5 linear mi) of perennial stream between elevations 494 and 508 ft.

Sandy Wash

In a few areas along the banks of the riverine or flowing stream community a sandy substrate with little vegetation has developed. These areas are frequently scoured and, as such, have little or no soil development. Sandy washes are inherently unstable and shift from year to year depending on rainfall patterns and intensity. For this reason, significant amounts of perennial vegetation rarely develop. Sandy wash comprises about 3.4 ha (8.4 ac) in the project area (see Table 3-1).

3.3.1.1.3 Non-Native, Manufactured, and Ruderal Plant Communities

Manufactured plant communities are those comprising non-native grasses (lawns) and ornamental shrubs and trees, either planted for landscaping or that have set seed and spread into other nearby areas. Ruderal plant communities are those comprising mostly (but not entirely) non-native species that have not been intentionally planted by man. These species are commonly referred to as "weeds" and the plant communities as "annual grassland", "fallow fields", "roadside ruderal", and the like.

<u>Eucalyptus Woodland and Mixed Eucalyptus and Willow Woodland</u>

Several areas within the Basin have been planted in eucalyptus groves, primarily lemon-scented gum (*Eucalyptus citriodora*) and red gum (*E. camaldulensis*). Most such areas are along the margins of the Basin in upland areas adjacent to ranches, farmland, and residences. However, one old grove is located on higher ground well within the Basin in the southern portion. It extends from near the east end of the spillway nearly to the Corona airstrip. About 15.3 ha (37.7 ac) of mature eucalyptus woodland is between elevations 494 and 508 ft, and another 5.2 ha (12.9 ac) of mixed eucalyptus and black willow woodland is found along the north and northeast edge of the eucalyptus woodland.

<u>Fallow Fields</u>

These are areas that are periodically in active cultivation. These are lands that have been planted exclusively or nearly exclusively in monoculture crops for human consumption or feed for livestock, and then allowed to lie fallow for several years. The predominant vegetation is annual grasses, especially Dallis grass (*Paspalum dilatatum*), cocklebur, and dock (largely *Rumex salicifolia*). About 55 ha (136 ac) of fallow fields are located between elevations 494 and 508 ft in the Basin, almost entirely in the northern portion along Chino Creek (see Exhibit 3-1).

<u>Ruderal</u>

Weedy, mostly herbaceous vegetation that is almost exclusively non-native predominates in these highly disturbed areas. Ruderal vegetation is found primarily along roadsides and in recently abandoned agricultural fields. Typical plants include barley (*Hordeum* spp.), fescue (*Vulpia myuros*), short-podded mustard (*Hirschfeldia incana*), horehound (*Marrubium vulgare*), filaree (*Erodium* spp.), and doveweed (*Eremocarpus setigerus*). Relatively low amounts of ruderal vegetation are currently found between elevations 494 and 508 ft, mostly along roadsides. This minor vegetational component is not mapped or quantified in Exhibit 3-1 and Table 3-1.

3.3.1.2 <u>Vegetation in the Santa Ana River Between Prado Dam and Weir Canyon</u>

A thorough description and analysis of vegetation types in this portion of the Santa Ana River is presented and mapped in the Santa Ana River Canyon Habitat Management Plan (OCFCD 1997). Only the active river channel and its associated wetland vegetation are directly affected floristically by this project. The upland associations presented in the earlier document are not addressed in the current study. The wetland communities in the Santa Ana River between Prado Dam and Weir Canyon comprise cottonwood and willow riparian forest (willow and cottonwood gallery forest of OCFCD 1997), riparian scrub, and arundo (included together as riparian brushland in OCFCD 1997).

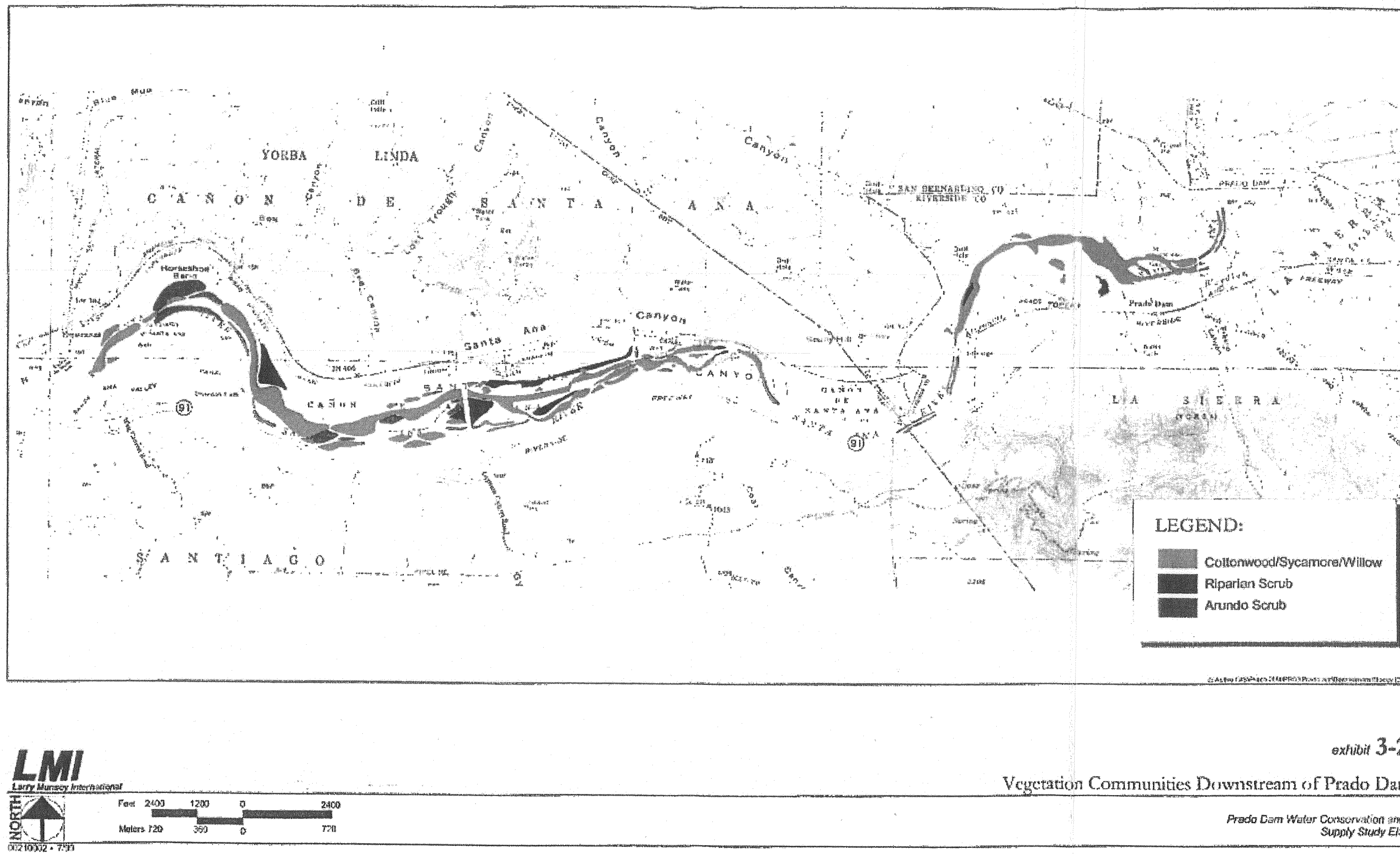

exhibit 3-2

Vegetation Communities Downstream of Prado Dam

Prado Dam Water Conservation and Supply Study EIS

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PHOTO 1: Northerly view near southern terminus of Serfas Club Drive within Sierra Del Oro development. View of southern portion of Prado Basin with San Bernardino Mountains visible in background.

PHOTO 2: Westerly view into Prado Basin from western portion of Corona Municipal Airport.

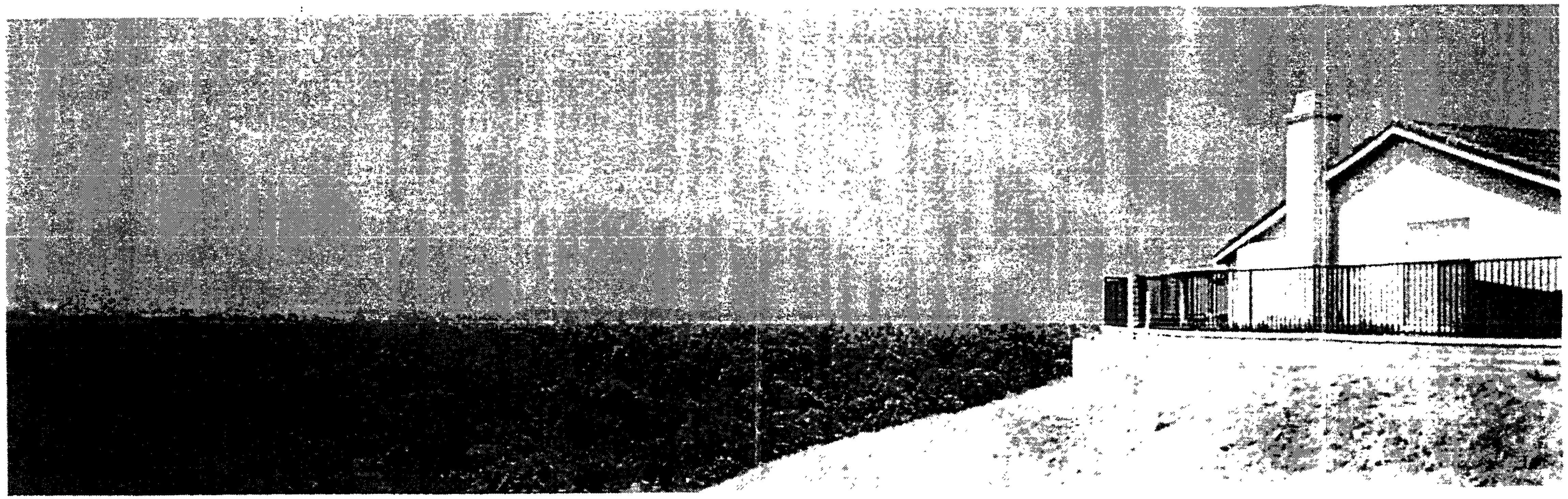


PHOTO 3: Southwesterly view of Prado Basin from residential area along Big Spring Court in the City of Corona.

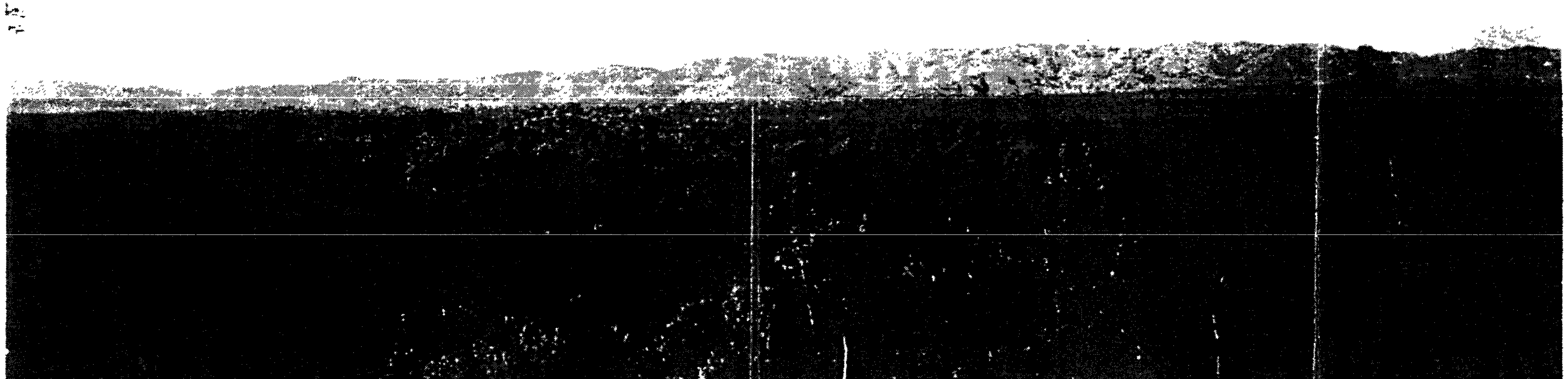


PHOTO 4: Southwesterly view of Prado Basin from end of Bluff Drive within Gameland Kennels. Chino Hills are located in background.

PHOTO 5: Southwesterly view into Prado Basin from Raahauge Hunting Club.

PHOTO 6: Southwesterly view of an agricultural field from River Road and Hellman Avenue intersection. Santa Ana Mountains and Chino Hills are visible in background.

PHOTO 7: Southerly view of northern portion of Prado Basin near intersection of Cucamonga Avenue and Chino-Corona Road. Santa Ana Mountains and Chino Hills are visible in background.

PHOTO 8: Southeasterly view toward Prado Basin near intersection of SR-71 and Euclid Avenue.

PHOTO 9: Easterly view of the southern portion of Prado Basin traveling south on SR-71. This view of the southern portion of Prado Basin is dominated by riparian wooded habitat.

The location and configuration of the three primary wetland vegetation associations are shown in Exhibit 3-2, and their areal extent is presented in Table 3-2.

TABLE 3-2
AREAS OF RIPARIAN HABITAT INUNDATED IN THE SANTA ANA RIVER BELOW PRADO DAM TO WEIR CANYON AT DIFFERENT RELEASE RATES

Habitat	Release Rate	Total Area Inundated	Percent Inundated	Total Area
Cottonwood/Willow Riparian	5,000 cfs	141.2 ac	59.3	
Cottonwood/Willow Riparian	7,400 cfs	167.1 ac	70.2	
Cottonwood/Willow Riparian	14,900 cfs	223.5 ac	93.9	
Cottonwood/Willow Riparian	25,900 cfs	232.4 ac	97.6	
Cottonwood/Willow Riparian				238.1 ac
Riparian Scrub	5,000 cfs	5.2 ac	12.0	
Riparian Scrub	7,400 cfs	8.2 ac	18.9	
Riparian Scrub	14,900 cfs	26.2 ac	60.4	
Riparian Scrub	25,900 cfs	29.7 ac	68.4	
Riparian Scrub				43.4 ac
Arundo	5,000 cfs	21.8 ac	65.7	
Arundo	7,400 cfs	26.4 ac	79.5	
Arundo	14,900 cfs	32.0 ac	96.4	
Arundo	25,900 cfs	32.6	98.2	
Arundo				33.2 ac

3.3.1.2.1 Cottonwood/Willow Woodland

The majority of the riparian woodland community in the Santa Ana River between Prado Dam and Weir Canyon is dominated by Fremont cottonwood and black willow, with minor components of western sycamore (*Platanus racemosa*), black cottonwood (*P. trichocarpa*), and three other willow species (see OCFCD 1997). In some areas, however, willows dominate — principally black willow, with smaller components of red willow, arroyo willow, and sandbar willow. Because no clear distinction between willow woodland and cottonwood woodland is apparent in most areas, these two are mapped together as cottonwood/willow woodland. Sycamore woodland is almost entirely on terraces above the floodplain.

3.3.1.2.2 Riparian Scrub

A relatively minor component of the wetland community in the Santa Ana River between Prado Dam and Weir Canyon is Riparian Scrub, with the majority being found at higher elevations within the floodplain. Floristically, this is a very heterogeneous community with the dominant components varying widely from one area to another. In most areas, mulefat and coyotebush are dominant. Subdominants include tree tobacco, mugwort, and various sedges. In some areas, this community grades imperceptibly into willow woodland, with sandbar willow and mulefat as transitional species between the two communities.

3.3.1.2.3 Arundo

Floristically, arundo is part of the riparian scrub community, but because it typically grows in pure stands and because it is a significant non-native invasive species, it is treated separately in this study. The only area of the river between the dam and Weir Canyon with significant stands of arundo is from

0.8 km (0.5 mi) to 1.7 km (1.1 mi) east of Weir Canyon Road. Many other areas have small patches of arundo (see Exhibit 3-2), some too small to map.

3.3.2 WILDLIFE

The wildlife resources in the Prado Basin and the Santa Ana River to Weir Canyon are highly important due, in part, to their high diversity and the large numbers of certain wetlands species that occur there. Wildlife resources in this section of the river were presented in detail by OCFCD (1997) and are summarized in this document. As with vegetation, the wildlife communities in Prado Basin and the river below the dam are discussed separately in the following sections.

3.3.2.1 Wildlife in Prado Basin

The extensive and continuous riparian woodland, unique for southern California, supports a number of rare and declining species, particularly birds. Based on available survey information (Zembal *et al.* 1985; Hays 1987), a summary description of the vertebrate species found in the Basin is provided in the following sections.

3.3.2.1.1 Fishes

At least 15 species of fishes have been found in the Prado Basin within the Santa Ana River and its three tributaries, Chino Creek, Cucamonga Creek, and Temescal Creek. Most of these occur in the affected area, at least seasonally. Two, the Santa Ana sucker and arroyo chub, are native to southern California; the rest are non-native introductions, mostly from the eastern United States. Easily, the two most abundant species in the Basin are the flathead minnow (*Pimephales promelas*) and mosquitofish (*Gambusia affinis*). These two, along with the carp (*Cyprinus carpio*), comprise about 95 percent of all fish species in the Basin (Swift unpubl. data).

3.3.2.1.2 Amphibians

The diversity of amphibians and reptiles in the project area is low. Seven species of amphibians and 13 species of reptiles are known to inhabit the Prado Basin and surrounding areas (Glaser 1970, Robertson and Shipman 1974, and Zembal *et al.* 1985). One additional amphibian and 16 additional reptiles are probably present in the study area based on their known range and habitat preferences.

The Pacific treefrog (*Hyla regilla*), the non-native bullfrog (*Rana catesbeiana*), and now the African clawed frog (*Xenopus laevis*) are the most commonly observed amphibians in the Basin. In upland areas, mostly outside the zone affected by this project, western toads (*Bufo boreas*) are often encountered.

3.3.2.1.3 Reptiles

The western fence lizard (*Sceloporus occidentalis*) is the most frequently encountered reptile in most plant associations within the Basin. The side-blotched lizard (*Uta stansburiana*), which may be more abundant in total numbers, is concentrated in upland areas. The western whiptail (*Cnemidophorus tigris*) is also found primarily outside the affected area in upland scrubland habitats around the perimeter of the Basin. The western skink (*Eumeces skiltonianus*) also inhabits remnant scrublands, but occurs in only low numbers. The gopher snake (*Pituophis melanoleucus*) is the snake most frequently observed in the Basin. It is found in both uplands and in drier riparian habitats.

3.3.2.1.4 Birds

More than 200 species of birds have been recorded in the Prado Basin (Hays 1987). Of these, approximately 95-100 breed in the Basin.

A substantial raptor population resides in the Basin. Their numbers are significantly augmented in winter with several species that breed farther north. The open fields are important for raptor foraging; the taller willows and eucalyptus are used for nesting, roosting and perching. Eleven species have bred in the Basin area, including the white-tailed kite (*Elanus leucurus*), Cooper's hawk (*Accipiter cooperii*), golden eagle (*Aquila chrysaetos*), western screech-owl (*Otus asio*), and long-eared owl (*Asio otus*). Moderate numbers of raptors from other regions, including relatively rare species such as the peregrine falcon (*Falco peregrinus*) and merlin (*Falco columbarius*), winter in the Basin along with the resident species.

The double-crested cormorant (*Phalacrocorax auritus*), great blue heron (*Ardea herodias*), and black-crowned night-heron (*Nycticorax nycticorax*) are conspicuous breeders among the larger water birds, although present in very local concentrations. The tree swallow (*Tachycineta bicolor*) is abundant locally, especially in the vicinity of dead trees with cavities where it nests. The red-winged blackbird (*Agelaius phoeniceus*) and marsh wren (*Cistothorus palustris*) are locally abundant nesters, as is pied-billed grebe (*Podilymbus podiceps*), ruddy duck (*Oxyura jamaicensis*), and American coot (*Fulica americana*). The mallard (*Anas platyrhynchos*) and cinnamon teal (*Anas cyanoptera*) are more widely scattered.

Shorebirds known to nest in the Basin include the killdeer (*Charadrius vociferus*), American avocet (*Recurvirostra americana*), black-necked stilt (*Himantopus mexicana*), and spotted sandpiper (*Actitis macularia*). Marsh-nesting birds include the American bittern (*Botaurus lentiginosus*), Virginia rail (*Rallus limicola*), common moorhen (*Gallinula chloropus*), common yellowthroat (*Geothlypis trichas*), song sparrow (*Melospiza melodia*), and tricolored blackbird (*Agelaius tricolor*).

Only two regular breeders, the western meadowlark (*Sturnella neglecta*) and horned lark (*Eremophila alpestris*), are abundant in upland grasslands, largely outside the affected areas. The burrowing owl (*Athene cunicularia*) also nests there but in much lower numbers. These open upland habitats also comprise the single most heavily used foraging areas for most species of the large resident and wintering raptor population, as well as for declining numbers of loggerhead shrikes (*Lanius ludovicianus*).

Species that nest in the eucalyptus groves include the Anna's hummingbird (*Calypte anna*), northern flicker (*Colaptes auratus*), Cassin's kingbird (*Tyrannus vociferans*), American crow (*Corvus brachyrhynchos*), European starling (*Sturnus vulgaris*), Bullock's oriole (*Icterus bullockii*), and house finch (*Carpodacus mexicanus*). Nests of the red-tailed hawk (*Buteo jamaicensis*) and red-shouldered hawk (*Buteo lineatus*) are regularly found in the eucalyptus trees as well, probably because they are often the tallest trees available. Oriole and kingbird nests are locally concentrated in eucalyptus trees.

The most commonly encountered winter visitors in the riparian forests are the ruby-crowned kinglet (*Regulus calendula*) and yellow-rumped warbler (*Dendroica coronata*). Lincoln's sparrow (*Melospiza lincolnii*) and white-crowned sparrow (*Zonotrichia leucophrys*) are found where more understory growth is present. In open areas, American pipit (*Anthus rubescens*) and savannah sparrow (*Passerculus sandwichensis*) are commonly observed in winter. The Say's phoebe (*Sayornis saya*), western bluebird (*Sialia mexicana*), and mountain bluebird (*Sialia currucoides*) are also conspicuous as they forage along fencerows in open areas.

Egrets, including the cattle egret (*Bubulcus ibis*), snowy egret (*Egretta thula*), and great egret (*Ardea alba*), are most common in winter, although a few non-breeders may remain through the summer. Numbers of European starlings increase substantially in winter on the small cattle feedlots where flocks often number well into the thousands. Many shorebirds winter in the Prado Basin and forage along the open pond margins and edges of the reservoir. The largest numbers are the least sandpiper (*Calidris minutilla*) and long-billed dowitcher (*Limnodromus scolopaceus*), with regular observations in far fewer numbers of the western sandpiper (*Calidris mauri*), greater yellowleg (*Tringa melanoleuca*), and several other species.

Winter concentrations of waterfowl in the Prado Basin are at least as large as those on any of the southern California coastal lagoons, and the Basin may hold the largest wintering populations of some species. Winter numbers of Canada geese (*Branta canadensis*), for example, are very high. The wintering waterfowl resources in the Basin are vast and are exploited by several waterfowl hunt club operators. Sixteen species of waterfowl have been found in the study area, many numbering in the thousands. The most abundant are green-winged teal (*Anas crecca*), mallard, cinnamon teal, northern shoveler (*Anas clypeata*), American wigeon (*Anas americana*), ring-necked duck (*Aythya collaris*), and ruddy duck.

3.3.2.1.5 Mammals

Twenty-three species of mammals, including three non-native species, have been observed in the Prado Basin. Annotations for all of the observed mammals are included in Zembal *et al.* (1985).

The California ground squirrel (*Spermophilus beecheyi*) is easily the most abundantly encountered small mammal in the study area. Annual grasslands and heavily grazed pastureland provide ideal habitat for this species. Botta's pocket gopher (*Thomomys bottae*) may be equally common but is seldom observed, as it spends most of its time below ground.

The coyote (*Canis latrans*) is the most commonly encountered of the seven carnivore species documented from the Basin. The next most frequently encountered carnivores or partial carnivores are the raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and long-tailed weasel (*Mustela frenata*). The bobcat (*Felis rufus*) is also probably regular in occurrence throughout the Basin but in relatively low numbers. Feral cats (*Felis domesticus*) are also frequently observed in the study area.

Mule deer (*Odocoileus hemionus*) tracks are occasionally observed in the Basin. The agricultural and croplands, along with the dense cover of willow forest, may provide support for a small deer herd in the Basin proper. However, the largest numbers of deer reside outside the Basin in the nearby lower Santa Ana River and canyon areas and in the Chino Hills.

Six species of mammals found in the Basin are listed in the California Hunting Regulations with seasons and limits set by the State Fish and Game Commission. The mule deer is a big game animal, the Audubon cottontail (*Sylvilagus audubonii*) and black-tailed jackrabbit (*Lepus californicus*) are resident small game animals, the gray fox (*Urocyon cinereoargenteus*) and raccoon are fur-bearing mammals, and the bobcat (*Lynx rufus*) is a regulated non-game mammal.

3.3.2.2 Wildlife in the Santa Ana River Between Prado Dam and Weir Canyon

The Santa River between Prado Dam and Weir Canyon serves as an important corridor for wildlife movement (see next section and OCFCD 1997) and as a major breeding area for riparian species (OCFCD 1997). The nearly continuous riparian woodland is of high value because of its species richness and structural diversity. For the most part, the wildlife species found in this section of the

Santa Ana River are similar to those in Prado Basin both in terms of types of species and their relative abundances.

3.3.2.2.1 Fishes

At least 14 species of fish have been recorded in this stretch of the Santa Ana River (OCFCD 1997 and present study), 13 of which were recorded in the present survey. The most common species found were the fathead minnow, carp, and mosquitofish, all of which are non-native. Much as in the Basin, these three species comprised 90 percent of all fish species found. Two native fishes, the Santa Ana sucker, a Federally listed threatened species, and arroyo chub, a species of special concern, were also found.

3.3.2.2.2 Amphibians

Seven species of amphibians have been reported in the study area (OCFCD 1997 and present study), four of which are native, none sensitive; although the Federally-threatened California red-legged frog may have occurred in the reach historically. The two most common native species are western toad and Pacific treefrog. Two non-native predators, the bullfrog and African clawed frog, are now common in the river.

3.3.2.2.3 Reptiles

About 20 species of reptiles have been recorded in the study area (OCFCD 1997 and present study). Of these, the San Diego horned lizard (*Phrynosoma coronatum)* and silvery legless lizard (*Anniella pulchra)*, are California species of special concern. Two others, the southwestern pond turtle and orange-throated whiptail (*Cnemidophorus hyperythrus)*, may be found occasionally in the study area but have yet to be confirmed. As in the Basin, the western fence lizard and side-blotched lizard are the two most commonly encountered species.

3.3.2.2.4 Birds

Bird species breeding in the river between Prado Dam and Weir Canyon are typical of other cottonwood and willow woodland communities in southern California; however, some species that are rare or absent in other such communities are well represented here. Among these is the least Bell's vireo, which is discussed in Section 3.3.4. Others, such as the Cooper's hawk, yellow warbler, and yellow-breasted chat, all California species of special concern, and the red-shouldered hawk and blue grosbeak among others, are also well represented in this stretch of river. More common and widespread species that are typical of breeding birds in this section of river are the house wren (*Troglodytes aedon*), common yellowthroat (*Geothlypis trichas*), California towhee (*Pipilo crissalis*), song sparrow (*Melospiza melodia*), black-headed grosbeak (*Pheucticus melanocephalus*), lesser and American goldfinches (*Carduelis psaltria* and *tristis*), and house finch (*Carpodacus mexicanus*). Species present during migration and in winter are typical of those also present in the Prado Basin at these seasons.

3.3.2.2.5 Mammals

Mammals utilizing the Santa Ana River below the dam are also typical of those in the Prado Basin, but for wide-ranging species such as the mountain lion, this portion of the Santa Ana River serves as an important link between the Basin and the Santa Ana Mountains and Chino Hills to the west and south (see next section).

3.3.3 WILDLIFE DISPERSION

Wildlife corridors link together areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or through human disturbance. The fragmentation of open space areas by urbanization creates isolated "islands" of wildlife habitat. In the absence of habitat linkages that allow movement to adjoining open space areas, various studies have concluded that some wildlife species, especially the larger and more mobile mammals, will not likely persist over time in fragmented or isolated habitat areas because they prohibit the infusion of new individuals and thus genetic information (MacArthur and Wilson 1967; Soule 1987; Harris and Gallagher 1989; Bennett 1990). Corridors mitigate the effects of this fragmentation by: (1) allowing animals to move between remaining habitats, which allows depleted populations to be replenished and promotes genetic exchange; (2) providing escape routes from fire, predators, and human disturbances, thus reducing the risk that catastrophic events (such as fire or disease) will result in population or local species extinction; and (3) serving as travel routes for individual animals as they move within their home ranges in search of food, water, mates, and other needs (Noss 1983; Farhig and Merriam 1985; Simberloff and Cox 1987; Harris and Gallagher 1989).

Wildlife movement activities usually fall into one of three categories: (1) dispersal (*e.g.*, juvenile animals from natal areas, individuals extending range distributions); (2) seasonal migration; and (3) movements related to home range activities (foraging for food or water, defending territories, searching for mates, breeding areas, or cover). A number of terms have been used in various wildlife movement studies, such as "travel route," "wildlife corridor," "habitat linkage," and "wildlife crossing," to refer to areas in which wildlife move from one area to another. To clarify the meaning of these terms and facilitate the discussion on wildlife movement in this study, these terms are defined as follows:

- *Travel route* - a landscape feature (such as a ridgeline, drainage, canyon, or riparian strip) within a larger natural habitat area that is used frequently by animals to facilitate movement and provide access to necessary resources (*e.g.*, water, food, cover, den sites). The travel route is generally preferred because it provides the least amount of topographic resistance in moving from one area to another; it contains adequate food, water, and/or cover while moving between habitat areas; and provides a relatively direct link between target habitat areas.

- *Wildlife corridor* - a piece of habitat, usually linear in nature, that connects two or more habitat patches that would otherwise be fragmented or isolated from one another. Wildlife corridors are usually bounded by urban land areas or other areas unsuitable for wildlife. The corridor generally contains suitable cover, food, and/or water to support species and facilitate movement while in the corridor.

- *Habitat linkages* - Larger, landscape-level corridors are often referred to as "habitat or landscape linkages." They can provide both transitory and resident habitat for a variety of species.

- *Wildlife crossing* - a small, narrow area, relatively short in length and generally constricted in nature, that allows wildlife to pass under, over or through an obstacle or barrier that otherwise hinders or prevents movement. Crossings typically are man-made and include culverts, underpasses, drainage pipes, and tunnels to provide access across or under roads, highways, pipelines, or other physical obstacles. These often represent "choke points" along a movement corridor.

A typical wildlife corridor provides both refuge and ease of movement (preferred travel routes). Canyon bottoms and ridgelines offer both. Canyon bottoms offer food, water, shelter and ease of movement because of their rich treelike plant growth, sparse undergrowth and reliable water supplies. Ridgelines offer ease of movement between adjacent canyons and refuge in adjacent brush. Most animals will also use firebreaks and dirt roads that are not heavily traveled by vehicles at night.

Generally, major drainages and major ridgelines represent the most important wildlife corridors. Secondary canyons and ridges may form an interconnecting network of smaller corridors that tie larger corridors together. These can be severed without seriously disrupting a major corridor. Likewise, a major corridor can be severed without serious hindrance to wildlife movement if several secondary corridors remain to connect the two ends of the major corridor with other major corridors.

Corridors function to prevent habitat fragmentation that would result in the loss of area-sensitive species (species that require large contiguous expanses of unbroken habitat) and the loss of large animals that have extensive home ranges and that normally occur in low densities, such as mountain lions. Habitat fragmentation may cause increases in the number of highly adaptable non-native species and favors those that are normally common, and may cause inbreeding to occur in species whose populations are small because they have become confined to smaller areas. This, in turn, lowers the rate of reproductive success. Corridors promote gene flow, allow recolonization after disturbance (such as fire), prevent the loss of large animals by linking suitable habitat areas and help ensure the survival of native species that cannot compete with more aggressive non-native species in fragmented habitats (Harris and Gallagher 1989).

Fragmentation, in the long run, can be equally as damaging as habitat destruction because it reduces functioning ecosystems to scattered pockets of habitat stripped of their essential interactive processes. These pockets tend to decrease substantially in biodiversity over time because small, isolated populations often become locally extinct in the absence of recruits from other areas. Local extinctions out-pace colonizations; thus the diversity of the plant and animal communities in these fragments declines. Biodiversity is, in effect, a measure of ecosystem health.

The adequacy of habitat corridors is dependent on several factors. Corridors incorporate a heterogeneous mix of topography and vegetation to mimic the conditions encountered by animals in unbroken habitat areas. They should be sufficiently isolated from human disturbance to avoid possible disruption of animal movements between larger patches of habitat. The ability of a proposed corridor to facilitate wildlife dispersal is largely dependent on its width. Corridors must be wide enough to provide a suitable environment that supports wildlife species during sustained periods, not only during dispersion.

The Santa Ana River is a major drainage that connects coastal regions of Orange County with interior regions of Riverside and San Bernardino counties. As such, the Santa Ana River is an important regional corridor linking riparian ecosystems from the immediate coastal plain with the interior plains and valleys of the region. The Prado Basin, with its extensive riparian woodland, provides a wealth of biological resources and serves as a major link within this regional corridor. In the Santa Ana River below Prado Dam, wildlife species can move relatively unimpeded downstream or upstream through the study area, but dispersion becomes further restricted southwest due to channelization of the streambed and adjacent urban development. The Chino Hills Regional Park and Cleveland National Forest in the Santa Ana Mountains are separated by the Santa Ana River canyon near the Basin. State

Route 91 presents a substantial barrier to wildlife movement from the Santa Ana Mountains to this portion of the Santa Ana River, but SR 91 freeway underpasses downstream from Prado Dam serve as key wildlife crossing points.

SR 71 is also a barrier to wildlife movement, although not as severe as SR 91. During the recent upgrading of SR 71 to an expressway (completed Fall 1997), large culverts were placed under the highway in key locations to facilitate wildlife movement between the Basin and the nearby Chino Hills. Nevertheless, SR 71 does serve as a partial barrier to wildlife movement because of the amount of noise, motion, light and startle impacts associated with traffic on that road. The importance of this stretch of the Santa Ana River as a wildlife movement corridor and linkage to natural areas both to the north and south is thoroughly discussed in OCFCD (1997).

3.3.4 SENSITIVE PLANTS AND WILDLIFE

The following section addresses special status ("sensitive") biological resources observed, reported, or having the potential to occur within the study area. These resources include plant and wildlife species that have been afforded special status and/or recognition by federal and state resource agencies, as well as private conservation organizations. In general, the principal reason an individual taxon (species, subspecies, or variety) is given such recognition is the documented or perceived decline or limitations of its population size or geographical distribution resulting in most cases from habitat loss. Brief accounts of sensitive species known to occur or potentially occur on the site are provided below. The discussion that follows provides a summary of each species including information on the status, habitat, distribution, presence/absence of each for the site, and optimal survey period. Definitions for the various status designations are given in the following paragraphs. In addition, sensitive biological resources include natural communities and habitats that are either unique, of relatively limited distribution in the region, or of particularly high wildlife value. These resources have been defined by federal, state, and local government conservation programs. Sources used to determine the sensitive status of biological resources are as follows:

- **Plants** — CDFG (1997, 1998a); CNDDB 1999; Skinner and Pavlik (1994); USFWS (1997a)
- **Wildlife** — CDFG (1991, 1998b); CNDDB 1999; USFWS (1997a)

Sensitive species do not necessarily require specific mitigation actions, although resource agencies typically request feasible mitigation during the NEPA review process.

3.3.4.1 Definitions of Sensitivity Designations

A **Federally Endangered Species** is a species of invertebrate, plant, or wildlife formally listed by the U. S. Fish and Wildlife Service (hereafter USFWS) as facing extinction throughout all or a significant portion of its geographic range. A **Federally Threatened Species** is one formally listed by the USFWS as likely to become endangered within the foreseeable future throughout all or a significant portion of its range. "Take" of such a species or its habitat is prohibited by federal law without a special permit. The term "take", under ESA, means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct. Harm is defined by the USFWS to encompass "an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering" (50 FR 17.3).

A **Proposed Species** is one officially proposed by the USFWS for addition to the federal Threatened or Endangered species lists.

The State of California considers an **Endangered Species** one whose prospects of survival and reproduction are in immediate jeopardy; a **Threatened Species** is one present in such small numbers throughout its range that it is considered likely to become an endangered species in the near future in the absence of special protection or management; and a **Rare Species** is one present in such small numbers throughout its range that it may become endangered if its present environment worsens. The designation "rare species" applies only to California native plants. State Threatened and Endangered species include both plants and wildlife (but not invertebrates) that are legally protected against "take", as this term is defined in the California ESA (California Fish & Game Code Section 2050 *et seq.*).

Species that are **California Fully Protected** include those protected by special legislation for various reasons, such as the white-tailed kite (*Elanus caeruleus*) and golden eagle (*Aquila chrysaetos*).

Species of Special Concern is an informal designation used by the CDFG for some declining wildlife species that are not officially listed as endangered, threatened, or rare. This designation does not provide legal protection, but signifies that these species are recognized as in jeopardy or potentially in jeopardy by CDFG.

The **California Native Plant Society** (CNPS) is a statewide resource conservation organization that has developed an inventory of California's sensitive plant species (Skinner and Pavlik 1994). This inventory is a summary of information on the distribution, rarity, and endangerment of California's vascular plants. This rare plant inventory consists of four lists. CNPS presumes that **List 1A** plant species are extinct in California because they have not been seen in the wild for many years. CNPS considers **List 1B** plants as rare, threatened, or endangered throughout their range. **List 2** plant species are considered rare, threatened, or endangered in California, but perhaps more common elsewhere. Plant species on lists 1A, 1B, and 2 meet CDFG criteria for endangered, threatened, or rare listing. Plant species for which CNPS considers it needs additional information before making a determination are included on **List 3**. **List 4** plant species are those of limited distribution in California whose susceptibility to threat is considered low at this time.

Forty-seven sensitive species (46 wildlife and 1 plant species) occur or potentially occur in the Basin and Santa Ana River below the dam to Weir Canyon (see Table 3-3). The majority of these species are primarily dependent on the willow and cottonwood riparian areas. These sensitive animal and plant species are discussed in the following paragraphs.

3.3.4.2 Federal Threatened and Endangered Species

Three bird species, two amphibian species, and one fish, that occur or potentially occur in the Basin and the Santa Ana River between Prado Dam and Weir Canyon have been given special protection under the federal Endangered Species Act. The least Bell's vireo was listed as Endangered in 1986 (USFWS 1986). It is a common summer breeding resident in Prado Basin and, as such, is a major focus of this document. The southwestern willow flycatcher, another summer breeding resident in the Basin, is much less common. It was afforded protection under the federal Endangered Species Act nine years later (USFWS 1995a). The bald eagle was formally listed in 1978, but was already protected under legislation that preceded the Endangered Species Act of 1973 and has recently been proposed for delisting (USFWS 1998b, 1999b). The species is an occasional winter visitor, but does not breed in the study area. The Santa Ana sucker was listed as a Federal Threatened Species in April 2000.

The arroyo southwestern toad was listed as Endangered in 1995 (USFWS 1995b); however, it has never been recorded in the study area, and it appears that no suitable habitat is present. The California red-legged frog was listed as Threatened in 1996 (USFWS 1996). It was formally resident in the Basin.

Least Bell's Vireo
Vireo bellii pusillus

STATUS: Federal and State Endangered.
HABITAT: For breeding, this species prefers riparian woodlands that combine an understory of dense willows or mulefat with a canopy of tall willows.
DISTRIBUTION: Formerly a common and widespread breeder in California and northwest Baja California, but now confined to isolated riparian drainages on the coastal slope of southern and central California.

TABLE 3-3
SPECIAL STATUS SPECIES OCCURRING OR POTENTIALLY OCCURRING WITHIN PRADO BASIN AND SANTA ANA RIVER BELOW PRADO DAM

Species	USFWS	CDFG	CNPS	Occurrence/Habitat at Prado
least Bell's vireo *Vireo bellii pusillus*	Federal Endangered	State Endangered		Common summer resident suitable breeding habitat
southwestern willow flycatcher *Empidonax traillii extimus*	Federal Endangered	State Endangered		Rare summer resident suitable breeding habitat
southern bald eagle *Haliaeetus leucocephalus*	Federal Threatened	State Endangered		Occasional winter visitor suitable foraging habitat
arroyo southwestern toad *Bufo microscaphus californicus*	Federal Endangered			Not recorded No habitat
California red-legged frog *Rana aurora draytoni*	Federal Threatened			Recorded once suitable habitat present
Santa Ana sucker *Catostomus santaanae*	Federal Threatened			Resident in vicinity suitable habitat present
Peregrine falcon *Falco peregrinus*		State Endangered		Occasional winter visitor suitable foraging habitat
western yellow-billed cuckoo *Coccyzus americanus occidentalis*		State Endangered		Rare summer resident suitable breeding habitat
Swainson's hawk *Buteo swainsoni*		State Threatened		Rare transient marginal foraging habitat
California mastiff bat *Eumops perotis californicus*		Special Concern		Resident? suitable foraging habitat
pallid bat *Antrozous pallidus*		Special Concern		Resident? suitable foraging habitat
pale big-eared bat *Plecotus townsendi pallescens*		Special Concern		Resident? suitable foraging habitat
San Diego black-tailed jackrabbit *Lepus californicus bennettii*		Special Concern		Fairly common resident suitable habitat present
northwestern San Diego pocket mouse *Chaetodipus fallax fallax*		Special Concern		Potentially occurs suitable habitat?
San Diego desert woodrat *Neotoma lepida intermedia*		Special Concern		Found around perimeter no habitat in Basin
double-crested cormorant *Phalacrocorax auritus*		Special Concern		Common winter visitor suitable breeding habitat
western least bittern *Ixobrychus exilis hesperis*		Special Concern		Summer visitor; may breed suitable breeding habitat
white-faced ibis *Plegadis chihi*		Special Concern		Common resident suitable breeding habitat

TABLE 3-3 (Continued)

Osprey *Pandion haliaetus*		Special Concern		Occasional winter visitor no breeding habitat
northern harrier *Circus cyaneus*		Special Concern		Uncommon visitor; may breed rarely; breeding habitat
sharp-shinned hawk *Accipiter striatus*		Special Concern		Uncommon winter visitor: suitable foraging habitat
Cooper's hawk *Accipiter cooperii*		Special Concern		Rare resident suitable breeding habitat
ferruginous hawk *Buteo regalis*		Special Concern		Occasional winter visitor marginal foraging habitat
merlin *Falco columbarius*		Special Concern		Occasional winter visitor suitable foraging habitat
prairie falcon *Falco mexicanus*		Special Concern		Not recorded marginal foraging habitat
long-billed curlew *Numenius americanus*		Special Concern		Occasional winter visitor suitable foraging habitat
long-eared owl *Asio otus*		Special Concern		Uncommon resident suitable breeding habitat
western burrowing owl *Athene cunicularia hypergia*		Special Concern		Rare resident suitable breeding habitat
loggerhead shrike *Lanius ludovicianus*		Special Concern		Very uncommon resident suitable breeding habitat
California horned lark *Eremophila alpestris actia*		Special Concern		Uncommon resident suitable breeding habitat
cactus wren (coastal populations) *Campylorhynchus brunneicapillus*		Special Concern		Rare resident around perimeter little suitable habitat
yellow warbler *Dendroica petechia*		Special Concern		Common summer resident suitable breeding habitat
yellow-breasted chat *Icteria virens*		Special Concern		Common summer resident suitable breeding habitat
So. Calif. rufous-crowned sparrow *Aimophila ruficeps canescens*		Special Concern		Rare resident around perimeter little habitat
tricolored blackbird *Agelaius tricolor*		Special Concern		Possibly resident suitable breeding habitat
southwestern pond turtle *Clemmys marmorata pallida*		Special Concern		Rare resident suitable habitat present
San Diego horned lizard *Phrynosoma coronatum blainvillei*		Special Concern		Found nearby marginal habitat present
orange-throated whiptail *Cnemidophorus hyperythrus*		Special Concern		Not recorded limited habitat
silvery legless lizard *Anniella pulchra pulchra*		Special Concern		Not recorded suitable habitat present
coast patch-nosed snake *Salvadora hexalepis virgultea*		Special Concern		One record limited habitat present
Two-striped garter snake *Thamnophis hammondii*		Special Concern		Present suitable habitat
northern red diamond rattlesnake *Crotalus ruber ruber*		Special Concern		Recorded Limited habitat
western spadefoot *Scaphiopus hammondii*		Special Concern		Probably extirpated Marginally suitable habitat
arroyo chub *Gila orcutti*		Special Concern		Fairly common resident Suitable habitat

TABLE 3-3 (Continued)

golden eagle *Aquila chrysaetos*		Special Concern & Fully Protected		Rare resident in CHSP Suitable foraging habitat in vicinity
white-tailed kite *Elanus leucurus*		Fully Protected		Uncommon resident Suitable breeding habitat
many-stemmed dudleya *Dudleya multicaulis*			List 1B	Two populations at perimeter No habitat - 508 ft

EXPLANATION OF COLUMN HEADINGS AND ABBREVIATIONS USED IN TABLE
(see text for more detailed explanation of terms)
Explanation of column headings:
USFWS (U. S. Fish and Wildlife Service):
Listed as threatened or endangered under U. S. Endangered Species Act
Listed as threatened or endangered under California Endangered Species Act
California Species of Special Concern
California Fully Protected Species.
CNPS (California Native Plant Society):
see text

OCCURRENCE ON SITE: The least Bell's vireo is known to nest throughout the Basin and in the Santa Ana River below the dam, with breeding territories also occurring upstream along several major riparian corridors such as the Santa Ana River, Chino Creek and Temescal Wash.
OPTIMAL SURVEY PERIOD: April - June.

The least Bell's vireo formerly was common to locally abundant from Tehama County, California, to Baja California, Mexico (Grinnell and Miller 1944). It nests in riparian habitats that typically consist of red willow (*Salix laevigata*) or Goodding's black willow with a dense understory of sandbar willow, arroyo willow, mulefat, and some herbaceous species. Cottonwoods, western sycamore, and coast live oak (*Quercus agrifolia*) may also contribute to the overstory in some areas.

Bell's vireos arrive in southern California in late March (exceptionally early March). Males usually arrive several days to a week prior to females (Barlow 1962). Fall migration commences in July and is generally over by the first week of September when all birds have departed for their wintering grounds in western Mexico.

Decline and Listing

The least Bell's vireo has declined as a result of the combined, perhaps synergistic, effects of habitat destruction and heavy brood parasitism by the brown-headed cowbird (*Molothrus ater*). The increase in cowbird populations has been caused by the expansion of cattle ranching in California (Franzreb 1989). Another important limiting factor in the decline of the least Bell's vireo is considered to be the destruction and fragmentation of riparian habitat as a result of residential and industrial development, which have increased the demand for water projects in least Bell's vireo habitat (Olson and Gray 1989).

As a result of the decline in numbers of breeding vireos and the dramatic reduction in the species' range in California, it was listed as Endangered by the CDFG on 27 June 1980 under the California ESA of 1970. The USFWS proposed listing the least Bell's vireo on 3 May 1985, and it was listed on 2 May 1986 under the Federal ESA of 1973 (USFWS 1986).

Current Status

Intensive surveys of historical breeding sites conducted in the 1970s and 1980s indicated that least Bell's vireo populations had become highly localized, with breeding confined to four coastal counties (Santa Barbara, Ventura, Los Angeles, and San Diego) and three inland counties (Inyo, San Bernardino, and Riverside) (Goldwasser 1978; Goldwasser *et al.* 1980; USFWS 1986). Since then, breeding pairs have become established in a few areas of Orange County and additional sites in the above seven counties.

In 1986, when the bird was Federally listed, only 397 territorial males were estimated to exist in the entire range of the species (Salata and Hays 1991). By 1997, the number had increased to an estimated 1700 territorial males (Pike *et al.* 1998). This reflects an overall increase since 1986 of 428 percent.

Status in Prado Flood Control Basin

The number of territorial pairs (= the number of females present, all of which are assumed to be paired) in the Prado Basin and contiguous reach of the Santa Ana River has increased from 19 in 1986 (5 percent of the total population) when the species was listed to 270 in 1998 and 224 in 1999 (see Exhibit 3-3) (Pike et al. 1998, *1999*). The number of successfully fledged birds has likewise increased from 20 in 1986 to a minimum of 489 in 1999 (see Exhibit 3-4). These increases have been attributed, in large part, to an intensive, ongoing cowbird trapping program in the region. As a result of these trapping efforts, the average number of young fledged per pair, after temporarily tripling in 1989 and 1990, appears to have stabilized at about two times what it was in 1986. The fact that roughly the same amount of habitat that was present in 1986 can support nearly 15 times the number of breeding pairs as were present in 1986 also suggests that, at least locally, cowbird parasitism, not loss of habitat, was the chief factor in the bird's decline. On a regional basis, however, habitat loss has been a major contributor, especially in areas where once suitable riparian habitat has been lost altogether or become so degraded that it can no longer support any critical vireos.

Status in the Santa Ana River Below Prado Dam

Although the USFWS does not conduct annual surveys for this species in this section of the Santa Ana River, it is known that they are present as confirmed by the few privately funded studies that have been conducted. In the Santa Ana River between the dam and Weir Canyon, 25 pairs were recorded in 1999 during the course of 8 surveys conducted between 10 April and 31 July according to USFWS protocol. All were located in the first 3 km (2 mi) between the dam and the railroad crossing at the east end of the Green River Golf Course. At least 6 pairs produced young, but special searches for nests and young were not conducted.

Vireo Nesting Habitat

Nesting habitat is defined in Section 3(5)(A) of the federal Endangered Species Act as: (i) the specific areas within the geographical area occupied by a species on which are found those physical or biological features essential to the conservation of the species and that may require special management considerations or protection, and (ii) specific areas outside the geographical area occupied by a species at the time it is listed, upon determination that such areas are essential for the conservation of the species. Section 3(5)(C) further indicates that in most cases, critical habitat should not encompass the entire geographical area that can be occupied by the species. Requirements for critical habitat include at a minimum: (1) enough space for both individual and population growth; (2)

food, water, air, light, minerals, or other nutritional or physiological requirements of the species; (3) cover or shelter; (4) sites for breeding, reproduction, and rearing of offspring; and (5) habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of the species.

The physical and biological habitat features that support feeding, nesting, roosting, and sheltering essential to the conservation of the vireo are described (USFWS 1994) as "riparian woodland vegetation that generally contains both canopy and shrub layers, and includes some associated upland habitats."

In the Basin, vireos are found preferentially in willow woodland with a tree overstory of Gooding's black willow and a shrub understory dominated by arroyo willow, mulefat, and hoary nettle. In the downstream portion of the Santa Ana River, it is found in similar habitat. The inter-habitat edge (openings within or adjacent to vireo territories) is composed of herbaceous and aquatic vegetation with seedling or sapling willows and mulefat invading. Vireo-occupied habitat usually contains a high degree of stratification: uneven age stands of mature overstory trees and shrub understory intermixed with openings within and immediately adjacent to the vireo territories. Tree canopy cover ranges from 50 to 75 percent, and shrub cover ranges from 50 to 90 percent.

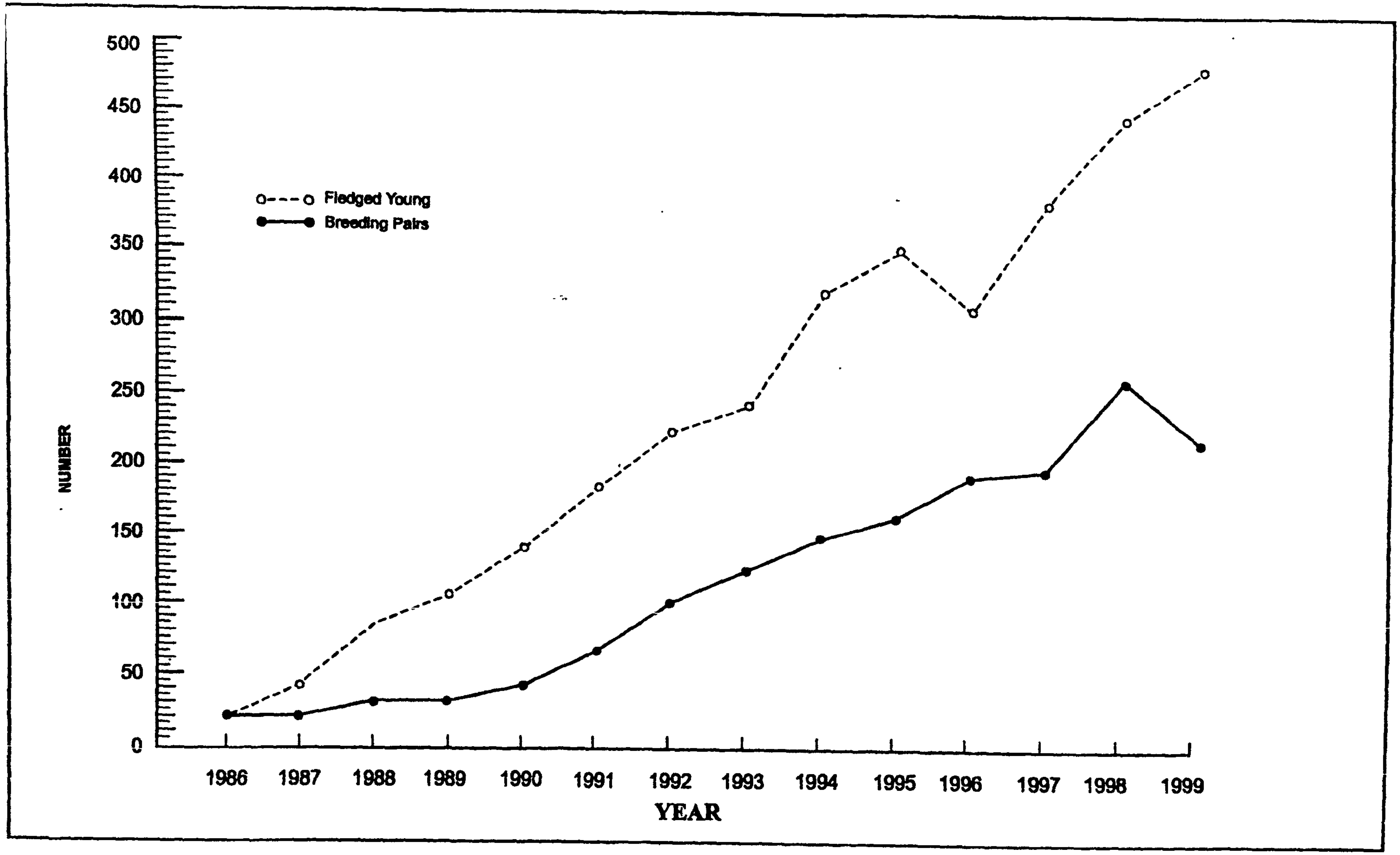
<u>USFWS Vireo Recovery Plan</u>

The prime objective of the Draft Recovery Plan for the Least Bell's Vireo (USFWS 1998a) is to delist the vireo. In order to do so, the USFWS must determine that the following listing factors are no longer present or continue to adversely affect the vireo: (1) the present or threatened destruction, modification, or curtailment of its habitat or range; (2) disease or predation; (3) the inadequacy of existing regulatory mechanisms; and (4) other natural or manmade factors affecting its continued existence. Delisting may occur when the following criteria are met or exceeded for five consecutive years: (1) designated populations or metapopulations, each consisting of several hundred pairs, are protected and managed at 11 designated southern California sites; (2) stable populations, each consisting of several hundred pairs, have become established and are protected and managed at three designated sites in the Central Valley; and (3) threats are reduced or eliminated so that vireo populations at the 14 designated sites are capable of persisting without significant human intervention, or perpetual endowments are secured for cowbird trapping and exotic plant control in riparian habitat occupied by vireos.

Pike *et al.* (1998) have recommended that, to ensure the recovery of the vireo population in the Prado Basin, the USFWS should: (1) restore and protect all habitats comprising native plant communities and natural physical features, (2) control or remove all noxious, non-native plants and animals from riparian habitats, and (3) restrict human presence and activities in least Bell's vireo home ranges and environs.

Southwestern Willow Flycatcher
Empidonax traillii extimus

STATUS: Federal and State Endangered (all subspecies of the willow flycatcher that breed in California are considered Endangered by CDFG).
HABITAT: Extensive riparian woodlands with water-filled creeks or channels and scattered overgrown clearings.
DISTRIBUTION: In southern California, this subspecies is now a very rare and local summer resident.
OCCURRENCE ON SITE: In Prado Basin, several pairs of willow flycatchers are generally located during each breeding season, and successful nesting has been documented. Seven territorial males were present during 1996,

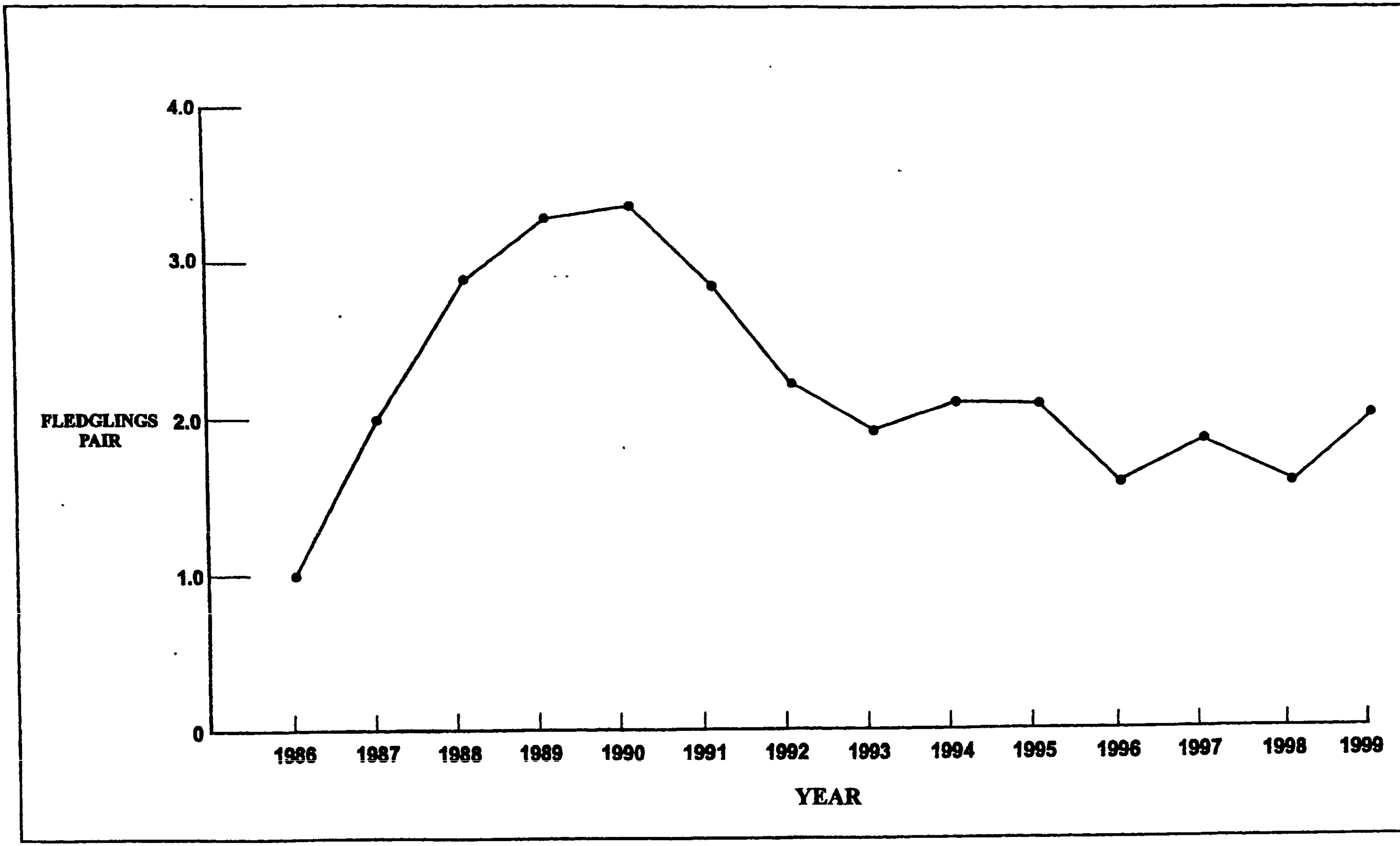


LMI
Larry Muncey International

Exhibit 3-3

Least Bell's Vireo Breeding Success, 1986-1999

Prado Dam Water Conservation And Supply Study F4 EIS



Larry Muncey International

Exhibit 3-4

Least Bell's Vireo Average Number of Fledglings Produced Per Pair, 1986-1999

six were present in 1997, three were present in 1998, and five were present in 1999 (Table 3-4). This species has not been found breeding in Reach 9 of the Santa Ana River.
OPTIMAL SURVEY PERIOD: late May - early July.

The willow flycatcher, like the least Bell's vireo, is a riparian obligate species that is present only during the summer months. Birds that breed in southern California are representative of the subspecies *extimus*, the southwestern willow flycatcher. The first birds arrive in Prado Basin in early May. As such, it is one of the last of southern California's summer breeding residents to arrive. Females follow shortly after the males, and nesting commences by the end of May. Most young are fledged by July, and the last birds have left the Basin by late August, although migrants, presumably of other subspecies from farther north, may be seen occasionally through September.

Decline and Listing

As with the least Bell's vireo, the southwestern willow flycatcher has declined as a result of habitat destruction and fragmentation, along with heavy brood parasitism by the brown-headed cowbird. As a result of the precipitous decline in numbers of breeding flycatchers and reduction in the species' range, it was listed as Endangered by the USFWS on 27 February 1995 under the Federal ESA of 1973 (USFWS 1995a).

Current Status

The southwestern willow flycatcher's breeding range includes southern California, Arizona, New Mexico, western Texas, southwestern Colorado, southern Nevada and Utah, and northwestern Mexico. Unitt (1987) estimated that the population was "well under 1,000 pairs, more likely 500." By the mid-1990s, despite the discovery of previously unknown populations, the population was estimated to be between 300 and 500 pairs (Sogge *et al.* 1997), with "more than 75 percent of the locations where flycatchers are found having five or fewer territorial birds and up to 20 percent of the locations having single, unmated individuals" (USFWS 1997).

Status in Prado Basin and the Santa Ana River Below Prado Dam

In 1996, willow flycatchers were closely monitored for the first time in the Basin. Seven birds occupying home ranges were detected, with pairs found in four home ranges (Pike *et al.* 1996). Two pairs produced a total of four fledglings. In 1997, six willow flycatchers were present in the Basin, at least two of which were paired (Pike *et al.* 1997). Both successfully raised young. The first birds arrived on 7 May. Five of the six were returning to territories occupied the previous year. In 1998, only three home ranges were located, with one pair producing four young. The other two males were unpaired (Pike *et al.* 1998). In 1999, five home ranges were located, with three pairs producing five young.

All known flycatcher territories in the Basin have been in proximity to water-filled creeks or channels. In addition, territories have incorporated overgrown clearings with at least a few moderately tall, often dense, willows. Among the five nests found in 1996, for example, two were in arroyo willows, one was in a red willow, one was in a narrow-leaved willow, and one was in a tamarisk (*Tamarix* sp.). Two of the five nests produced a total of four fledglings. Of the other three nests, two were predated and the other containing a cowbird egg was abandoned. Willow flycatchers have bred in the north, west, and south portions of the Basin.

Since first discovered in the Basin in 1987, no more than seven territorial flycatchers have been present in any one year, and only nineteen fledglings in all have been observed over the past twelve breeding seasons (through 1998), fifteen of these in the last four seasons (Collins *et al.* 1992; Pike *et al.* 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999). Table 3-4 clearly indicates that the species' status as a breeder in the Basin is tenuous. Prado Basin is one of the few places in southern California where *extimus* still breeds.

TABLE 3-4
WILLOW FLYCATCHER NESTING SUCCESS IN PRADO BASIN

Year	Territories	Pairs	Nests	Fledglings
1987	0	0	0	0
1988	NA	1	1	2
1989	NA	NA	NA	0
1990	NA	NA	NA	0
1991	5	3	1-2	2
1992	NA	NA	NA	0
1993	3	3	1	0
1994	5-6	2+	NA	0
1995	3	1	1	3
1996	7	4	2	4
1997	6	2	2	4
1998	3	1	1	4
1999	5	3	3	5

NA – Not Available because no survey was conducted.

Flycatcher Nesting Habitat

All areas of designated nesting habitat for this species (USFWS 1997b) provide dense thickets of riparian shrubs and trees, both native and exotic, in the riparian ecosystem within the 100-year floodplain, including areas where dense riparian vegetation is not present, but may become established in the future. The species composition of vegetation ranges from nearly monotypic stands to multiple species stands with a structure ranging from simple, single stratum patches as low as 3 m (10 ft) in height and lacking a distinct overstory to complex patches with multiple strata and canopies nearing 18 m (59 ft) in height. Vegetation patches may be uniformly dense throughout, or occur as a mosaic of dense thickets interspersed with small openings, bare soil, open water, or shorter, sparser vegetation. These patches may be relatively dense, linear contiguous stands or irregularly-shaped mosaics of dense vegetation with open areas. In size, these habitat patches may vary considerably, with some as small as 0.8 ha (2 ac) and others as large as several hundred ha. The Prado Basin and Santa Ana River upstream to near Riverside is one of seven areas designated as critical habitat in California and one of 18 such areas rangewide.

Southern Bald Eagle
Haliaeetus leucocephalus leucocephalus

STATUS: Federal Threatened and State Endangered; proposed for delisting (USFWS 1999a). Protected by the Bald Eagle Protection Act.
HABITAT: In winter, large bodies of water, including reservoirs, lakes, bays, and offshore islands where it forages primarily on fish and carrion.
DISTRIBUTION: Occurs in southern California as a very local and uncommon winter visitor, primarily at Big Bear Lake and Lake Mathews. It has been successfully re-introduced as a breeding species on Santa Catalina Island after becoming extirpated from the Channel Islands in the 1950s.

OCCURRENCE ON SITE: Bald eagles occur as an irregular and rare winter visitor to the Basin.
OPTIMAL SURVEY PERIOD: late November - mid-March.

Arroyo Southwestern Toad
Bufo microscaphus californicus

STATUS: Federal Endangered.
HABITAT: Restricted to riparian woodlands and alluvial habitats, where it breeds in shallow, slow-moving streams and pools. It is a habitat specialist, requiring exposed shallow, gravel- or sand-based pools with low current velocity and little marginal vegetation in streams free of predatory fishes.
DISTRIBUTION: Foothill regions in southern California from San Luis Obispo County to Baja California. It historically occurred along the length of drainages, including coastal areas, but now survives generally in the headwaters as small isolated populations. The nearest known extant population is along San Juan Creek in southern Orange County.
OCCURRENCE ON SITE: Although the Basin and Santa Ana River to Weir Canyon may contain potential marginal habitat for the arroyo toad, no records for this area are known. Jennings and Hayes (1994) suggest that it may be extirpated from the Santa Ana River drainage system.
OPTIMAL SURVEY PERIOD: March - June.

California Red-legged Frog
Rana aurora draytoni

STATUS: Federal Threatened.
HABITAT: Prefers dense, shrubby riparian vegetation, usually arroyo willow, cattails, and bulrushes associated with deep, still or slow-moving water such as found in ponds, lakes and marshes.
DISTRIBUTION: Coast ranges of California and the foothills of the Sierra Nevada. Presently, this frog is known to occur in very few locations in southern California.
OCCURRENCE ON SITE: Red-legged frog tadpoles were observed on the south shore of the Basin during surveys in 1983 and 1984 (Zembal *et al.* 1985), but it is now believed to be extirpated from the area.
OPTIMAL SURVEY PERIOD: November - April.
COMMENT: Reasons for its relatively rapid decline are poorly understood, although loss of habitat and competition with non-native frogs and fish are thought to be important factors.

Santa Ana Sucker
Catostomus santaanae

STATUS: Federal Threatened (USFWS 2000).
HABITAT: Small to medium-sized flowing streams, usually less than 7.6 m (25 ft) in width, with depths ranging from a few centimeters to over a meter.
DISTRIBUTION: Found only in the Los Angeles Basin. The original range included only the Los Angeles, Santa Ana and San Gabriel river systems (Smith 1966). Now confined to the Santa Ana River, Tujunga Wash in the Los Angeles River system (possibly extirpated), and in the upper San Gabriel River system.
OCCURRENCE ON SITE: Although introduced fishes now predominate along the lower portions of the Santa Ana River where they have largely eliminated the native species, small numbers of the Santa Ana sucker still exist in the Basin and the Santa Ana River between Prado Dam and Weir Canyon where they are confined to the main branch of the river. Between 27 June and 17 August 1998, surveys were conducted by Camm Swift at 25 stations along the Santa Ana River between Norco and Weir Canyon, and along the three tributaries within the Prado Basin. A total of 42 Santa Ana suckers were found, all in the mainstem of the Santa Ana River; however, none were found within the 494-508 ft zone or downstream to the dam. The nearest station where the species was taken (16 individuals examined) was at Station 8 just NNW of the Corona Airport and about 1 km upriver of the 508-ft contour line. All suckers examined were juveniles or young of the year, and their numbers appear to be highly transitory, suggesting that the main breeding populations are farther upstream (C. Swift, pers. comm.). The Santa Ana River in the Norco region may serve as a nursery. Suckers found below the dam have been effectively removed from the gene pool because no suitable breeding habitat is found in this reach of the river.

Some of the side drainages appear to have suitable substrate for spawning (*e.g.*, Chino Creek between Central Avenue and Euclid Avenue) but may be too polluted.
OPTIMAL SURVEY PERIOD: Year-round; but in the lower Basin only during periods of low water when the flowing stream habitat it inhabits is not inundated.

3.3.4.3 State Endangered and Threatened Species

Three bird species have been listed as Endangered (peregrine falcon and western yellow-billed cuckoo) or Threatened (Swainson's hawk) under the California Endangered Species Act but not under the federal Act. These species now have a very limited breeding distribution in the state, but are more widespread outside the state. The yellow-billed cuckoo was listed as Threatened in 1971 (CDFG 1971) but upgraded to Endangered in 1988 (CDFG 1988). The Swainson's hawk was listed as Threatened in 1983 (CDFG 1983).

Peregrine Falcon
Falco peregrinus anatum and F. p. tundrius

STATUS: State Endangered; the USFWS recently delisted North American populations of this species (USFWS 1999b).
HABITAT: Prefers coastal estuaries and other wetlands that concentrate waterfowl and shorebirds, but forages widely over many habitats, especially during migration.
DISTRIBUTION: Occurs in southern California as a rare to uncommon migrant and winter visitor, especially along the coast. *F. p. anatum* breeds locally on the Channel Islands (both self- and man-induced re-introductions following extirpation earlier in the century). A few introduced birds have also bred successfully in the Los Angeles and San Diego metropolitan areas where they nest on ledges of tall buildings.
OCCURRENCE ON SITE: Occurs as a rare transient and irregular winter visitor to the Basin.
OPTIMAL SURVEY PERIOD: October - April.

Western Yellow-billed Cuckoo
Coccyzus americanus occidentalis

STATUS: State Endangered.
HABITAT: Extensive riparian woodlands, especially those dominated by cottonwood and willow.
DISTRIBUTION: A very rare and localized summer resident in California; only a few breeding stations for this species in the state are currently known.
OCCURRENCE ON SITE: From one to several territorial cuckoos have been present in the Basin in most years since 1983. Pairs are occasionally observed, and breeding has been confirmed. No cuckoos were found below the dam during focused surveys in 1999.
OPTIMAL SURVEY PERIOD: June - July.

Swainson's Hawk
Buteo swainsoni

STATUS: State Threatened.
HABITAT: Breeds primarily in arid interior valleys and high desert with scattered large trees or riparian woodland corridors surrounded by open fields, desert scrub, or agricultural land.
DISTRIBUTION: Occurs in southern California as a rare to uncommon transient with breeding mostly confined to valleys in the northern interior of the state. Along the coast, the Swainson's hawk is a rare spring and fall migrant.
OCCURRENCE ON SITE: Has been observed on several occasions in the Basin during spring migration.
OPTIMAL SURVEY PERIOD: April - August for breeding; April - May and September - early October for migrants.

3.3.4.4 California Species of Special Concern

A number of vertebrate species have been included on the CDFG's Species of Special Concern lists. The Bird list was prepared by Remsen (1978), the Mammal list by Williams (1986), the Reptiles and Amphibians list by Jennings and Hayes (1994), and the Fishes list by Moyle *et al.* (1989), which has since been updated (Moyle *et al.* 1995). Both the bird and mammal lists are being extensively revised and are expected to be published soon. Six species of mammals, 21 species of birds, 7 species of reptiles, 1 species of amphibians, and 1 species of fish of special concern are identified in this document as occurring or potentially occurring in the Basin.

California Mastiff Bat
Eumops perotis californicus

HABITAT: Favors rugged, rocky areas at low elevations in the coastal basins where suitable crevices for roosting are found. This species has very specific roosting structure needs, such as crevices that open downward and are at least 5 cm wide and 30 cm deep (Burt and Grossenheider 1976). They must also be high, as the bat needs 2-3 m of drop space to launch itself into flight. It feeds extensively on bees and wasps and has a large foraging range, which may extend up to 9.3 km from its daytime roost (Barbour and Davis 1969).
DISTRIBUTION: Butte County south through the Southern California coastal mountains and portions of the southeastern desert region.
OCCURRENCE ON SITE: Suitable roosting habitat does not occur on the site; however, it may use the site for foraging.
OPTIMAL SURVEY PERIOD: Probably year-round

Pallid Bat
Antrozous pallidus

HABITAT: Scrubland, woodland, and grassland at low elevations. it uses rocky areas for roosting.
DISTRIBUTION: Throughout much of the West, including al of California except for the Sierras and the Pacific northwest.
OCCURRENCE ON SITE: Suitable habitat does not occur on the site, but it may use the site for foraging.
OPTIMAL SURVEY PERIOD: Probably year-round.

Pale Big-eared Bat
Plecotus townsendi pallescens

HABITAT: Found in a wide variety of habitats from grasslands to conifer woodlands. Roosting sites include limestone caves, mine tunnels, buildings, and other man-made structures.
DISTRIBUTION: All of California west of the deserts.
OCCURRENCE ON SITE: Suitable roosting habitat does not occur on the project site, but it may use the site for foraging.
OPTIMAL SURVEY PERIOD: Probably year-round.

San Diego Black-tailed Jackrabbit
Lepus californicus bennettii

HABITAT: Prefers open areas, typically occurring in alluvial sage scrub and open Riversidean sage scrub.
DISTRIBUTION: Occurs in coastal southern California from approximately Santa Barbara County south into Baja California.
OCCURRENCE ON SITE: Common resident in the Basin, primarily in areas of upland scrub.
OPTIMAL SURVEY PERIOD: Year-round.

Northwestern San Diego Pocket Mouse
Chaetodipus fallax fallax

HABITAT: Sage scrub.
DISTRIBUTION: San Onofre (northern San Diego County), north to Claremont (Los Angeles County), east to Banning, and south to Jacumba and Baja California.
OCCURENCE ON SITE: Unrecorded, but possibly resident in uplands around perimeter of site.
OPTIMAL SURVEY PERIOD: Probably year-round.

San Diego Desert Woodrat
Neotoma lepida intermedia

HABITAT: Found in a variety of habitats from sea level to 8,500 ft in elevation.
DISTRIBUTION: Occurs along the coast from northwest Baja California to San Luis Obispo County.
OCCURRENCE ON SITE: The desert woodrat is expected to be resident in the uplands in the Basin where sparse scrublands predominate, especially where prickly pear cactus occurs.
OPTIMAL SURVEY PERIOD: Year-round.

Double-crested Cormorant
Phalacrocorax auritus

HABITAT: In winter, most large, open bodies of water; for breeding, predator free islands and partially submerged dead trees.
DISTRIBUTION: Common year-round resident in the coastal region of southern California, with most breeding colonies confined to the Channel Islands.
OCCURRENCE ON SITE: Fairly common winter visitor. Although small numbers regularly summer, and occasionally breed, in the area, nesting is extremely localized and generally unexpected and has not been confirmed for the Basin (Hays 1987).
COMMENT: Until the ban on the use of DDT in the United States, this species was in serious decline; however, its numbers have recovered in recent years to near historical levels (Jones and Collins, in press).
OPTIMAL SURVEY PERIOD: September - April; (for breeding: April - July).

Western Least Bittern
Ixobrychus exilis hesperis

HABITAT: This secretive species prefers densely vegetated brackish and freshwater marshes.
DISTRIBUTION: Generally considered a rare transient and summer visitor in southern California, with the exception of the Salton Sea where it is fairly common. A few local breeding records have been documented in recent years, and the species is known to have bred at San Jacinto Lake (Garrett and Dunn 1981).
OCCURRENCE ON SITE: In the Basin, the least bittern occurs as a rare and irregular visitor and as a possible breeder.
OPTIMAL SURVEY PERIOD: May - June.

White-faced Ibis
Plegadis chihi

HABITAT: Extensive freshwater and brackish marshes
DISTRIBUTION: Formerly a locally common breeder in coastal southern California, it became rare and no longer nested in the region; however, recently its numbers have increased rapidly and it is again breeding in the region.
OCCURRENCE ON SITE: Recently, it has become a common breeding resident in the Basin.
OPTIMAL SURVEY PERIOD: April - July.

Osprey
Pandion haliaetus

HABITAT: For breeding, large dead trees, poles, or other suitable sites providing nest platforms adjacent to the ocean, bays, estuaries, lagoons, or large lakes. This species is found in close association with moderate to large bodies of fresh, brackish, or salt water throughout the year.
DISTRIBUTION: Formerly bred on the southern Channel Islands and in scattered locations on the mainland of southern California. Now a fairly common non-breeding visitor in southern California; although it still nests both north and south of the region. Although ospreys are found year round in southern California, they are generally rare during the summer. This large raptor most often occurs along the immediate coast or occasionally at large inland bodies of water.
OCCURRENCE ON SITE: In the Basin, the osprey occurs as a regular non-breeding visitor, with a few occasionally present during the summer.
OPTIMAL SURVEY PERIOD: September - April.

Northern Harrier
Circus cyaneus

HABITAT: Grasslands, fresh- and brackish-water marshes.
DISTRIBUTION: Throughout most of the United States and all of California below the mountains; however, breeding records in Southern California are sparse.
OCCURRENCE ON SITE: Forages along the Santa Ana River, primarily in winter; however, there are a few summer records. May have formerly bred on the site, but no longer does.
OPTIMAL SURVEY PERIOD: For breeding, May-August; in winter, September-April.

Sharp-shinned Hawk
Accipiter striatus

HABITAT: Riparian and oak woodlands and coniferous forests.
DISTRIBUTION: Fairly common winter visitor in the coastal lowlands and rare summer resident in the mountains of southern California.
OCCURRENCE ON SITE: Occurs as a fairly common winter visitor in the Basin and lower Santa Ana River.
OPTIMAL SURVEY PERIOD: March - August.

Cooper's Hawk
Accipiter cooperii

HABITAT: Nests primarily in fairly dense oak and riparian woodlands.
DISTRIBUTION: Fairly common winter visitor and rare summer resident throughout most of southern California.
OCCURRENCE ON SITE: The Cooper's hawk occurs as a year-round resident in the Basin and lower Santa Ana River. It is fairly common during the winter season and uncommon during the summer season, with a few breeding.
OPTIMAL SURVEY PERIOD: March - August.

Ferruginous Hawk
Buteo regalis

HABITAT: Grasslands, agricultural areas, and deserts.
DISTRIBUTION: A locally fairly common winter visitor to grasslands and agricultural areas of the arid interior regions of southern California.
OCCURRENCE ON SITE: A regular winter visitor in small numbers to open fields adjacent to the Basin.
OPTIMAL SURVEY PERIOD: mid-October - March.

Merlin
Falco columbarius

HABITAT: Forages widely, but often near water where it is most often encountered in winter and in migration.
DISTRIBUTION: Breeds north of California; migrates through California, and winters from California south to South America.
OCCURRENCE ON SITE: Seen occasionally in Fall and Winter.
OPTIMAL SURVEY PERIOD: mid-September - mid-April.

Prairie Falcon
Falco mexicanus

HABITAT: Desert mountains and arid mountains and hills west of the desert, rarely to the coast. Ranges over a broader area in winter, but generally not migratory.
DISTRIBUTION: Throughout the western U. S. and California except for the humid northwest.
OCCURRENCE ON SITE: May forage on the site in winter on occasion, but no breeding habitat is present in the Basin.
OPTIMAL SURVEY PERIOD: Primarily September-April for wintering birds.

Long-billed Curlew
Numenius americanus

HABITAT: Agricultural fields and pasturelands.
DISTRIBUTION: Uncommon to fairly common migrant and winter visitor at estuaries along the southern California coast. It is a sparse visitor to interior valleys.
OCCURRENCE ON SITE: In the vicinity of Prado, small migrant flocks of curlews are occasionally observed in agricultural areas.
OPTIMAL SURVEY PERIOD: July - mid-April.

Western Burrowing Owl
Athene cunicularia hypergia

HABITAT: Inhabits relatively flat and open areas such as grasslands, coastal dunes and agricultural areas; requires the presence of burrows for nesting and roosting activities.
DISTRIBUTION: An uncommon to locally common resident in southern California.
OCCURRENCE ON SITE: Found in the upland areas adjacent to the Basin. Six nesting pairs were located in 1983 and 1984 (Zembal *et al.* 1985).
OPTIMAL SURVEY PERIOD: March - August.

Long-eared Owl
Asio otus

HABITAT: Within its southern California range, the long-eared owl inhabits riparian woodlands or other groves of trees.
DISTRIBUTION: An uncommon resident of the interior areas of southern California, it is a rare breeder along the coastal slope. Some movement occurs during the winter season, and fairly large concentrations occasionally occur at winter roosting sites.
OCCURRENCE ON SITE: The Basin possibly supports the largest population of long-eared owls along the coast of southern California. Four or five breeding pairs were reported in 1983 and 1984 (Zembal *et al.* 1985). It is also present in the section of river between Prado Dam and Weir Canyon.
OPTIMAL SURVEY PERIOD: April - July.

Loggerhead Shrike
Lanius ludovicianus

HABITAT: Loggerhead shrikes generally occupy open habitats with scattered large shrubs or trees.
DISTRIBUTION: An uncommon, though widespread, resident throughout southern California. This species has decreased sharply throughout California in the past ten years, a pattern consistent with populations elsewhere in the united States. Shrikes had become scarce in the Northeast as early as the 1960s and in the Southeast by the late 1970s. In some states where they were once common, they are now virtually extirpated. The reasons for these declines are largely speculative or unknown.
OCCURRENCE ON SITE: Small numbers of this species breed in the Basin and the section of river between Prado Dam and Weir Canyon.
OPTIMAL SURVEY PERIOD: April - August.

California Horned Lark
Eremophila alpestris actia

HABITAT: Requires open fields and grasslands.
DISTRIBUTION: A year-round resident that generally occurs in the coastal region of California, from Sonoma County south to Baja California (Grinnell and Miller 1944).
OCCURRENCE ON SITE: It may breed in or adjacent to the Basin.
OPTIMAL SURVEY PERIOD: April - June.

Cactus Wren (coastal populations only)
Campylorhynchus brunneicapillus

HABITAT: Requires sage scrub habitats with patches of prickly pear cactus or cholla.
DISTRIBUTION: The coastal population of this species is an uncommon resident from Santa Paula in Ventura County south to San Diego.
OCCURRENCE ON SITE: Small numbers have been observed in the Basin where prickly pear cactus is found in the shrub-dominated upland areas.
OPTIMAL SURVEY PERIOD: January - April.
COMMENT: Coastal populations of the cactus wren from southern Orange County south to northern Baja California are considered by some to represent a distinct and endangered subspecies. This population, and possible subspecies, is not found as far north as the Prado Basin; however, all populations of Cactus Wren on the coastal slope (*C. b. couesi*) are considered a Species of Special Concern.

Yellow Warbler
Dendroica petechia

HABITAT: For breeding, this species inhabits mature riparian woodland, especially where dominated by willows or alders.
DISTRIBUTION: An uncommon summer resident along the coastal slope of southern California; however, in some localities it can be fairly common (Garrett and Dunn 1981).
OCCURRENCE ON SITE: A common breeder throughout most of the Basin and the Santa Ana River below the dam to Weir Canyon.
OPTIMAL SURVEY PERIOD: May - July.

Yellow-breasted Chat
Icteria virens

HABITAT: Generally inhabits mature riparian plant communities with a dense understory.
DISTRIBUTION: An uncommon and local summer resident in southern California.

OCCURRENCE ON SITE: A fairly common breeder throughout the Basin and in the Santa Ana River below the dam to Weir Canyon.
OPTIMAL SURVEY PERIOD: May - June.

Southern California Rufous-crowned Sparrow
Aimophila ruficeps canescens

HABITAT: Typically inhabits rocky slopes with relatively open shrub cover that is intermixed with grassy areas.
DISTRIBUTION: Occurs west of the deserts from Ventura County south into Baja California.
OCCURRENCE ON SITE: A local and uncommon resident near the perimeter of the Basin where scrub habitats, especially coastal sage scrub, remain.
OPTIMAL SURVEY PERIOD: March - April.

Tricolored Blackbird
Agelaius tricolor

HABITAT: This highly gregarious blackbird is a colonial nester that requires freshwater marshes and ponds with adjacent grasslands or croplands for foraging.
DISTRIBUTION: This species is a near California endemic, being found primarily on the coastal slope and interior valleys from southern Oregon to northern Baja California.
OCCURRENCE ON SITE: Occurs as a fairly common, though irregular, breeding species in the Basin.
OPTIMAL SURVEY PERIOD: May - June.

Southwestern Pond Turtle
Clemmys marmorata pallida

HABITAT: Confined to quiet waters such as lakes and ponds, although also found in quiet pools in rivers and streams.
DISTRIBUTION: California coast from near San Francisco south to northwest Baja California.
OCCURRENCE ON SITE: Small numbers persist in the Basin.
OPTIMAL SURVEY PERIOD: Year-round.
COMMENT: Populations of this turtle have drastically declined due to habitat loss, over-collecting, perturbations of stream hydrology and ecology, and the introduction of bullfrogs and predatory exotic fishes such as bass, sunfish and catfish. Bass and bullfrogs eat large numbers of hatchlings.

San Diego Horned Lizard
Phrynosoma coronatum blainvillei

HABITAT: Generally occurs in sage scrub and chaparral, but can also be found in coniferous forest and broadleaf woodland. It is usually found in sandy areas, especially where harvester ants are found.
DISTRIBUTION: Restricted to southwestern California and northwestern Baja California.
OCCURRENCE ON SITE: Expected to be present in the scrub habitats along the fringes of the Basin.
OPTIMAL SURVEY PERIOD: March - June.

Orange-throated Whiptail
Cnemidophorus hyperythrus

HABITAT: Typically occurs in open sage scrub or chaparral where loose soils and occasional rocky areas are found.
DISTRIBUTION: Restricted in the United States to southwestern California.
OCCURRENCE ON SITE: Potential habitat for this species exists in the coastal sage scrub habitat found locally on the upland areas mostly near the perimeter of the Basin and river.

OPTIMAL SURVEY PERIOD: April - September.
COMMENT: The principal threat to this species is the loss of habitat throughout its limited range.

Silvery Legless Lizard
Anniella pulchra pulchra

HABITAT: A small, secretive snake-like lizard that lives and forages beneath leaf litter, under debris or in soil (Stebbins 1985). It occurs in a variety of habitats, including washes and woodlands, and has been previously recorded in upper alluvial fans in alluvial scrub habitat (Schoenherr 1976).
DISTRIBUTION: Coastal slope from San Francisco Bay to Baja California.
OCCURRENCE ON SITE: This species is expected to be present in suitable habitat in the Basin.
OPTIMAL SURVEY PERIOD: March - July.

Coast Patch-nosed Snake
Salvadora hexalepis virgultea

HABITAT: Inhabits a variety of habitats, including chaparral and sage scrub.
DISTRIBUTION: Coastal southern California from approximately Santa Barbara County south into Baja California.
OCCURRENCE ON SITE: One was observed along Temescal Wash in 1983 and 1984 (Zembal *et al.* 1985).
OPTIMAL SURVEY PERIOD: April - August.

Two-striped Garter Snake
Thamnophis hammondii

HABITAT: Perennial and intermitten streams having rocky beds and bordered by willow thickets or other dense vegetation. May also in habitat shallow rivers and stockponds bordered by thick riparian vegetation.
DISTRIBUTION: Coastal slope from County to northern Baja California and up to 4,500 feet elevation.
OCCURRENCE ON SITE: Present in suitable habitat throughout.
OPTIMAL SURVEY PERIOD: March – October.

Northern Red Diamond Rattlesnake
Crotalus ruber ruber

HABITAT: Inhabits a variety of brushy habitats such as sage scrub and chaparral, often where rocky areas are present.
DISTRIBUTION: Primarily along the coastal slope of the transverse and peninsular ranges from southwestern California to Baja California.
OCCURRENCE ON SITE: Occurs in the vicinity of the Basin and may occur in the Basin itself where suitable habitat exists.
OPTIMAL SURVEY PERIOD: April - August.

Western Spadefoot
Scaphiopus hammondii

HABITAT: Arid and semi-arid regions in the lowlands and foothills (below 4,500 feet) in washes, river floodplains, alluvial fans, playas, and alkali flats.
DISTRIBUTION: Primarily in Central Valley and adjacent foothills, and in the Coast Ranges from Redding to northwestern Baja California. Now believed to be extirpated from most of southern California.
OCCURRENCE ON SITE: Believed to be extirpated from the Santa Ana River watershed (Jennings and Hayes 1994).
OPTIMAL SURVEY PERIOD: Following relatively warm rains in late winter and spring and in fall (Jennings and Hayes 1994).

Arroyo Chub
Gila orcutti

HABITAT: Warm streams with highly variable seasonal stream flows where it seeks slow water areas within medium- to high-gradient streams. It is adapted to survive both hypoxic and large temperature fluctuations (Castleberry and Cech 1986).
DISTRIBUTION: Originally native to the Los Angeles, San Gabriel and Santa Ana river systems, Malibu and San Juan creeks, and the Santa Margarita River drainage. Introduced into several river systems to the north of its native range.
OCCURRENCE ON SITE: In 1998, arroyo chubs were found in small numbers at two collecting stations along the mainstem of the river in Prado Basin and at one collecting station below the dam. In all, only 15 chubs were found, none in the side channels. These may be downstream migrants from portions of the river upstream of Prado Basin.
OPTIMAL SURVEY PERIOD: Year-round.

3.3.4.5 State Fully Protected Species

Two bird species have been given special "Fully Protected" status under the California Fish and Game Code by special legislation. These are the white-tailed kite and the golden eagle. The latter is also a species of special concern.

White-tailed Kite
Elanus leucurus

HABITAT: Requires open habitats such as grasslands, croplands and marshes; nests primarily in riparian areas with sycamores, oaks, willows and cottonwoods, and hunts in adjacent open spaces.
DISTRIBUTION: Uncommon to locally fairly common resident along the coastal slope of southern California.
OCCURRENCE ON SITE: The Basin supports a relatively large breeding population of white-tailed kites; 17 breeding pairs were reported in 1983 and 1984 (Zembal *et al.* 1985). It may also breed, at least occasionally, in the Santa Ana River between the dam and Weir Canyon.
OPTIMAL SURVEY PERIOD: February - May (for breeding).

Golden Eagle
Aquila chrysaetos

STATUS: Also a species of special concern.
HABITAT: Inhabits open areas including grasslands, brushy or open wooded areas. It typically nests in the more remote, rugged, mountainous areas.
DISTRIBUTION: Uncommon resident in southern California.
OCCURRENCE ON SITE: A rare, though fairly regular visitor to the west side of the Basin; individuals are frequently observed in nearby Chino Hills State Park.
OPTIMAL SURVEY PERIOD: January - July.

3.3.4.6 California Native Plant Society Listed Plants

Only one species of plant in the Basin, the many-stemmed dudleya, has been identified by the CNPS as sensitive. It grows on gravelly hillsides and cliffs in coastal sage scrub, grassland, and chaparral.

Many-stemmed Dudleya
Dudleya multicaulis

STATUS: CNPS List 1B.
HABITAT: Dry, rocky areas in coastal sage scrub, chaparral and grasslands, usually on poor soils.

DISTRIBUTION: From Los Angeles County to western San Bernardino, Riverside, San Diego and Orange counties.
OCCURRENCE ON SITE: A small population exists near the Raahauge Pheasant Club within the Basin, and another population is on the steep slope between the reservoir and SR 71 just north of the dam (Zembal *et al.* 1985).
OPTIMAL SURVEY PERIOD: May - June. This herbaceous species has no vegetative form (only ungerminated seeds) in winter.
COMMENT: As is true of many other geophytes, the number of individuals observed in any given year is dependent on the abundance and pattern of local rainfall.

3.3.5 SENSITIVE HABITATS

All riparian areas in Southern California are considered sensitive, especially willow woodland, with or without co-dominants such as cottonwood or sycamore. The extensive willow woodland in the Basin is the largest of its kind remaining in Southern California. The cottonwood and willow woodland along the Santa Ana River from Prado Dam to Weir Canyon is also of high value compared with other river systems in Southern California. It is believed that nearly 90 percent of all riparian habitats (especially willow and cottonwood riparian woodlands) in California have been lost in the past century, even after factoring in the expansion of many riparian areas as a result of various flood control and water conservation projects like the one in Prado Basin. Riparian plant communities, along with associated wetlands, comprise a high degree of biodiversity. They also serve as sediment filters, protecting downstream areas from high rates of siltation.

3.4 AIR QUALITY

The Prado Reservoir is located in the central part of the South Coast Air Basin (SCAB) of California, a 10,628 km^2 (6,600 mi^2) area encompassing Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino counties. SCAB is bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east.

3.4.1 REGULATORY REQUIREMENTS

Air Quality in the SCAB is regulated by federal, state, and regional control authorities, including the U.S. Environmental Protection Agency (EPA); the California Air Resources Board (ARB), which is part of the California Environmental Protection Agency (Cal EPA); the SCAQMD and the Southern California Association of Governments (SCAG).

3.4.2 REGIONAL AIR QUALITY

3.4.2.1 Attainment Status

The 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.

The SCAB is designated as a nonattainment area for several pollutants. Criteria pollutants and the levels at which they occur in the basin are described below.

Ozone. Ozone is a colorless toxic gas that irritates the lungs and damages materials and vegetation. Levels of ozone exceed national and state standards throughout the basin. Because ozone formation is the result of photochemical reactions between nitrogen oxides (NOx) and reactive organic compounds (ROC), peak concentrations of ozone occur downwind of precursor emission sources. Ozone readings in areas that lie at the base of the San Gabriel and San Bernardino Mountains are among the highest in the United States. The entire basin is designated as a nonattainment area for state and national ozone standards.

Carbon Monoxide. Carbon monoxide (CO) is a colorless gas, produced almost entirely from automobiles, that 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 SCAB is classified as a nonattainment area for the national and state carbon monoxide standards. National and state standards for carbon monoxide are exceeded in Los Angeles County but generally not in other counties. Riverside and San Bernardino counties attain 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.

Nitrogen Dioxide. Nitrogen dioxide is a reddish-brown gas that can cause breathing difficulties at high levels. 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 standards were exceeded only once in 1993, and the federal standards were not exceeded on any occasion. However, until the SCAQMD requests a redesignation, the SCAB 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.

Suspended Particulate Matter. PM10 refers to particulate matter that is 10 microns or less in diam. PM10 levels regularly exceed the national standard in Los Angeles, Riverside, and San Bernardino counties. In 1990, the national PM10 standards were 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.

Sulfur Dioxide and Lead. Sulfur dioxide and lead levels in all areas of the basin are below national and state standards. The entire basin is in attainment for these pollutants.

3.4.2.2 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 volume near the ground and restrict dispersion.

3.4.3 LOCAL AIR QUALITY

Baseline air quality in the project area can be determined from ambient air quality measurements conducted by the SCAQMD at the Pomona and Rubidoux stations, which are the closest monitoring stations to the Prado Reservoir. Table 3-5 summarizes the air quality data collected at these stations from 1993 through 1996. While both federal and state air quality standards for several contaminants continue to be violated, the data indicates overall improving air quality during the 4-year period.

TABLE 3-5
SUMMARY OF AIR QUALITY DATA[a]

Pollutant	Monitoring Station[g]							
	1993		1994		1995		1996	
	PO[b]	RB[c]	PO	RCO[d]	PO	RCO	PO	RCO
Carbon Monoxide								
Federal ≥ 9.5 ppm (8-hr)	0	0	0	0	0	0	0	0
State ≥ 9.1 ppm (8-hr)	0	0	0	0	0	0	0	0
State > 20 ppm (1-hr)	0	0	0	0	0	0	0	0
Ozone								
Federal > 0.12 ppm (1-hr)	45	71	47	77	47	52	16	38
State > 0.09 ppm (1-hr)	104	132	104	134	87	109	44	92
Nitrogen Dioxide								
Federal > 0.0534 ppm (% samples)	0[E]	0	0	0	0	0	0	0
State > 0.25 ppm (1-hr)	0	0	0	0	0	0	0	0
Sulfur Dioxide								
Federal > 0.14 ppm (24-hr)	nm[f]	0	nm	0	nm	0	nm	0
State ≥ 0.05 ppm (24-hr)	nm	0	nm	0	nm	0	nm	0
Suspended Particulates								
Federal >150 μg/m³ (24-hr) (% samples)	nm	7	nm	2	nm	73	nm	1
State >50 μg/m³ (24-hr) (% samples)	nm	69	nm	67	nm	62	nm	43
Lead								
Federal >1.5 μg/m³ (quarterly average)	nm	0	nm	0	nm	0	nm	0
State ≥25 μg/m³ (monthly average)	nm	0	nm	0	nm	0	nm	0
Sulfate								
Federal (no standard)	--	--	00	--	--	00	--	--
State >25 μg/m³ (24-hr) (% samples)	nm	0	nm	0	nm	0	nm	0

a *Frequency in days unless otherwise noted.*
b *Pomona Monitoring Station.*
c *Rubidoux Monitoring Station.*
d *Metro Riverside County Monitoring Station.*
e *Percent samples are rounded to nearest whole number.*
f *Not measured.*
g *SCAQMD deleted the Rubidoux monitoring station and added the Metro Riverside County in 1994*
Source: SCAQMD.

Climate

Temperature

The temperatures in the area range annually from summer afternoon highs in the low-90's (degrees Fahrenheit) to winter morning lows in the low-40's.. Temperatures above 100 degrees Fahrenheit or below 30 degrees Fahrenheit occur only in unusual weather conditions. Because of the moderating marine influence that decreases with distance from the ocean, monthly and annual spreads between temperatures are greatest inland near the study area, and smallest 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 Norco area averages 28 centimeters (cm) (11 inches) annually and occurs almost exclusively from late October to early April. Summers are often completely dry, and there are frequent 4- to 5-month periods of no rain. Annual rainfall is lowest in the coastal plain and inland valleys, higher in the foothills, and highest in the mountains.

Rainfall ranging from 8 to 89 cm (3 to 35 inches) per year has been recorded in the project vicinity, depending on large-scale weather patterns.

Winds

Winds across the project area are an important meteorological param because they control both the initial rate of dilution of locally generated air pollutant emissions and their regional trajectory. The prevailing summer daytime winds in the basin come from the southwest at 13 to 19 km (8 to 12 mi) per hour. On summer nights, the pattern reverses, with winds coming form the north at 6 to 10 km (4 to 6 mi) per hour. In winter months, daytime ocean winds range from 11.3 to 14.5 km (7 to 9 mi) per hour and night winds range from 5 to 13 km (3 to 8 mi) per hour. Approximately 5 to 10 times a year, the Basin experiences hot, dry easterly winds called Santa Anas, which usually occur during autumn months and last an average of 2 to 3 days. These winds can reach velocities of up to 97 km (60 mi) per hour and greater.

Inversions

The SCAB frequently experiences temperature inversions that 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 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 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.

3.5 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.HAZARDOUS, TOXIC AND RADIOACTIVE WASTE

An HTRW study was performed on the Prado Basin area to elevation 508 ft (OCWD, June 1998). No HTRW sites were identified that have the potential to adversely affect the proposed area of inundation for any of the project alternatives. The study identified five potential areas of concern and recommended actions as described below.

Thirteen oil wells within the study area owned by Prado Petroleum. Oil spills resulted from these wells on at least two occasions. However, these wells were abandoned in place in 1996 and capped. The Bureau of Land Management has jurisdiction over these wells and any resumption of operation will have to be authorized by that agency.

An oil pipeline near the southeast corner of the basin recently leaked and spilled oil into a basin tributary. However, this pipeline is no longer in service. Other pipelines within Prado Basin are considered to be in compliance with existing regulations.

Animal waste from dairy farms washes into Prado Basin during certain periods of high precipitation and runoff. However, current regulations require that all dairies that are considered concentrated animal feed operations have plans for containment to prevent waste flows from leaving diary property. The timing on these plans is over the next several years, with each dairy on a different schedule. In addition, many of the dairies are ceasing operations because the "Dairy Preserve" status of the area has been removed, with much of the land being rezoned as residential or commercial.

Occasional illegal dumping reportedly occurs in the basin, predominantly from illegal drug manufacturers. The only way to prevent this activity is to put the entire basin off limits to the public. This is not feasible because the Corps leases much of the basin area to local entities for recreation facilities. However, any illegal dumpsites that are discovered are cleaned up. In addition, any illegal dumping activity observed by Corps personnel is forthwith reported to the appropriate authorities.

The above recommendations are not proposed mitigation measures to project impacts and that neither the Corps nor Orange County Water District has the authority to implement these recommendations.

The foregoing areas of contamination occur at elevations significantly above the elevations where water conservation operations will reach. If a problem occurs with regards to each area, said problem is rectified upon discovery.

3.6 NOISE

3.6.1 INTRODUCTION

Noise pollution, like air and water pollution, is a very real environmental concern. The effects of noise on people range from annoyance and inconvenience to temporary or permanent hearing loss. The average annoyance produced by a sound depends on its loudness, duration, time of day, impulse character, pure tone content, variability, season of the year, and community.

3.6.2 NOISE SCALES

Since the human ear is not equally sensitive to sound at all frequencies, a specific frequency-dependent rating scale is used to relate noise to human sensitivity. An A-weighted dB (dBA) scale performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear. The basis for compensation is the faintest sound audible to the average ear at the frequency of maximum sensitivity. This A-weighted dB scale has been chosen by most authorities for purposes of environmental noise regulation.

Typical sounds normally range from 40 dBA (very quiet) to 100 dBA (very loud). Conversation is roughly 60 dBA at 0.9 m (3 ft). As background noise levels increase up to this level (or louder), speech intelligibility becomes increasingly difficult. Noise becomes physically discomforting at 110 dBA.

The Day-Night Average Noise Level (Ldn) and the Community Noise Equivalent Level (CNEL) are the noise and land use compatibility criteria most widely used in the State of California and applied by federal agencies. These measurements represent an average of all measured noise levels obtained over a specified period of time.

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. For a relatively long-term noise exposure resulting from construction activities, a CNEL up to 65 dBA is generally acceptable for noise-sensitive land uses, including residences, schools, hospitals, and churches. A CNEL up to 75 dBA is often considered acceptable for office buildings and other commercial activities. However, for short-term construction activities, levels considerably higher may be acceptable because of the temporary nature of the activity. A CNEL up to 90 dBA for noise-sensitive land uses and up to 100 dBA for offices and commercial activities would not be considered unacceptable and is in fact found in the vicinity of many construction sites in downtown urban areas throughout the country.

3.6.3 NOISE 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 regulates noise levels in the work place, aircraft noise, and noise emitted by certain products at the time of manufacture. The State of California regulates noise levels of motor vehicles and freeway noise affecting classrooms, sets standards for sound transmission control and occupational noise control, and identifies noise insulation standards and airport noise/land use compatibility. Local communities generally regulate land use/noise level compatibility, allowable levels on private property, and levels associated with the use of certain types of sources. The applicable standards and guidelines for this project are discussed below.

3.6.3.1 State of California

The State of California has adopted noise standards in areas of regulation not preempted by the federal government. The State of California has also developed land use compatibility guidelines for community noise environments.

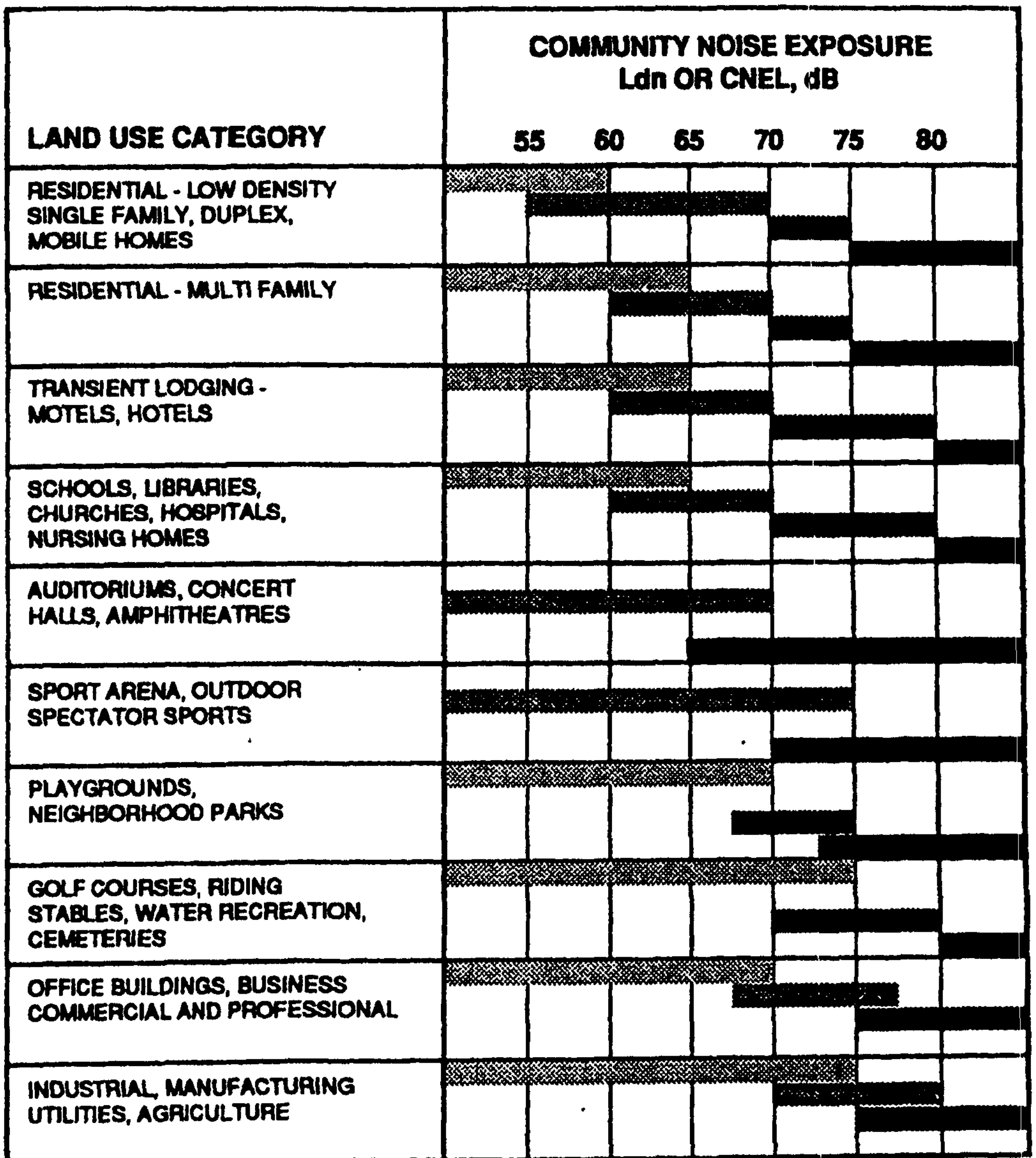
The State Office of Noise Control in *Guidelines for the Preparation and Content of Noise Elements of the General Plan*, established in February 1976, provided guidance for the acceptability of projects within specific CNEL contours (see Exhibit 3-5). Residential uses, churches, libraries, and hospitals 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 communities' sensitivities 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 action 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.

3.6.3.2 County of San Bernardino

Construction is prohibited from 7:00 PM to 7:00 AM, and on Sundays and Federal holidays per the County of San Bernardino noise ordinance (County Development Code 87.0905). According to the County of San Bernardino General Plan, residents in the County are currently exposed to vehicular noise in excess of acceptable levels. For this reason, the County actively enforces sections of the California Vehicle Code relating to adequate vehicle mufflers and modified exhaust systems, and further limits construction activity and truck traffic in residential areas. Potentially sensitive uses for which the County has established land use compatibility standards include: residential uses; public uses such as hospitals, nursing homes, schools, churches, and libraries; and open space uses (parks).



LEGEND

NORMALLY ACCEPTABLE
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

CONDITIONALLY ACCEPTABLE
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply system or air conditioning will normally suffice.

NORMALLY UNACCEPTABLE
New construction or developement should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

CLEARLY UNACCEPTABLE
New Construction or development should generally not be undertaken.

CONSIDERATIONS IN DETERMINATION OF NOISE-COMPATIBLE LAND USE

A. NORMALIZED NOISE EXPOSURE INFORMATION DESIRED
Where sufficient data exists, evaluate land use suitability with respect to a "normalized" value of CNEL or Ldn. Normalized values are obtained by adding or subtracting the constants described in Table 1 to the measured or calculated value of CNEL or Ldn.

B. NOISE SOURCE CHARACTERISTICS
The Land use-noise compatibility recommendations should be reviewed in relation to the specific source of the noise. For example, aircraft and railroad noise is normally made up of higher single noise events than auto traffic but occurs less frequently. Therefore, different sources yielding the same composite noise exposure do not necessarily create the same noise environment. The State Aeronautics Act uses 65 dB CNEL as the criterion which airports must eventually meet to protect existing residential communities from unacceptable exposure to air craft noise. In order to facilitate the purpose of the Act, one of which is to encourage land uses compatible with the 65 dB CNEL criterion wherever possible, and in order to facilitate the ability of airports to comply with the Act, residential uses located in Community Noise Exposure Areas greater then 65 dB should be discouraged and considered located within normally acceptable areas.

C. SUITABLE INTERIOR ENVIRONMENTS
One objective of locating residential units relative to a known noise source is to maintain a suitable interior noise environment at no greater than 45 dB CNEL of Ldn. This requirement, coupled with the measured or calculated noise reduction performance of the type of structure under consideration, should govern the minimum acceptable distance to a noise source.

D. ACCEPTABLE OUTDOOR ENVIRONMENTS
Another consideration, which in some communities is an overriding factor, is the desire for an acceptable outdoor noise environment. When this is the case, more restrictive standards for land use compatibility, typical below the maximum considered "normally acceptable" for that land use category, may be appropriate.

SOURCE: Ciifornia Department of Health, Guidelines for the Preparation and Content of Noise ts of The General Plan, February 1976.

exhibit 3-5

LMI Larry Munsey International

Acceptable Noise Levels for Various Land Use Categories

Prado Dam Water Conservation and Supply Study EIS

For these uses, the maximum allowable interior noise level is 45 dBA CNEL and the maximum allowable outdoor noise level is 65 dBA CNEL.

3.6.3.3 County of Riverside

Construction is prohibited from occurring within a quarter-mile of occupied residences from 6:00 PM to 6:00 AM from June through September, and from 6:00 PM to 7:00 AM from October through May per the County of Riverside noise ordinance (Ordinance 457). According to the Riverside County General Plan, noise sensitive uses must be identified and protected from land uses that produce high noise levels. Noise sensitive uses include residences, group homes, hospitals, schools and other learning institutions, and park and open space areas in which low noise levels are an important basis for use. These sensitive uses are not to be exposed to exterior noise levels in excess of 65 dBA CNEL. Business and professional offices are generally required by the County General Plan to mitigate interior noise levels to 45 dBA.

3.6.3.4 County of Orange

Construction is prohibited between the hours of 8 p.m. and 7 a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday. Construction noise occurring during allowed time periods are exempted from the noise level provisions in the County's noise control ordinance. The County of Orange Noise Element of the General Plan specifies outdoor and indoor noise limits for residential uses, places of worship, and schools. The outdoor noise limit is 65 dBA CNEL and the indoor noise limit is 45 dB CNEL.

3.6.3.5 City of Yorba Linda

Downstream of Prado Dam and upstream of Weir Canyon Road, the Santa Ana River flows through the City of Yorba Linda within Orange County. According to the City of Yorba Linda Municipal Code, construction noise is considered an acceptable intrusion when construction activities are limited to the hours of 7 a.m. to 8 p.m. and excluded on Sundays and holidays. The City of Yorba Linda Noise Element sets a level of 65 dBA CNEL as a maximum desirable level for residential land uses.

3.6.3.6 City of Anaheim

A small portion of the City of Anaheim is located upstream of Weir Canyon Road. Construction noise levels are exempt from compliance with the City's noise ordinance between 7 a.m. and 7 p.m. However, any construction activities occurring between 7 p.m. and 7 a.m. are required to be in compliance with the Anaheim Municipal Code, which is 60 dBA at the property line.

3.6.4 EXISTING NOISE ENVIRONMENT

Consistent with the large scale and range of uses within Prado Reservoir, the area is characterized by a wide variety of ambient noise levels. Along the periphery of the basin in which commercial and industrial facilities as well as freeways are found, noise levels are generally high. These levels drop off substantially towards the central portions of the Reservoir area, often to rural levels of noise. Numerous noise sources exist within the Basin area and include: traffic on SR-91, SR-71, and Euclid Avenue; aircraft noise from Corona Municipal Airport and Chino Municipal Airport; rail traffic from Atchison Topeka & Santa Fe (AT&SF) Railroad; industrial development in the City of Corona; and agricultural activity to the north and east. Noise levels measured by the USACE as part of the Phase II General Design Memorandum, Supplemental EIS/EIR ranged from over 70 dB where SR-71 passes near the dam access road, to approximately 45 dB in quiet residential areas east of the Prado Basin. The primary noise sources in the basin area are described below.

- **SR-91** is an eight lane east-west freeway along the southern border of the Prado Basin. Traffic volumes average 190,500 vehicles per day between SR-71 and North Main Street (California Dept. of Transportation 1992). Noise from SR-91 is predominant in the southern portion of Prado Reservoir.

- **SR-71** is a four lane north-south expressway (limited access) along the western border of the Prado Reservoir, veering northwest towards Pomona. Traffic Volumes average 15,500 vehicles per day between SR-71 and Merrill Avenue (Caltrans 1992).

- **Euclid Avenue** is a two lane north-south expressway from SR-71 to midway between SR-71 and Pine Avenue, and a four lane divided expressway as it proceeds north toward Ontario. Traffic volumes average 15,500 vehicles per day between SR-71 and Merrill Avenue (Caltrans 1992).

- **Corona Municipal Airport** is a small, single runway, recreation airport used mostly by small private planes. It is in the southern part of the Prado Reservoir north of SR-91. The 70 and 65 CNEL are completely within the Reservoir.

- **Chino Municipal Airport** is a two runway airport north of the Prado Reservoir. The southernmost portion of the 65 CNEL contour extends south to within the Basin area.

- **AT&SF Railroad** is aligned east-west along the Santa Ana River downstream of Prado Dam and along the southernmost border of the Prado Reservoir. The Riverside County General Plan estimates the 65 Ldn noise contour associated with operations on these tracks extends approximately 183 to 213.5 m (600 to 700 ft) north and south of the tracks.

The primary noise sources between Prado Dam and Weir Canyon Road are SR-91 and AT&SF Railroad. These sources provide background ambient noise within the river channel.

3.7 LAND USE/RECREATION

Prado Reservoir consists of approximately 3,940 ha (9,740 ac) of land up to the 556-ft elevation. The Federal Government is the owner of roughly 68 percent of the land in the Reservoir area up to elevation 556, and has acquired flood easements on all lands it does not own within the inundation line for the reservoir. The OCWD is the other major owner of the remaining land in the Reservoir.

Historically, the Reservoir has been used primarily for agricultural purposes, such as dairies, ranches, and farms. A variety of land uses are currently found within and surrounding the Prado Reservoir including urban, agricultural, and recreational. Generally, existing land uses to the east and south consist of commercial, industrial, and residential uses. Some residential uses exist to the west, and agricultural uses to the north.

Land users within the Prado Reservoir fall into one or more of the following categories.

- Leases for public parks and recreational purposes from the USACE to Riverside County, San Bernardino County, and the City of Corona.

- Land leased for parks and recreation purposes that may be leased by the USACE for agricultural purposes until the land is needed for public use.

- Various leases from the USACE for special purposes such as sewage plants and infiltration ponds.

- Leases for recreation purposes from OCWD. OCWD owns a large middle section of the basin below elevation 514 ft.

- Mineral leases from BLM, who controls subsurface rights within the reservoir, mainly to oil producers.

- Oil Wells – OCWD leases the surface rights to Prado Petroleum Company; the Santa Ana River Development Company (SARDCO) owns the mineral rights.

Downstream of Prado Reservoir, the Santa Ana River meanders naturally through the Santa Ana Canyon for approximately 9 miles before Weir Canyon Road. Land uses located within the River channel or adjacent to the River are discussed in Section 3.6.1.2 below.

3.7.1 ONSITE AND SURROUNDING LAND USES

3.7.1.1 <u>Upstream of Prado Dam</u>

The Prado Reservoir lies within the boundaries of the County of Riverside, the County of San Bernardino, and the City of Corona.

County of Riverside

The land uses described below fall within the County of Riverside. This area is generally bounded by the mountainous area west of State Route (SR) 71 (Corona Expressway), State Route (SR) 91 (Riverside Freeway), and the intersection of SR 71 and Euclid Avenue. The majority of land uses in this area are vacant or agricultural.

<u>Prado Petroleum Company</u>

The Prado Petroleum Company formally operated a total of 13 oil wells between elevation 493 and 505 ft within the central-west portion of the lower Prado Reservoir. All 13 wells were properly abandoned by cleaning each well out and filling each with cement. Three of the abandoned oil wells were leased through the federal government and are located at an elevation of approximately 125.5 m (500 ft). The government leasehold area is approximately 78.9 ha (195 ac). Ten of the abandoned wells are on oil and gas rights underlying a portion of land previously owned by the Santa Ana River Development Company (SARDCO). These wells range in elevation from 493 to 505 ft. The surface area of the previous SARDCO lease is approximately 191 ha (472 ac), and was acquired by the OCWD through eminent domain proceedings in 1967.

Under present conditions, the abandoned oil wells could be inundated approximately 0 to 275 days during a 2-year to a 100-year frequency flood. Under future conditions, the abandoned oil wells could be inundated approximately 0 to 315 days during a 2-year to a 100-year frequency flood. The average annual days that the oil wells could be inundated could be approximately 9 to 42 days under present conditions and 12 to 68 days under future conditions.

Raahauge's Hunting Club

This area is utilized as a large waterfowl and upland fowl hunting facility, for public use. It is located in the lower central and eastern portions of the Prado Reservoir at elevations ranging from 485 to 514 ft. The land is leased from the OCWD.

Under present conditions, the Raahauge's Hunting Club could be inundated approximately 0 to 330 days during a 2-year to a 100-year frequency flood. Under future conditions, the hunting club area could be inundated approximately 0 to 350 days during a 2-year to a 100-year frequency flood. The average annual days that the hunting club area could be inundated would be approximately 1.5 to 70 days under present conditions and 2 to 103 days under future conditions.

Riverside County Recreational Leases

The existing Riverside recreation leases are at elevations extending below 490 ft. Prado Park and the Fly Away Foundation are two of these leases currently in effect, as discussed below.

Fly Away Foundation. The area is a 40 ha (100-ac) waterfowl hunting facility leased from the County of Riverside. It is located in the central portion of the Prado Reservoir between elevations 485 ft and 520 ft. The area is developed with refuge ponds, shooting blinds, and a barn type structure. The structure is located at an approximate elevation of 520 ft.

Under present conditions, the Fly Away Foundation could be inundated approximately 0 to 330 days during a 2-year to a 100-year frequency flood. Under future conditions, the Fly Away Foundation could be inundated approximately 0 to 350 days during a 2-year to a 100-year frequency flood. The average annual days that the Fly Away Foundation area could be inundated could be approximately 1.5 to 70 days under present conditions and 2 to 103 days under future conditions.

Prado Basin Park. Prado Basin Park is a 334 ha (826-ac) site located on River Road in the eastern portion of the Prado Reservoir Basin. Uses within the park include a wildlife preserve as well as an active recreation facility providing playground equipment, equestrian trails, interpretive center, hiking trails, amphitheater, and picnic facilities. These developed portions of Prado Basin Park are located between elevations 525 ft and 573 ft.

Under present conditions, the Prado Basin Park could be inundated approximately 0 to 8.5 days during a 2-year to a 100-year frequency flood. Under future conditions, the park area could be inundated approximately 0 to 11 days during a 2-year to a 100-year frequency flood. The average annual days that Prado Basin Park could be inundated could be approximately 0 to 0.5 day under present conditions and 0 to 1 day under future conditions.

Agricultural Leases

The USACE agricultural leases in the County of Riverside portion of Prado Basin vary in user type. All of the agricultural leases occurring on federal property are a temporary use of master recreation outgrants until the County develops the area for recreational uses.

Under present conditions, the agricultural leases in the County of Riverside could be inundated approximately 0 to 310 days during a 2-year to a 100-year frequency flood. Under future conditions, this area could be inundated approximately 0 to 335 days during a 2-year to a 100-year frequency flood. The average annual days that the agricultural leases could be inundated could be approximately 0.5 to 54 days under present conditions and 1 to 88 days under future conditions.

County of San Bernardino

The following land uses fall within the County of San Bernardino. The area lies in the northern part of the Reservoir, east of SR 71. A variety of uses are found in this area, but are characterized mainly by recreational uses.

Prado Regional Park

This park consists of 920 hectares (2,280 ac), portions of which are developed with a 24-hae (60-ac) fishing lake, 75 campsites, softball fields, and soccer fields. The park is located along Euclid Avenue, south of Pine Avenue. Prado Regional Park includes the Richardson's Dog Training (formerly Prado Recreation, Inc.), Prado Tira Shooting Range Recreation Area, and Oranco Bowman Archery Range Recreation Area. The park is located between elevations 490 ft and 560 ft.

Richardson's Dog Training. The Richardson's Dog Training area is a dog boarding and training facility. The total acreage is approximately 507 ac, of which 269 ac are in active use. It is located in the central northwestern portion of the Prado Reservoir, southeast of Euclid Avenue at elevations ranging from 490 ft to 554 ft. The dog-boarding facilities are located at an elevation of approximately 554 ft. Most of the land that is used for dog training purposes is located between elevations 490 and 505 ft. An access road to the kennel was relocated in 1988 to an alignment above elevation 516 ft.

Under present conditions, the boarding and training facilities could be inundated approximately 0 to 310 days during a 2-year to a 100-year frequency flood. Under future conditions, the boarding and training facilities could be inundated approximately 0 to 335 days during a 2-year to a 100-year frequency flood. The average annual days that the boarding and training facility could be inundated could be approximately 0 to 54 days under present conditions and 0 to 88 days under future conditions. Most of the training facilities are between elevations 490 to 505 ft. The average annual days that the training facilities could be inundated could be approximately 9 to 54 days under the present conditions and 12 to 88 days under the future conditions.

Prado Tira Shooting Range Recreation Area. This facility is used for shooting events and is located within Prado Regional Park between elevations 516 ft and 518 ft. Under present conditions, the shooting range could be inundated approximately 0 to 16 days during a 2-year to a 100-year frequency flood. Under future conditions, the shooting range could be inundated approximately 0 to 18 days during a 2-year to a 100-year frequency flood. The average annual days that the boarding and training facility could be inundated could be approximately 1.5 days under present conditions and 2 days under future conditions.

Oranco Bowman Archery Range Recreation Area. This facility is an archery range located south of the Prado Olympic Park. The Park contains a nationally sanctioned 54 target area, hillside targets for "run and shoot" national competitions, and unimproved parking facilities. The archery range is located between elevations 520 and 560 ft.

Under present conditions, the archery range could be inundated approximately 0 to 8.5 days during a 2-year to a 100-year frequency flood. Under future conditions, the archery range area could be inundated approximately 0 to 11 days during a 2-year to a 100-year frequency flood. The average annual days that the archery range could be inundated could be approximately 0 to 0.5 day under present conditions and 0 to 1 day under future conditions.

Prado Olympic Shooting Park

This facility was the site of the 1984 Summer Olympic shooting events. The Park is located north of the dog training facility off Pomona-Rincon Road, near the Euclid Avenue intersection, and is located generally at elevation 510 to 520 ft. The facility is run by a private concessionaire and is open to the public.

Under present conditions, this facility could be inundated approximately 0 to 16 days during a 2-year to a 100-year frequency flood. Under future conditions, the park area could be inundated approximately 0 to 18 days during a 2-year to a 100-year frequency flood. The average annual days that Prado Basin Park could be inundated could be approximately 0 to 0.5 day under present conditions and 0 to 1 day under future conditions.

Prado Equestrian Center

The Prado Equestrian Center is located north of the Prado Regional Park and south of Pine Avenue. Park facilities include two arenas, an office/tack shop, a dressage court, horse rental area, group pasture area, lunging ring, hotwalker, round pen, caretaker trailer, and parking for trailers and visitors. This facility is located above elevation 560 ft. Under present and future conditions, this facility could be inundated approximately 0 to 1 day during a 2-year to a 100-year frequency flood.

El Prado Golf Course

This golf course is north of the Prado Olympic Shooting Park with access near the intersection of Pine Avenue and El Prado Road. The site has two separate 18-hole public golf courses that are run by concessionaires.

The golf courses are located between elevations 510 ft and 567 ft. Under present conditions, the golf courses could be inundated approximately 0 to 16 days during a 2-year to a 100-year frequency flood. Under future conditions, the golf courses could be inundated approximately 0 to 18 days during a 2-year to a 100-year frequency flood. The average annual days that the archery range could be inundated could be approximately 0 to 1.5 days under present conditions and 0 to 2 days under future conditions.

Agricultural Leases

The USACE agricultural leases in the County of San Bernardino portion of Prado Basin vary in user type. All of the agricultural leases occurring on federal property are a temporary use of master recreation outgrants until the County develops the area for recreational uses.

Under present conditions, the agricultural leases in the County of San Bernardino could be inundated approximately 0 to 310 days during a 2-year to a 100-year frequency flood. Under future conditions, the park area could be inundated approximately 0 to 335 days during a 2-year to a 100-year frequency flood. The average annual days that Prado Basin Park could be inundated could be approximately 0.5 to 54 days under present conditions and 1 to 88 days under future conditions.

City of Corona

The land uses described below are within the City of Corona, which are mainly in the southern portion of the Prado Reservoir.

Corona Municipal Airport

This is a recreational airport used predominantly for small private planes. It is located in the southeastern portion of the Prado Reservoir at an elevation range from approximately 513 to 528 ft. The land is leased by the City of Corona from the federal government. In the past, high groundwater has affected the taxi and landing surface of the airport.

Under present conditions, the airport could be inundated approximately 0 to 16 days during a 2-year to a 100-year frequency flood. Under future conditions, the airport area could be inundated approximately 0 to 18 days during a 2-year to a 100-year frequency flood. The average annual days that the airport could be inundated could be approximately 0 to 1.5 days under present conditions and 0 to 2 days under future conditions.

Butterfield Stage Trail Park

This is a 26 ha (64-ac) municipal sports park with seven ball-fields located in the City of Corona, south of Corona Municipal Airport. This sports park is located between elevations 527 and 550. Under present conditions, the sports park could be inundated approximately 0 to 8.5 days during a 2-year to a 100-year frequency flood. Under future conditions, the sports park area could be inundated approximately 0 to 11 days during a 2-year to a 100-year frequency flood. The average annual days that the sports park could be inundated could be approximately 0 to 0.5 day under present conditions and 0 to 1 day under future conditions.

City of Corona Recreational Leases

The lease areas are located in the southern part of the Prado Reservoir in the City of Corona. Though no recreation uses in the area are currently in effect, the City has formally proposed recreational uses within the Prado Project Master Plan.

3.7.1.2 Downstream of Prado Dam

County of Riverside

Downstream of Prado Dam, the Santa Ana River lies adjacent to a variety of land uses. These include the Riverside Freeway (SR-91), the Corona Freeway (SR-71), the AT&SF Railroad, single family residential, a mobile home park, and a portion of Chino Hills State Park and the Green River Golf Course. All of these land uses are protected from flooding during existing water conservation operations during the flood season because these operations involve a maximum release rate of 2,500 cfs. However, during existing flood control operations, release rates could exceed 5,000 cfs. An exceedance of 5,000 cfs would result in flooding on portions of the golf course and the RV Park within Featherly Regional Park. No other land uses would be inundated.

The Green River Golf Course is located west of Green River Drive at the borders of the Counties of Orange, Riverside, and San Bernardino, immediately north of the Santa Ana River. Bordering the golf course to the north is the AT & SF Railroad line, with SR-91 located south of the golf course, below the Santa Ana River. The golf course comprises approximately 255 acres and is a 36-hole recreational facility with a clubhouse located in the north-central portion of the course. The course is subject to flooding when release rates from Prado Dam exceed 5,000 cfs. Existing water conservation operations during the flood season involve a maximum release rate of 2,500 cfs. However, current flood control operations can result in release rates above 5,000 cfs and subsequent flooding of the golf course.

County of Orange

Upstream of Weir Canyon Road and downstream of Prado Dam, the Santa Ana River flows adjacent to the Cities of Yorba Linda and Anaheim within the County of Orange. Land uses adjacent to the River and within the County of Orange include Green River Golf Course, agricultural lands, AT & SF Railroad, SR-91, residential development, and Featherly Regional Park. All of these areas are protected from flooding during existing water conservation operations during the flood season; however, the Green River Golf course and the RV Park within Featherly Regional Park could be inundated during flood control operations involving release rates from Prado Dam above 5,000 cfs.

3.7.2 PLANNING AND POLICY DOCUMENTS

3.7.2.1 Upstream of Prado Dam

As described previously, the Prado Reservoir falls within the planning jurisdiction of the County of Riverside, the County of San Bernardino, and the City of Corona. Planned land uses within the Prado Basin are identified by the respective General Plans from the relevant jurisdiction. The USACE has also recently completed the Prado Flood Control Basin Project Master Plan. Generally, the existing land uses within the Basin are consistent with planning documents and local planning policy. The narrative below outlines the planning and policy guidelines relating to the Prado Reservoir. Not all the proposed mitigation measure offsets are the responsibility of the Corps or the local sponsors but by the responsible parties. We cannot implement the recommendation unless we have the authority to do so.

Prado Flood Control Basin Project Master Plan

The purpose of the Prado Project Master Plan is to provide a guide for the orderly and coordinated use, development and management of all resources in the existing and proposed Prado Reservoir. The primary goals of the Master Plan are to prescribe an overall land management plan, resource objectives, and associated design and management concepts. The Prado Project Master Plan is described as a "continuing and dynamic document" that presents broad concepts rather than specific site design proposals. The Master Plan identifies "Planning Areas" in the Prado Reservoir within the 556-ft elevation project boundary, and provides a range of land use development alternatives based on applicable local zoning, input form local agencies and potential development intensity.

Riverside County General Plan

A substantial portion of the Prado Reservoir lies within unincorporated Riverside County. The Riverside County General Plan is the primary planning document relating to the implementation of development and conservation proposals.

The Santa Ana River Corridor Elements of the General Plan explicitly address the Prado Reservoir area. The Santa Ana River Corridor Policy Area (SARCPA) includes the Santa Ana River bottom area, lands lying in the river floodplain above and below Prado Dam, and lands adjacent to the river.

The goal of the County is to preserve the SARCPA in an open and natural state, to conserve natural resources, to preserve its scenic beauty and to define the limits and form of urbanization in the area. Land use policies in the General Plan for development in the SARCPA emphasize the need for preserving the open space and natural character of the Santa Ana River.

San Bernardino County General Plan

According to the County General Plan, the Prado Reservoir falls within the West Valley Subregional Planning Area of San Bernardino County. The West Valley contains six major cities including Chino, Chino Hills, Fontana, Montclair, Ontario, Rancho Cucamonga, and Upland. The West Valley area is the most heavily developed subregion in the County. Much of the future growth in the region is anticipated to occur in these cities and in the areas within their sphere of influence. Most of the land in this area is incorporated. North of elevation 556 ft is generally unincorporated San Bernardino County and is designated as Agriculture in the County General Plan.

City of Corona General Plan

The purpose of the City of Corona General Plan is to identify the City's goals for developments occurring within the City limits. These goals include "Development of a land use pattern which meets the basic needs of Corona residents for essential services, working and living areas, and areas for the pursuit of leisure time activities," as well as the "Conservation, protection and enhancement of natural resources for the benefit and enjoyment of the resident population and the region and guide future development in a direction that maximizes the utility of natural resources." The General Plan designations relating to the part of the Prado Reservoir within the City limits include Flood Control Basin, Parks, and Open Space.

3.7.2.2 Downstream of Prado Dam

Between Prado Dam and Weir Canyon, the Santa Ana River falls within the planning jurisdiction of the California Department of Parks and Recreation, County of Orange, City of Yorba Linda, and the City of Anaheim. Following is a discussion of the planning and policy guidelines relating to the Santa Ana River, which encompasses Featherly Regional Park, and the Green River Golf Course.

Chino Hills State Park Preliminary General Plan

Chino Hills State Park is located in the Counties of Orange, Riverside, and San Bernardino, just below Prado Dam. As of November 1998, the park contains approximately 11,770 acres, most of which consists of rolling hills. A one-mile long section of the Santa Ana River and its associated riparian woodland habitat are located within park boundaries. This area is subject to the Lower Santa Ana Canyon Resource, Floodplain, and Habitat Management Plan. The stated goal within the Chino Hills State Park General Plan is to "Protect and enhance natural resources in the Santa Ana River and adjacent habitat."

County of Orange General Plan

The County of Orange General Plan is part of the Advance Planning Program, and was originally adopted in June of 1992 by the County Board of Supervisors. Each of the nine elements of the

General Plan has since been revised and updated to reflect changing County demographics, policies, and programs.

The Featherly Park area, which is located within the downstream study area, is guided by the policies and guidelines in the County of Orange General Plan. Featherly Park has been designated as a regional park that would provide recreational facilities to residents in Orange County. Currently, Featherly Park is being leased by the County of Orange to a private concessionaire for use as the Canyon RV Park. The RV Park contains a number of RV and campsites as well as other recreational amenities.

City of Yorba Linda General Plan

Affected land uses in the Santa Ana River floodplain within the City of Yorba Linda are guided by the Santa Ana River Canyon Resource Management Plan. The goal of the plan is "to preserve the beauty and natural characteristics of the riparian environment and provide public opportunity for an educational/recreational experience aimed at fostering an appreciation and respect for the natural and cultural resources therein." In addition, the City of Yorba Linda identifies the Regional Trail on the north side of the River above Weir Canyon Road.

City of Anaheim General Plan

The City of Anaheim General Plan was adopted in 1963, comprehensively updated in 1984, and is continually amended to meet the needs of the City. The General Plan establishes guidelines for future development and redevelopment within the City's sphere of influence, which includes the approximately 50-square mile corporate City limits. A small portion of the Santa Ana River upstream of Weir Canyon Road is located in the City of Anaheim. According to the City's General Plan, this area is designated as flood plain. In addition, the General Plan identifies the Regional Trail on the north side of the River above WEIS/EIR Canyon Road.

3.7.3 PLANNED LAND USES

3.7.3.1 Upstream of Prado Dam

Following is a discussion of planned land uses within the Prado Reservoir. Not all the proposed mitigation measure offsets are the responsibility of the Corps or the local sponsors but by the responsible parties. We cannot implement the recommendation unless we have the authority to do so.

County of Riverside

The County has shown an active interest in the planning process for the Prado Reservoir. The Jurupa Community Plan (JCP) covers approximately 101.4 km² (63 mi²) in the northwestern corner of the County, including those areas of Prado Reservoir that are located in the County of Riverside. The JCP was developed to provide additional land use goals and policies that address the unique concerns and needs of the JCP area, thus facilitating implementation of the General Plan. Land use designations for the Reservoir predominantly consist of water resources/flooding, parks and recreation, and agriculture/development reserve. The plan also includes an extensive network of regional trails, community trails, and bicycle trails throughout the Reservoir area.

County of San Bernardino

The County has prepared a preliminary master plan that illustrates conceptual recreation development including hiking, bicycle trails, picnic areas and play areas within the County's lease area.

City of Corona

The City of Corona has proposed future park development uses in the lower southeast part of the Prado Reservoir. Other development proposals related to the Prado Reservoir include:

- A lighted sports complex at the northeast corner of Auburndale Street and Rincon Street. Development is contingent on the final location of levees to protect the Alcoa Aluminum plant and funding.

- Reopening of the Corona Golf Course, which involve a portion of lands now used as settling ponds north of Rincon Street. The settling ponds would be phased out as part of the reopening. In addition, the City plans to develop a neighborhood park in accordance with the Corona Golf Course Master Plan.

- An 8-ac public park known as Stagecoach Drive on property owned by the USACE. Development is contingent upon funding from fees to be paid by the developer of a nearby residential tract.

- Improvement to Corona Municipal Airport, including an administration building and hangar facilities.

3.7.3.2 Downstream of Prado Dam

Land uses downstream of Prado Dam and upstream of Weir Canyon Road within and adjacent to the Santa Ana River are predominantly built-out. No new significant land uses are planned downstream which could be affected by the proposed action.

3.8 AESTHETICS

3.8.1 UPSTREAM OF PRADO DAM

The Prado Reservoir contains significant open space and wildlife resources. Visually, the Reservoir can be described as rural or pastoral in character. More than 50 percent of the Reservoir is covered with riparian woodland vegetation, representing the most extensive area of wooded wetland remaining in Southern California. Additional vegetation occurring within and along the perimeter of the Reservoir serves to buffer noise from freeways and other sources. Activities in the Reservoir area include numerous recreational facilities, agricultural (mainly dairy farms), and other low-intense uses. Together, these factors combine to create a unique and valuable aesthetic environment both within and around the Basin area.

The Prado Reservoir is surrounded by a variety of land uses including residential, commercial, agricultural, and recreational (see Section 3.6, Land Use). Areas to the east and south of the Reservoir area are developed primarily with commercial, residential, and industrial uses. Agricultural uses predominate in the area to the north. The western portion of the Reservoir is bounded generally by the Chino foothills, which include a few residential neighborhoods primarily near the intersection of SR-71 and Euclid Avenue.

Various sensitive viewsheds exist throughout the Reservoir area. Sensitive viewsheds can be defined as densely populated areas developed mainly with residential uses that have unrestricted views into the Reservoir. The topography of the Reservoir exhibits a relatively gentle sloping pattern towards the east and north. Thus, these areas tend to have views of the Reservoir restricted by trees, man-made structures, and small landforms. To the south and west, elevations rise somewhat more dramatically, often providing unobstructed views of the Reservoir area. A number of photographs in the vicinity of the Reservoir were taken and the locations are depicted in Exhibit 3-6.

The area south of the Prado Reservoir (south of SR-91) along Serfas Club Drive rises sharply in topography. These areas are densely developed primarily with residential uses, as well as supporting commercial uses. Some industrial/commercial uses exist along the area adjacent to SR-91. Several areas within the residential community of Sierra Del Oro have expansive views of the Reservoir area, extending as far as the San Bernardino Mountains (See Exhibit 3-7, Photograph 1). However, while many views are unobstructed, the overall distance to the Reservoir tends to diminish the aesthetic quality of the view. Areas at lower elevations along SR-91 generally have views obstructed by the topography of the Basin and by commercial and industrial uses.

The southeastern area of the Reservoir, south of the Santa Ana River, contains densely developed residential areas. Most of the residents do not have views of the Prado Reservoir as the area is relatively level in slope, except for the relatively steep drop at the edge of the Reservoir (parallel to and between Rincon Street and River Road near Corydon Avenue). Several residences adjacent to these cliffs do have views of grasses, trees, and natural terrain within the Basin as shown in Exhibit 3-8, Photographs 3 and 4. Southeast of the Santa Ana River lies an equestrian community located along Bluff Drive. Exhibit 3-8, Photograph 3 shows the view from the end of Bluff Drive at the Gameland Kennels. Expansive views of the riparian woodland habitat, extending to the western portion of the Basin area at the Chino foothills, are accessible from this area.

The northeastern area surrounding the Reservoir is typified by agricultural uses, typically dairy farms. The Reservoir itself is often not visible, as the gradual slope of the area does not provide views into the Reservoir. Exhibit 3-8, Photograph 4 displays a view towards the Reservoir from an agricultural area (dairy farm) with the Santa Ana Mountains in the background. Exhibit 3-9, Photograph 5 is a view of an agricultural field from River Road and Hellman Avenue oriented southeasterly towards the Chino foothills and the Santa Ana Mountains. Minor middleground views of habitat within Prado Reservoir riparian woodland is visible from this viewpoint.

The northern portion of the Reservoir area remains rural in character with low-intense development and mainly agricultural uses. Exhibit 3-9, Photograph 6 is oriented southerly towards the Santa Ana Mountains. The viewshed is dominated by the agricultural field, however riparian woodland habitat is visible in the middleground, as well as the Santa Ana Mountains and Chino Hills in the background.

While westerly portions of the Reservoir area within the Chino Hills provide potentially the most sensitive viewshed areas, this area has a few residential communities; however, the area remains predominantly undeveloped. The Butterfield Ranch community is located within the Chino Hills near the intersection of SR-71 and Euclid Avenue. The area rises steadily above the Basin, westward from SR-71. Due to the residential structures, views of the Reservoir are obstructed from the surface streets within the community; however, several residences have panoramic views of the Reservoir. Exhibit 3-10, Photograph 7, depicts a southeasterly view of the Basin area just below Butterfield Ranch at the intersection of Euclid Avenue and SR-71. SR-71 is designated as a scenic route within the San Bernardino and Riverside County General Plans. Exhibit 3-10, Photograph 8 is taken from SR-71

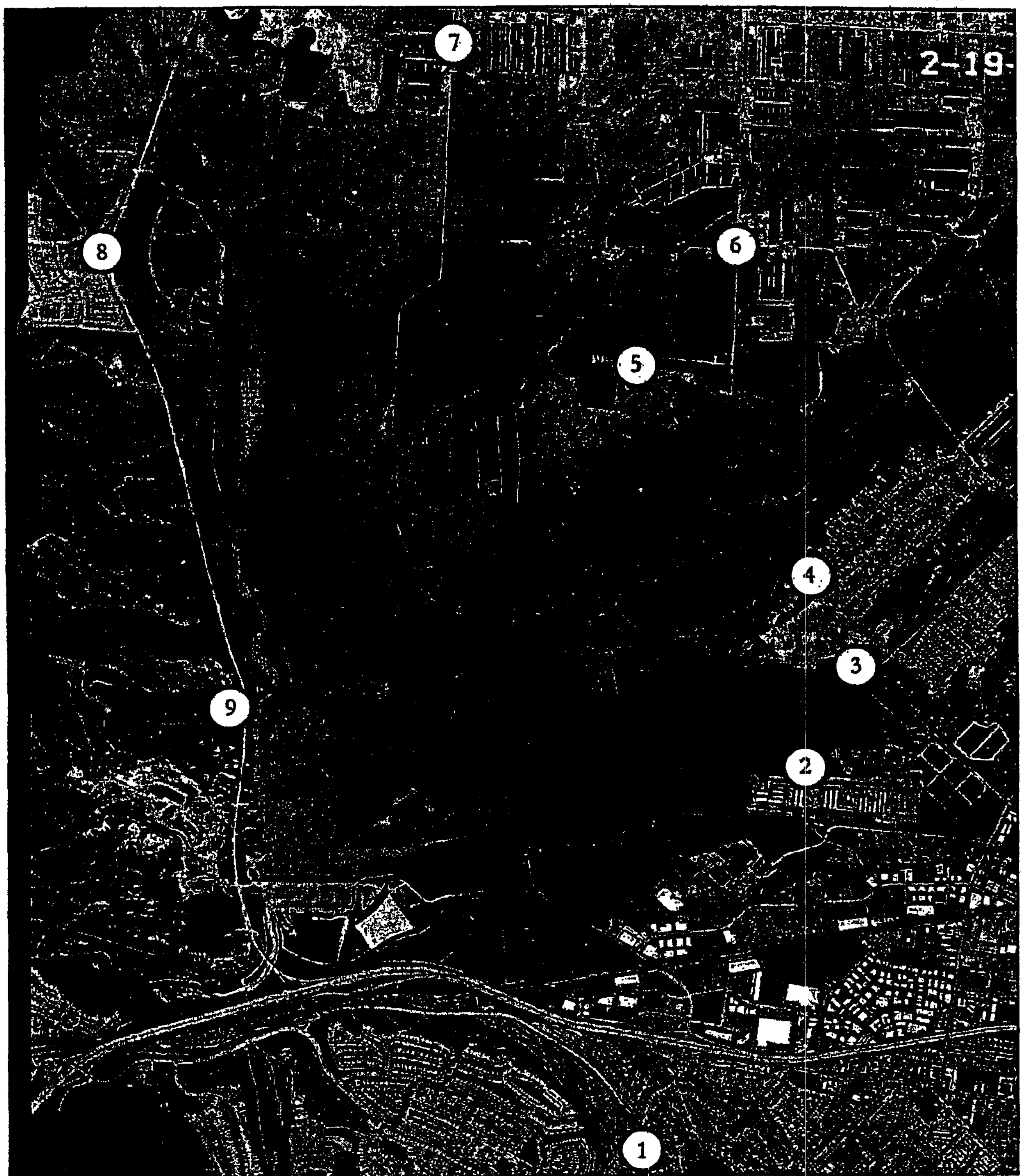


exhibit **3-6**

LMI
Larry Munsey International

Upstream Photographic Location Index

NORTH 3000 1500 0 3000 FEET

Prado Dam Water Conservation and Supply Study EIS

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along the southern portion of the Reservoir area. Extensive views of the riparian woodland habitat within the Prado Reservoir are readily viewable from this area.

3.8.2 DOWNSTREAM OF PRADO DAM

The approximately 9-mile course of the Santa Ana River downstream of Prado Dam and upstream of Weir Canyon Road remains in a primarily naturalized state. The River and associated riparian habitat provide visual relief from the increasing urbanization in surrounding areas. Photographs of the downstream area are indexed in Exhibit 3-11. The visual character of the Santa Ana River is characterized in Exhibit 3-12, Photograph 10, which shows the dense riparian habitat within the River channel from Weir Canyon Road, as well as the typical water flow through the River (see Exhibits 3-13 and 3-14). The view also shows surrounding residential and commercial land uses, and the rolling Chino Hills in the background.

3.9 CULTURAL RESOURCES

3.9.1 PREVIOUS ACTIONS FOR WATER CONSERVATION BETWEEN ELEVATION 490 FEET AND 505 FEET UPSTREAM OF PRADO DAM

Previous cultural resources studies of Prado Reservoir identified numerous historic and prehistoric resources below the current water conservation elevation of 505 ft. Most of these resources consist of archival locations for which no surface remains could be observed as a result of sedimentation. Four resources, which could be observed and evaluated, were determined to be eligible for the National Register of Historic Places (NRHP). These four included one prehistoric site (CA-RIV-2804), and three historic sites (CA-RIV-2802-H, CA-RIV-3694-H [Rincon Townsite], and CA-RIV-2778 [Aros-Serrano Adobe]).

Because current water conversation below elevation 505 ft would have an adverse effect on the characteristics of cultural sites (three of the sites qualified for the NRHP), mitigation measures were developed and implemented. A Memorandum of Agreement (MOA) was negotiated between the California State Historic Preservation Officer, USACE, and the Advisory Council on Historic Preservation. OCWD participated as a concurring party to the MOA. The MOA outlined the specific mitigation measures to be implemented prior to water conservation. This consultation process was conducted in accordance with Section 106 of the National Historic Preservation Act, as implemented by 36 CFR 800.

Subsequent to execution of the MOA, data recovery excavations were conducted at three of the sites. A data recovery was not conducted at the Aros-Serrano Adobe (CA-RIV-2778) since previous studies had exhausted its research potential. The purpose of the data recovery was to retrieve the significant information, which would be lost over time as a result of periodic inundation for water conservation.

3.9.2 CULTURAL RESOURCES BETWEEN ELEVATIONS 505 FEET AND 510 FEET UPSTREAM OF PRADO DAM

As a result of previous studies, several historic archeological sites are known to be located within the area of potential effects for water conservation between elevations 505 and 510 ft. The following resources are within the APE, and have not been previously dealt with during preparations for water conservation at elevation 505 ft. All four of these are historic archeological sites. A recent limited archival and subsurface testing was conducted at these sites by Statistical Research (1999).

CA-RIV-2203-H	Elevation 505-520 ft

CA-RIV-2204-H	Elevation 506-520 ft
CA-RIV-4760-H (PB-29)	Elevation 508-514 ft
CA-RIV-4761-H (PB-31)	Elevation 505-520 ft

3.9.2.1 CA-RIV-2203-H Fear Ranch Site

This site has been previously thought to be the location of the Fear Ranch. The recent NRHP evaluation indicates that the site is probably a staging area for the loading and unloading of cattle. No evidence was found linking the remains with the Fear Ranch. The site is not considered eligible for the NRHP.

3.9.2.2 CA-RIV-22040H La Puerta Abierta

La Puerta Abierta is the location of a late 19th to earth 20th century farming operation. Remains present include a stone entryway and a light scatter of historic trash. It is possible that subsurface excavations would reveal features and/or historic trash deposits, which might provide significant information on the early history of the area. This site is potentially NRHP eligible.

3.9.2.3 CA-RIV-4760-H The Second Strong Property

The site record form indicates that this site is an early 20th century residential location. Archival information indicates that John Strong moved here in about 1914 from the Billingsley Dairy Site (CA-RIV-3508-H). No intact structural remains are present. A small depression, and a brick lined conical sub-surface feature have been observed at the site. The recent investigation revealed little in the way of intact artifactual concentrations. It is not considered eligible for listing on the NRHP.

3.9.2.4 CA-RIV-4761-H The West Ranch

The site record form for this site indicates that this was the location of a former ranch built by the West family. There was a structure present on the site by at least 1899. A house and a barn were once present on this parcel. No intact structures are now present. Observable remains of the ranch include concrete foundation, fence line remnants, concrete fishpond, two unknown depressions, and surface scatter of historic trash. The recent investigation indicates that the archeological deposit retains subsurface integrity, and the artifactual types and numbers present could address significant research issues. This site is considered eligible for the NRHP.

3.9.2.5 Additional Required Studies And Actions

An additional study of CA-RIV-2204-H, La Puerta Abierta needs to be made. The recent limited archival and field study was not able to recover information with which to make a NRHP evaluation. It is anticipated that the required studies would consist of additional archival research and test excavations. If any of these resources are ultimately determined to be eligible for the NRHP, mitigation measures would be required. A MOA would be negotiated between the California State Historic Preservation Officer, USACE, and the Advisory Council on Historic Preservation. OCWD would participate as a concurring party to the MOA. The MOA would outline the specific mitigation measures to be implemented prior to water conservation. This consultation process is in accordance with Section 106 of the National Historic Preservation Act, as implemented by 36 CFR 800.

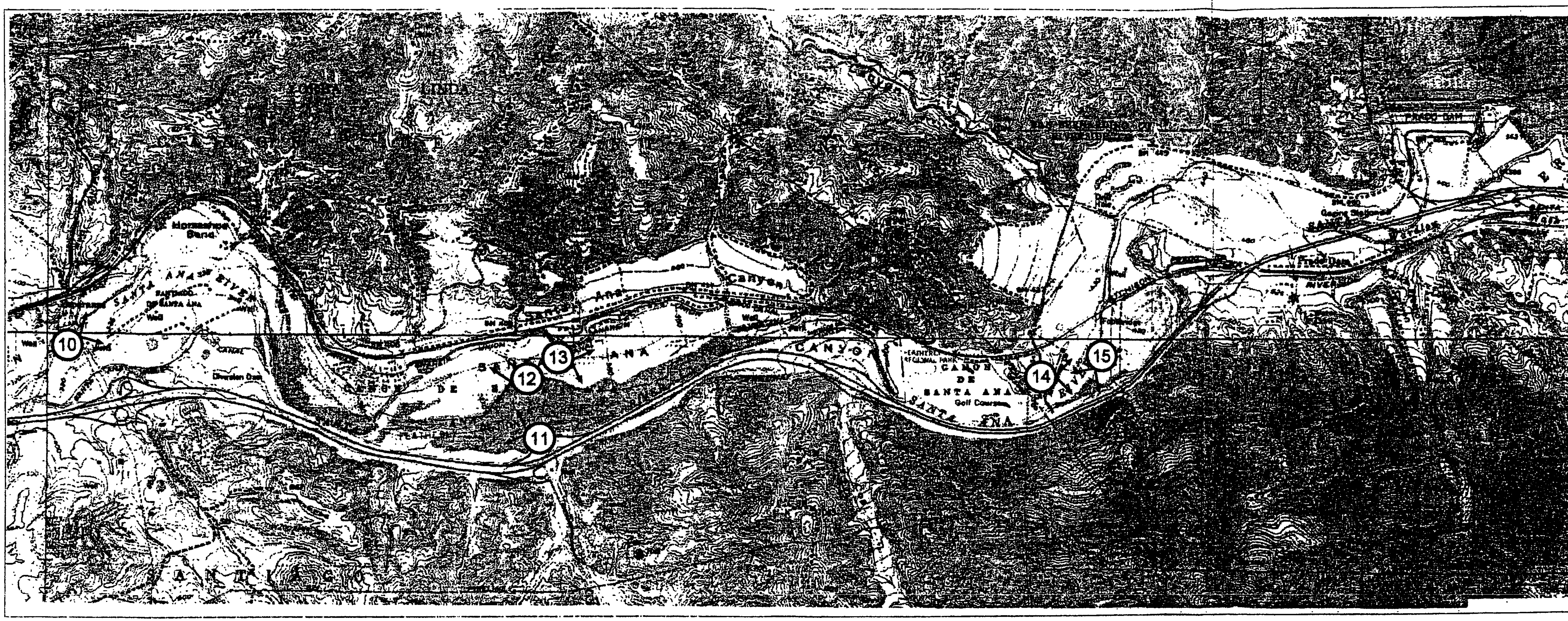

exhibit **3-11**

Downstream Photographic Location Index

Prado Dam Water Conservation and Supply Study EIS

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Larry Munsey International

NORTH

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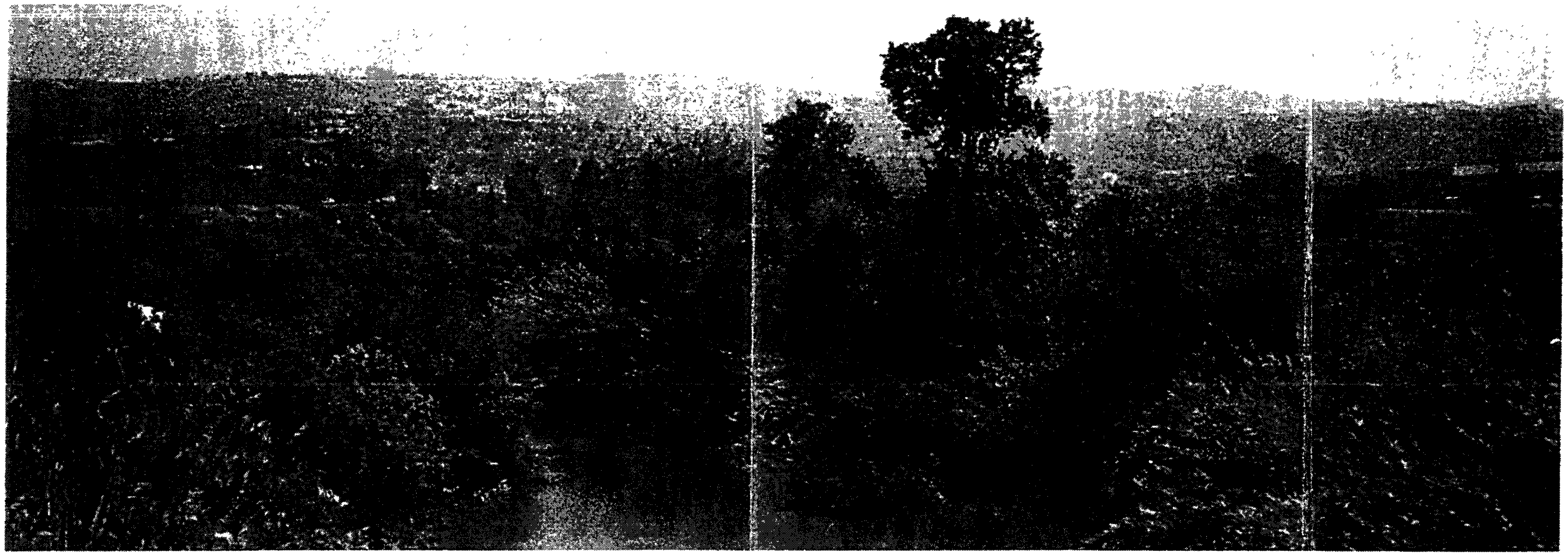


PHOTO 10: Facing northeast at bridge crossing on Weir Canyon Road toward Featherly Regional Park area of the Santa Ana River.

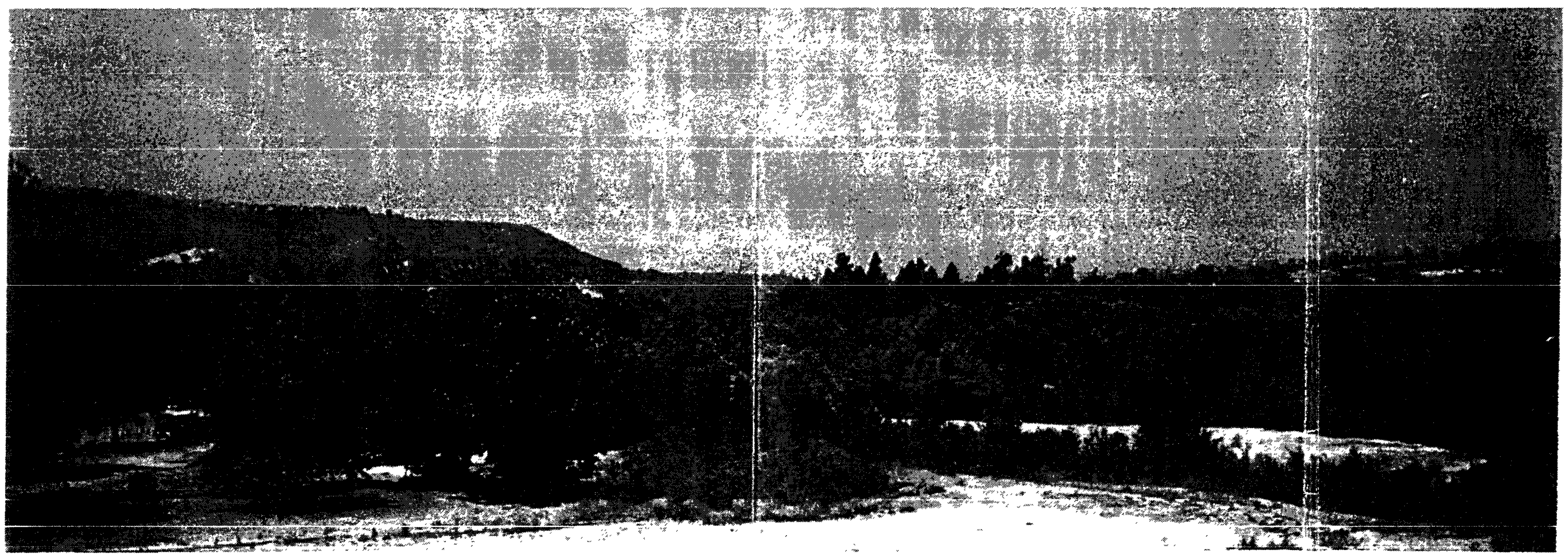


PHOTO 11: Facing northwest near bridge crossing at Gypsum Canyon Road toward RV campground in Featherly Regional Park and the southern bank of the Santa Ana River.

LMI
Larry Munsey International

exhibit **3-12**
Downstream Site Photographs 10 and 11

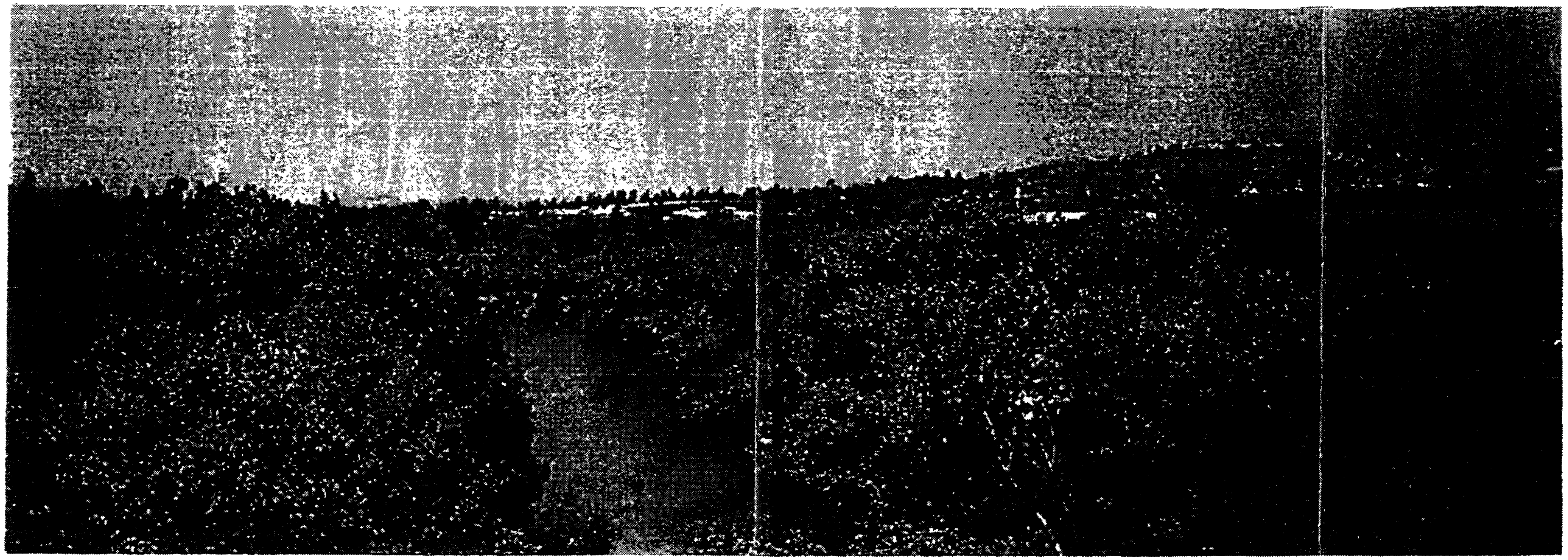


PHOTO 12: Facing west towards Santa Ana River and Featherly Park from the Santa Ana River recreational trail on the Gypsum Canyon Road Bridge.

PHOTO 13: Facing east at La Palma Avenue along Santa Ana River recreational trail.

PHOTO 14: Facing east at Green River Golf Course at potential flood plain area, with Santa Ana River in the background.

PHOTO 15: Facing southwest over small bridge crossing at Green River Golf Course within floodplain of the Santa Ana River.

exhibit **3-14**

Downstream Site Photographs 14 and 15

3.9.3 CULTURAL RESOURCES DOWNSTREAM OF PRADO BASIN

Cultural resources downstream of Prado Dam and upstream of Weir Canyon Road were previously addressed in the Phase II GDM for the Santa Ana River Mainstem. One prehistoric site and 15 historic sites have been identified through a cultural resources survey. These are listed in Table 3-6, below. The prehistoric site (Ora-817) was previously test excavated and determined ineligible for the National Register. Of the 15 historic sites, six may be eligible for the National Register and the other nine appear to be ineligible. The six potentially eligible sites are the Smith Property (CSULB-1), Scully Ranch (PB-138), Ken Yorba House (PB-140), Cajon Canal (PB-141), SAUI ditch (PB-142), and the Alta Vista townsite (PB-145).

TABLE 3-6
CULTURAL RESOURCES DOWNSTREAM OF PRADO DAM

Site No.	Name/Type	Significance	
		National Register	Other
ORA-817	Prehistoric site	Ineligible	None
CSULB-1	Smith Property	May be Eligible	Unknown
PB-108	Rubio House	Ineligible	None
PB-112	Grajalva House	May be Ineligible	Interpretive
PB-132	Ranch house	May be Ineligible	None
PB-133	Ranch house	May be Ineligible	None
PB-137	Bryant House	May be Ineligible	Interpretive
PB-138	Scully Ranch	May be Eligible	Interpretive
PB-139	Ranch site	May be Ineligible	None
PB-140	Ken Yorba House	May be Eligible	Interpretive
PB-141	Cajon Canal	May be Eligible	Interpretive
PB-142	SAVI Ditch	May be Eligible	None
PB-143	Manuel Feliz Adobe	May be Ineligible	None
PB-144	Peralta Adobe	May be Ineligible	None
PB-145	Alta Vista Townsite	May be Eligible	Interpretive
PB-146	Bixby Pump Station	May be Ineligible	None

3.10 PUBLIC HEALTH AND SAFETY

Mosquito breeding within standing water of the Prado Reservoir is the primary health and safety issue associated with the project area. Two mosquito abatement districts maintain responsibility for vector control within the Prado Reservoir. The Northwest Mosquito Abatement District (NMAD) has jurisdiction over approximately 90 percent of the Basin, and is funded by the City of Corona, the County of Riverside, and the OCWD. The West Valley Vector Control District (WVVCD) has jurisdiction in the northern section of the Reservoir and is funded by the residents of San Bernardino County. Downstream of Prado Reservoir, the NMAD and the Orange County Vector Control District (OCVCD) have jurisdiction over this reach of the Santa Ana River.

Mosquito breeding is most likely to occur during the summer months when ponds are first filled or created. Standing water such as the duck ponds within the Reservoir provide potential breeding areas. Typically, about five weeks after the ponds are developed, predators increase in numbers to effectively control the mosquito population. When necessary, mosquito abatement is conducted by spraying and by use of the mosquito fish (Gambusia affinis). The level of abatement depends upon the water level, the number of mosquitoes, and the potential for disease such as encephalitis and malaria.

According to Dr. Dillon of the NMAD, mosquito abatement within the Reservoir occurs up to ten times per summer, typically around the pond areas in the Basin. The NMAD has an MOU with the OCWD for compensation of the costs of abatement, which range from 15 to 20 thousand dollars annually. Art Cook, also from the NMAD, stated that over last several years the majority of the mosquito abatement (approximately 90 to 95 percent) has occurred through the use of mosquito fish. Approximately 5 to 10 percent of the mosquito population is controlled with the use of spraying.

4 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

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. The level of impact for issues within each topical area are classified as "beneficial impact," "adverse, but less than significant impact," and "adverse significant impact." 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 and is reasonably foreseeable. Issues are numbered in each section. As a result of this issue/impact identification methodology, more than one alternative can have the same type/number of issue/impact identification methodology, more than one alternative can have the same type/number of issue/ impact. Where issues/impacts are similar between alternatives, a reference is made to that effect and only the differences are described under the issue 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, and follow the Environmental Consequences discussion.

The identification of environmental consequences (or "impacts") for this project are those that occur with the implementation of the following alternatives: Alternative 1: No Action; Alternative 2: Flood Season Water Conservation up to Elevation 498 ft and Non-Flood Season Water Conservation up to Elevation 505 ft; Alternative 3: Flood Season Water Conservation up to Elevation 500 ft and Non-Flood Season Water Conservation up to Elevation 505 ft; Alternative 4: Flood Season Water Conservation up to Elevation 505 ft and Non-Flood Season Water Conservation Up to Elevation 505 ft; Alternative 5: Flood Season Water Conservation up to Elevation 508 ft and Non-Flood Season Water Conservation up to Elevation 508 ft.

4.1 EARTH RESOURCES

4.1.1 ENVIRONMENTAL CONSEQUENCES

4.1.1.1 Thresholds of Significance

An earth resources impact is considered adverse and significant if people or structures are exposed to major geologic hazards.

4.1.1.2 Geology and Soils

Alternative 1

No impacts on geology and soils would occur under the no action alternative as no changes to existing operations would occur.

Alternatives 2, 3, 4, and 5

Issue 4.1.1: Increased Underseepage Through Dam Foundation (Direct, Adverse, But Less Than Significant Impact). Increased water impoundment volumes that would occur during the flood season under this alternative could result in increased underseepage through the Prado Dam foundation. However, Prado Dam was constructed using a concrete key wall and sheet pile cutoff in order to minimize underseepage. Further, the bedrock structure is not conducive to underseepage; the sedimentary beds dip moderately to steeply in an upstream direction. This potential impact is considered less than significant.

4.1.1.3 Topography

Alternative 1

No impacts on topography would occur under the "No Action" Alternative as no changes to existing operations would occur. The projected sediment deposition under existing water conservation operations during a 50-year period is 35,000 ac-ft or 700 ac-ft per year.

Alternatives 2, 3, 4, and 5

Issue 4.1.2: Alteration of the Existing Topography (Direct, Adverse, But Less Than Significant Impact). Implementation of Alternatives 2 through 5 would result in a range of sediment deposition of 37,050 to 39,800 ac-ft within Prado Reservoir during a 50-year period. This sediment deposition would be an increase of 41 to 96 ac-ft per year compared to the existing operations. This increase of sediment deposition throughout Prado Reservoir (10,280 ac) would represent an average increase in topographic height of approximately 2 to 6 inches throughout the reservoir over the life of the project. These increases in topographic height would not be considered a significant impact on topography.

4.1.1.4 Seismicity

Alternative 1

No impacts involving seismicity would occur under the "No Action" Alternative as no changes to existing operations would occur.

Alternatives 2, 3, 4, and 5

No impacts involving seismicity would occur under Alternatives 2, 3, 4, and 5, as the increased water level from each of these alternatives is well within the safe capacity of Prado Dam.

4.1.2 MITIGATION MEASURES

Alternatives 1

No mitigation is required.

Alternatives 2, 3, 4, and 5

Issue 4.1.1: Increased Underseepage Through Dam Foundation.

No mitigation is required.

Issue 4.1.2: Alteration of the Existing Topography.

No mitigation is required.

4.1.3 LEVEL OF SIGNIFICANCE AFTER MITIGATION

No significant impacts would occur with the implementation of the above alternatives.

4.2 WATER RESOURCES

4.2.1 ENVIRONMENTAL CONSEQUENCES

4.2.1.1 Thresholds of Significance

An alternative is considered to have a significant adverse impact if it would result in:

- Substantial erosion or sedimentation;
- Adversely affect the flood control function of the Prado Dam basin area;
- Reduce the flood control protection that is currently provided by the downstream flood control facilities;
- Decrease the groundwater yield in the project vicinity;
- Substantially degrade the quality of surface water.

4.2.1.2 Hydrology

Alternative 1

The No Action Alternative would not result in any impacts when compared to existing conditions because there is no action under this alternative. Based on existing projections, approximately 35,000 ac-ft (af) of sediment and debris would settle within Prado Reservoir over the next 50 years. This equates to a rate of 700 ac-ft per year. This sediment is projected to decrease the existing water storage capacity over the next 50 years. This equates to a rate of 700 ac-ft per year. Once the design sediment allocation of 35,000 af is reached (50 years), sediment removal would be required.

Alternative 2

Issue 4.2.1: Accumulation of Sediment or Debris Within Prado Dam Basin Area (Direct, Adverse, But Less Than Significant Impact). Under this alternative, the maximum water conservation pool during the flood season would be at elevation 498 ft while the maximum conservation pool during the non-flood season would remain at elevation 505 ft. This rise in water surface elevation during the flood season would result in approximately 703 ac-ft per year (afy) of sediment and debris settling within the Prado Reservoir. This alternative would result in an approximately 3 afy increase in sediment and debris that would settle within the reservoir when normally (under present and future conditions) this sediment and debris would be flushed through the Prado Dam outlets into the lower reaches of the Santa Ana River. Over a 50-year period, approximately 150 af of additional sediment and debris would settle within the reservoir. This amount of sedimentation represents an approximately 0.04 percent reduction in water storage capacity at Prado Dam (up to elevation 563 feet). The depletion of the design sediment allocation by three years and the reduction of the water storage capacity by one percent over fifty years are not considered to be significant.

Issue 4.2.2: Potential Impacts on Existing Downstream Flood Control Facilities (Direct, Beneficial Impact). Increased water impoundment behind Prado Dam would result in a greater amount, although not significant of sediment being deposited within Prado Reservoir. This would result in less sediment being transported downstream, proportionate to the increase in sedimentation behind Prado Dam (refer to issue 4.2.1). The decrease in the amount of sediment downstream would not be significant and may not be noticeable. Therefore, maintenance activities required at downstream flood control facilities may be minimally decreased. This is considered a beneficial impact of the proposed action.

Issue 4.2.3: Increased Yields of Groundwater Recharge (Direct, Beneficial Impact). Under the implementation of this alternative during the present conditions, the annual groundwater recharge yield at the downstream spreading facilities would be 240,000 af, which is an increase of 2,000 af, compared to existing operations. During future conditions, the annual groundwater recharge yield at the downstream spreading facilities would be 318,000 af, which is an increase of 4,000 af, compared to existing operations. These increases in annual groundwater recharge yield under this alternative would be considered a beneficial impact.

Issue 4.2.4: Increased Sediment Erosion at the Downstream River View Golf Course (Indirect, Adverse, Potentially Significant Impact). The proposed Prado Dam release rate associated with this project alternative have the potential to substantially impact the River View Golf Course, located approximately 21 miles downstream from the Prado Reservoir. Portions of the golf course were constructed by placing fill above the design invert and grouted stone side slopes. The total volume of fill in this area is approximately 357,000 cubic yards (cy), which may be susceptible to erosion from higher release rates from Prado Dam. The potential for erosion was addressed in the *Prado Dam Water Conservation Study Hydraulics Appendix for AFB Documentation* prepared by USACE in August 1999.

Under this alternative, the maximum release rate of 5,000 cfs from Prado Dam has the potential for eroding a total of 1,400 cy of sediment at the golf course. Further, subsequent to implementation of this alternative, the frequency associated with a release of 5,000 cfs would change from once every 12 years to once every 2 years. Thus, the likelihood of realizing the maximum release rate and subsequent erosion at the golf course would increase under this project alternative. The increased potential for erosion is considered a potentially significant impact

Alternative 3

Issue 4.2.1: Accumulation of Sediment or Debris Within Prado Reservoir (Direct, Adverse, But Less Than Significant Impact). Under this alternative, the water conservation pool during the flood season would be allowed to rise to elevation 500 ft while the conservation pool during the non-flood season would remain at elevation 505 ft. This rise in water surface elevation during the flood season would result in approximately 705 afy of sediment and debris settling to the bottom of the Prado Reservoir. This alternative would result in an approximately 55 afy increase in sediment and debris that would settle to the bottom of the reservoir when normally (under present and future conditions) this sediment and debris would be flushed through the Prado Dam outlets into the lower reaches of the Santa Ana River. Over a 50-year period, approximately 37,750 af of sediment and debris would settle to the bottom of the reservoir. This amount of sedimentation represents an approximately 11 percent reduction in water storage capacity within Prado Reservoir (up to elevation 563 feet), or an additional one percent reduction compared to existing operations. In addition, the design sediment allocation of 35,000 af would be reduced from 50 to 46 years under this Alternative. The depletion of the design sediment allocation by four years and the reduction of the water storage capacity by one percent over fifty years are not considered to be significant.

Issue 4.2.2: Potential Impacts on Existing Downstream Flood Control Facilities (Direct, Beneficial Impact). Modifications to the dam's operations plan under this alternative would result in a lower discharge rate of 500 cfs between elevations 494 ft and 500 ft during the flood season compared to the present rate (after the outlet structure is modified under the Phase II GDM design for Prado Dam). The discharge rate during the non-flood season would remain the same. The decrease in discharge rate and increase in the water conservation pool during the flood season would allow a decrease in the amount of sediment that is transported to downstream flood control facilities. This decrease in the amount of sediment would require less maintenance of the downstream flood control facilities and would result in a beneficial impact.

Issue 4.2.3: Increased Yields of Groundwater Recharge (Direct, Beneficial Impact). Under the implementation of this alternative during present conditions, the annual groundwater recharge yield at Prado Dam would be 241,000 af which is an increase of 3,000 af compared to existing operations. During future conditions, the annual groundwater yield at Prado Dam would be 319,000 af, which is an increase of 5,000 af, compared to existing operations. These increases in annual groundwater recharge yield under this alternative would be considered a beneficial impact.

Issue 4.2.4: Increased Sediment Erosion at the Downstream River View Golf Course (Indirect, Adverse, Potentially Significant Impact). The proposed Prado Dam release rate associated with this project alternative has the potential to substantially affect the River View Golf Course, located approximately 21 miles downstream from the Prado Basin. Portions of the golf course were constructed by placing fill above the design invert and grouted stone side slopes. The total volume of fill in this area is approximately 357,000 cubic yards (cy), which may be susceptible to erosion from higher release rates from Prado Dam. The potential for erosion was addressed in the *Prado Dam Water Conservation Study Hydraulics Appendix for AFB Documentation* prepared by USACE in August 1999.

Under this alternative, the maximum rate of 7,400 cfs from Prado Dam has the potential for eroding a total of 4,500 cy of sediment at the golf course. Further, subsequent to implementation of this alternative, the frequency associated with a release of 7,400 cfs would change from once every 18 years to once every 3 years. Thus, the likelihood of realizing the maximum release rate and subsequent erosion at the golf course would increase under this project alternative. The increased potential for erosion is considered a potentially significant impact.

Alternative 4

Issue 4.2.1: Accumulation of Sediment or Debris Within Prado Reservoir (Direct, Adverse, But Less Than Significant Impact). Under this alternative, the water conservation pool during the flood season would be allowed to rise to elevation 505 ft while the conservation pool during the non-flood season would remain at elevation 505 ft. This rise in water surface elevation during the flood season would result in approximately 707 ac-ft per year of sediment and debris settling to the bottom of the Prado Dam reservoir. This alternative would result in an approximately 82-afy increase in sediment and debris that would settle to the bottom of the reservoir when normally (under present and future conditions) this sediment and debris would be flushed through the Prado Dam outlets into the lower reaches of the Santa Ana River. Over a 50-year period, approximately 39,100 af of sediment and debris would settle to the bottom of the reservoir. This amount of sedimentation represents an approximately 11 percent reduction in water storage capacity within Prado Basin (up to elevation 563 feet), or an additional one percent reduction compared to existing operations. In addition, the design sediment allocation of 35,000 af would be reduced from 50 to 45 years under this Alternative. The depletion of the design sediment allocation by five years and the reduction of the water storage capacity by one percent over fifty years are not considered to be significant.

Issue 4.2.2: Potential Impacts on Existing Downstream Flood Control Facilities (Direct, Beneficial Impact). Modifications to the dam's operations plan under this alternative would result in a lower discharge rate of 500 cfs between elevations 494 ft and 505 ft during the flood season compared to Alternative 1. The discharge rate during the non-flood season would remain the same. The decrease in discharge rate and increase in the water conservation pool during the flood season would allow a decrease in the amount of sediment that is transported to downstream of Prado Dam. This decrease in the amount of sediment would require less maintenance and would result in a beneficial impact on the downstream flood control facilities.

Issue 4.2.3: Increased Yields of Groundwater Recharge (Direct, Beneficial Impact). Under the implementation of this alternative during the present conditions, the annual groundwater recharge yield at Prado Dam would be 242,000 af which is an increase of 4,000 af compared to existing operations. During future conditions, the annual groundwater yield at Prado Dam would be 322,000 af, which is an increase of 8,000 af, compared to existing operations. These increases in annual groundwater recharge yield under this alternative would be considered a beneficial impact.

Issue 4.2.4: Increased Sediment Erosion at the Downstream River View Golf Course (Indirect, Adverse, Potentially Significant Impact). The proposed Prado Dam release rate associated with this project alternative has the potential to substantially affect the River View Golf Course, located approximately 21 miles downstream from the Prado Basin. Portions of the golf course were constructed by placing fill above the design invert and grouted stone side slopes. The total volume of fill in this area is approximately 357,000 cubic yards (cy), which may be susceptible to erosion from higher release rates from Prado Dam. The potential for erosion was addressed in the *Prado Dam Water Conservation Study Hydraulics Appendix for AFB Documentation* prepared by USACE in August 1999.

Under this alternative, the maximum release rate of 14,900 cfs from Prado Dam has the potential for eroding a total of 16,500 cy of sediment at the golf course. Further, subsequent to implementation of this alternative, the event frequency associated with the 14,900 cfs release rate would change from 33-yr to 3.5-yr. Thus, the likelihood of realizing the maximum release rate and subsequent erosion at the golf course would increase under this project alternative. The increased potential for erosion is considered a potentially significant impact.

Alternative 5

Issue 4.2.1: Accumulation of Sediment or Debris Within Prado Reservoir (Direct, Adverse, But Less Than Significant Impact). Under this alternative, the water conservation pool during the flood season would be allowed to rise to elevation 508 ft while the conservation pool during the non-flood season would be allowed to rise to elevation 508 ft. This rise in water surface elevation during the flood season would result in approximately 709 ac-ft per year of sediment and debris settling to the bottom of the Prado Dam reservoir. This alternative would result in an approximately 93-afy increase in sediment and debris that would settle to the bottom of the reservoir when normally (under present and future conditions) this sediment and debris would be flushed through the Prado Dam outlets into the lower reaches of the Santa Ana River. Over a 50 year period, approximately 39,800 af of sediment and debris would settle to the bottom of the reservoir. This amount of sedimentation represents an approximately 11 percent reduction in water storage capacity within Prado Basin (up to elevation 563 feet), or an additional one percent reduction compared to existing operations. In addition, the design sediment allocation of 35,000 af would be reduced from 50 to 44 years under this Alternative. The depletion of the design sediment allocation by six years and the reduction of the water storage capacity by one percent over fifty years are not considered to be significant.

Issue 4.2.2: Potential Impacts on Existing Downstream Flood Control Facilities (Direct, Beneficial Impact). Modifications to the dam's operations plan under this alternative would result in a lower discharge rate of 500 cfs between elevations 494 ft and 508 ft during the flood season and between elevations 505 ft and 508 ft during the non-flood season compared to the present rate (after the outlet structure is modified under the Phase II GDM design for Prado Dam). The decrease in discharge rate and increase in the water conservation pool would allow a decrease in the amount of sediment that is transported to downstream flood control facilities. This decrease in the amount of sediment would require less maintenance of the downstream flood control facilities and would result in a beneficial impact.

Issue 4.2.3: Increased Yields of Groundwater Recharge (Direct, Beneficial Impact). Under the implementation of this alternative during the present conditions, the annual groundwater recharge yield at Prado Dam would be 244,000 af which is an increase of 6,000 af compared to existing operations. During future conditions, the annual groundwater yield at Prado Dam would be 324,000 af, which is an increase of 10,000 af, compared to existing operations. These increases in annual groundwater recharge yield under this alternative would be considered a beneficial impact.

Issue 4.2.4: Increased Sediment Erosion at the Downstream River View Golf Course (Indirect, Adverse, Potentially Significant Impact). The proposed Prado Dam release rate associated with this project alternative has the potential to substantially affect the River View Golf Course, located approximately 21 miles downstream from the Prado Basin. Portions of the golf course were constructed by placing fill above the design invert and grouted stone side slopes. The total volume of fill in this area is approximately 357,000 cubic yards (cy), which may be susceptible to erosion from higher release rates from Prado Dam. The potential for erosion was addressed in the *Prado Dam*

Water Conservation Study Hydraulics Appendix for AFB Documentation prepared by USACE in August 1999.

Under this alternative, the maximum release rate of 25,900 cfs from Prado Dam has the potential for eroding a total of 89,100 cy of sediment at the golf course. Further, subsequent to implementation of this alternative, the event frequency associated with the 25,900 cfs release rate would change from once every 83 years to once every 4 years. Thus, the likelihood of realizing the maximum release rate and subsequent erosion at the golf course would increase under this project alternative. The increased potential for erosion is considered a potentially significant impact.

4.2.1.3 Water Quality

Alternative 1

This alternative would not result in any impacts when compared to existing conditions because there is no action under this alternative.

Alternative 2

Issue 4.2.5: Impacts of Surface Water Quality Downstream of Prado Dam (Direct, Beneficial Impact). The implementation of this alternative would impound more water during the flood season compared to existing operations. The increase in water impoundment would dilute pollutants associated with the base flow that enters Prado Reservoir. Therefore, the quality of the water that is released downstream of Prado Dam to the groundwater spreading grounds would be higher than under the existing operations. This alternative would result in a beneficial impact on surface water quality downstream of Prado Dam compared to existing operations.

Issue 4.2.6: Impacts of Surface Water Quality Within the Prado Dam Basin Area (Direct, Beneficial Impact). For a number of years, state and local water agencies have been concerned with the quality of water within the Santa Ana River. The California Regional Water Quality Control Board (CRWQCB) has established water quality objectives for the Santa Ana River. For the reach immediately upstream from Prado Dam, including the reservoir, an objective of 700 mg/l total filterable residue (TFR) has been set for the baseflow, expressed as a 5-year moving average. Under the existing operations of Prado Dam, flood water that is impounded during the flood season (elevation 494 ft) currently dilutes the poor quality surface water. With the implementation of Alternative 2, an increased volume of water would be impounded for a longer period of time and there would be an increase in dilution during the flood season within the Prado Reservoir area compared to the existing operations. Therefore, this alternative would result in a beneficial impact on existing surface water quality.

Alternative 3

Issue 4.2.5: Impacts of Surface Water Quality Downstream of Prado Dam (Direct, Beneficial Impact). The implementation of this alternative would impound more water during the flood season compared to existing operations. The increase in water impoundment would dilute pollutants associated with the base flow that enters Prado Reservoir. Therefore, the quality of the water that is released downstream of Prado Dam to the groundwater spreading grounds would be higher than under the existing operations. This alternative would result in a beneficial impact on surface water quality downstream of Prado Dam compared to existing operations.

Issue 4.2.6: Impacts of Surface Water Quality Within the Prado Dam Basin Area (Direct, Beneficial Impact). For a number of years, state and local water agencies have been concerned with the quality of water within the Santa Ana River. The California Regional Water Quality Control Board (CRWQCB) has established water quality objectives for the Santa Ana River. For the reach immediately upstream from Prado Dam, including the reservoir, an objective of 700 mg/l total filterable residue (TFR) has been set for the baseflow, expressed as a 5-year moving average. Under the existing operations of Prado Dam, flood water that is impounded during the flood season (elevation 494 ft) currently dilutes the poor quality surface water. With the implementation of Alternative 3, more water also would be impounded for a longer period of time and there would be an increase in dilution during the flood season within the Prado Dam basin area compared to the existing operations. Therefore, this alternative would result in a beneficial impact on existing surface water quality.

Alternative 4

Issue 4.2.5: Impacts of Surface Water Quality Downstream of Prado Dam(Direct, Beneficial Impact). The implementation of this alternative would impound more water during the flood season compared to existing operations. The increase in water impoundment would dilute pollutants associated with the base flow that enters Prado Reservoir. Therefore, the quality of the water that is released downstream of Prado Dam to the groundwater spreading grounds would be higher than under the existing operations. This alternative would result in a beneficial impact on surface water quality downstream of Prado Dam compared to existing operations.

Issue 4.2.6: Impacts of Surface Water Quality Within the Prado Dam Basin Area (Direct, Beneficial Impact). For a number of years, state and local water agencies have been concerned with the quality of water within the Santa Ana River. The California Regional Water Quality Control Board (CRWQCB) has established water quality objectives for the Santa Ana River. For the reach immediately upstream from Prado Dam, including the reservoir, an objective of 700 mg/l total filterable residue (TFR) has been set for the baseflow, expressed as a 5-year moving average. Under the existing operations of Prado Dam, floodwater that is impounded during the flood season (elevation 494 ft) currently dilutes the poor quality surface water. With the implementation of Alternative 4, more water also would be impounded for a longer period of time and there would be an increase in dilution during the flood season within the Prado Dam basin area compared to the existing operations. Therefore, this alternative would result in a beneficial impact on existing surface water quality.

Alternative 5

Issue 4.2.5: Impacts of Surface Water Quality Downstream of Prado Dam (Direct, Beneficial Impact). The implementation of this alternative would impound more water during the flood season compared to existing operations. The increase in water impoundment would dilute pollutants associated with the base flow that enters Prado Reservoir. Therefore, the quality of the water that is released downstream of Prado Dam to the groundwater spreading grounds would be higher than under the existing operations. This alternative would result in a beneficial impact on surface water quality downstream of Prado Dam compared to existing operations.

Issue 4.2.6: Impacts of Surface Water Quality Within the Prado Dam Basin Area (Direct, Beneficial Impact). For a number of years, state and local water agencies have been concerned with the quality of water within the Santa Ana River. The California Regional Water Quality Control Board (CRWQCB) has established water quality objectives for the Santa Ana River. For the reach immediately upstream from Prado Dam, including the reservoir, an objective of 700 mg/l total filterable residue (TFR) has been set for the baseflow, expressed as a 5-year moving average. Under the existing operations of Prado Dam, floodwater that is impounded during the flood season (elevation 494 ft) currently dilutes the poor quality surface water. With the implementation of Alternative 5, more water would be impounded for a longer period of time and there would be an increase in dilution during the flood and non-flood seasons within the Prado Dam basin area compared to the existing operations. Therefore, this alternative would result in a beneficial impact on existing surface water quality.

4.2.2 MITIGATION MEASURES

4.2.2.1 Hydrology

Alternative 1

No mitigation is required.

Alternatives 2, 3, 4, and 5

Issue 4.2.1: Accumulation of Sediment or Debris Within the Prado Dam Basin Area.

No mitigation is required.

Issue 4.2.2: Potential Impacts on Existing Downstream Flood Control Facilities.

No mitigation is required.

Issue 4.2.3: Increased Yields of Groundwater Recharge.

No mitigation is required.

Issue 4.2.4: Increased Sediment Erosion at the Downstream River View Golf Course.

When maximum discharge rates are realized under the proposed water conservation operations, sediment material at the downstream River View Golf Course will need to be replaced more frequently compared to existing conditions and any required reconstruction at the golf course will need to occur.

4.2.2.2 Water Quality

Alternative 1

No mitigation is required.

Alternatives 2, 3, 4, and 5

Issue 4.2.5: Impacts of Surface Water Quality Downstream of Prado Dam.

No mitigation is required.

Issue 4.2.6: Impacts of Surface Water Quality Within the Prado Dam Basin Area.

No mitigation is required.

4.2.3 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Implementation of the above mitigation measures would reduce all adverse impacts to a level that is considered less than significant.

4.3 BIOLOGICAL RESOURCES

Long-term operational impacts on biological resources are assessed using inundation durations at various elevations under both present and future conditions for five post-construction and four pre-construction alternatives. These impacts are assessed based on 2-, 5-, 10-, 25-, 50-, and 100-year flood events, as well as the length of inundation averaged over a 100-year period (see Tables 2-2 through 2-15 in Section 2.6.2). Inundation during the flood season (October 1 through the end of February) and the non-flood season (March 1 through September 30) are examined separately with respect to impacts. For alternatives 2 through 5, the present condition assumes that Phase II GDM dam improvements already approved have been completed. The future condition takes into account projected urban development in the upper watershed with its concomitant increase in surface water run-off leading to a greater volume of inflow into the Basin, as well as the accumulation of sediments in the Basin over time.

The U.S Fish and Wildlife Service (Service) were involved in all meetings on the biological impacts of the proposed action from the inception of the study. The Draft Coordination Act Report (CAR) was utilized early in the study, but as the project kept evolving over time, it was decided by the Corps, OCWD and the Service, that rather than finalize the CAR, the logical step was to initiate Section 7 and request a Biological Opinion for the proposed project. The Draft CAR is included as Appendix C, and the Biological Opinion as Appendix F. A letter was provided more recently by the Service requesting that the subject Draft CAR serve as the Final CAR for this project.

4.3.1 ENVIRONMENTAL CONSEQUENCES UPSTREAM OF PRADO DAM

The biological resources consequences of storing more water behind Prado Dam for flood control and water conservation are primarily the result of alterations in the amounts and distribution of riparian vegetation types in the Basin and, in spring, the potential flooding of least Bell's vireo nests following a major storm event late in the season. Predicting the nature of and attempting to quantify alterations in riparian vegetation is a nearly insurmountable task, especially in light of the highly variable annual inundation profiles. For example, at the present time, the water conservation pool is allowed to rise to elevation 494 ft during the months of October through February and to elevation 505 ft between March and September. However, in dry years these levels are not achieved and in wet years the elevation 494-ft level is exceeded following heavy storms. Even with no action, the present inundation profile will change over time as surface runoff increases with the build-out of urbanizing areas in the Santa Ana River watershed upstream (*e.g.*, Norco, Corona, Riverside, San Bernardino) and sediments build up in the Basin. This future "baseline" condition is also analyzed in the following paragraphs.

The reservoir pool reaches elevation 494 ft only 42 days a year on average and elevation 505 ft only 9 days a year under existing operations for present conditions (Table 2-2). This is expected to increase to 68 and 12 days a year, respectively, for future conditions without any change in existing operations (Table 2-3). By increasing the flood season water conservation pool (the buffer pool) to elevation 498 ft (Alternative 2), the number of days of inundation at elevation 494 ft is only expected to increase by an average of 6 additional days (14 percent) a year. The most dramatic increase in the water conservation pool to elevation 508 ft for both flood control and water conservation (Alternative 5) would result in an average annual increased duration of inundation at elevation 494 ft of 21 days a year (50 percent increase) under present conditions and 44 days a year under future conditions.

Perhaps more important than average reservoir levels is extreme conditions associated with major storm events (see Tables 2-2 through 2-11 in Section 2.7.2). For example, little if any direct impacts on the endangered least Bell's vireo are likely to occur if the seasonal pool is at elevation 505 ft 12 more days a year than under existing operations. But one spring storm event that raises the level to elevation 505 ft when it has been well below that level may flood (and thus destroy) dozens of vireo nests, significantly impacting vireo nesting success for that year. For this reason, inundation levels are also analyzed based on 2-, 5-, 10-, 25-, 50-, and 100-year storm events.

For present conditions under existing operations (the No Action Alternative), inundation levels will reach elevation 494 ft, the existing flood season water conservation objective, an average of 42 days a year. This objective will be exceeded approximately every 5 years (a five-year storm event) when inundation levels would be expected to reach or exceed elevation 494 ft for 80 days. This duration of inundation increases significantly with storm events of increasing magnitude. For example, a 100-year storm will raise the reservoir level to or higher than elevation 494 for 275 days (nine months) and to elevation 505 ft for 135 days (four and a half months). Under the various project alternatives discussed below, both average inundation levels and major storm event inundation periods are expected to increase accordingly and have increasingly greater long-term operational impacts on biological resources.

Twenty-four impact areas have been identified for biological resources. For a summary of the extent of impacts and their significance for these 24 biological resource areas in the Basin and the Santa Ana River between Prado Dam and Weir Canyon, see Table S-1.

4.3.1.1 Thresholds of Significance

Impacts on 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 nesting or 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 Threatened or Endangered Species or its habitat.

- Substantial loss of individuals or populations of a species proposed for federal listing, a candidate for state listing, or species that are regionally rare or otherwise sensitive.

- 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 reduction 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.

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 resource, 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 population-wide or region-wide basis.

4.3.1.2 Impacts on Critical Habitat

The predominant vegetation type in the Basin between elevations 494 and 508 ft is willow woodland (approximately 915 ac), which is also a major component of least Bell's vireo and southwestern willow flycatcher critical habitat. A complex mosaic of understory vegetation, an important component of critical habitat for these two species, develops along the edges of the mature willow woodland and along the banks of stream channels. Significant understory vegetation generally does not develop in the interior of the willow forest. Altering the inundation profile may alter the pattern and extent of understory vegetation over time, but the extent to which it will be altered under such a complex system is not possible to quantify.

Understory vegetation is important in the breeding success of these two endangered species in the Basin. Any overall reduction in the amount of understory vegetation may have a significant adverse effect on the breeding success of these two species as discussed below. Also, excessive inundation late in the flood season may destroy nests of the least Bell's vireo.

Alternative 1

No additional direct impacts on vireo or flycatcher critical habitat would result under existing operations which are to keep the water conservation pool levels in the reservoir during flood season at or below elevation 494 ft and the non-flood season at or below elevation 505 ft.

Alternative 2

Issue 4.3.1: Impacts on Least Bell's Vireo Critical Habitat (Direct, Adverse, Significant Impact). Under present conditions, implementation of Alternative 2 would result in the inundation of 89.0 ha (219.6 ac) of critical vireo habitat (willow woodland, eucalyptus/willow woodland, and riparian scrub) for an average of 5 more days a year (6 more days per year at elevation 494 ft and 4 more days at elevation 498 ft) than under existing operations (Table 2-4). Under future conditions, the Basin would be inundated an average of 16.5 more days between elevations 494 and 498 ft than under existing operations (Table 2-5).

Major storm events will increase the continuous period of inundation at all elevations below 508 ft, depending on the intensity of the storm and the conversation pool elevation. For example, under present conditions, at elevation 494 ft, a 2-year storm event will increase the inundation duration by 10 days, a 10-year storm by 20 days, and a 50-year storm by 40 days during the flood season (Table 2-4). However, at elevation 505 ft, the inundation period is not increased significantly under this alternative (only by 5 days following a 50-year or greater storm event). Under future conditions, at elevation 494 ft, 2-, 10-, and 50-year storm events will increase the inundation period by 50, 25, and 40 days respectively. This does not represent a substantial increase over existing operations for major storm events, but represents a five-fold increase over Alternative 2 present conditions following a 2-year storm. Under future conditions at elevation 505 ft, increased inundation periods are much less, the maximum is approximately 10 days following a 50-year storm.

A number of plant species within the willow woodland habitat are adapted to flooded conditions, ranging from "tolerant" to "very tolerant" of inundation. Tolerant species, including most willow species, can withstand flooding for most of one growing season. Very tolerant species (*e.g.*, black willow which is easily the most common willow in the Basin) can be inundated for two or more growing seasons without deleterious effects (USFWS 1997b). In fact, both tolerant and very tolerant species exhibit new root development during periods of inundation. Willow woodland, however, may be affected differently, depending on the depth of inundation (*e.g.*, submerged soils only, understory level, or canopy level) and the number of consecutive years of inundation. Long periods of inundation resulting in super-saturated soils have been known to cause mature black willows to fall over (V. Smith pers. comm.).

Because of the uncertainty of potential effects associated with various levels and durations of inundation, implementation of Alternative 2 may or may not have an adverse impact on willow woodland habitat. From a biological standpoint, such impacts would be temporary, relatively short term, and less than significant when occur outside the growing season.

Measurable amounts of riparian scrub, another component of vireo critical habitat, are not present at or below elevation 505 ft. With implementation of Alternative 2, average annual inundation periods are not expected to increase above elevation 505 ft. Only a 50-year storm or greater would be expected to increase the period of inundation in the riparian scrub community under existing operations, and then only by 1-3 days. Under future conditions, increased periods of expected inundation above elevation 505 ft are only 1-2 days, but this increase could occur following a 5-year storm event.

Understory vegetation is a critical component of the vireo's critical habitat (USFWS 1994). Extensive periods of flooding at elevations where most understory vegetation has developed may result in its temporary reduction. Although impossible to quantify, any reduction, even for a few seasons, in the amount of understory vegetation would represent a significant adverse impact. Interestingly, prolonged periods of inundation that may result in a reduction of existing understory vegetation, may also cause mature black willows to topple, creating new "understory" vegetation. Vireos in the Basin readily nest in recently fallen willows that still retain their foliage (V. Smith pers. comm.). Irrespective of new "understory" vegetation that may be created, increased inundation levels resulting from implementation of Alternative 2 are not considered to be significant.

Issue 4.3.2: Impacts on Southwestern Willow Flycatcher Critical Habitat (Direct, Adverse, Significant Impact). Implementation of Alternative 2 would have similar impacts on willow flycatcher critical habitat as on the Bell's vireo critical habitat.

Alternative 3

Issue 4.3.1: Impacts on Least Bell's Vireo Critical Habitat (Direct, Adverse, Significant Impact). Under present conditions, implementation of Alternative 3 would result in the inundation of 140.6 ha (346.9 ac) of critical vireo habitat between elevations 494 and 500 ft for an average of 10 more days a year than existing operations and 15 more days a year under future conditions with existing operations.

Implementation of Alternative 3, under present conditions, will result in an increased period of inundation at elevations 494 ft of 15 days following a 2-year storm, 20 days following a 10-year storm, and 40 days following a 50-year storm compared to existing operations. When compared to future conditions with existing operations (no action), this increases to 50 and 25 days respectively for 2-year and 5-year events, but does not increase further with a 50-year event.

Inundation of willow woodland habitat would not be significantly greater under Alternative 3, and impacts on this component of vireo critical habitat would remain not significant.

Increased inundation of riparian scrub would remain at 3 days or less, even following a 50- or 100-year storm event, and thus, would be not significant.

As under Alternative 2, the increased number of days of inundation may result in a temporary reduction of the amount of understory vegetation that is an important component of vireo critical habitat. Therefore, impacts on understory vegetation resulting from implementation of Alternative 3 would be significant.

Issue 4.3.2: Impacts on Southwestern Willow Flycatcher Critical Habitat (Direct, Adverse, Significant Impact). As in Alternative 2, implementation of Alternative 3 would potentially have similar adverse, but not significant impacts on willow flycatcher critical habitat as on Bell's vireo critical habitat.

Alternative 4

Issue 4.3.1: Impacts on Least Bell's Vireo Critical Habitat (Direct, Adverse, Significant Impact). Implementation of Alternative 4 would result in the inundation of 260.3 ha (642.4 ac) of critical vireo habitat between elevations 494 and 505 ft for an average of 14 more days a year under present conditions and 17 more days under future conditions compared to existing operations. Because understory vegetation may be significantly reduced, at least temporarily, under this alternative, this is seen as a significant adverse impact.

With implementation of Alternative 4, inundation periods following major storm events at elevation 494 ft increase noticeably under present conditions compared to existing operations. Following a 2-year storm event inundation would be 20 more days under this alternative compared to 10 more days with Alternative 2 and 15 more days with Alternative 3. Under future conditions, however, inundation remains the same as present conditions, except following a 10-year storm when the duration increases from 25 to 40 days.

Impacts on riparian scrub remain essentially the same with implementation of Alternative 4 as with Alternatives 2 and 3. Understory vegetation may be reduced temporarily with implementation of this alternative, and for this reason, impacts on vireo critical habitat would be considered significant.

Issue 4.3.2: Impacts on Southwestern Willow Flycatcher Critical Habitat (Direct, Adverse, Significant Impact). Implementation of Alternative 4 would have similar, significant adverse impacts on the willow flycatcher as on the Bell's vireo.

Alternative 5

Issue 4.3.1: Impacts on Least Bell's Vireo Critical Habitat (Direct, Adverse, Significant Impact). Implementation of Alternative 5 would result in the inundation of about 378.0 ha (933.0 ac) of critical vireo habitat (willow woodland, riparian scrub, and mixed eucalyptus-willow woodland) between elevations 494 and 508 ft for an average of 17.5 to 37.5 more days per year under present and future conditions, respectively compared to existing operations.

Under present conditions, the various alternatives would result in a significant increase in the inundation period at elevation 494' only following a 5-year storm event — from 30 more days with Alternative 4 to 60 more days under Alternative 5. Under future conditions, however, this increase is markedly greater for all but 50- and 100-year storms — increasing from 50, 40, 40, and 20 more days for 2-year, 5-year, 10-year, and 25-year storm events with Alternative 4 to 115, 85, 80, and 50 more days with Alternative 5. No mitigation plan has been established for inundation at elevation 508' under Alternative 5, therefore significant impact would result during the growing and non-growing seasons.

Riparian scrub, which is found only between elevations 505 and 508 ft, is also affected. With Alternative 5, this habitat would be inundated for up to 8 more days following a 100-year event. Understory vegetation, especially that below elevation 505 ft, will be significantly reduced.

Under this alternative, the duration and extent of inundation is much greater in many circumstances, especially following short- to moderate-term storm events. It is possible that a permanent reduction in both the amount of understory and the amount of mature willow overstory would occur. The amount of breeding habitat available for the vireo would be reduced, thus restricting the number of vireo pairs that could potentially nest in the Basin. Because significant amounts of important breeding habitat would be inundated during the breeding season or removed altogether, this would represent a permanent adverse significant impact on the least Bell's vireo.

Issue 4.3.2: Impacts on Southwestern Willow Flycatcher Critical Habitat (Direct, Adverse, Significant Impact). Implementation of Alternative 5 would have similar, possibly permanent, significant adverse impacts on the willow flycatcher as on the Bell's vireo.

4.3.1.3 Impacts on Other Sensitive Habitats

Willow woodland, riparian scrub, and freshwater marsh plant associations on-site are considered sensitive vegetation types. Willow woodland and riparian scrub are important components of least Bell's vireo and southwestern willow flycatcher critical habitat and have been analyzed as such in Section 4.3.1.2, above. They are also an important component of breeding habitat for one state Endangered Species, the western yellow-billed cuckoo, and two species of special concern, the yellow warbler and yellow-breasted chat. Freshwater marsh vegetation serves as nesting, roosting, and sheltering habitat for several Species of Special Concern, including the white-faced ibis, and potentially, the least bittern and tricolored blackbird, as well as a number of species of waterfowl. Herbaceous riparian habitat on the site comprises primarily non-native species such as cocklebur and non-native grasses, and therefore, is not considered to be a sensitive habitat.

Alternative 1

No additional direct impacts on sensitive vegetation types would result under existing operations, which are to keep the water conservation pool levels in the reservoir during the flood season at or below elevation 494 ft, and during the flood season at or below elevation 505 ft.

Alternative 2

Issue 4.3.3: Impacts on Willow Woodland (Direct, Adverse, Significant Impact). Implementation of Alternative 2 would result in the inundation of 87.6 ha (216.1 ac) of willow woodland and an additional 1.4 ha (3.5 ac) of willows within the mixed eucalyptus/willow woodland association between elevations 494 and 498 ft for an average of 5 days a year more than under present conditions and 16.5 more days under future conditions compared to existing operations. The effect of major storm events would be the same as discussed under Issue 4.3.1 above. Implementation of Alternative 2 may adversely impact this vegetation type, when flooding occurs during growing seasons, because some long-term or permanent reduction in willow woodland, especially willow woodland with understory, is likely to result from the increased duration of inundation and the unlikelihood that willow woodland would regenerate at higher elevations in the Basin to replace that lost at lower elevations.

Issue 4.3.4: Impacts on Riparian Scrub (Direct, Adverse, Less Than Significant Impact). No riparian scrub is found between elevations 494 and 498 ft; however, there is some riparian scrub above elevation 505 ft. Some increases in the extent and duration of inundation in this habitat will occur with the implementation of this alternative, but it is negligible.

Issue 4.3.5: Impacts on Freshwater Marsh Vegetation (No Impact). Although 3.2 ha (8.0 ac) of freshwater marsh vegetation are found between elevations 494 and 498 ft, this habitat is in impounded ponds that would not be affected by inundation levels at or below 500 ft.

Alternative 3

Issue 4.3.3: Impacts on Willow Woodland (Direct, Adverse, Significant Impact). Impacts associated with this alternative would be incrementally greater than in Alternative 2, with 138.5 ha (341.7 ac) of willow woodland inundated for an average of 10 more days a year between elevations 494 and 500 ft under present and 15 more days under future conditions compared to existing operations. The effects of major storm events would be the same as discussed under Issue 4.3.1 above.

Issue 4.3.4: Impacts on Riparian Scrub (Direct, Adverse, Less Than Significant Impact). No riparian scrub is found between elevations 494 and 500 ft; however, there is some riparian scrub above elevation 505 ft. Some increases in the extent and duration of inundation in this habitat will occur with the implementation of this alternative, but it is negligible.

Issue 4.3.5: Impacts on Freshwater Marsh Vegetation (No Impact). Although 3.6 ha (8.9 ac) of freshwater marsh vegetation are found between elevations 494 and 500 ft, this habitat is in impounded ponds that would not be affected by inundation levels at or below elevation 500 ft.

Alternative 4

Issue 4.3.3: Impacts on Willow Woodland (Direct, Adverse, Significant Impact). Impacts associated with this alternative would be incrementally greater than in Alternatives 2 or 3, with about 256.4 ha (632.7 ac) of willow woodland being inundated an average of 16 more days a year under present conditions and 17 more days under future conditions compared to existing operations. Impacts resulting from major storm events would be the same as discussed under Issue 4.3.1.

Issue 4.3.4: Impacts on Riparian Scrub (Direct, Adverse, Less Than Significant Impact). No riparian scrub is found between elevations 494 and 505 ft; however, there is some riparian scrub above elevation 505 ft. Some increases in the extent and duration of inundation in this habitat will occur with the implementation of this alternative, but it is negligible.

Issue 4.3.5: Impacts on Freshwater Marsh Vegetation (Direct, Adverse, But Less Than Significant). There are 4.1 ha (10.1 ac) of freshwater marsh vegetation that found between elevations 494 and 505 ft. Inundation levels much in excess of elevation 498 ft will breach the dikes and cover some to most of the freshwater marsh vegetation for varying lengths of time. Nevertheless, this is not likely to result in any permanent loss of freshwater marsh vegetation unless the dikes are damaged to the point where they can no longer impound water. This is not seen as a significant adverse impact.

Alternative 5

Issue 4.3.3: Impacts on Willow Woodland (Direct, Adverse, Significant Impact). Impacts associated with this alternative would be incrementally greater than in Alternatives 2, 3, and 4, with about 370.7 ha (914.8 ac) of willow woodland being inundated for an average of 17.5 to 37.5 more days per year under present and future conditions, respectively compared to existing operations. Major storm events would contribute significantly to increased levels of inundation of willow woodland, as discussed under Issue 4.3.1. Impacts associated with implementation of Alternative 5 may be significant.

Issue 4.3.4: Impacts on Riparian Scrub (Direct, Adverse, But Less Than Significant Impact). No riparian scrub is found between elevations 494 and 505 ft. Approximately 1.9 ha (4.8 ac) of riparian scrub are found between elevations 505 and 508 ft within the Basin. Implementation of Alternative 5 would result in an increase in the duration of inundation of this vegetation type, on average one more day a year under both present and future conditions compared to existing operations. Major storm events would not contribute significantly to increased levels of inundation of riparian scrub; therefore, slight increases in the amount of inundation of riparian scrub habitat, although adverse, are not seen as significant.

Issue 4.3.5: Impacts on Freshwater Marsh Vegetation (Direct, Adverse, Significant Impact). There are 4.3 ha (10.6 ac) of freshwater marsh vegetation are found between elevations 494 and 508 ft, primarily contained within 113 ha (280 ac) of freshwater impoundments. Regular inundation levels to elevation 508 ft may destroy the integrity of the dikes that impound water and allow freshwater marsh vegetation to accumulate. This degree of inundation is likely to result in permanent reduction of freshwater marsh vegetation in the Basin. This is seen as a significant adverse impact.

4.3.1.4 <u>Impacts on Federally Endangered and Threatened Species</u>

Impacts on the critical habitat of the two federally Endangered bird species found in the Basin have already been discussed in Section 4.3.1.2. However, additional long-term, direct impacts on the birds themselves have not been addressed. Potential operational impacts on these two species are most likely to be the inundation of nests that may occur following major storm events late in the flood season. Additionally, impacts on the Santa Ana sucker, currently proposed as a federal Threatened Species, are discussed in this section.

Alternative 1

No additional direct impacts on federally Endangered or Threatened Species would result if the water conservation pool is at or below elevation 494 ft during the flood season and the water conservation pool is kept at or below elevation 505 ft during the non-flood season, as they are presently.

Alternative 2

Issue 4.3.6: Impacts on Least Bell's Vireo (Direct, Adverse, Significant Impact). Approximately 28 territorial male least Bell's vireos were found between elevations 494 and 498 ft in 1999 (see Exhibit 4-1 and Table 4-1). Any sudden and substantial rise in the reservoir pool after 1 April resulting from an unusually large late-season storm event may inundate, and thus destroy, vireo nests that would otherwise not be harmed if the water conservation pool were maintained at lower levels. This would constitute a direct take under the Endangered Species Act and would be a direct, adverse significant impact.

TABLE 4-1
MALE LEAST BELL'S VIREO TERRITORIES WITHIN THE PROJECT SITE IN 1999

Elevational Gradient	Territorial Males	Elevational Gradient	Territorial Males
Below 494 ft	15	Below 494 ft	15
494-495 ft	15	494-495 ft	15
495-496 ft	8	494-496 ft	23
496-498 ft	5	494-498 ft	28
498-499 ft	4	494-499 ft	32
499-500 ft	11	494-500 ft	43
500-505 ft	32	494-505 ft	75
505-508 ft	31	494-508 ft	106
Above 508 ft	215	494 ft and above	321

Issue 4.3.7: Impacts on Southwestern Willow Flycatcher (No Impact). Because willow flycatchers do not arrive on their breeding grounds until mid-May and do not commence nesting before the end of May, it is highly unlikely that any storm event this late in the season would be of such magnitude as to raise the reservoir pool high enough to destroy flycatcher nests. Also, willow flycatchers normally do not nest in this portion of the Basin. Therefore, no adverse impacts are foreseen.

Issue 4.3.8: Impacts on the Santa Ana Sucker (No Impact). Implementation of Alternative 2 will result in the inundation of and loss of significant flow in a 160 m (525 ft) length of the Santa Ana River (suckers have not been found in the three tributaries in the Basin) between elevations 494 and 498 ft for an average of 6 more days at elevation 494 ft and 4 more days at elevation 498 ft under present conditions, and 16.5 days per year under future conditions compared to existing operations. Because suckers typically do not spawn in this portion of the Santa Ana River (they spawn upstream; only juveniles and young of the year are typically found within the Basin), this increased duration of inundation should have no measurable impact on sucker populations in the streams entering the reservoir.

Issue 4.3.9: Impacts on Arroyo Southwestern Toad and California Red-legged Frog (No Impact). The arroyo southwestern toad has not been recorded in the Basin, and little if any suitable habitat is present. Although the red-legged frog was reported in the Basin in the mid-1980s (R. Zembal, pers.

comm.), increasing numbers of non-native predatory bullfrogs and largemouth bass would preclude this species gaining a foothold in the Basin without major recovery efforts. Therefore, implementation of this alternative would have no impact on these two amphibian species.

Alternative 3

Issue 4.3.6: Impacts on Least Bell's Vireo (Direct, Adverse, Significant Impact). Approximately 43 territorial male least Bell's vireos were found between elevations 494 and 500 ft in 1999 (see Exhibit 4-1 and Table 4-1). Any sudden and substantial rise in the reservoir pool after 1 April resulting from an unusually large late-season storm event may inundate, and thus destroy, vireo nests that would otherwise not be harmed if the water conservation pool were maintained at lower levels. This would constitute a direct take under the Endangered Species Act and would be a direct, adverse significant impact.

Issue 4.3.7: Impacts on Southwestern Willow Flycatcher (No Impact). Because willow flycatchers do not arrive on their breeding grounds until mid-May and do not commence nesting before the end of May, it is highly unlikely that any storm event this late in the season would be of such magnitude as to raise the reservoir pool high enough to destroy flycatcher nests. Also, willow flycatchers normally do not nest in this portion of the Basin. Therefore, no adverse impacts are foreseen.

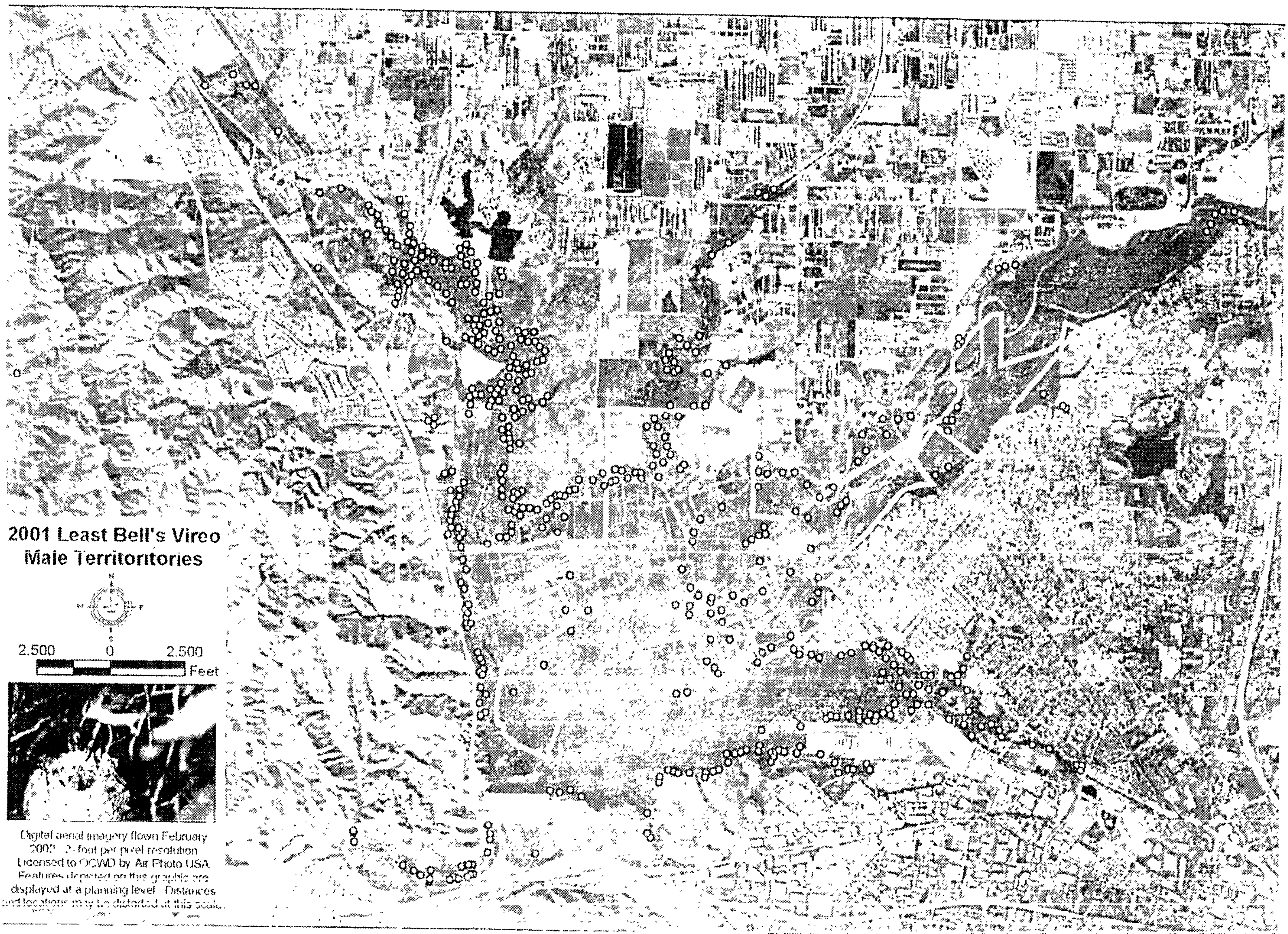
Issue 4.3.8: Impacts on the Santa Ana Sucker (Direct, Adverse, But Less Than Significant Impact). Implementation of Alternative 3 will result in inundation of and loss of significant flow in a 365 m (1,200 ft) length, of the Santa Ana River between elevations 494 and 500 ft for an average of 10 more days a year under present conditions and 15 more days a year under future conditions compared to existing operations. This slight increase over Alternative 2 may have a negligible adverse impact on sucker populations in the streams feeding the reservoir.

Issue 4.3.9: Impacts on Arroyo Southwestern Toad and California Red-legged Frog (No Impact). The arroyo southwestern toad has not been recorded in the Basin, and little if any suitable habitat is present. Although the red-legged frog was reported in the Basin in the mid-1980s (R. Zembal, personal communication), increasing numbers of non-native predatory bullfrogs and largemouth bass would preclude this species gaining a foothold in the Basin without major recovery efforts. Therefore, implementation of this alternative would have no impact on these two amphibian species.

Alternative 4

Issue 4.3.6: Impacts on Least Bell's Vireo (Direct, Adverse, Significant Impact). Approximately 75 territorial male least Bell's vireos were found between elevations 494 and 505 ft in 1999 (see Exhibit 4-1 and Table 4-1). Any sudden and substantial rise in the reservoir pool after 1 April resulting from an unusually large late season storm event may inundate, and thus destroy, vireo nests that would otherwise not be harmed if the water conservation pool were maintained at lower levels. This would constitute a direct take under the Endangered Species Act and would be a direct, adverse significant impact.

Issue 4.3.7: Impacts on Southwestern Willow Flycatcher (Direct, Adverse, But Less Than Significant Impact). Because willow flycatchers do not arrive on their breeding grounds until mid-May and do not commence nesting before the end of May, it is highly unlikely that any storm event this late in the season would be of such magnitude as to raise the reservoir pool high enough to destroy flycatcher nests. Also, willow flycatchers normally do not nest in this portion of the Basin.



2001 Least Bell's Vireo
Male Territoritories
2,500
0
2,500
Feet
Digital aerial imagery flown February
2002 2-foot per pixel resolution
Licensed to OCWD by Air Photo USA
Features depicted on this graphic are
displayed at a planning level. Distances
and locations may be distorted at this scale.

Exhibit 4-1

However, substantial increases in the extent to which the Basin is inundated and the duration of inundation in very wet winters must be considered, as the areal extent of habitat available for nesting may be reduced as late into the season as May. While this may be the case with implementation of Alternative 4 following the most extreme series of winter storms, perhaps once or twice a century, this would represent an adverse, but less than significant impact.

Issue 4.3.8: Impacts on the Santa Ana Sucker (Direct, Adverse, But Less Than Significant Impact). Implementation of Alternative 4 will result in inundation of and loss of significant flow in an 520 m (1,700 ft) length of the Santa Ana River between elevations 494 and 505 ft for an average of 16 more days under present conditions and 17 more days under future conditions compared to existing operations. Major storm events will result in longer periods of duration, but not far enough upstream to affect spawning populations. Because suckers spawn upstream of the Basin and have not been found in the three tributaries in the Basin, implementation of this alternative should not have a significant adverse impact on sucker populations in the Basin.

Issue 4.3.9: Impacts on Arroyo Southwestern Toad and California Red-legged Frog (No Impact). The arroyo southwestern toad has not been recorded in the Basin, and little if any suitable habitat is present. Although the red-legged frog was reported in the Basin in the mid-1980s (R. Zembal, personal communication), increasing numbers of non-native predatory bullfrogs and largemouth bass would preclude this species gaining a foothold in the Basin without major recovery efforts. Therefore, implementation of this alternative would have no impact on these two amphibian species.

Alternative 5

Issue 4.3.6: Impacts on Least Bell's Vireo (Direct, Adverse, Significant Impact).). Approximately 106 territorial male least Bell's vireos were found between elevations 494 and 508 ft in 1999 (see Exhibit 4-1 and Table 4-1). Any sudden and substantial rise in the reservoir pool after 1 April resulting from an unusually large late season storm event may inundate, and thus destroy, vireo nests that would otherwise not be harmed if the water conservation pool were maintained at lower levels. This would constitute a direct take under the Endangered Species Act and would be a direct, adverse significant impact.

Issue 4.3.7: Impacts on Southwestern Willow Flycatcher (Direct, Adverse, Significant Impact). Although no southwestern willow flycatchers have nested between elevations 494 and 508 ft, from one to seven home ranges, and up to four confirmed nests, have been found just above elevation 508 ft annually since at least 1993 (Table 3-4). Because willow flycatchers do not arrive on their breeding grounds until mid-May and do not commence nesting before the end of May, it is highly unlikely that any storm event this late in the season would be of such magnitude as to raise the reservoir pool high enough to destroy flycatcher nests. Therefore, no adverse impacts as a resource of water conservation are foreseen. However, as with Alternative 4, substantial increases in the extent to which the Basin is inundated and the duration of inundation in wet winters may reduce the amount of habitat available for nesting. At the present time, this is not significant because few flycatchers nest in the Basin, and these nest at higher elevations that are not likely to remain inundated into May in all but the very wettest years. However, if recovery efforts result in a marked increase in the number of flycatchers nesting in the Basin, implementation of Alternative 5 may result in increased duration and extent of inundation in the Basin in these very wettest years to cause impacts that are significant.

Issue 4.3.8: Impacts on the Santa Ana Sucker (Direct, Adverse, But Less Than Significant Impact). Implementation of Alternative 5 will result in inundation of and loss of significant flow in a 700 m (2,300 ft) length of the Santa Ana River between elevations 494 and 508 ft for an average of 17.5 to

37.5 more days per year under present and future conditions, respectively compared to existing operations. However, this should not have a significant adverse impact on sucker populations in the Basin for the same reasons given under the other alternatives.

Issue 4.3.9: Impacts on Arroyo Southwestern Toad and California Red-legged Frog (No Impact). The arroyo southwestern toad has not been recorded in the Basin, and little if any suitable habitat is present. Although the red-legged frog was reported in the Basin in the mid-1980s (R. Zembal, personal communication), increasing numbers of non-native predatory bullfrogs and largemouth bass would preclude this species gaining a foothold in the Basin without major recovery efforts. Therefore, implementation of this alternative would have no impact on these two amphibian species.

4.3.1.5 Impacts on State Endangered and Threatened Species

The western yellow-billed cuckoo is the only state Endangered Species that occurs in the Basin. The Swainson's hawk, a rare visitor to the Basin in migration, is a state threatened species.

Alternative 1: No Action

No additional direct impacts on state Endangered or Threatened Species would result under this alternative because the water conservation pool level would remain at or below elevation 494 ft during the flood season and the water conservation pool level would remain at or below elevation 505 ft during the non-flood season.

Alternatives 2 through 5

Issue 4.3.10: Impacts on Bald Eagle and Peregrine Falcon (No Impact). These two species are rare migrants and winter visitors in the Prado Basin. The bald eagle preys primarily on fish, and the peregrine falcon on birds, usually shorebirds and waterfowl. These prey species will not be adversely affected by implementation of his alternative, and no impacts on these two endangered species are foreseen.

Issue 4.3.11: Impacts on Western Yellow-billed Cuckoo (No Impact). This species nests in willow woodland; therefore inundation profiles would be the same for the cuckoo as for willow woodland. Riparian scrub and understory are not important components of cuckoo habitat as they are for the Bell's vireo and willow flycatcher. Also, the yellow-billed cuckoo is the last of all migratory nesters to arrive in California, usually not arriving before the first of June, 2-3 weeks later than the willow flycatcher. Therefore, implementation of any of the alternatives is not likely to have an adverse impact on his species.

Issue 4.3.12: Impacts on Swainson's Hawk (No Impact). This species does not nest in the Basin nor in the project vicinity, and is now a very rare migrant in the region. Therefore, no adverse impacts on this species are foreseen under any of the alternatives.

4.3.1.6 Impacts on Species of Special Concern

A number of species of special concern occur or potentially occur in the Basin or in the areas immediately surrounding the Basin (see Section 3.4.3.4 and Table 3-2). Impacts range from no direct impact to adverse significant impact. Impacts on these species are discussed below under the group headings Birds, Mammals, Reptiles, Amphibians, and Fishes.

Alternative 1

No additional direct impacts on species of special concern would result under this alternative because the water conservation pool level would remain at or below elevation 494 ft during the flood season and at or below elevation 505 ft during the non-flood season.

Alternative 2

Issue 4.3.13: Impacts on Birds of Special Concern (Direct, Adverse, But Less Than Significant Impact). Of 21 bird species of special concern identified as occurring or potentially occurring in the Basin or River downstream to Weir Canyon (Section 3.4.3.4 and Table 3-2), nine are wetland dependent species and 12 are generally associated with uplands near the perimeter of the Basin. Of the nine wetland species, four breed on the site (white-faced ibis, Cooper's hawk, yellow warbler, yellow-breasted chat) and three others may breed occasionally (double-crested cormorant, least bittern, tricolored blackbird). Only the yellow warbler and yellow-breasted chat breed in habitat likely to be inundated on a regular basis. Both are fairly common summer residents on the site, and both arrive in early to mid-April. Increased inundation levels associated with implementation of Alternative 2, however, are not likely to have a significant adverse impact on these species.

Issue 4.3.14: Impacts on Mammals of Special Concern (Direct, Adverse, But Less Than Significant Impact). Other than three bat species and two rodent species of uncertain occurrence, only one mammal of special concern, the San Diego black-tailed jackrabbit, is found in the Basin. This species is fairly common in the region. Only a small amount of potential foraging and breeding habitat of this species will be impacted with implementation of this alternative because the jackrabbit is an upland species found mostly around the perimeter of the Basin. Bats may forage over the Basin, but no roosts are known within the Basin. Insect populations, upon which bats feed, are not likely to be adversely affected by implementation of this alternative. Therefore, impacts on mammals of special concern, while potentially adverse, would not be significant.

Issue 4.3.15: Impacts on Reptiles of Special Concern (Direct, Adverse, But Less Than Significant Impact). Seven reptile species of special concern reside or may reside in the Basin. Of these, only the pond turtle is found in wetland or aquatic habitats. The others inhabit dry, upland areas not likely to be significantly affected by this alternative. Pond turtles are apparently scarce in the Basin, with few actual records. Increased inundation levels may interfere slightly with the reproductive success of this species (assuming it breeds in the Basin), but this would not be considered a significant adverse impact.

Issue 4.3.16: Impacts on Amphibians of Special Concern (Direct, Adverse, But Less Than Significant Impact). Only one amphibian of special concern, the western spadefoot toad, has been identified as potentially occurring in the Basin; however, it has not been recorded and may not be present. Regardless, impacts associated with implementation of this alternative would be less than significant.

Issue 4.3.17: Impacts on Fishes of Special Concern (Direct, Adverse, But Less Than Significant Impact). Only one species of special concern, the arroyo chub, is found within the Basin. During surveys for fish in Prado Basin in 1998, 11 arroyo chubs were taken in the mainstem of the Santa Ana River between elevations 494 and 508 ft on two of three visits. They were not taken elsewhere within the project boundary. Occasional increases in the inundation period under this alternative would not have a significant adverse impact on this species.

Alternative 3

Issue 4.3.13: Impacts on Birds of Special Concern (Direct, Adverse, But Less Than Significant Impact). As with Alternative 2, impacts associated with implementation of Alternative 3, while adverse, are not likely to be significant.

Issue 4.3.14: Impacts on Mammals of Special Concern (Direct, Adverse, But Less Than Significant Impact). Other than three bat species and two rodent species of uncertain occurrence, only one mammal of special concern, the San Diego black-tailed jackrabbit, is found in the Basin. This species is fairly common in the region. Only a small amount of potential foraging and breeding habitat of this species will be impacted with implementation of this alternative because the jackrabbit is an upland species found mostly around the perimeter of the Basin. Bats may forage over the Basin, but no roosts are known within the Basin. Insect populations, upon which bats feed, are not likely to be adversely affected by implementation of this alternative. Therefore, impacts on mammals of special concern, while potentially adverse, would not be significant.

Issue 4.3.15: Impacts on Reptiles of Special Concern (Direct, Adverse, But Less Than Significant Impact). Seven reptile species of special concern reside or may reside in the Basin. Of these, only the pond turtle is found in wetland or aquatic habitats. The others inhabit dry, upland areas not likely to be significantly affected by this alternative. Pond turtles are apparently scarce in the Basin, with few actual records. Increased inundation levels may interfere slightly with the reproductive success of this species (assuming it breeds in the Basin), but this would not be considered a significant adverse impact.

Issue 4.3.16: Impacts on Amphibians of Special Concern (Direct, Adverse, But Less Than Significant Impact). Only one amphibian of special concern, the western spadefoot toad, has been identified as potentially occurring in the Basin; however, it has not been recorded and may not be present. Regardless, impacts associated with implementation of this alternative would be less than significant.

Issue 4.3.17: Impacts on Fishes of Special Concern (Direct, Adverse, But Less Than Significant Impact) Only one species of special concern, the arroyo chub, is found within the Basin. During surveys for fish in Prado Basin in 1998, 11 arroyo chubs were taken in the mainstem of the Santa Ana River between elevations 494 and 508 ft on two of three visits. They were not taken elsewhere within the project boundary. Occasional increases in the inundation period under this alternative would not have a significant adverse impact on this species.

Alternative 4

Issue 4.3.13: Impacts on Birds of Special Concern (Direct, Adverse, But Less Than Significant Impact). As with Alternative 3, impacts associated with implementation of Alternative 4, while adverse, are not likely to be significant.

Issue 4.3.14: Impacts on Mammals of Special Concern (Direct, Adverse, But Less Than Significant Impact). Other than three bat species and two rodent species of uncertain occurrence, the San Diego black-tailed jackrabbit, is found in the Basin. This species is fairly common in the region. Only a small amount of potential foraging and breeding habitat of this species will be impacted with implementation of this alternative because the jackrabbit is an upland species found mostly around the perimeter of the Basin. Bats may forage over the Basin, but no roosts are known within the Basin. Insect populations, upon which bats feed, are not likely to be adversely affected by implementation of this alternative. Therefore, impacts on mammals of special concern, while potentially adverse, would not be significant.

Issue 4.3.15: Impacts on Reptiles of Special Concern (Direct, Adverse, But Less Than Significant Impact). Seven reptile species of special concern reside or may reside in the Basin. Of these, only the pond turtle is found in wetland or aquatic habitats. The others inhabit dry, upland areas not likely to be significantly affected by this alternative. Pond turtles are apparently scarce in the Basin, with few actual records. Increased inundation levels may interfere slightly with the reproductive success of this species (assuming it breeds in the Basin), but this would not be considered a significant adverse impact.

Issue 4.3.16: Impacts on Amphibians of Special Concern (Direct, Adverse, But Less Than Significant Impact). Only one amphibian of special concern, the western spadefoot toad, has been identified as potentially occurring in the Basin; however, it has not been recorded and may not be present. Regardless, impacts associated with implementation of this alternative would be less than significant.

Issue 4.3.17: Impacts on Fishes of Special Concern (Direct, Adverse, But Less Than Significant Impact) Only one species of special concern, the arroyo chub, is found within the Basin. During surveys for fish in Prado Basin in 1998, 11 arroyo chubs were taken in the mainstem of the Santa Ana River between elevations 494 and 508 ft on two of three visits. They were not taken elsewhere within the project boundary. Occasional increases in the inundation period under this alternative would not have a significant adverse impact on this species.

Alternative 5

Issue 4.3.13: Impacts on Birds of Special Concern (Direct, Adverse, Significant). Because the Prado Basin represents one of the few areas left in southern California where the yellow warbler and yellow-breasted chat breed in substantial numbers, impacts on these two species associated with implementation of Alternative 5, especially in the wettest years, may become significant, as the overall amount of uninundated habitat available may be substantially reduced early in the nesting season in those years.

Issue 4.3.14: Impacts on Mammals of Special Concern (Direct, Adverse, But Less Than Significant Impact). Other than three bat species and two rodent species of uncertain occurrence, only one mammal of special concern, the San Diego black-tailed jackrabbit, is found in the Basin. This species is fairly common in the region. Only a small amount of potential foraging and breeding habitat of this species will be impacted with implementation of this alternative because the jackrabbit is an upland species found mostly around the perimeter of the Basin. Bats may forage over the Basin, but no roosts are known within the Basin. Insect populations, upon which bats feed, are not likely to be adversely affected by implementation of this alternative. Therefore, impacts on mammals of special concern, while potentially adverse, would not be significant.

Issue 4.3.15: Impacts on Reptiles of Special Concern (Direct, Adverse, But Less Than Significant Impact). Seven reptile species of special concern reside or may reside in the Basin. Of these, only the pond turtle is found in wetland or aquatic habitats. The others inhabit dry, upland areas not likely to be significantly affected by this alternative. Pond turtles are apparently scarce in the Basin, with few actual records. Increased inundation levels may interfere slightly with the reproductive success of this species (assuming it breeds in the Basin), but this would not be considered a significant adverse impact.

Issue 4.3.16: Impacts on Amphibians of Special Concern (Direct, Adverse, But Less Than Significant Impact). Only one amphibian of special concern, the western spadefoot toad, has been identified as potentially occurring in the Basin; however, it has not been recorded and may not be present. Regardless, impacts associated with implementation of this alternative would be less than significant.

Issue 4.3.17: Impacts on Fishes of Special Concern (Direct, Adverse, But Less Than Significant Impact). Only one species of special concern, the arroyo chub, is found within the Basin. During surveys for fish in Prado Basin in 1998, 11 arroyo chubs were taken in the mainstem of the Santa Ana River between elevations 494 and 508 ft on two of three visits. They were not taken elsewhere within the project boundary. Occasional increases in the inundation period under this alternative would not have a significant adverse impact on this species.

4.3.1.7 <u>Impacts on Fully Protected Species</u>

Two Fully Protected Species, the white-tailed kite and golden eagle, occur in the Basin. The kite breeds in the Basin and the eagle nests in the hills surrounding the Basin and forages on the site.

Alternative 1

No additional direct impacts on Fully Protected Species would result under this alternative because the water conservation pool level would remain at or below elevation 494 ft during the flood season and the water conservation pool would remain at or below elevation 505 ft during the non-flood season.

Alternatives 2 through 5

Issue 4.3.18: Impacts on Fully Protected Species (Direct, Adverse, But Less Than Significant Impact). The white-tailed kite nests in the Basin, but golden eagle does not. Both, however, forage in the Basin, the kite regularly, the eagle rarely. Kites typically nest high in large trees (eucalyptus, sycamores, large willows) and forage mostly in uplands, as do golden eagles. Impacts associated with implementation of any of these alternatives, while possibly adverse, would not be significant.

4.3.1.8 <u>Impacts on Sensitive Plant Species</u>

Only one sensitive plant species, the many-stemmed dudleya (*Dudleya multicaulis*) has been identified within the Prado Basin (Zembal *et al.* 1985). Two small populations have been located near the perimeter of the Basin as defined by the 566-ft elevational contour line.

Alternative 1

No additional direct impacts on sensitive plants would result under this alternative because the water conservation pool level would remain at or below elevation 494 ft during the flood season and the water conservation pool level would remain at or below elevation 505 ft during the non-flood season.

Alternatives 2 through 5

Issue 4.3.19: Impacts on Many-stemmed Dudleya (No Impact). In the extremely rare occasions that one or both of these populations may be inundated by the reservoir pool, inundation time would almost certainly be brief and should not adversely impact the population. Therefore, no adverse impacts on sensitive plant species are anticipated from project implementation.

4.3.1.9 Impacts on Wildlife Movement Corridors

Alternative 1

No additional direct impacts on wildlife movement corridors would result under this alternative because the water conservation pool level would remain at or below elevation 494 ft during the flood season and the water conservation pool level would remain at or below elevation 505 ft during the non-flood season.

Alternatives 2 through 5

Issue 4.3.20: Impacts on Wildlife Movement Corridors (Direct, Adverse, But Less Than Significant Impact). Many wildlife species use the Santa Ana River floodplain as a seasonal migration route or for access to and from food sources, shelter, or breeding grounds. However, wildlife movement through the Basin would not be significantly adversely affected by seasonal inundation levels up to the 508-ft elevational gradient.

4.3.1.10 Impacts on Non-Sensitive Vegetation

Alternative 1

No additional direct impacts on non-sensitive vegetation would result under this alternative.

Alternatives 2 through 5

Issue 4.3.21: Impacts on Non-Sensitive Native Vegetation (Direct, Adverse, But Less Than Significant Impact). Non-sensitive native vegetation in the Basin occurs in small patches and does not form discrete plant associations. These mostly comprise scattered groups of native plants mixed in with non-native species or with sensitive species already discussed. Most are at higher elevations in fringing upland habitats. Impacts associated with implementation of these alternatives would be adverse under extreme conditions, but not significant.

Issue 4.3.22: Impacts on Ruderal and Invasive Non-Native Vegetation (Direct, Adverse to Beneficial, But Less Than Significant Impact). Impacts on non-sensitive arundo, sandy wash, riverine (freshwater aquatic) and fallow field vegetation types during implementation of any of the alternatives are not considered significant. Arundo is an invasive non-native weed that replaces valuable native riparian habitats over time. Additionally, any loss of fallow field habitat would allow more area for generation of valuable willow riparian habitat, especially with special management conducive to the growth of willows. Loss of sandy washes resulting from changing inundation and scour patterns is transitory, as they would reform in nearby areas according to the patterns of disturbance and water flow alteration that would occur under the various alternatives. Any benefits resulting from short-term losses of arundo, due to increased inundation, would be offset by concurrent losses of sensitive riparian vegetation. As arundo invades riparian areas that have been disturbed, short-term losses in arundo are likely to result in long-term increases in this invasive weed.

4.3.1.11 Impacts on Non-Sensitive Wildlife

Alternative 1

No additional direct impacts on non-sensitive wildlife would result under this alternative.

Alternatives 2 through 5

Issue 4.3.23: Impacts on Non-Sensitive Wildlife Species (Direct, Adverse, But Less Than Significant Impact). A number of non-sensitive native bird species and smaller numbers of mammal, reptile, and amphibian species inhabit the Basin, but impacts associated with these alternatives, while at times adverse, will not be significant.

4.3.2 ENVIRONMENTAL CONSEQUENCES DOWNSTREAM OF PRADO DAM

The operation plan for water conservation requires that the flood season pool be evacuated down to the debris pool elevation (490 ft) within 24 hours prior to forecasted major storms to accommodate anticipated increased rate of inflow.

The maximum release rates required to evacuate the flood season conservation pool within 24 hours have been calculated for the existing condition (Alternative 1), and each of the post-construction alternatives (1-5). These rates are described in Section 2.6.2 and shown in Table 4-2, along with the associated minimum and maximum velocities of water flow downstream of Prado Dam and upstream of Weir Canyon Road.

TABLE 4-2
MAXIMUM RELEASE RATES FROM PRADO DAM
AND ASSOCIATED VELOCITIES

Alternative	Flood Pool Elevation (ft)	Debris Pool Elevation (ft)	Difference (vertical ft)	Maximum Release Rate (cfs)	Outside Low-Flow Channel Velocity (ft/s)
				GDM Gates	Min. and Max.
1	494	490	4	2,500	Stays in channel
2	498	490	8	5,000	Stays in channel
3	500	490	10	7,400	4-14
4	505	490	15	14,900	4-17
5	508	490	18	25,900	4-20

Impacts on biological resources downstream of Prado Dam associated with these increased release rates and velocities are of three sorts: increased frequency and magnitude of inundation outside the normal stream channel, the force of rushing water against the vegetation in the channel, and channel improvements necessary to accommodate large flows without destroying channel integrity.

Impacts associated with inundation downstream are not unlike those associated with raising the flood forecasting and water conservation pools above the dam. However, impacts associated with the force of rushing water on vegetation downstream of Prado Dam are not easily evaluated. Two measurements of stream force, shear stress (pounds of pressure per square foot) and stream power (foot-pounds per second per square foot), have been calculated for each of the release rates associated with the project alternatives. However, translating these values into real world conditions is problematical. The impact of 8.6 lbs/ft^2 of shear stress or 104.9 ft-lbs/s/ft^2 of stream power on a 12-inch dbh cottonwood or a 1-inch dbh mulefat bush depends upon the type of substrate in which the plant is rooted, root depth, health of the plant, flow characteristics of the stream at the point of impact, bank stability, and the downstream consequences of upstream damage. For example, a poorly anchored plant in shallow, loose sand will be toppled long before a well-anchored plant in a deep loam or clay substrate. The water force may break the trunk of an unhealthy plant before that of a healthy plant. Trees that have been uprooted upstream, perhaps along with parts of manmade structures such as buildings and bridges, being carried downstream in the rush of water, will have a domino effect on plants downstream. One large tree carried downstream by the flood waters will cause damage that would otherwise not occur if the tree had been healthy or more firmly anchored and remained standing. In addressing the problems inherent in designing erodible channels, Chow (1959) stated, "The behavior of flow in an erodible channel is influenced by so many physical factors and by field conditions so complex and uncertain that precise design of such channels...is beyond the realm of theory."

Few, if any, studies have addressed the issue of vegetation damage due to stream power and shear stress from a predictive standpoint. However, a number of reports have described the resulting damage caused by flood flows in streams, both natural and below dams. But every stream course is different and every storm event is different. Comparisons cannot be made between one stream, or even one stretch of one stream and another, nor between one storm event and the next, as vegetation weakened in one storm may be toppled in the next, milder storm. The U. S. Soil Conservation Service (now known as the Natural Resources Conservation Service) conducted a series of experiments in the late 1940s on manufactured channels lined with various types of grasses. The results of these studies are presented in Chow (1959). Among other findings, they determined that Bermuda grass (the most resistant in their study) could withstand velocities of 6-8 ft/sec in erosion-resistant soils and 4-6 ft/sec in easily eroded soils. While these studies have little bearing on the effects of stream velocity on complex vegetation communities with grasses, shrubs, and trees, they do suggest that velocities as low as 6 ft/sec can cause scouring of herbaceous vegetation, even in relatively non-erodible channels. At release rates of 7,400 cfs (Alternative 3) downstream of Prado Dam, maximum velocities are more than twice this amount (Table 4-2), suggesting that a 7,400 cfs release can cause considerable scouring of the channel. Empirical evidence supports this.

Before Prado Dam was constructed in 1941, Santa Ana River flood flows passed through the narrow canyon below present-day SR-71 with enough force to remove most of the riparian floodplain vegetation approximately once every 20-30 years, returning the vegetation to an early successional stage. Since construction of the dam, water releases have been regulated, with a limit of 300 cfs when flood-flow releases are not necessary. Flood-flow releases generally have not exceeded 2,500 cfs. These releases maintain the high water table in the canyon and the thick phreatophytic cottonwood and willow forests along the margins of the stream course. The result, however, is a smaller but more stable and mature riparian habitat than was originally present. On four occasions since 1941, releases have reached or exceeded 5,100 cfs: in 1969, 6,000 cfs in 1980, 5,100 cfs in 1983, and 5,300 cfs in 1993, an average of once every 14.5 years.

According to at least one source, considerable vegetation was lost in the 1969 flood as a result of controlled releases up to 5,100 cfs (USACE 1988). This being the case, similar impacts would be presumed to have occurred during flood flows in excess of 5,000 cfs in the other three years. However, empirical evidence suggests otherwise. Although, residents and employees living or working downstream of the dam have observed noticeable scouring in the stream channel as a result of the two most recent events (1983 and 1993), only a relatively small proportion of the herbaceous and woody understory vegetation was lost. Little, if any, significant damage to overstory woody vegetation occurred (G. Arrowsmith, pers. comm.).

In the following analysis of impacts, certain assumptions have been made:

1. The extent of impacts on riparian vegetation from various flow velocities cannot be determined directly, nor can they be quantified.

2. All releases to evacuate the buffer pool will take place prior to April 1.

In order to compute mitigation costs, impacts must be quantified, even if such an exercise is somewhat arbitrary. The following additional assumptions have been made in an attempt to quantify impacts:

3. Within the channel, the understory is knocked down and some is ripped out. Trees less than 4 inches dbh will be knocked down, but trees greater than 4 inches dbh will not.

4. No impacts will occur outside the channel for flows less than 5,000 cfs.

5. With flows in excess of 5,000 cfs every 2-4 years, riparian habitat will not be allowed to fully recover between events.

6. Understory and trees with less than 4 inches dbh are assumed to occupy 30 percent of the total area of riparian woodland habitat. For all practical purposes, 50 percent of this will be permanently impacted because of limited recruitment between maximum flow events.

7. Trees greater than 4 dbh will continue to grow.

The frequency of releases from Prado Dam will increase dramatically over present conditions for some alternatives. For moderate releases that remain within the existing channel, as under Alternative 2, the increase in frequency should have little adverse impact in the short run, but may have a significant adverse impact on a cumulative basis, as sediments in the channel are washed away over time and not replenished.

Major releases, as under Alternatives 4 and 5, and to a lesser extent Alternative 3, will have immediate significant adverse impacts because small to moderate amounts of occupied or potentially occupied endangered species habitat will be lost. Because of the high frequency of these releases with the proposed water conservation objectives, this vegetation often will not have sufficient time to regenerate before the next major release, resulting in a steady deterioration of riparian habitat in the streambed. Areas of vegetation inundated under each alternative are given in Table 4-3.

TABLE 4-3
AREAL EXTENT OF HABITAT INUNDATED DOWNSTREAM OF PRADO DAM

Alternative	Maximum Release (cfs)	Area Inundated ha (ac)	Riparian Habitat Inundated ha (ac)
1	2,500	0	0
2	5,000	106.0 (261.6)	59.3 (146.4)
3	7,400	144.9 (357.7)	71.0 (175.3)
4	14,900	308.9 (762.4)	112.9 (278.6)
5	25,900	363.5 (897.2)	159.8 (394.3)

4.3.2.1 Impacts on Vireo and Flycatcher Nesting Habitat

The predominant vegetation downstream of Prado Dam and upstream of Weir Canyon Road is cottonwood and cottonwood/willow woodland, a major component of least Bell's vireo and southwestern willow flycatcher nesting habitat. Small amounts of riparian scrub contribute to the total amount of nesting habitat downstream of Prado Dam and upstream of Weir Canyon Road. These two plant communities are analyzed together as components of vireo and flycatcher nesting habitat in this section, but are analyzed as separate plant communities in the following section. Not surprisingly, impacts on cottonwood/willow riparian discussed in Section 4.3.2.2 are similar to those for nesting habitat, of which this community comprises about 85 percent.

Alternative 1

Under the No Project Alternative, releases would not exceed 2,500 cfs, water would remain well within the stream bank, and no significant impacts on nesting habitat would occur.

Alternative 2

Issue 4.3.1: Impacts on Least Bell's Vireo Nesting Habitat (Direct, Adverse, But Less Than Significant Impact). At releases of 5,000 cfs, water would remain in the stream channel. Historical evidence from such events arguably demonstrates that no significant adverse impacts on riparian vegetation occur during such release rates. For purposes of impact analysis associated with Alternatives 3, 4, and 5, below, the 5,000 cfs release rate is considered the baseline upon which impacts on riparian vegetation from greater releases are based. Flood flows within the channel will inundate approximately 59.3 ha (146.4 ac) of nesting habitat.

Issue 4.3.2: Impacts on Southwestern Willow Flycatcher Nesting Habitat. (Direct, Adverse, But Less Than Significant Impact). Impacts on suitable southwestern willow flycatcher nesting habitat would be similar for those on least Bell's vireo nesting habitat.

Alternative 3

Issue 4.3.1: Impacts on Least Bell's Vireo Nesting Habitat (Direct, Adverse, Significant Impact). At a maximum release rate of 7,400 cfs associated with implementation of Alternative 3, water would overflow the stream bank in a few places, inundating an additional 11.7 ha (28.9 ac) of nesting habitat (total=71.0 ha or 175.3 ac) for up to 24 hours. A minor amount of scouring may result in the removal of small amounts of understory vegetation. For each individual event this would be considered a less than significant impact; however, the frequency of maximum releases of 7,400 cfs is anticipated to increase from once every 18 years without the proposed water conservation, as is currently the case, to once every three years with the proposed water conservation. With this substantial increase in frequency, cumulative adverse impacts on nesting habitat are likely to be significant.

Issue 4.3.2: Impacts on Southwestern Willow Flycatcher Nesting Habitat. (Direct, Adverse, Significant Impact). Impacts on suitable southwestern willow flycatcher nesting habitat would be similar for those on least Bell's vireo nesting habitat.

Alternative 4

Issue 4.3.1: Impacts on Least Bell's Vireo Nesting Habitat (Direct, Adverse, Significant Impact). At a maximum release rate of 14,900 cfs associated with Alternative 4, water would overflow the stream bank in a number of areas, flooding an additional 41.9 ha (103.3 ac) of nesting habitat (total=112.9 ha or 278.6 ac) above the 5,000 cfs inundation level for up to 24 hours. Considerable scouring of the stream channel and associated understory vegetation in and near the channel is also likely to occur. Also, the frequency of releases of this magnitude with the proposed water conservation measures in place is predicted to increase from once every 33 years (flood control releases) to once every 3.5 years. Therefore, this is seen as a significant adverse impact on an important component of suitable vireo nesting habitat.

Issue 4.3.2: Impacts on Southwestern Willow Flycatcher Nesting Habitat. (Direct, Adverse, Significant Impact). Impacts on suitable southwestern willow flycatcher nesting habitat would be similar for those on least Bell's vireo nesting habitat.

Alternative 5

Issue 4.3.1: Impacts on Least Bell's Vireo Nesting Habitat (Direct, Adverse, Significant Impact). At a maximum release rate of 25,900 cfs at a frequency of 83 years (flood control releases) to once every 4 years (water conservation) associated with Alternative 5, water would overflow the stream bank in a number of areas, flooding an additional 46.9 ha (115.7 ac) of riparian habitat (total=159.8 ha or 394.3 ac) above the 5,000 cfs inundation level for up to 24 hours. As with Alternative 4, extensive scouring of the stream channel and associated understory vegetation in and near the channel would also occur. Therefore, this is seen as a significant adverse impact on an important component of vireo nesting habitat.

Issue 4.3.2: Impacts on Southwestern Willow Flycatcher Nesting Habitat. (Direct, Adverse, Significant Impact). Impacts on suitable southwestern willow flycatcher nesting habitat would be similar for those on least Bell's vireo nesting habitat.

4.3.2.2 Impacts on Other Sensitive Habitats

Alternative 1

Under the No Project Alternative, releases would not exceed 2,500 cfs, water would remain well within the stream bank, and no adverse impacts on cottonwood/willow woodland habitat would occur.

Alternative 2

Issue 4.3.24: Impacts on Cottonwood/Willow Woodland (Direct, Adverse, But Less Than Significant Impact). Implementation of Alternative 2 would result in the inundation of 141.2 ac of cottonwood/ willow woodland habitat during maximum releases of 5,000 cfs, all within the existing river channel.

Even with an increase in release frequency from once every 12 years to once every two years, the impact on this habitat, while adverse, should not become significant.

Issue 4.3.4: Impacts on Riparian Scrub (Direct, Adverse, But Less Than Significant Impact). Historical results of releases of approximately 5,000 cfs have demonstrated that some herbaceous and small woody plants are uprooted during minor scouring of the riverbed. About 5.2 ac of riparian scrub is found within the inundation area; however, the great majority of riparian scrub is found at higher elevations that would not be inundated. Even with an increase in frequency from once every 12 years to once every two years, this adverse impact would be less than significant. This minor scouring constitutes an adverse but less than significant impact on this plant community.

Alternative 3

Issue 4.3.24: Impacts on Cottonwood/Willow Woodland (Direct, Adverse, Significant Impact). Under this alternative, an additional 25.9 ac of cottonwood/willow woodland habitat would be inundated with maximum releases of 7,400 cfs. Some small willows and sapling cottonwoods may be uprooted, thus temporarily thinning out the habitat. However, with an increased frequency of such releases from once every 18 years without proposed water conservation to once every three years with water conservation, there will be insufficient time, on average, for the habitat to regenerate before the next event. Thus, on a cumulative basis, this impact would be adverse and significant.

Issue 4.3.4: Impacts on Riparian Scrub (Direct, Adverse, But Less Than Significant Impact). Impacts on riparian scrub from releases of 7,400 cfs would be incrementally greater than those associated with a 5,000 cfs release; however, it is anticipated that most riparian scrub vegetation would remain in tact, as it generally grows at higher elevations in the riverbed (only an additional 3.0 acres would be inundated along the 7.4 mi. stretch of river). Therefore, even with an increased frequency of releases associated with the proposed water conservation, impacts on riparian scrub would remain adverse, but less than significant.

Alternative 4

Issue 4.3.24: Impacts on Cottonwood/Willow Woodland (Direct, Adverse, Significant Impact). With maximum releases of 14,900 cfs, an additional 82.3 ac of cottonwood/willow woodland would be inundated than would be with a 5,000 cfs release. Impacts on the habitat would be incrementally greater than under Alternative 3 and may cause a short-term, but significant, alteration of habitat density and age-class diversity. The greatly increased frequency of these releases would not allow for any significant regrowth between flood events; thus, cumulatively, impacts are expected to be quite severe.

Issue 4.3.4: Impacts on Riparian Scrub (Direct, Adverse, Significant Impact). With a release of 14,900 cfs, an additional 21.0 acres of riparian scrub would be inundated than would be with a 5,000 cfs release. This represents nearly 50 percent of all the riparian scrub in the riverbed. Even though water velocity would be considerably less at the higher elevations where most riparian scrub grows, and relatively little vegetation would be uprooted with each event, cumulatively, with anticipated maximum releases every 3.5 years, this adverse impact would become significant.

Alternative 5

Issue 4.3.24: Impacts on Cottonwood/Willow Woodland (Direct, Adverse, Significant Impact). With maximum releases of 25,900 cfs, an additional 91.2 ac of cottonwood/willow habitat will be inundated than under Alternative 2, or about 98 percent of the total cottonwood/willow habitat in this reach of the Santa Ana River. The force of water associated with a release of this magnitude is likely to topple at least a few larger cottonwoods and willows, and possibly many because of the domino effect resulting from a few being uprooted. This impact would have a long-term highly adverse significant impact on the habitat.

Issue 4.3.4: Impacts on Riparian Scrub (Direct, Adverse, Significant Impact). A release of 25,900 cfs would inundate 24.5 more acres of this habitat than would a release of 5,000 cfs contained within the channel. By comparison, the 5,000 cfs release would inundate only 5.2 acres. With such a high magnitude and frequency of this high volume release, it is likely that water velocities would be great enough at the higher elevations to cause some, if not most, riparian scrub vegetation to be uprooted or damaged with each release. This, in itself, would represent a significant adverse impact.

4.3.2.3 Impacts on Federally Endangered and Threatened Species

Impacts on suitable habitat for least Bell's vireo and southwestern willow flycatcher are discussed above. As nesting, foraging, and sheltering habitat plays an integral part in the welfare of any endangered animal; it is difficult to separate one from the other in any impact analysis. In this section only direct impacts on birds, their offspring, eggs, or nest are considered. As maximum releases are only necessary prior to impending major storm events, it is anticipated that all or virtually all releases would occur prior to April when the vireos commence nesting, and certainly prior to late May when the flycatchers commence nesting. Therefore, it is not likely that nests would be destroyed even under the maximum releases associated with Alternative 5, even though the habitat that supports these birds and their nests may be destroyed.

Alternative 1

Under the No Project Alternative, releases would not exceed 2,500 cfs, water would remain well within the stream bank, and no adverse impacts on federally endangered species would occur.

Alternative 2

Issue 4.3.6: Impacts on Least Bell's Vireo (No Impact). At releases of 5,000 cfs, water would remain in the stream channel, and, as discussed above, no releases should occur during the nesting season.

Issue 4.3.7: Impacts on Southwestern Willow Flycatcher. (No Impact). Although suitable habitat is present, the southwestern willow flycatcher was not recorded in this reach of the Santa Ana River during 1999 surveys, nor has breeding been documented in the past. Even if present, flood flows would occur outside the breeding season for this species.

Issue 4.3.8: Impacts on Santa Ana Sucker. (Direct, Adverse, Significant Impact). Releases from Prado Dam would adversely affect populations of suckers both above and below the dam. Some suckers are likely to pass through the release gates during maximum releases under this alternative. As little, if any, suitable spawning areas exist in the river below the dam, these suckers would be effectively removed from the gene pool. Additionally, many suckers already below the dam are likely to be carried farther downstream past the drop structure at Weir Canyon. Suckers below Weir Canyon Road cannot return upriver past this drop structure, and no habitat for this species exists below the drop structure.

Issue 4.3.9: Impacts on Arroyo Southwestern Toad and California Red-legged Frog (No Impact). Neither of these species is found in the Santa River between the dam and Weir Canyon, although both may have occurred historically.

Alternative 3

Issue 4.3.6: Impacts on Least Bell's Vireo (No Impact). Under this alternative, only minor flooding, primarily in the vicinity of Green River Golf Course, would occur during a maximum release of 7,400 cfs. Releases would take place during the flood-forecasting season or very early in the non-flood season (early March) when this species is absent or, at the latest, just arriving on its breeding grounds.

Issue 4.3.7: Impacts on Southwestern Willow Flycatcher. (No Impact). Although suitable habitat is present, the southwestern willow flycatcher was not recorded in this reach of the Santa Ana River during 1999 surveys, nor has breeding been documented in the past. Even if present, flood flows would occur outside the breeding season for this species.

Issue 4.3.8: Impacts on Santa Ana Sucker. (Direct, Adverse, Significant Impact). Releases from Prado Dam would adversely affect populations of suckers both above and below the dam. Some suckers are likely to pass through the release gates during maximum releases under this alternative. As little, if any, suitable spawning areas exist in the river below the dam, these suckers would be effectively removed from the gene pool. Additionally, many suckers already below the dam are likely to be carried farther downstream past the drop structure at Weir Canyon. Suckers below Weir Canyon Road cannot return upriver past this drop structure, and no habitat for this species exists below the drop structure.

Issue 4.3.9: Impacts on Arroyo Southwestern Toad and California Red-legged Frog (No Impact). Neither of these species is found in the Santa River between the dam and Weir Canyon, although both may have occurred historically.

Alternative 4

Issue 4.3.6: Impacts on Least Bell's Vireo (Direct, Adverse, But Less Than Significant Impact). While significant impacts on its nesting habitat may occur, no significant impacts on the birds or their nests, eggs, or offspring are foreseen. Because it is possible that a maximum release could occur in late March after the first few birds have arrived, and this could temporarily disrupt the establishment of breeding territories by the males, impacts on this species under this alternative are considered potentially adverse, but not significant.

Issue 4.3.7: Impacts on Southwestern Willow Flycatcher. (No Impact). Although suitable habitat is present, the southwestern willow flycatcher was not recorded in this reach of the Santa Ana River during 1999 surveys, nor has breeding been documented in the past. Even if present, flood flows would occur outside the breeding season for this species.

Issue 4.3.8: Impacts on Santa Ana Sucker. (Direct, Adverse, Significant Impact). Releases from Prado Dam would adversely affect populations of suckers both above and below the dam. Some suckers are likely to pass through the release gates during maximum releases under this alternative. As little, if any, suitable spawning areas exist in the river below the dam, these suckers would be effectively removed from the gene pool. Additionally, many suckers already below the dam are likely to be carried farther downstream past the drop structure at Weir Canyon. Suckers below Weir Canyon Road cannot return upriver past this drop structure, and no habitat for this species exists below the drop structure.

Issue 4.3.9: Impacts on Arroyo Southwestern Toad and California Red-legged Frog (No Impact). Neither of these species is found in the Santa River between the dam and Weir Canyon, although both may have occurred historically.

Alternative 5

Issue 4.3.6: Impacts on Least Bell's Vireo (Direct, Adverse, But Less Than Significant Impact). While a maximum release of 25,900 cfs could be devastating on its habitat, no direct significant impacts on the birds or their nests, eggs, or offspring are foreseen.

Issue 4.3.7: Impacts on Southwestern Willow Flycatcher. (No Impact). Although suitable habitat is present, the southwestern willow flycatcher was not recorded in this reach of the Santa Ana River during 1999 surveys, nor has breeding been documented in the past. Even if present, flood flows would occur outside the breeding season for this species.

Issue 4.3.8: Impacts on Santa Ana Sucker. (Direct, Adverse, Significant Impact). Releases from Prado Dam would adversely affect populations of suckers both above and below the dam. No scouring of substrate is expected to occur. Scouring of substrate is only expected to occur at higher flow. Some suckers are likely to pass through the release gates during maximum releases under this alternative. As little, if any, suitable spawning areas exist in the river below the dam, these suckers would be effectively removed from the gene pool. Additionally, many suckers already below the dam are likely to be carried farther downstream past the drop structure at Weir Canyon. Suckers below Weir Canyon Road cannot return upriver past this drop structure, and no habitat for this species exists below the drop structure.

Issue 4.3.9: Impacts on Arroyo Southwestern Toad and California Red-legged Frog (No Impact). Neither of these species is found in the Santa River between the dam and Weir Canyon, although both may have occurred historically.

4.3.2.4 Impacts on State Endangered and Threatened Species

Alternative 1

Alternatives 2 through 5

Issue 4.3.10: Impacts on Bald Eagle and Peregrine Falcon (No Impact). The bald eagle is unlikely to occur in the Santa Ana River between the dam and Weir Canyon, and the peregrine falcon is, at best, an occasional migrant that may forage there on rare occasions.

Issue 4.3.11: Impacts on Western Yellow-billed Cuckoo. (No Impact). Although suitable breeding habitat is present, no yellow-billed cuckoos were recorded during the 1999 surveys, nor has this species been documented breeding in this section of river prior to 1999.

Issue 4.3.12: Impacts on Swainson's Hawk (No Impact). The Swainson's hawk is not expected to occur in the lower Santa Ana River.

4.3.2.5 Impacts on Species of Special Concern

In the river below the dam, as in the Basin, the yellow warbler and yellow-breasted chat are summer breeding residents, and the black-tailed jackrabbit is found in drier areas of the riverbed, usually associated with upland vegetation. The western spadefoot toad potentially occurs, and the pond turtle may occasionally appear in this section of the river, although it has not been documented breeding there.

Alternative 1

No impacts on species of special concern are anticipated under the No Project Alternative.

Alternative 2

Issue 4.3.13: Impacts on Birds of Special Concern (No Impact). Under Alternative 2, no impacts on the yellow warbler or yellow-breasted chat are expected. These species are absent during the flood-forecasting season.

Issue 4.3.14: Impacts on Mammals of Special Concern (No Impact). No upland habitat should be adversely affected under Alternative 2; therefore, no impacts on the black-tailed jackrabbit are anticipated.

Issue 4.3.15: Impacts on Reptiles of Special Concern (Direct, Adverse, But Less Than Significant Impact). The 5,000 cfs maximum releases associated with this alternative would have little adverse impact on pond turtles if they occur in this section of the river. Pond turtles frequent streams that are subject to winter flood flows, where they find shelter in deeper water, eddies, and shallows.

Issue 4.3.16: Impacts on Amphibians of Special Concern (No Impact). As the western spadefoot is the only amphibian of special concern in the general vicinity and it is unlikely to occur in this portion of the Santa Ana River, no impacts on this species are anticipated.

Issue 4.3.17: Impacts on Fishes of Special Concern. (Direct, Adverse, But Less Than Significant Impact). The chub population below the dam is apparently small, and it is unknown if this population is viable. Large releases through the dam will carry chubs from the Basin to the lower river, and from the reach above Weir Canyon to reaches below Weir Canyon where no habitat exists. While these impacts will be adverse, they are not considered to be significant on a regional level.

Alternative 3

Issue 4.3.13: Impacts on Birds of Special Concern (Direct, Adverse, But Less Than Significant Impact). The yellow warbler and yellow-breasted chat are absent during the flood-forecasting season; however, minor habitat damage may occur (see Issues 4.3.4 and 4.3.24), especially with release frequencies of this magnitude expected on average every three years. This would likely permanently reduce the amount of available shelter and nest sites to a minor degree.

Issue 4.3.14: Impacts on Mammals of Special Concern (No Impact). No upland habitat should be adversely affected under Alternative 3; therefore, no impacts on the black-tailed jackrabbit are anticipated.

Issue 4.3.15: Impacts on Reptiles of Special Concern (Direct, Adverse, But Less Than Significant Impact). The 7,400 cfs maximum releases associated with Alternative 3 would have little adverse impact on any pond turtles that may be present for the reasons given under Alternative 2.

Issue 4.3.16: Impacts on Amphibians of Special Concern (No Impact). As the western spadefoot is the only amphibian of special concern in the general vicinity and it is unlikely to occur in this portion of the Santa Ana River, no impacts on this species are anticipated.

Issue 4.3.17: Impacts on Fishes of Special Concern (Direct, Adverse, But Less Than Significant Impact). The chub population below the dam is apparently small, and it is unknown if this population is viable. Large releases through the dam will carry chubs from the Basin to the lower river, and from the reach above Weir Canyon to reaches below Weir Canyon where no habitat exists. While these impacts will be adverse, they are not considered to be significant on a regional level.

Alternative 4

Issue 4.3.13: Impacts on Birds of Special Concern (Direct, Adverse, Significant Impact). The yellow warbler and yellow-breasted chat are absent during the flood-forecasting season; however, moderate habitat damage may occur during a release of 15,900 cfs (see Issues 4.3.4 and 4.3.24), and significant damage would occur on a cumulative basis with maximum releases anticipated every 3.5 years on average, resulting in significant long-term habitat alteration.

Issue 4.3.14: Impacts on Mammals of Special Concern (Direct, Adverse, But Less Than Significant Impact). Only small amounts of upland habitat are likely to be inundated under Alternative 4, and these areas only briefly. Jackrabbits can easily take temporary shelter outside the flood zone; however, a few animals may be trapped by rapidly rising water and swept away. Therefore, an adverse but less than significant impact on this mammal species of special concern is anticipated.

Issue 4.3.15: Impacts on Reptiles of Special Concern (Direct, Adverse, Significant Impact). The 14,900 cfs maximum releases associated with Alternative 4 would have a moderate adverse impact on any pond turtles that may be present because the strength of the flow through the watershed may preclude some animals from reaching shelter. However, with frequent releases of this magnitude, alterations in stream channel characteristics and, consequently, this species' habitat may be permanently altered.

Issue 4.3.16: Impacts on Amphibians of Special Concern (No Impact). As the western spadefoot is the only amphibian of special concern in the general vicinity and it is unlikely to occur in this portion of the Santa Ana River, no impacts on this species are anticipated.

Issue 4.3.17: Impacts on Fishes of Special Concern. (Direct, Adverse, But Less Than Significant Impact). The chub population below the dam is apparently small, and it is unknown if this population is viable. Large releases through the dam will carry chubs from the Basin to the lower river, and from the reach above Weir Canyon to reaches below Weir Canyon where no habitat exists. While these impacts will be adverse, they are not considered to be significant on a regional level.

Alternative 5

Issue 4.3.13: Impacts on Birds of Special Concern (Direct, Adverse, Significant Impact). The yellow warbler and yellow-breasted chat are absent during the flood-forecasting season; however, major habitat damage associated with frequent releases of 25,900 cfs would significantly and permanently alter the riparian habitat of these two species.

Issue 4.3.14: Impacts on Mammals of Special Concern (Direct, Adverse, But Less Than Significant Impact). Moderate amounts of upland habitat are likely to be inundated under Alternative 5, albeit relatively briefly. Rapidly rising water may isolate and sweep away a few individuals; therefore, an adverse but less than significant impact from implementation of this alternative is anticipated.

Issue 4.3.15: Impacts on Reptiles of Special Concern (Direct, Adverse, Significant Impact). As with Alternative 4, 25,900 cfs maximum releases on average every four years associated with Alternative 5 would have a permanent and significant adverse impact on pond turtle habitat, and the rapid increase and magnitude of the flow through the watershed could easily preclude animals from reaching shelter.

Issue 4.3.16: Impacts on Amphibians of Special Concern (No Impact). As the western spadefoot is the only amphibian of special concern in the general vicinity and it is unlikely to occur in this portion of the Santa Ana River, no impacts on this species are anticipated.

Issue 4.3.17: Impacts on Fishes of Special Concern (Direct, Adverse, But Less Than Significant Impact). The chub population below the dam is apparently small, and it is unknown if this population is viable. Large releases through the dam will carry chubs from the Basin to the lower river, and from the reach above Weir Canyon to reaches below Weir Canyon where no habitat exists. While these impacts will be adverse, they are not considered to be significant on a regional level.

4.3.2.6 Impacts on Fully Protected Species

Only one Fully Protected Species, the white-tailed kite, is likely to occur in this portion of the Santa Ana River, with any regularity. It occasionally to frequently forages in this stretch of river and suitable breeding habitat is present. The golden eagle may occasionally forage in the adjacent hillsides.

Alternative 1

No direct adverse impacts on Fully Protected Species would occur under this alternative.

Alternatives 2 and 3

Issue 4.3.18: Impacts on Fully Protected Species (No Impact). No adverse impacts on white-tailed kite are anticipated from flood flows resulting from implementation of these alternatives.

Alternatives 4 and 5

Issue 4.3.18: Impacts on Fully Protected Species (Direct, Adverse, But Less Than Significant Impact). Maximum flood flows resulting from implementation of either of these two alternatives would alter the riparian community to the extent that foraging and nesting opportunities for the white-tailed kite would be reduced.

4.3.2.7 Impacts on Sensitive Plant Species

Alternative 1

No direct adverse impacts on sensitive plant species would occur under the No Project Alternative.

Alternative 2, 3, 4, and 5

Issue 4.3.19: Impacts on Many-stemmed Dudleya. No adverse impacts to the Many-stemmed Dudleya will occur from the implementation of these alternatives.

4.3.2.8 Impacts on Wildlife Movement Corridors

Wildlife corridors serve as links between larger expanses of wildlife habitats and allow long-term access for wildlife moving in both directions. As such, they facilitate gene flow and help stabilize populations in the larger areas. These attributes of wildlife movement corridors are not normally affected by short-term events such as brief flooding. But events that result in permanent or long-term habitat loss within the corridor can be adverse and significant.

Alternative 1

Under the No Project Alternative, wildlife movement corridors would not be affected.

Alternatives 2 and 3

Issue 4.3.20: Impacts on Wildlife Movement Corridors (No Impact). Short-term flooding (less than 24 hours) associated with these alternatives should have no measurable adverse impact on the major wildlife movement corridor through this reach of the Santa Ana River. Therefore, no adverse impacts are foreseen from implementation of these alternatives.

Alternatives 4 and 5

Issue 4.3.20: Impacts on Wildlife Movement Corridors (Direct, Adverse, Significant Impact). Wildlife corridors are not normally adversely impacted by short-term events such as flooding of less than 24-hour duration. However, major releases associated with Alternatives 4 and 5 can destroy habitat necessary for shelter and foraging, and if these releases occur with such frequency that the habitat has little chance to regenerate, then the adverse impact on the corridor becomes significant.

4.3.2.9 Impacts on Non-Sensitive Vegetation

Alternative 1

No direct impacts on non-sensitive vegetation would result under this alternative.

Alternatives 2 and 3

Issue 4.3.21: Impacts on Non-Sensitive Native Vegetation (No Impact). As in the Basin, non-sensitive native vegetation in this section of the Santa Ana River occurs in small patches in fringing upland areas (it is assumed that all wetland-associated vegetation associations are considered sensitive). Impacts in these areas from moderate release flows associated with these alternatives would not adversely affect these non-sensitive plant associations.

Issue 4.3.22: Impacts on Ruderal and Invasive Non-Native Vegetation (No Impact). The moderate releases associated with these alternatives would have no impact (adverse or beneficial) on non-native vegetation, including the highly invasive arundo, the species of most concern.

Alternatives 4 and 5

Issue 4.3.21: Impacts on Non-Sensitive Native Vegetation (Direct, Adverse, But Less Than Significant Impact). Major releases associated with these alternatives would cause major damage to sensitive wetland habitats, especially if they occur, on average, as frequently as every 3.5 to 4 years. Long-term or permanent reduction in non-sensitive habitats on the fringes of the wetlands would undoubtedly also occur, but would be much less extensive. While impacts would be adverse, they would not be significant.

Issue 4.3.22: Impacts on Ruderal and Invasive Non-Native Vegetation (Direct, Beneficial and Significant to Adverse and Significant Impact). Arundo is the major invasive species of concern. Major releases would scour a broad swath of riverbed in this stretch of the river, taking out both cottonwood/willow woodland and arundo. Removal of mature stands of arundo would be seen as beneficial, but this is offset by the removal of sensitive vegetation. Without man's assistance, regenerating arundo would out-compete the regenerating native vegetation; this is how arundo became established in the first place. Ultimately, arundo would become the predominant plant community. This is especially true if major releases were to occur on average every 3.5 to 4 years, as arundo could gain a foothold under such circumstances, but native cottonwoods and willows could not, even in the absence of arundo (they would never reach maturity). Thus, without mitigation, impacts from these two alternatives on arundo would encourage its spread, and the ultimate effect on biological resources would be adverse and significant.

4.3.2.10 Impacts on Non-Sensitive Wildlife

Alternative 1

No direct adverse impacts on non-sensitive wildlife would result under this alternative.

Alternatives 2 and 3

Issue 4.3.23: Impacts on Non-Sensitive Wildlife Species (No Impact). A number of non-sensitive native bird species and smaller numbers of mammal, reptile, and amphibian species inhabit this reach of the river, but impacts associated with these alternatives, would not be significant.

Alternatives 4 and 5

Issue 4.3.23: Impacts on Non-Sensitive Wildlife Species (Direct, Adverse, Significant Impact). The combined magnitude and frequency of releases of 14,900 to 25,900 cfs would permanently alter most habitats within this section of the river, and therefore have a significant adverse impact on many non-sensitive wildlife species residing there, especially those species dependent upon riparian and other wetland vegetation.

4.3.3 MITIGATION MEASURES

USACE recognizes the necessity of a vireo management strategy and necessary habitat compensation to achieve restoration and maintenance of habitat that may be altered, diminished in value, or lost as a result of this project. USACE is continuing to coordinate with USFWS and other resource agencies on the implementation of management strategies designed to reduce or eliminate potential impacts on listed species from continuing water conservation planning in Prado Basin.

The general mitigation policy of the resource agencies, as well as USACE, is derived from definitions of mitigation provided in the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) guidelines. In order of preference, they are:

a. avoiding impacts by not taking a certain action or parts of an action;

b. minimizing impacts by limiting the degree or magnitude of the action and its implementation;

c. rectifying impacts by repairing, rehabilitating, or restoring the affected environment;

d. reducing or eliminating impacts over time by preservation and maintenance operations during the life of the action;

e. compensating for impacts by replacing or providing substitute resources or environments.

USFWS and Environmental Protection Act (EPA) policies both state that each of these five elements represent the preferred sequence in any mitigation planning process, with each element being fully exhausted before moving to the next level. An evaluation of alternatives presented in this document, along with mitigation negotiations conducted between the above agencies and USACE, indicate that the first four elements are generally incompatible with the provision of adequate capacity for water conservation and the strong need for additional land within the Basin to meet these water conservation objectives. Therefore, the mitigation plan is limited primarily to the compensation for impacts by replacement of habitat values, or otherwise providing substitute resources or environments.

4.3.3.1 Least Bell's Vireo, Southwestern Willow Flycatcher

USACE's mitigation goal for water conservation at Prado Basin is 100 percent replacement of lost wildlife habitat values through a combination of land acquisition for habitat replacement and a cash contribution to the Santa Ana River Conservation Trust Fund to support their continuing arundo removal and cowbird trapping programs.

Mitigation for maintaining a water conservation pool at elevation 494 ft during the flood season and a water conservation pool elevation 505 ft during the non-flood season has already been negotiated under the 1992 water conservation agreement (USACE 1992). In that agreement it was assumed that all habitat values within the flood season pool (to elevation 494 ft) would be lost, and that 50 percent of the habitat values in the non-flood season water conservation pool (between elevations 494 and 505 ft) would be lost. During the El Nino drought, habitat losses occurred below elevation 494 ft and between 494 and 505 ft. Under the currently proposed program, using Alternative 2 as an example, the flood season pool would be raised from elevation 494 to 498 ft. Therefore, habitat values originally compensated for at 50 percent between these elevations will now be compensated an additional amount based on the number of additional days the basin would be inundated at 498 ft following a "worst case" 100-year storm event (Table 4-4). For example, under present conditions, the Basin is flooded at the 498-ft level for 240 days following a 100-year storm. If the flood-season water conservation pool is maintained at 498 ft instead of 494 ft, the Basin will be flooded for 255 days at 498 ft. This represents a 6.3 percent increase in number of days of inundation.

Mitigation under Alternative 2 is therefore calculated at 6.3 percent for all vireo and flycatcher critical habitat between elevations 494 and 498 ft, bringing the total mitigation to 56.3 percent to compensate for what will now be an estimated loss of half the habitat. Habitat values lost between elevations 498 and 505 ft have already been fully mitigated under the previous agreement. Table 4-5 shows the mitigation costs associated with each alternative.

TABLE 4-4
DAYS OF INUNDATION FOLLOWING 100-YEAR STORM EVENT

Alternative	494 ft	495 ft	496 ft	498 ft	500 ft	505 ft	508 ft
1	275	265	255	240	215	135	75
2				255			
3					240		
4						175	
5							130
INCREASE		*3.4%*	*3.5%*	*6.3%*	*11.6%*	*29.6%*	*73.3%*

TABLE 4-5
PRADO DAM WATER CONSERVATION
MITIGATION COSTS

Alternative	Zone	Habitat Flooded (ac)*	Understory Impacted (ac)	Mitigation Level	Area to Mitigate (ac)	Minus 112-ac Donation	Cost @ $50,000/ac	Maintenance @ $25,000/ac on Restored Land	Contribution (Subtotal)	Contribution (Total)
MITIGATION FOR IMPACTS ABOVE PRADO DAM										
2	494-498	54.9	---	6.3%	6.9	-105.1	$0.00	$172,500	$172,500	
3	494-500	86.8	---	11.6%	20.1	-91.9	$0.00	$502,500	$502,500	
4	494-505	160.6	---	29.6%	95.1	-16.9	$0.00	$2,377,500	$2,377,500	
5	494-505	160.6	---	29.6%	95.1	-16.9				
	505-508	145.3		73.3%	213.0	196.1	$9,805,000	$2,800,000	$11,624,500	
MITIGATION FOR IMPACTS BELOW PRADO DAM										
2	494-498	146.4	43.9	50%	22.0	-83.1	$0.00	$550,000	$550,000	$772,500
3	494-500	175.3	52.6	50%	26.3	-65.6	$0.00	$657,500	$657,500	$1,160,000
4	494-505	278.6	83.6	50%	16.9	0	$0.00	$422,500		
					24.9	---	$1,245,000	$0.00	$1,543,000	$3,920,500
5	494-508	394.3	118.3	50%	59.2	---	$2,960,000	$0.00	$2,664,000	$14,288,500

* For impacts above Prado Dam, the acreage is 50% of the total amount flooded because 50% of this flooded habitat has already been fully mitigated under the previous Water Conservation agreement.

Alternative 1

No mitigation is required.

Alternative 2

Impacts within the Basin would include the following: 87.6 ha (216.1 ac) of willow woodland and 1.4 ha (3.5 ac) of mixed eucalyptus and willow woodland for a total of 89.0 ha (219.6 ac). To reduce these impacts, the following measures are recommended.

5. The entire 89.0 ha (219.6 ac) have already been mitigated at 50 percent. To phrase it another way, 44.5 ha (109.8 ac) have already been mitigated at 100%. An additional 6.3 percent mitigation (or 2.8 ha [6.9 ac]) for impacts on the remaining 44.5 ha (109.8 ac) is all that is required based on the additional number of days of inundation at 498 ft in a 100-year flood event. The local sponsor will acquire 2.8 ha (6.9 ac) for restoration. This land will be obtained from a 45.4-ha (112-ac) parcel known as Northern Pheasant (PR-6) within Prado Basin previously leased to the Raahauge and the lease terminated. PR-6 is currently owned by the OCWD that is available for restoration.

6. The local sponsor will provide compensation to the Trust Fund for maintenance of the 2.9 ha (6.9 ac) of riparian habitat that will be acquired for restoration. The total compensation will be $25,000/ac for a total of $172,500. PR-6 is covered with arundo. The trust fund will be used for maintaining and controlling arundo and for initial restoration. Currently, arundo removal activities are occurring in the adjacent parcels to PR-6 and eventually will work its way into PR-6.

Impacts downstream of the Basin include the understory associated with 59.3 ha (146.4 ac) of native riparian vegetation. Understory is assumed to occupy 30 percent of the total area, or 17.8 ha (43.9 ac). Only about 50 percent of the understory, or about 8.9 ha (22.0 ac) will be inundated with no significant impact.

7. The local sponsor will acquire 8.9 ha (22.0 ac) from the remaining 42.5 ha (105.1 ac) of the original 45.4-ha (112-ac) parcel within the Prado Basin that is available for mitigation.

8. The local sponsor will provide compensation to the Trust Fund for maintenance of the 8.9 ha (22.0 ac) of riparian habitat that will be acquired for restoration. The total compensation will be $25,000/ac for a total of $550,000.

Alternative 3

Impacts within the Basin would include the following: 138.5 ha (341.7 ac) of willow woodland and 2.1 ha (5.2 ac) of mixed eucalyptus and willow woodland for a total of 140.6 ha (346.9 ac). To reduce these impacts, the following measures are recommended.

3. The entire 140.6 ha (346.9 ac) have already been mitigated at 50 percent; an additional 11.6 percent mitigation for the remaining 70.2 ha (173.5 ac), or 8.1 ha (20.1 ac), is all that is required based on the additional number of days of inundation at 500 ft in a 100-year flood event. The local sponsor will acquire 8.1 ha (20.1 ac) for restoration. This land will be obtained from a 45.4-ha (112-ac) parcel within Prado Basin that is available for restoration.

4. The local sponsor will provide compensation to the Trust Fund for maintenance of the 8.1 ha (20.1 ac) of riparian habitat that will be acquired for restoration. The total compensation will be $25,000/ac for a total of $502,500.

Impacts downstream of the Basin include the understory associated with 71.0 ha (175.3 ac) of native riparian vegetation. Understory is assumed to occupy 30 percent of the total area, or 21.3 ha (52.6 ac). Only about 50 percent of the understory, or about 10.7 ha (26.3 ac), will be impacted.

5. The local sponsor will acquire 10.6 ha (26.3 ac) from the remaining 37.2 ha (91.9 ac) of the original 45.4-ha (112-ac) parcel within the Prado Basin that is available for mitigation.

6. The local sponsor will provide compensation to the Trust Fund for maintenance of the 10.6 ha (26.3 ac) of riparian habitat that will be acquired for restoration. The total compensation will be $25,000/ac for a total of $657,500.

Alternative 4

Impacts within the Basin would include the following: 256.1 ha (632.7 ac) of willow woodland and 3.9 ha (9.7 ac) of mixed eucalyptus and willow woodland for a total of 260.0 ha (642.4 ac). To reduce these impacts, the following measures are recommended.

3. The entire 260.0 ha (642.4 ac) have already been mitigated at 50 percent; an additional 29.6 percent mitigation for the remaining 130.0 ha (321.2 ac), or 38.5 ha 95.1 ac), is all that is required based on the additional number of days of inundation at 505 ft in a 100-year flood event. The local sponsor will acquire 38.5 ha (95.1 ac) for restoration from a 45.4-ha (112-ac) parcel within Prado Basin that is available for restoration.

4. The local sponsor will provide compensation to the Trust Fund for maintenance of the 38.5 ha (95.1 ac) of riparian habitat that will be acquired for restoration. The total compensation will be $25,000/ac for a total of $2,377,500.

Impacts downstream of the Basin include the understory associated with 112.9 ha (278.6 ac) of native riparian vegetation. Understory is assumed to occupy 30 percent of the total area, or 33.9 ha (83.6 ac). Only about 50 percent of the understory, or about 17.0 ha (41.8 ac) will be impacted.

6. The local sponsor will acquire the remaining 6.8 ha (16.9 ac) of the original 45.4-ha (112-ac) parcel within the Prado Basin that is available for mitigation.

7. The local sponsor will provide compensation to the Trust Fund for maintenance of the 6.8 ha (16.9 ac) of riparian habitat that will be acquired for restoration. The total compensation will be $25,000/ac for a total of $422,500.

8. The local sponsor will provide compensation for the loss of an additional 10.1 ha (24.9 ac) of native riparian woodland understory. This compensation will be $50,000/ac for a total of $1,245,000. The fund will be used for arundo removal.

Alternative 5

Impacts within the Basin would include the following: 370.7 ha (914.8 ac) of willow woodland, 1.9 ha (4.8 ac) of riparian scrub, and 5.4 ha (13.4 ac) of mixed eucalyptus and willow woodland, for a total of 378.0 ha (933.0 ac). Of this 378.0 ha (933.0 ac), 260.3 ha (642.4 ac) is between elevations 494 and 505 ft. The remaining 117.7 ha (290.6 ac) is between 505 and 508 ft elevation. To reduce these impacts, the following measures are recommended.

5. There are 260.3 ha (642.4 ac) that are located between elevations 494 and 505 ft that have already been mitigated at 50 percent. The remaining 130.2 ha (321.2 ac) will be mitigated at 29.6 percent, for a total of 38.5 ha (95.1 ac). The remaining 117.7 ha (290.6 ac) that are between 505 and 508 ft elevation will be mitigated at 73.3 percent of its habitat value, or 86.3 ha (213.0 ac), based on the additional number of days of inundation at 508 ft in a 100-year flood event. Therefore, a total of 124.8 ha (308.1 ac) will be required to be mitigated. The local sponsor will acquire a 45.4-ha (112-ac) parcel within the Prado Basin that is available for restoration. This acquisition will provide partial mitigation.

6. The local sponsor will provide compensation to the Trust Fund for the loss of an additional 74.9 ha (196.1 ac) of riparian habitat. This compensation will be $50,000/ac for a total of $9,805,000. This fund will be used for arundo removal.

7. The local sponsor will provide compensation to the Trust Fund for maintenance of the riparian habitat on the 112-ac parcel that will be acquired for restoration. This compensation will be $25,000/ac for a total of $2,800,000.

Impacts downstream of the Basin include the understory associated with 159.8 ha (394.3 ac) of native riparian vegetation. Understory is assumed to occupy 30 percent of the total area, or 47.9 ha (118.3 ac). Only about 50 percent of the understory, or about 24.0 ha (59.2 ac) will be impacted.

8. The local sponsor will provide compensation for the loss of 24.0 ha (59.2 ac) of native riparian woodland understory. This compensation will be $50,000/ac for a total of $2,960,000. This fund will be used for arundo removal.

4.3.3.2 Santa Ana Sucker

Direct impacts on Santa Ana Suckers and their potential spawning habitat downstream of Prado Dam are considered to be adverse and significant regardless of project alternative (Section 4.3.2). To compensate for impacts in this reach of the Santa Ana River, the local sponsor will prepare a Santa Ana Sucker Management Plan, an outline of which is provided in Appendix E. This plan will be completed prior to the first winter of project implementation. The focus of the plan will be to manage the aquatic environment, not just the Santa Ana sucker, throughout the Basin and Reach 9. The plan must be adaptive so that adjustments to the plan can be made as needed.

An integral part of the management plan will be an aquatic predator control plan. Non-native fishes and amphibians that thrive in ponds and sluggish streams have been introduced throughout the region and have proliferated especially in the Prado Basin. If these predators can be maintained in low numbers, or even eradicated, it is expected that sucker populations will benefit significantly.

OCWD will provide $25,000 annually for the first five years and $10,000 annually for 45 years toward the implementation of the sucker management plan. Implementation has three basic components:

habitat enhancement, aquatic predator control, and sucker monitoring. Habitat enhancement should be completed within the first five years; whereas, management and monitoring will continue for the 50-year life of the project. The most likely areas for creating or enhancing sucker spawning habitat should be along the stretch of river between Interstate 15 on the upstream end and River Road on the downstream end, as well as in Reach 9, as suckers are already present in these sections, at least seasonally. The management plan can be subject to revision as additional information become available.

Between River Road and the dam, the emphasis should be on aquatic predator control. The objective is to significantly reduce the populations of these predators along this stretch of seasonally flooded river within the basin proper, and maintain their numbers at this lower level (it may not be feasible to eliminate aquatic predators altogether). By managing the predator population, suckers should be able to survive seasonally in this stretch of river.

The Santa Ana sucker population in the river between I-15 to Weir Canyon will be monitored annually during the 50-year life of the projects, and adjustments made to the implementation strategy as needed to facilitate the recovery of sucker populations and encouraging sucker spawning along this stretch of the Santa Ana River. A by-product of the sucker management plan will be a healthier aquatic environment for all native fish species in the river, including the arroyo chub.

4.3.3.3 Commitments Already Made by Local Sponsor

The local sponsor is already providing compensation for a managing biologist ($25,000/yr) and staff biologist ($15,000/yr) to participate in developing a Santa Ana Sucker Recovery Plan, has made a $55,000 cash contribution to existing Santa Ana Sucker studies in the Basin, and has provided $15,000 for water quality analysis equipment and laboratory.

4.4 AIR QUALITY

4.4.1 ENVIRONMENTAL CONSEQUENCES

Potential air quality impacts associated with the proposed action have been assessed using approved SCAQMD, ARB, and EPA air quality assessment methodologies. Because the project does not necessitate construction or demolition of any kind, no short-term construction related emissions would occur. Potential long-term, intermittent air quality impacts associated with maintenance of the Prado Dam facilities are analyzed in this section.

4.4.1.1 Thresholds of Significance

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.

4.4.1.2 Impacts

Alternative 1

No change to the existing operational characteristics or maintenance activities within Prado Basin would occur under this alternative. Therefore, no impacts on air quality would result.

Alternatives 2, 3, 4, and 5

No change to the existing operational characteristics or maintenance activities within Prado Basin would occur under these alternatives. Therefore, no impacts on air quality would result

Issue 4.4.1: Exhaust and Fugitive Dust Emissions from Maintenance-Related Activities Downstream of Prado Dam (Direct, Adverse, But Less Than Significant). These project alternatives would result in an increase in water velocity flowing through the downstream channel when the basin requires evacuation for flood control purposes. Alternatives 3 through 5 are associated with maximum Prado Dam release rates of 7,400 cfs, 14,900 cfs, and 25,900 cfs, respectively, which are above what is considered to be the "non-damaging" release rate. The current frequency of these release rates range from once every 27 years to once every 83 years. With the implementation of these alternatives, the frequency of these release rates would increase to a range of once every 2 years to once every 4 years. The increased velocity through the Santa Ana River channel has the potential to result in an increase in maintenance-related emissions due to possible structural damage as well as increased debris floating downstream. However, the maximum release rate would be sustained for a period of time no greater than 24 hours, at which point downstream water velocity would revert to baseline conditions. The required maintenance and associated air quality emissions are therefore, not anticipated to be substantially greater than under the existing condition, and the impact is considered less than significant.

4.4.1.3 Conformity Screening

The Clean Air Act (CAA) requires that projects receiving federal funds prove conformity with the approved State Implementation Plan (SIP)/local air quality attainment plan for the region. The SCAQMD adopted the 1994 Air Quality Management Plan on September 9, 1994. The 1994 AQMP is the regionally approved air quality plan that states a project may have significant environmental effects if it is not consistent with locally adopted environmental plans. However, guidelines for the 1994 AQMP also contain requirements for project conformity to the policies and measures contained in the 1989 and 1991 AQMPs.

The project would include occasional repairs that would nominally increase long-term operational emissions. These are expected to fall well below the federal de minimis levels for PM10 and NOx. PM10 and NOx federal de minimis levels are 70 tons per year and 50 tons per year, respectively. In addition, the project would not affect any local sensitive receptor and would be consistent with the approved AQMP. The project would, therefore, meet the federal conformity screening requirements.

4.4.2 MITIGATION MEASURES

Alternative 1

No mitigation is required.

Alternative 2, 3, 4, and 5

Issue 4.4.1: Exhaust and Fugitive Dust Emissions from Maintenance-Related Activities Downstream of Prado Dam.

No mitigation is required.

4.4.3 LEVEL OF SIGNIFICANCE AFTER MITIGATION

No significant air quality impacts would occur with the implementation of the above alternatives.

4.5 NOISE

4.5.1 ENVIRONMENTAL CONSEQUENCES

The potential noise impacts of the proposed water conservation alternatives include long-term operational impacts associated with maintenance vehicles. No short-term construction related impacts would occur.

4.5.1.1 Thresholds of Significance

The proposed action would result in a significant noise impact if long-term operational noise associated with maintenance activities does not occur in accordance with applicable local noise ordinances. Maintenance activities are prohibited:

- In the County of San Bernardino between 7:00 p.m. to 7:00 a.m., and on Sundays and federal holidays, and

- In the County of Riverside within 0.25 mi of occupied residences from 6:00 p.m. to 6:00 a.m. from June through September and from 6:00 p.m. to 7:00 a.m. from October through May

- In the City of Corona from 7:00 p.m. to 7:00 a.m. Monday through Friday, and on Saturdays and Sundays, unless no noise sensitive land uses would be affected by construction noise

- In the County of Orange, between the hours of 8 p.m. and 7 a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday.

- In the City of Yorba Linda, such activities may not take place between the hours of 8 p.m. and 7 a.m. on weekdays, or on Sundays or a holidays.

- In the City of Anaheim, between the hours of 7 p.m. and 7 a.m.

4.5.1.2 Impacts

Alternative 1

No noise impacts would result from this alternative as no changes to existing operations would occur.

Alternatives 2, 3, 4, and 5

Issue 4.5.1: Noise Emissions from Periodic Maintenance Activities Downstream of Prado Dam (Direct, Adverse, But Less Than Significant Impact). These project alternatives would result in an increase in water velocity flowing through the downstream channel when the basin requires evacuation for flood control purposes. Alternatives 2 through 5 are associated with maximum Prado Dam release rates of 5,000 cfs, 7,400 cfs, 14,900 cfs, and 25,900 cfs, respectively. The current frequency of these release rates range from once every 27 years to once every 83 years. With the implementation of these alternatives, the frequency of these release rates would increase to a range of once every 2 years to once every 4 years. The increased velocity through the Santa Ana River channel has the potential to result in an increase in maintenance-related emissions due to possible structural damage as well as increased debris floating downstream. However, the required maintenance would conform to the applicable local noise ordinance. Further, all noise impacts would be temporary. The impact is, therefore, considered to be less than significant.

4.5.2 MITIGATION MEASURES

Alternative 1

No mitigation is required.

Alternative 2, 3, 4, and 5

Issue 4.5.1: Noise Emissions from Maintenance Activities Downstream of Prado Dam.

No mitigation is required.

4.5.3 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Implementation of the proposed action would not result in significant noise impacts.

4.6 LAND USE AND RECREATION

4.6.1 ENVIRONMENTAL CONSEQUENCES

4.6.1.1 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
- Substantially affect the long-term provision of, or access to, recreational uses within the area

4.6.1.2 Existing Onsite and Surrounding Land Uses Upstream of Prado Dam

Alternative 1

This alternative (continuation of existing Prado Dam operations for water conservation and flood control purposes) would not result in any additional effects on the existing land uses within Prado Basin.

Alternative 2

Issue 4.6.1: Effects on the Availability of Existing Recreational and Other Uses Resulting from Inundation Within the Prado Basin Area (Direct, Adverse, But Less Than Significant Impact). This alternative would result in an increase in the duration of inundation within Prado Basin compared to existing operations. This increased duration of inundation during the flood season would further reduce the availability of recreation and other uses that are located below elevation 530 ft. Recreational and other uses that are located between elevation 510 ft and 530 ft could experience one additional day of inundation per year (present and future conditions). These recreational and other uses would not be significantly affected under this alternative. The uses that are located above elevation 510 ft include Prado Basin Park, Prado Regional Park, Oranco Bowman Archery Range, Prado Olympic Shooting Park, Prado Equestrian Center, Butterfield Stage Trail Park, El Prado Golf Course, and Corona Municipal Airport. The land uses that are below elevation 510 ft that would be affected by increased inundation under this alternative include the Prado Petroleum Company wells (elevations 493 to 505 ft), agricultural leases (elevations 490 to 510 ft), Raahauge's Hunting Club (485 to 514 ft), the Fly Away Foundation (elevation 485 to 520 ft), and Richardson's Dog Training (elevation 490 to 554 ft). These uses could experience a maximum average of 6 additional days of inundation per year under existing conditions and a maximum average of 20 additional days of inundation per year under future conditions. A maximum average of 20 additional days per year of inundation would reduce the availability of these recreational and other uses by 4 percent each year compared to existing operations. The total reduction of availability each year including the reduction that currently occurs during the non-flood season is 31 percent. The additional 4 percent of reduction in the availability of the recreational and other uses that are located below elevation 510 ft is not expected to be significant.

Issue 4.6.2: Effects Relating to the Physical Degradation of Existing Recreational and Other Uses Resulting from Inundation Within the Prado Basin Area (Direct, Adverse, But Less Than Significant Impact). As previously mentioned, this alternative would result in an increase in the duration of inundation and an increase in inundation elevation during the flood season within the Prado Basin compared to existing operations. Based on an evaluation of frequency storms, for present and future conditions this alternative would result in 10 to 30 more days of inundation at elevation 498 ft during 5-year to 100-year frequency floods, compared to existing operations. The recreational uses that would be inundated at elevation 498 ft or below include Raahauge's Hunting Club (485 to 514 ft), the Fly Away Foundation (elevation 485 to 520 ft), and Richardson's Dog Training (elevation 490 to 554 ft). This increased inundation is not considered to be an adverse significant impact.

Alternative 3

Issue 4.6.1: Effects on the Availability of Existing Recreational and Other Uses Resulting from Inundation Within the Prado Basin Area (Direct, Adverse, But Less Than Significant Impact). Similar to Alternative 2, the operations at Prado Dam under this alternative would result in an increase in the duration of inundation during the flood season within the basin area compared to existing operations and, therefore, would reduce the availability of existing recreational and other uses below elevation 530 ft. Recreational and other uses that are located between elevation 510 ft and 530 ft could experience a maximum of 3 additional days of inundation per year (present and future conditions). These uses would not be significantly affected under this alternative. The uses that are located above elevation 510 ft include Prado Basin Park, Prado Regional Park, Oranco Bowman Archery Range, Prado Olympic Shooting Park, Prado Equestrian Center, Butterfield Stage Trail Park, El Prado Golf Course, and Corona Municipal Airport. The land uses that are below elevation 510 ft that would be affected by increased inundation under this alternative include Prado Petroleum Company wells (elevations 493 to 505 ft), agricultural leases (elevations 490 to 510 ft), Raahauge's Hunting Club (485 to 514 ft), the Fly Away Foundation (elevation 485 to 520 ft), and Richardson's Dog Training (elevation 490 to 554 ft). These uses could experience a maximum average of 11 additional days of inundation per year under existing conditions and a maximum average of 20 additional days of inundation per year under future conditions. A maximum average of 20 additional days of inundation per year would reduce the availability of these uses by 4 percent each year compared to existing operations. The total reduction of availability each year including the reduction that currently occurs during the non-flood season is 31 percent. The additional 4 percent of reduction in the availability of the recreational and other uses that are located below elevation 510 ft is not expected to be significant.

Issue 4.6.2: Effects Relating to the Physical Degradation of Existing Recreational and Other Uses Resulting from Inundation Within the Prado Basin Area (Direct, Adverse, But Less Than Significant Impact). As stated above, this alternative would result in an increase in the duration of inundation and an increase in inundation elevation during the flood season within the Prado Basin compared to existing operations. Based on an evaluation of frequency storms for present and future conditions, this alternative would result in 15 to 40 more days of inundation at elevation 500 ft NGVD for 5-year to 100-year frequency floods, compared to existing operations. The recreational and other uses that would be inundated at elevation 500 ft or below include Prado Petroleum Company wells (elevations 493 to 505 ft), agricultural leases (elevations 490 to 510 ft), Raahauge's Hunting Club (485 to 514 ft), the Fly Away Foundation (elevation 485 to 520 ft), and Richardson's Dog Training (elevation 490 to 554 ft). This increased inundation is not considered to be an adverse significant impact.

Alternative 4

Issue 4.6.1: Effects on the Availability of Existing Recreational and Other Uses Resulting from Inundation Within the Prado Basin Area (Direct, Adverse, But Less Than Significant Impact). Similar to Alternatives 2 and 3, the operations at Prado Dam under this alternative would result in an increase the duration of inundation during the flood season within Prado Basin compared to existing operations, and therefore, would partially reduce the availability of existing recreational and other uses below elevation 530 ft. Recreational and other uses that are located between elevation 510 ft and 530 ft could experience a maximum of 3 additional days of inundation per year (present and future conditions). These uses would not be significantly affected under this alternative. The uses that are located above elevation 510 ft include Prado Basin Park, Prado Regional Park, Oranco Bowman Archery Range, Prado Olympic Shooting Park, Prado Equestrian Center, Butterfield Stage Trail Park, El Prado Golf Course, and Corona Municipal Airport. The land uses that are below elevation 510 ft that will be affected by increased inundation under this alternative include Prado Petroleum Company wells (elevations 493 to 505 ft), agricultural leases (elevations 490 to 510 ft), Raahauge's Hunting Club (485 to 514 ft), the Fly Away Foundation (elevation 485 to 520 ft), and Richardson's Dog Training (elevation 490 to 554 ft). These uses could experience a maximum average of 18 additional days of inundation per year under existing conditions and a maximum average of 21 additional days of inundation per year under future conditions. A maximum average of 21 additional days of inundation would reduce the availability of these uses by 4 percent each year compared to existing operations. The total reduction of availability each year including the reduction that currently occurs during the non-flood season is 32 percent. The additional 4 percent of reduction in the availability of the recreational and other uses that are located below elevation 510 ft is not expected to be significant.

Issue 4.6.2: Effects Relating to the Physical Degradation of Existing Recreational and Other Uses Resulting from Inundation Within the Prado Basin Area (Direct, Adverse, But Less Than Significant Impact). As stated above, this alternative would result in an increase in the duration of inundation and an increase in inundation elevation during the flood season within the Prado Basin area compared to existing operations. Based on an evaluation of frequency storms for present and future conditions, this alternative would result in 25 to 60 more days of inundation at elevation 505 ft NGVD during 5-year to 100-year frequency floods compared to existing operations. The recreational and other uses that would be inundated at elevation 505 ft or below include Prado Petroleum Company wells (elevations

493 to 505 ft), agricultural leases (elevations 490 to 510 ft), Raahauge's Hunting Club (485 to 514 ft), the Fly Away Foundation (elevation 485 to 520 ft), and Richardson's Dog Training (elevation 490 to 554 ft). This increased inundation is not considered to be an adverse significant impact.

Alternative 5

Issue 4.6.1: Effects on the Availability of Existing Recreational and Other Uses Resulting from Inundation Within the Prado Basin Area (Direct, Adverse, But Less Than Significant Impact). Similar to Alternatives 2, 3, and 4, the operations at Prado Dam under this alternative would result in an increase the duration of year-round inundation within Prado Basin compared to existing conditions and, therefore, would reduce the availability of existing recreational and other uses below elevation 540 ft. Recreational and other uses that are located between elevation 510 ft and 540 ft could experience a maximum of 8 additional days of inundation per year (present and future conditions). These recreational uses would not be significantly affected under this alternative. The uses that are located above elevation 510 ft include Prado Basin Park, Prado Regional Park, Oranco Bowman Archery Range, Prado Olympic Shooting Park, Prado Equestrian Center, Butterfield Stage Trail Park, El Prado Golf Course, and Corona Municipal Airport. The land uses that are below elevation 510 ft that would be affected by increased inundation under this alternative include Prado Petroleum Company wells (elevations 493 to 505 ft), agricultural leases (elevations 490 to 510 ft), Raahauge's Hunting Club (485 to 514 ft), the Fly Away Foundation (elevation 485 to 520 ft), and Richardson's Dog Training (elevation 490 to 554 ft). These uses could experience a maximum average of 25 additional days of inundation per year under existing conditions and a maximum average of 54 additional days of inundation per year under future conditions. A maximum average of 54 additional days of inundation would reduce the availability of these uses by 11 percent each year compared to existing operations. The total reduction of availability each year including the reduction that currently occurs during the non-flood season is 39 percent. The additional 11 percent of reduction in the availability of the recreational and other uses that are located below elevation 510 ft is not expected to be significant.

Issue 4.6.2: Effects Relating to the Physical Degradation of Existing Recreational Uses Resulting from Inundation Within the Prado Basin Area (Direct, Adverse, But Less Than Significant Impact). As stated above, this alternative would result in an increase in the duration of inundation and an increase in inundation elevation year-round within the Prado Basin area compared to existing operations. Based on an evaluation of frequency storms for present and future conditions, this alternative would result in 9 to 80 more days of inundation at an elevation 508 ft during 5-year to 100-year frequency floods compared to existing operations. The recreational uses that would be inundated at elevation 508 ft or below include Raahauge's Hunting Club (485 to 514 ft), the Fly Away Foundation (elevation 485 to 520 ft), and Richardson's Dog Training (elevation 490 to 554 ft). This increased inundation is not considered to be an adverse significant impact.

4.6.1.3 Existing Onsite and Surrounding Land Uses Downstream Land Uses

Alternative 1

This alternative would not require a change in operations and therefore would not have any impact on downstream land uses.

Alternative 2

Issue 4.6.3: Effects on the Availability of Existing Recreational and Other Uses Resulting from Inundation Below Prado Dam (Direct, Adverse, But Less Than Significant). This alternative could result in a maximum release rate of 5,000 cfs from Prado Dam in order to evacuate the Reservoir for flood control purposes. Under this alternative, the frequency of this release rate would be once every 2 years, which is an increase from the current frequency (once every 12 years) of releasing 5,000 cfs from Prado Dam. While a 5,000 cfs release rate into the Santa Ana River from Prado Dam would inundate riparian habitat within the stream banks upstream of Weir Canyon Road, no adjacent land uses would be subject to flooding, other than a small area of the Green River Golf Course. No significant impact would occur.

Issue 4.6.4: Effects Relating to the Physical Degradation of Existing Recreational and Other Uses Resulting from Inundation Below Prado Dam (Direct, Adverse, But Less Than Significant Impact). The maximum release rate of 5,000 cfs, which could occur under Alternative 2, would not result in the flooding of any adjacent land uses, other than a small area of the Green River Golf Course, and would not cause the physical degradation of existing recreational or other uses. The impact is less than significant.

Alternative 3

Issue 4.6.3: Effects on the Availability of Existing Recreational and Other Uses Resulting from Inundation Below Prado Dam (Direct, Adverse, But Less Than Significant Impact). This alternative could result in a maximum release rate of 7,400 cfs from Prado Dam in order to evacuate the Reservoir for flood control purposes. Under this alternative, the frequency of this release rate would be once every 3 years, which is an increase from the current frequency (once every 18 years) of releasing 7,400-cfs from Prado Dam. A 7,400-cfs release rate into the Santa Ana River would inundate riparian habitat within the stream banks as well as approximately 23 acres at the Green River Golf Course. In addition, approximately 9 acres of the active recreational uses within Featherly Park would become inundated as well as portions of the Regional Trail on the north side of the river.

While inundation at the golf course, park, and trail would temporarily limit the use of the facilities, the maximum release rate would be sustained for no longer than 24 hours. Further, inundation would occur immediately prior to, or during a storm event when use of these facilities would already be limited. The impact on the availability of these uses would therefore be less than significant.

Issue 4.6.4: Effects Relating to the Physical Degradation of Existing Recreational and Other Uses Resulting from Inundation Below Prado Dam (Direct, Adverse, Significant Impact). The maximum release rate of 7,400 cfs, which could occur under Alternative 3, would result in the flooding of portions of Green River Golf Course, Featherly Regional Park, and the Regional trail on the north side of the river. The potential for physical degradation of these facilities is considered a significant impact of this Alternative.

Alternative 4

Issue 4.6.3: Effects on the Availability of Existing Recreational and Other Uses Resulting from Inundation Below Prado Dam (Direct, Adverse, But Less Than Significant). This alternative could result in a maximum release rate of 14, 900 cfs from Prado Dam in order to evacuate the Reservoir for flood control purposes. Under this alternative, the frequency of this release rate would be once every

3.5 years, which is an increase from the current frequency (once every 33 years) of releasing 14,900-cfs from Prado Dam. A 14,900-cfs release rate into the Santa Ana River would inundate riparian habitat within the stream banks as well as approximately 172 acres at the Green River Golf Course. In addition, approximately 33 acres of the active recreational uses within Featherly Park would become inundated as well as portions of the Regional Trail on the north side of the river.

While inundation at the golf course, park, and trail would temporarily limit the use of the facilities, the maximum release rate would be sustained for no longer than 24 hours. Further, inundation would occur immediately prior to, or during a storm event, when use of these facilities would already be limited. The impact on the availability of these uses would therefore be less than significant.

Issue 4.6.4: Effects Relating to the Physical Degradation of Existing Recreational and Other Uses Resulting from Inundation Below Prado Dam (Direct, Adverse, Significant Impact). The maximum release rate of 14,900 cfs, which could occur under Alternative 4, would result in the flooding of portions of Green River Golf Course, Featherly Regional Park, and the Regional trail on the north side of the river. The potential for physical degradation of these facilities is considered a significant impact of this Alternative.

Alternative 5

Issue 4.6.3: Effects on the Availability of Existing Recreational and Other Uses Resulting from Inundation Below Prado Dam (Direct, Adverse, But Less Than Significant Impact). This alternative could result in a maximum release rate of 25,900 cfs from Prado Dam in order to evacuate the Reservoir for flood control purposes. Under this alternative, the frequency of this release rate would be once every 4 years, which is an increase from the current frequency (once every 83 years) of releasing 25,900-cfs from Prado Dam. A 25,900-cfs release rate into the Santa Ana River would inundate riparian habitat within the stream banks as well as approximately 198 acres at the Green River Golf Course. In addition, approximately 38 acres of the active recreational uses within Featherly Park would become inundated as well as portions of the Regional Trail on the north side of the river.

While inundation at the golf course, park, and trail would temporarily limit the use of the facilities, the maximum release rate would be sustained for no longer than 24 hours. Further, inundation would occur immediately prior to, or during a storm event, when use of these facilities would already be limited. The impact on the availability of these uses would therefore be less than significant.

Issue 4.6.4: Effects Relating to the Physical Degradation of Existing Recreational and Other Uses Resulting from Inundation Below Prado Dam (Direct, Adverse, Significant Impact). The maximum release rate of 25,900 cfs, which could occur under Alternative 5, would result in the flooding of portions of Green River Golf Course, Featherly Regional Park, and the Regional trail on the north side of the river. The potential for physical degradation of these facilities is considered a significant impact of this Alternative.

4.6.1.4 Future Land Uses Upstream of Prado Dam

Future recreational uses within Prado Basin are determined by the Conceptual Planning Areas mapped and described in the Prado Flood Control Basin Project Master Plan (U.S. Army Corps of Engineers 1993). The current applicability of the Conceptual Planning Areas has been confirmed by the County of Riverside (Brewer, pers. comm., August 1998) and the City of Corona (Wills, pers. comm., August 1998).

Alternative 1

This alternative would not result in any additional effects on the land uses proposed within the Prado Basin area as identified in the Prado Flood Control Basin Master Plan (March 1993).

Alternative 2

Issue 4.6.5: Effects on the Availability of Future Recreational Uses Resulting from Inundation Within the Prado Basin Area (Direct, Potentially Adverse, But Less Than Significant Impact). Under this alternative, the operations of Prado Dam would result in an increase in the duration of inundation during the flood season within the Basin area compared to existing operations. This increased duration of inundation would not affect the Conceptual Planning Areas for recreation development. Under this alternative, a maximum average of 13 more days per year of inundation would occur at an elevation of 498 ft NGVD under present and future conditions compared to the duration of inundation under existing operations. Even though this alternative would only increase the flood season water conservation pool to elevation 498 ft, this alternative would result in an increase in inundation of future recreational facilities that are planned above elevation 505 ft. Portions of these future recreational facilities could be inundated for an average of 0.5 additional day under present conditions and 2 additional days under future conditions per year compared to existing operations. The maximum average of 2 additional days of inundation under this alternative would not significantly affect the availability of future recreational facilities in the Prado Basin.

Issue 4.6.6: Effects Relating to the Physical Degradation of Future Recreational Uses Resulting from Inundation Within the Prado Basin Area (Direct, Potentially Adverse, But Less Than Significant Impact). As indicated previously, this alternative would result in an increase in the duration of inundation and an increase in the inundation elevation during the flood season within the Prado Basin area compared to existing operations. This alternative could result in a maximum average of 2 additional days per year of inundating future recreational uses at elevation 505 ft. As all facilities within Prado Basin have to be floodable, the potential increase in inundation will not result in an additional physical degradation of future uses, and therefore, is not considered to be an adverse significant impact.

Alternative 3

Issue 4.6.5: Effects on the Availability of Future Recreational Uses Resulting from Inundation Within the Prado Basin Area (Direct, Potentially Adverse, But Less Than Significant Impact). Similar to Alternative 2, the operations at Prado Dam under this alternative would result in an increase in the duration of inundation during the flood season within the Basin area compared to existing operations. Even though this alternative would only increase the flood season water conservation pool to elevation 500 ft, this alternative would result in an increase in inundation of future recreational facilities that are planned above elevation 505 ft. Portions of these future recreational facilities could be inundated for an average of 3 additional days under present conditions and 6 additional days under future conditions per year compared to existing operations. The maximum average of 6 additional days of inundation under this alternative would not significantly affect the availability of future recreational facilities in the Prado Basin.

Issue 4.6.6: Effects Relating to the Physical Degradation of Future Recreational Uses Resulting from Inundation Within the Prado Basin Area (Direct, Potentially Adverse, But Less Than Significant Impact). As indicated previously, this alternative would result in an increase in the duration of inundation and an increase in the inundation elevation during the flood season within the Prado Basin area compared to existing operations. This alternative could result in a maximum average of 6 additional days per year of inundating future recreational uses at elevation 505 ft. As all facilities within Prado Basin have to be floodable, the potential increase in inundation will not result in an additional physical degradation of future uses, and therefore, is not considered to be an adverse significant impact.

Alternative 4

Issue 4.6.5: Effects on the Availability of Future Recreational Uses Resulting from Inundation Within the Prado Dam Basin Area (Direct, Potentially Adverse, But Less Than Significant Impact). Similar to Alternatives 2 and 3 the operations at Prado Dam under this alternative would result in an increase in the duration of inundation during the flood season within the basin area, compared to existing operations. Even though this alternative would increase the flood season water conservation pool to elevation 505 ft, this alternative would result in an increase in inundation of future recreational facilities that are planned above elevation 505 ft. Portions of these future recreational facilities could be inundated for an average of 6 additional days under present conditions and 11 additional days under future conditions per year compared to existing operations. The maximum average of 11 additional days of inundation under this alternative would not significantly affect the availability of future recreational facilities in the Prado Basin.

Issue 4.6.6: Effects Relating to the Physical Degradation of Future Recreational Uses Resulting from Inundation Within the Prado Basin Area (Direct, Potentially Adverse, But Less Than Significant Impact). As indicated previously, this alternative would result in an increase in the duration of inundation and an increase in the inundation elevation during the flood season within the Prado Basin area compared to existing operations. This alternative could result in a maximum average of 11 additional days per year of inundating future recreational uses at elevation 505 ft. As all facilities within Prado Basin have to be floodable, the potential increase in inundation will not result in an additional physical degradation of future uses, and therefore, is not considered to be an adverse significant impact.

Alternative 5

Issue 4.6.5: Effects on the Availability of Future Recreational Uses Resulting from Inundation Within the Prado Basin Area (Direct, Potentially Adverse, But Less Than Significant Impact). Similar to Alternatives 2, 3, and 4, the operations at Prado Dam under this alternative would result in an increase in the duration of year-round inundation within the Basin area compared to existing operations. This alternative would increase the flood season water conservation pool to elevation 508 ft, which would result in an increase in inundation of future recreational facilities that are planned above elevation 505 ft. Portions of these future recreational facilities could be inundated for an average of 22 additional days under present conditions and 54 additional days under future conditions per year compared to existing operations. The maximum average of 54 additional days of inundation under this alternative would not significantly affect the availability of future recreational facilities in the Prado Basin.

Issue 4.6.6: Effects Relating to the Physical Degradation of Future Recreational Uses Resulting from Inundation Within the Prado Dam Basin Area (Direct, Potentially Adverse, But Less Than Significant Impact). As indicated previously, this alternative would result in an increase in the duration of inundation and an increase in the inundation elevation during the flood and non-flood seasons within Prado Basin, compared to existing conditions. This alternative could result in a maximum average of 54 additional days per year of inundating future recreational uses at elevation 505 ft. As all facilities within Prado Basin have to be floodable, the potential increase in inundation will not result in an additional physical degradation of future uses, and therefore, is not considered to be an adverse significant impact.

4.6.1.5 Future Land Uses Downstream of Prado Dam

Because no new land uses are anticipated in the substantially built-out areas within the downstream study area, implementation of the project alternatives would not result in any effects on future land uses.

4.6.2 MITIGATION MEASURES

Alternative 1

No mitigation is required.

Alternatives 2, 3, 4, and 5

Issue 4.6.1: Effects on the Availability of Existing Recreational and Other Uses Resulting from Inundation Within the Prado Basin Area.

No mitigation is required.

Issue 4.6.2: Effects Relating to the Physical Degradation of Existing Recreational and Other Uses Resulting from Inundation Within the Prado Basin Area.

All recreation facilities within Prado Basin are required to be floodable. Following inundation of existing recreational and other uses within the Prado Basin area, maintenance activities to restore these uses to their pre-inundation condition may be required.

Issue 4.6.3: Effects on the Availability of Existing Recreational and Other Uses Resulting from Inundation Below Prado Dam

No mitigation is required.

Issue 4.6.4: Effects Relating to the Physical Degradation of Existing Recreational and Other Uses Resulting from Inundation Below Prado Dam

Following inundation of existing recreational and other uses downstream of Prado Dam, maintenance activities to restore these uses to their pre-inundation condition may be required.

Alternatives 2, 3, 4, and 5

Issue 4.6.5: Effects on the Availability of Future Recreational Uses Resulting from Inundation Within the Prado Basin Area.

No mitigation is required.

Issue 4.6.6: Effects Relating to the Physical Degradation of Future Recreational Uses Resulting from Inundation Within the Prado Basin Area.

All future recreational uses within Prado Basin will be planned and constructed according to Corps regulations for uses within flood control basins. No recreational facilities will be constructed at the lower elevations within Prado Basin.

4.6.3 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Implementation of the project alternatives would not result in significant impacts on land use and recreation.

4.7 AESTHETICS

4.7.1 ENVIRONMENTAL CONSEQUENCES

Implementation of each of the project alternatives has the potential to affect views surrounding the Prado Basin and thus may result in visual impacts.

4.7.1.1 Thresholds of Significance

The proposed action is considered to have a significant effect on the environment if:

- a project would obstruct an existing public scenic view or view from a designated scenic highway
- a project would substantially alter the existing character of the area or any designated scenic element

4.7.1.2 Views from Visually Sensitive Land Uses Surrounding Prado Basin

Alternative 1

This alternative would not result in any changes to the existing water conservation operations. Therefore, no changes in views from visually sensitive land uses would occur.

Alternative 2

Issue 4.7.1: Alteration of Existing Views from Residences Surrounding Prado Basin (Direct, Adverse, But Less Than Significant Impact). Views from surrounding residences (*i.e.*, community of Sierra Del Oro, residences along cliffs between Rincon Road and River Road near Corydon Avenue, and Butterfield Ranch) would experience minimal to no changes. Under this alternative, the water conservation pool would be increased to elevation 498 ft from elevation 494 ft during the flood season. This alternative would not result in changes to the water conservation pool elevation during the non-flood season; therefore, only views during the flood season would be altered. During the flood season, this alternative would result in an average maximum of 6 additional days per year during present conditions and 20 additional days per year during future conditions that portions of the Basin may be inundated compared to existing operations. Views from the community of Sierra Del Oro are distant (*i.e.*, greater than one mi) and will not be affected under this alternative. Views from residences along the cliffs between Rincon Road and River Road near Corydon Avenue are approximately 0.6 mi from elevation 498 ft. Due to the extensive riparian woodland vegetation, a change in water elevation by 4 ft may not be noticeable from these residences and if it is noticeable, the 4-ft change in water elevation during an average maximum of 20 additional days per year during the flood season would not be significant. Residences within Butterfield Ranch that have views of the Basin are located approximately 0.4 mi from elevation 498 ft. Views from the residences within Butterfield Ranch are expansive and cover a large portion of the Basin. The 4-ft elevation change in water elevation may allow these residences to view impounded water for a longer period of time during the flood season; however, this increase in time (a maximum of 20 additional days per year) during the flood season will not substantially alter the existing views. In summary, existing views from surrounding residences may be affected; however, these views would not be significantly altered under this alternative.

Alternative 3

Issue 4.7.1: Alteration of Existing Views from Residences Surrounding Prado Basin (Direct, Adverse, But Less Than Significant Impact). Views from surrounding residences (*i.e.*, community of Sierra Del Oro, residences along cliffs between Rincon Road and River Road near Corydon Avenue, and Butterfield Ranch) would experience minimal to no changes. Under this alternative, the water conservation pool would be increased to elevation 500 ft from elevation 494 ft during the flood season. This alternative would not result in changes to the water conservation pool elevation during the non-flood season; therefore, only views during the flood season would be altered. During the flood season, this alternative would result in an average maximum of 11 additional days per year during present conditions and 20 additional days per year during future conditions that portions of the Basin may be inundated compared to existing operations. Views from the community of Sierra Del Oro are distant (*i.e.*, greater than one mi) and will not be affected under this alternative. Views from residences along the cliffs between Rincon Road and River Road near Corydon Avenue are approximately 0.5 mi from elevation 500 ft. Due to the extensive riparian woodland vegetation, a change in water elevation by 4 ft may not be noticeable from these residences and if it is noticeable, the 6-ft change in water elevation during an average maximum of 20 additional days per year during the flood season would not be significant. Residences within Butterfield Ranch that have views of the Basin are located approximately 0.4 mi from elevation 500 ft. Views from the residences within Butterfield Ranch are expansive and cover a large portion of the Basin. The 6-ft elevation change in water elevation may allow these residences to view impounded water for a longer period of time during the flood season; however, this increase in time (a maximum of 20 additional days per year) during the flood season will not substantially alter the existing views. In summary, existing views from surrounding residences may be affected; however, these views would not be significantly altered under this alternative.

Alternative 4

Issue 4.7.1: Alteration of Existing Views from Residences Surrounding Prado Basin (Direct, Adverse, But Less Than Significant Impact). Views from surrounding residences (*i.e.*, community of Sierra Del Oro, residences along cliffs between Rincon Road and River Road near Corydon Avenue, and Butterfield Ranch) would experience minimal to no changes. Under this alternative, the water conservation pool would be increased to elevation 505 ft from elevation 494 ft during the flood season. This alternative would not result in changes to the water conservation pool elevation during the non-flood season; therefore, only views during the flood season would be altered. During the flood season, this alternative would result in an average maximum of 18 additional days per year during present conditions and 21 additional days per year during future conditions that portions of the Basin may be inundated compared to existing operations. Views from the community of Sierra Del Oro are distant (*i.e.*, greater than one mi) and will not be affected under this alternative. Views from residences along the cliffs between Rincon Road and River Road near Corydon Avenue are approximately 0.4 mi from elevation 505 ft. Due to the extensive riparian woodland vegetation, a change in water elevation by 4 ft may not be noticeable from these residences and if it is noticeable, the 8-ft change in water elevation during an average maximum of 21 additional days per year during the flood season would not be significant. Residences within Butterfield Ranch that have views of the Basin are located approximately 0.4 mi from elevation 505 ft. Views from the residences within Butterfield Ranch are expansive and cover a large portion of the Basin. The 8-ft elevation change in water elevation may allow these residences to view impounded water for a longer period of time during the flood season; however, this increase in time (a maximum of 21 additional days per year) during the flood season will not substantially alter the existing views. In summary, existing views from surrounding residences may be affected; however, these views would not be significantly altered under this alternative.

Alternative 5

Issue 4.7.1: Alteration of Existing Views from Residences Surrounding Prado Basin (Direct, Adverse, But Less Than Significant Impact). Views from surrounding residences (*i.e.*, community of Sierra Del Oro, residences along cliffs between Rincon Road and River Road near Corydon Avenue, and Butterfield Ranch) would experience minimal changes. Under this alternative, the water conservation pool would be increased to elevation 508 ft from elevation 494 ft during the flood and non-flood seasons. During the flood and non-flood seasons, this alternative would result in an average maximum of 25 additional days per year during present conditions and 54 additional days per year during future conditions that portions of the Basin may be inundated compared to existing operations. Views from the community of Sierra Del Oro are distant (*i.e.*, greater than one mi) and will not be affected under this alternative. Views from residences along the cliffs between Rincon Road and River Road near Corydon Avenue are approximately 0.2 mi from elevation 508 ft. Due to the extensive riparian woodland vegetation, a change in water elevation by 14 ft during the flood season and 3 ft during the non-flood season may not be noticeable from these residences and if it is noticeable, the 14-ft and 3-ft changes in water elevation during an average maximum of 54 additional days per year would not be significant. Residences within Butterfield Ranch that have views of the Basin are located approximately 0.2 mi from elevation 508 ft. Views from the residences within Butterfield Ranch are expansive and cover a large portion of the Basin. The 14-ft and 3-ft elevation changes in water elevation may allow these residences to view impounded water for a longer period of time during the flood and non-flood seasons; however, this increase in time (a maximum of 54 additional days per year) will not substantially alter the existing views. In summary, existing views from surrounding residences may be affected; however, these views would not be significantly altered under this alternative.

4.7.1.3 <u>Views from Scenic Highways</u>

Alternative 1

This alternative would not result in any changes to the existing water conservation operations. Therefore, no changes in views from scenic highways would occur.

Alternative 2

Issue 4.7.2: Alteration of Existing Views from State Route 71 (Direct, Adverse, But Less Than Significant Impact). Motorists traveling northbound and southbound along SR 71, which is a San Bernardino County and Riverside County-designated scenic highway, have intermittent views of Prado Basin. This alternative may alter motorists views during the flood season. As described previously, this alternative would result in an average maximum of 20 additional days of inundation compared to existing operations. A 4-ft elevation change in the impoundment of water during the flood season within Prado Basin would not substantially alter existing views by motorists.

Alternative 3

Issue 4.7.2: Alteration of Existing Views from State Route 71 (Direct, Adverse, But Less Than Significant Impact). Motorists traveling northbound and southbound along SR 71, which is a San Bernardino County and Riverside County-designated scenic highway, have intermittent views of Prado Basin. This alternative may alter motorists views during the flood season. As described previously, this alternative would result in an average maximum of 20 additional days of inundation compared to existing operations. A 6-ft elevation change in the impoundment of water during the flood season within Prado Basin would not substantially alter existing views by motorists because motorists already view a greater amount of water impoundment during the non-flood season under the existing operations.

Alternative 4

Issue 4.7.2: Alteration of Existing Views from State Route 71 (Direct, Adverse, But Less Than Significant Impact). Motorists traveling northbound and southbound along SR 71, which is a San Bernardino County and Riverside County-designated scenic highway, have intermittent views of Prado Basin. This alternative may alter motorists views during the flood season. As described previously, this alternative would result in an average maximum of 21 additional days of inundation compared to existing operations. An 11-ft elevation change in the impoundment of water during the flood season within Prado Basin would not substantially alter existing views by motorists because motorists already view water impoundment at this elevation during the non-flood season under the existing operations.

Alternative 5

Issue 4.7.2: Alteration of Existing Views from State Route 71 (Direct, Adverse, But Less Than Significant Impact). Motorists traveling northbound and southbound along SR 71, which is a San Bernardino County and Riverside County-designated scenic highway, have intermittent views of Prado Basin. This alternative may alter motorists views during the flood and non-flood seasons. As described previously, this alternative would result in an average maximum of 54 additional days of inundation compared to existing operations. A 14-ft elevation change in the impoundment of water during the flood season and a 3-ft elevation change during the non-flood season within Prado Basin would not substantially alter existing views by motorists because the increase in water impoundment (*i.e.*, increase in area and additional days of inundation) is not considered substantial compared to the existing operations under the non-flood season.

4.7.1.4 Views from Downstream Land Uses

Alternative 1

This alternative would not result in any changes to existing water conservation operations, including changes to release rates from Prado Dam, which could alter downstream views. No impact would occur.

Alternative 2

Issue 4.7.3: Alteration of Views from Land Uses Downstream of Prado Dam (Direct, Adverse, But Less Than Significant Impact). Alternative 2 could result in a maximum release rate of 5,000 cfs from Prado Dam. At this release rate, views within and surrounding the Santa Ana River below the Dam would not be impacted as this volume of water would remain within the River channel. A small portion of the Green River Golf Course may be inundated at 5,000 cfs; however, the total acreage would be minimal and the inundation would not last longer than 24 hours. Further, inundation would occur either before or during a major storm event when use of the facility would be limited. Given the total area inundated at the Golf Course and the timing, the impact on views would not be significant. Further, views at other downstream areas of the Santa Ana River would not be substantially altered or degraded (*i.e.*, no flooding would occur) and these impacts would also be less than significant.

Alternative 3

Issue 4.7.3: Alteration of Views from Land Uses Downstream of Prado Dam (Direct, Adverse, But Less Than Significant Impact). Alternative 3 could result in a maximum release rate of 7,400 cfs from Prado Dam. At this release rate, water flows will remain within the Santa Ana River channel except for approximately 23 acres at the Green River Golf Course. Inundation will result in an alteration of views at the Golf Course; however, the impact would be temporary, lasting no longer the 24 hours. Further, inundation would occur either during or just before a storm event, when use of the Golf Course would be limited. Therefore, the aesthetic impact of temporary inundation on views at the Golf Course is not considered significant. Views from other areas would not be substantially altered or degraded because the increased volume of water associated with the maximum release would be contained with the banks of the River. No significant impact would occur.

Alternative 4

Issue 4.7.3: Alteration of Views from Land Uses Downstream of Prado Dam (Direct, Adverse, But Less Than Significant Impact). Alternative 4 could result in a maximum release rate of 14,900 cfs from Prado Dam. At this release rate, water flows will remain within the Santa Ana River channel except for approximately 172 acres at the Green River Golf Course. Inundation will result in an alteration of views at the Golf Course; however, the impact would be temporary, lasting no longer the 24 hours. Further, inundation would occur either during or just before a major storm event, when use of the Golf Course would be limited. Therefore, the aesthetic impact of temporary inundation on views at the Golf Course is not considered significant. Views from other areas would not be substantially altered or degraded because the increased volume of water associated with the maximum release would be contained with the banks of the River. No significant impact would occur.

Alternative 5

Issue 4.7.3: Alteration of Views from Land Uses Downstream of Prado Dam (Direct, Adverse, But Less Than Significant Impact). Alternative 5 could result in a maximum release rate of 25,000 cfs from Prado. At this release rate, water flows will remain within the Santa Ana River channel except for approximately 198 acres at the Green River Golf Course. Inundation will result in an alteration of views at the Golf Course; however, the impact would be temporary, lasting no longer the 24 hours. Further, inundation would occur either during or just before a major storm event, when use of the Golf Course would be limited. Therefore, the aesthetic impact of temporary inundation on views at the Golf Course is not considered significant. Views from other areas would not be substantially altered or degraded because the increased volume of water associated with the maximum release would be contained with the banks of the River. No significant impact would occur.

4.7.2 MITIGATION MEASURES

Alternative 1

No mitigation is required.

Alternatives 2, 3, 4, and 5

Issue 4.7.1: Alteration of Existing Views from Residences Surrounding Prado Basin.

No mitigation is required.

Issue 4.7.2: Alteration of Existing Views from State Route 71.

No mitigation is required.

Issue 4.7.3: Alteration of Views from Land Uses Downstream of Prado Dam.

No mitigation is required.

4.7.3 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Implementation of the project alternatives would not result in significant impacts on existing views.

4.8 CULTURAL RESOURCES

4.8.1 ENVIRONMENTAL CONSEQUENCES

Potential impacts on cultural resources may result from the water conservation alternatives as discussed below. These impacts include the uncovering of potentially unknown cultural resources as well as the inundation of areas previously not subject to regular inundation.

4.8.1.1 Thresholds of Significance

Criteria for the evaluation of effects to National Register properties are found in 36 CFR 800.9, *Criteria of Effect and Adverse Effect*. These include:

- An undertaking has an effect on a historic property when the undertaking may alter characteristics of the property that may qualify the property for inclusion in the National Register. For the purpose of determining effect, alteration to features of a property's location, setting, or use may be relevant depending on a property's significant characteristics and should be considered.

- An undertaking is considered to have an adverse effect when the effect on a historic property may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects on historic properties include, but are not limited to:

  - Physical destruction, damage, or alteration of all or part of the property;

  - Isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualification for the National Register;

  - Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;

  - Neglect of a property resulting in its deterioration or destruction; and

  - Transfer, lease, or sale of the property.

- Effect of an undertaking that would otherwise be found to be adverse may be considered as being not adverse for the purpose of these regulations;

  - When the historic property is of value only for its potential contribution to archeological, historical, or architectural research, and when such value can be substantially preserved through the conduct of appropriate research, and such research is conducted in accordance with applicable professional standards and guidelines;

  - When the undertaking is limited to the rehabilitation of buildings and structures and is conducted in a manner that preserves the historical and architectural value of affected historic property through conformance with the "Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings," or;

  - When the undertaking is limited to the transfer, lease, or sale of a historic property, and adequate restrictions or conditions are included to ensure preservation of the property's significant historic features.

4.8.1.2 Impacts

Alternative 1

The implementation of this alternative would not result in any additional adverse impacts because no action would occur.

Alternative 2, 3, and 4

Issue 4.8.1: Known National Register Eligible Resources Within Prado Basin (Indirect, Adverse, But Less than Significant Impact). National Register eligible resources were previously subjected to data recovery excavations as part of the water conservation study that addressed impacts to elevation 505 ft. A Memorandum of Agreement (MOA) between USACE, SHPO, and the Advisory Council on Historic Preservation was executed. This MOA document outlined the measures required to address impacts up to the elevation 505 ft. No new impacts would occur as a result of implementation of these alternatives.

Issue 4.8.2: Known National Register Resources Downstream of Prado Dam (Indirect, Adverse, Potentially Adverse Significant Impact). Increased outflows from Prado Dam have the potential to cause additional erosion in downstream areas and may damage known cultural resources, including sites, which may be eligible for the National Register. Any adverse impact on these sites would be considered significant.

Issue 4.8.3: Unknown Cultural Resources (Indirect, Potentially Adverse Significant Impact). There is a potential for unknown cultural resources to be uncovered due to erosion as a result of the project alternatives. If resources are uncovered, there is a potential that these resources could be eligible for the National Register. If uncovered resources are eligible for the National Register, this adverse impact would be considered significant.

Alternative 5

Issue 4.8.1: Known National Register Eligible Resources Within Prado Basin (Indirect, Adverse Potentially Significant Impact). Four Historic archeological sites within the area of potential effect are potentially eligible for listing on the National Register of Historic Places (NRHP). The four sites are: CA-RIV-2203-H, the Fear Ranch Site; CA-RIV-2204-H, La Puerta Abierta; CA-RIV-4760-H, the Second Strong Property; and CA-RIV-4761-H, the West Ranch Site. These four sites were recently subjected to a limited NRHP evaluation by Statistical Research, Inc (1999). Two of these are potentially eligible for the NRHP, CA-RIV-2204-H, and CA-RIV-4761-H.

Assuming that one or more of these archeological sites are ultimately determined to be NRHP eligible, water conservation to elevation 508 ft would have an adverse effect on these archaeological sites. Short and long-term inundation would result in the loss of any significant historic information the sites might contain.

Issue 4.8.2: Known National Register Resources Downstream of Prado Dam (Indirect, Adverse, Potentially Adverse Significant Impact). Increased outflows from Prado Dam have the potential to cause additional erosion in downstream areas and may damage known cultural resources, including sites, which may be eligible for the National Register. Any adverse impact on these sites would be considered significant.

Issue 4.8.3: Unknown Cultural Resources (Indirect, Potentially Adverse Significant Impact). There is a potential for unknown cultural resources to be uncovered due to erosion as a result of the project alternatives. If resources are uncovered, there is a potential that these resources could be eligible for the National Register. If uncovered resources are eligible for the National Register, this adverse impact would be considered significant.

4.8.2 MITIGATION MEASURES

Alternative 1

No mitigation is required.

Alternatives 2, 3, and 4

Issue 4.8.1: Known National Register Eligible Resources Within Prado Basin.

No mitigation is required.

Issue 4.8.2: Known National Register Resources Downstream of Prado Dam.

Compliance with Section 106 of the National Historic Preservation Act (36 (CFR 800) is required prior to implementation of the project alternatives. The National Register eligible historic sites will require a test excavation to determine their significance. If any of these are determined to be NRHP eligible, specific mitigation measures will than be developed in accordance with the procedures in 36 CFR 800. The final mitigation measures will be developed in consultation with the SHPO, and the Advisory Council on Historic Preservation.

Issue 4.8.3: Unknown Cultural Resources.

In the event that previously unknown resources are uncovered during implementation of water conservation, the USACE will be required to comply with 36 CFR 800.11, *Properties Discovered During Implementation of an Undertaking.* This might occur if previously undisturbed landforms are eroded away to reveal buried cultural resources. In such an event, additional mitigation measures will be required. These additional mitigation measures will be developed in consultation with the SHPO, and the Advisory Council on Historic Preservation.

Alternative 5

Issue 4.8.1: Known National Register Eligible Resources Within Prado Basin.

Compliance with Section 106 of the National Historic Preservation Act (36 CFR 800) is required prior to implementation of this alternative. The four potentially National Register (NRHP) eligible historic sites will require a test excavation to determine their significance. If any of these are determined to be NRHP eligible, specific mitigation measures will than be developed in accordance with the procedures in 36 CFR 800. The final mitigation measures will be developed in consultation with the SHPO, and the Advisory Council on Historic Preservation. It is likely that data recovery will be the most feasible mitigation option.

Issue 4.8.2: Known National Register Resources Downstream of Prado Dam.

Compliance with Section 106 of the National Historic Preservation Act (36 (CFR 800) is required prior to implementation of the project alternatives. The National Register eligible historic sites will require a test excavation to determine their significance. If any of these are determined to be NRHP eligible, specific mitigation measures will than be developed in accordance with the procedures in 36 CFR 800. The final mitigation measures will be developed in consultation with the SHPO, and the Advisory Council on Historic Preservation.

Issue 4.8.3: Unknown Cultural Resources.

In the event that previously unknown resources are uncovered during implementation of water conservation to elevation 508 ft, the USACE will be required to comply with 36 CFR 800.11, *Properties Discovered During Implementation of an Undertaking.* This might occur if previously undisturbed landforms are eroded away to reveal buried cultural resources. In such an event, additional mitigation measures will be required. These additional mitigation measures will be developed in consultation with the SHPO, and the Advisory Council on Historic Preservation.

4.8.3 LEVEL OF SIGNIFICANCE AFTER MITIGATION

After the implementation of the above mitigation measures, the alternatives would not significantly affect cultural resources.

4.9 PUBLIC HEALTH AND SAFETY

4.9.1 ENVIRONMENTAL CONSEQUENCES

4.9.1.1 Thresholds of Significance

The proposed action is considered to have a significant effect if there is a greater nuisance from mosquitoes within Prado Basin compared to existing operations.

4.9.1.2 Impacts

Alternative 1

Because there would be no changes to the existing water conservation operations of the dam, no increased nuisance from mosquitoes would occur.

Alternatives 2, 3, 4, and 5

Issue 4.9.1: Effects from Increases in Mosquitoes (Direct, Adverse, Significant Impact). Due to an increase in the number of days of inundation within Prado Basin, as well as infrequent increased flooding downstream, there would be a potential for an increase in the number of breeding mosquitoes. Therefore, there would be a potential for increased nuisances from mosquitoes. This potential increase under each of the alternatives is considered significant.

4.9.2 MITIGATION MEASURES

Alternative 1

No mitigation is required.

Alternatives 2, 3, 4, and 5

Issue 4.9.1: Effects from Increases in Mosquitoes. If an increase in mosquitoes and nuisances to the public results from increased water impoundment levels behind Prado Dam or water releases from Prado Dam, an increase in mosquito abatement will be provided in the Prado Basin area. Increases in mosquito abatement will be provided through the contribution of funds to the Northwest Mosquito Abatement District, West Valley Vector Control District, or Orange County Vector Control District so that mosquito nuisances to the public are reduced to less than significant.

4.9.3 LEVEL OF SIGNIFICANCE AFTER MITIGATION

No significant impacts are anticipated after the implementation of the above mitigation measure.

5 PUBLIC INVOLVEMENT

5.1 PUBLIC INVOLVEMENT PROGRAM

Coordination with public agencies, organizations and concerned individuals is a vitally important element of the Prado Basin Water Conservation Feasibility Study Project EIS/EIR. Public involvement efforts for the project included a public workshop held on November 17, 1997 in Corona, California. The purpose of the public workshop was to provide public input to the study process and facilitate decision-making. In addition, a public meeting for responses to the Draft Environmental Impact Statement (DEIS/EIR) will be provided. The workshop and public meeting's attendance will consist of the general public and representatives of local agencies and organizations.

The Notice of Intent to prepare a Draft Environmental Impact Statement for the Prado Basin Water Conservation Feasibility Study EIS/EIR was published in the Federal Register on November 20, 1997 (Vol.62, No. 224) in compliance with the Council on Environmental Quality final regulations implementing the procedural provisions of the National Environmental Policy Act of 1969, as amended.

5.2 REQUIRED COORDINATION

Respective comments and responses are presented in the Final Environmental Impact Statement/Environmental Impact Report (FEIS/EIR). Other required coordination documents (*i.e.*, Coordination Act Report and Biological Assessment) are attached as appendices to this document ***[to be provided]***.

5.3 STATEMENT RECIPIENTS

The subject EIS/EIR is sent to many state and federal agencies, plus interested groups, for a 45-day review and comment period. Because of publishing constraints, individual reports cannot be provided to all potentially interested parties. The EIS/EIR may be examined, however, at many public places including public offices in Riverside, San Bernardino, and Orange Counties. Notices of Availability of the EIS/EIR are sent to all other interested parties on the project mailing list.

5.3.1 FEDERAL

United States Fish and Wildlife Service
Federal Aviation Administration

5.3.2 STATE

California Department of Fish and Game
California Department of Parks and Recreation

5.3.3 COUNTIES

San Bernardino County
Riverside County
Orange County Public Facilities and Resources Department
Orange County Parks and Recreation Department

5.3.4 CITIES

City of Norco
City of Corona
City of Chino
City of Chino Hills
City of Anaheim
City of Yorba Linda

5.3.5 UTILITIES, WATER DISTRICT AND TRANSPORTATION

Orange County Water District
Santa Fe Railroad Company (Now known as the Burlington Northern Santa Fe Railway)

5.3.6 INTERESTED GROUPS

South Coast Air Quality Management District (SCAQMD)
Southern California Association of Governments (SCAG)
San Bernardino Association of Governments (SBAG)

5.3.7 LIBRARIES

City of Chino Branch Library
City of Corona Public Library
City of Yorba Linda District Library

6 GROWTH-INDUCING & CUMULATIVE IMPACTS

6.1 GROWTH-INDUCING IMPACTS

NEPA (40 C.F.R. § 1508.8) defines indirect effects as those that include growth-inducing effects or other effects related to induced changes in population density or growth rate. CEQA Guidelines Section 15 126.2(d) requires a discussion of growth-inducing impacts of the proposed project. A project is defined as growth inducing when it

* fosters economic growth, population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment;

* removes obstacles to population growth

* results in further taxes to existing community service facilities

* encourages or facilitates other activities that could significantly affect the environment, either individually or cumulatively

Growth inducement is generally dependent on the presence or lack of existing utilities and public services in an area. The provision of new utilities and services in an undeveloped area can induce growth in that area. Growth inducement can also occur if the proposed project makes it more feasible to increase the density of development in surrounding areas. Growth may be considered beneficial, detrimental, or of little significance to the environment, depending on its actual impacts to the environmental resources present.

6.1.1 EXISTING CONDITIONS

Orange County Water District supplies water to north and central Orange county, an area that is fully developed other than infilling on open lots that are scattered throughout the county. The groundwater aquifer that OCWD manages has been the main source of water for the OCWD service area, supplemented by purchases of water from outside sources. The aquifer is below maximum capacity, and has been such for several years due to the drought conditions that have occurred. The current recharge for the aquifer is Santa Ana River water that has been released from Prado Dam. The proposed action will increase the amount of water that can be diverted to the OCWD recharge basins.

6.1.2 IMPACT ANALYSIS

Implementation of the proposed action will not result in growth-inducing impacts in Orange County, or in the area surrounding Prado Basin. Growth in Orange County is occurring primarily in the southern part of the county, an area that is not serviced by OCWD. The development around Prado basin is occurring due to the termination of the Dairy Preserve, and the availability of open farm land being put on the market for development.

6.2 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 that results from the cumulative impact of the project when added to other closely-related future projects.

Water Resources

Implementation of the project would contribute to the long-term accumulation of sediment and debris in Prado Basin and slightly reduce the water storage capacity of the basin over the 50-year life of the project. This is not considered a significant reduction and the project would therefore not contribute to any cumulative effects on storage capacity at the reservoir.

The project would beneficially contribute to the long-term cumulative increase in groundwater recharge and improve surface water quality because more solids could settle to the bottom of the impoundment area prior to being released downstream and the increase in water volume would dilute pollutants associated with the base flow that currently enters Prado Basin.

Biological Resources

Repeated prolonged inundation of habitat in the lower elevations of Prado Basin is liable to cumulatively damage some riparian elements such that they may not recover. If so, there could be cumulative effects over long wet cycles that damage more habitat than indicated by the analysis herein. However, 4 years of data on the elevational distribution of vireo nests support the opposing theory that the habitat rebounds predictably in response to the wet/dry cycle. The abundance of vireo nesting is reflective of the availability of understory and the shrubbier elements of the riparian forest, the very elements most affected by prolonged inundation. In 1999, following a moderately wet El Nino winter 103, or 31.1% of 332 vireo territories in the Prado Basin were located below elevation 505 feet. By 2001, 170 or 33.4% of all 509 vireo territories in the Prado Basin were below 505 feet and in 2002, 210 or 41% of 512 territories were below 505 feet. Clearly, so far the habitat rebounds during dry and average years.

Land Use and Recreation

The proposed project is not expected to significantly impede the use of existing recreational opportunities in the project vicinity or include any recreational uses as part of the project. Therefore, the project would not contribute to any cumulative effects on recreation in the project area.

Air Quality

Since there would be no change to the existing operational characteristics or maintenance activities within Prado Basin with implementation of the proposed project, the project would not contribute to any cumulative impacts on air quality in the project area.

Noise

Project implementation has the potential to increase maintenance-related noise emissions due to possible structural damage and/or increased debris flows associated with the increased frequency of maximum release rates. However, all such noise impacts would be temporary and conform to the applicable local noise ordinance and not contribute to any cumulative impact on noise levels in the project area.

Cultural Resources

Since the proposed water conservation project would not result in any significant effects to 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 significant increase in public health and safety effects, the project would not contribute to any cumulative impact on public health and safety.

7 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM RODUCTIVITY

Lead agencies are required to consider the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity (40 CFR 1502.16). Short-term uses that would result from implementation of either the NED Plan (Alternative 2) or the Locally-Preferred Plan (Alternative 3) include such benefits as replenishment of the groundwater for the Orange County Water District.

These benefits, however, are associated with both short-term costs and long-term productivity costs. Short-term costs are incurred during the pre-operational phase of the project and include increased inundation of the lower elevations behind Prado Dam and the cost of mitigation.

The effects of these costs and benefits are analyzed in detail in Section 4 of this document.

Long-term productivity refers to valuable uses of the existing environment. Although impacts were associated with the project, valuable uses of the existing environment would not be lost permanently as a result of implementation because the impacts are either temporary or would be fully offset by proposed mitigation measures.

8 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Under 40 CFR 1502.16, NEPA documents are required to include a discussion of significant irreversible environmental changes that would result from implementation of a proposed action. Irreversible commitment of resources would occur as a result of implementing either the NED Plan (Alternative 2) or the Locally-Preferred Plan (Alternative 3). These resources include building materials, fossil fuels, labor, and energy required to construct and maintain either the NED Plan Alternative or the Locally-Preferred Plan Alternative.

As the proposed action is for the re-operation of Prado Basin for water conservation and does not require any construction, the resources being committed are those required to complete the mitigation requirements.

9 LIST OF PREPARERS

9.1 PREPARERS OF THE EIS/EIR

9.1.1 LEAD AGENCY

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Gary Gunther, Study Manager (1997-2002)..........Land Use Planner (20yrs COE)
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APPENDICES

A NOTICE OF INTENT

Federal Register Document

[Federal Register: November 20, 1997 (Volume 62, Number 224)]
[Notices]
[Page 62018]
From the Federal Register Online via GPO Access [wais.access.gpo.gov]
[DOCID:fr20no97-44]

DEPARTMENT OF DEFENSE

Department of the Army
Corps of Engineers

Environmental Impact Statement: Prado Basin, Riverside, CA; Water Supply Study

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

ACTION: Notice of intent.

SUMMARY: The Los Angeles District intends to prepare an EIS to support the proposed water supply study at Prado Basin, Riverside County, California. The purpose of the proposal is to increase the level of water conservation storage within Prado Basin, and allow Orange County Water District to harvest the water through their recharge facilities along the Santa Ana River downstream of Prado Basin. The proposed project alternatives would include increasing the level of water storage during the non-flood season from 505 feet to 508 feet, storage of water at elevation 505 year-round, as well as a no action alternative. The EIS will analyze potential impacts on the environment of a range of alternatives, including the recommended plan.

FOR FURTHER INFORMATION CONTACT: For further information contact Mr. Gary Gunther at (213) 452-3794 or Mr. Alex Watt either by telephone at (213) 452-3860, by fax at (213) 452-4204, or by mail at the address below.

SUPPLEMENTARY INFORMATION: The Army Corps of Engineers intends to prepare an EIS to assess the environmental effects associated with the proposed water supply study. The public will have the opportunity to comment on this analysis before any action is taken to implement the proposed action.

Scoping

The Army Corps of Engineers will conduct a scoping meeting prior to preparing the Environmental Impact Statement to aid in determining the significant environmental issues associated with the proposed action.

The public, as well as Federal, State, and local agencies are encouraged to participate in the scoping process by submitting data, information, and comments identifying relevant environmental and socioeconomic issues to be addressed in the environmental analysis. Useful information includes other environmental studies, published and unpublished data. alternatives that should be addressed in the analysis, and potential mitigation measures associated with the proposed action.

A public scoping meeting will be held in conjunction with the Orange County Water District in November, 1997. The location, date, and time of the public scoping meeting will be announced in the local news media. A separate notice of this meeting will be sent to all parties on the project mailing list.

Individuals and agencies may offer information or data relevant to the environmental or socioeconomic impacts by attending the public scoping meeting, or by mailing the information to Mr. Alex Watt at the address below prior to December 30, 1997. Comments, suggestions, and requests to be placed on the mailing list for announcements and for the Draft EIS, should be sent to Alex Watt, U.S. Army Corps of Engineers, Los Angeles District, ATTN: CESPL-PD-RQ, P.O. Box 532711, Los Angeles, CA 90053.

Availability of the Draft EIS

The Draft EIS is expected to be published and circulated in July 1998, and a public hearing to receive comments on the Draft EIS will be held after it is published.

Mary V. Yonts,
Alternate Army Federal Register Liaison Officer.
[FR Doc. 97-30487 Filed 11-19-97; 8:45 am]
BILLING CODE 3710-KF-M

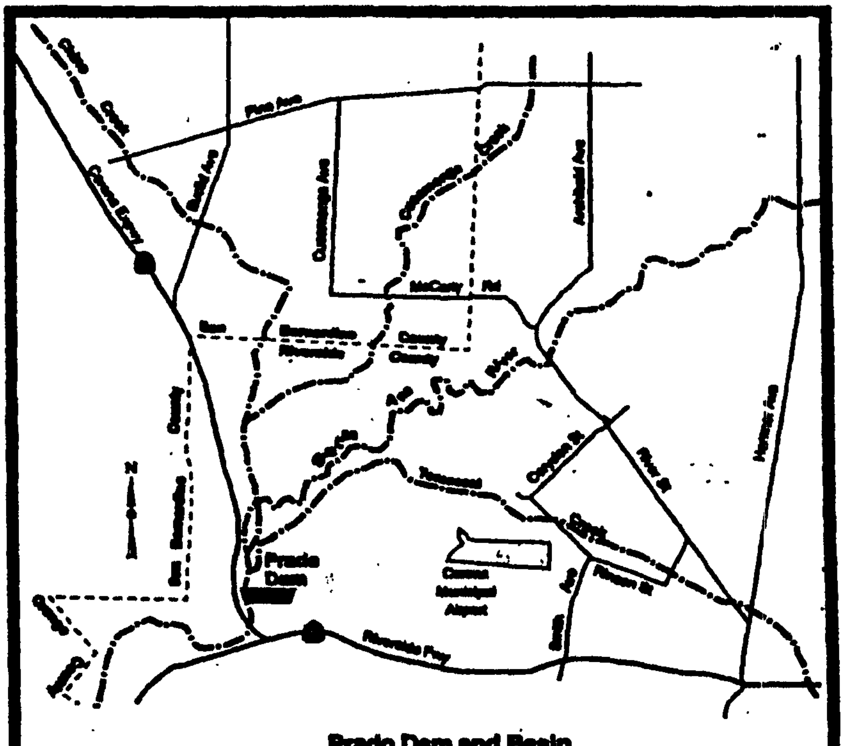
B

SCOPING ANNOUNCEMENT, SCOPING REPORT, AND DISTRIBUTION LIST

PUBLIC WORKSHOP

And Environmental Scoping Meeting

Prado Basin Water Supply Feasibility Study



Prado Dam and Basin

The Orange County Water District and the U.S. Army Corps of Engineers invite you to this public workshop to obtain more information on the feasibility study of alternatives for increasing storage for water conservation behind Prado Dam.

US Army Corps of Engineers
Los Angeles District

- **Monday Evening, November 17, 1997**
- **7:00 PM**
- **Corona Fundamental Intermediate School**

Multipurpose Room
1230 S. Main St., Corona

The Los Angeles District of the U.S. Army Corps of Engineers and the Orange County Water District (OCWD) have begun the 18-month *Prado Basin Water Supply Feasibility Study* to determine the feasibility of modifying the operation of Prado Dam to achieve additional water conservation.

Prado Dam is on the Santa Ana River within Riverside and San Bernardino counties at the head of Santa Ana Canyon three miles upstream from Orange County (see map on cover). The Santa Ana River is the largest river system in Southern California, containing 2,455 square miles in its basin. The river originates in the San Bernardino Mountains and flows 80 miles south and west to the Pacific Ocean. Numerous tributary streams enter the river at Prado Reservoir.

The Corps of Engineers built Prado Dam and Reservoir in 1941 for flood control and other compatible purposes. In addition, the Corps has cooperated with public and private facilities within the reservoir boundaries.

The OCWD owns all rights, title, and interest in Santa Ana River water flowing into Prado Reservoir up to elevation 512 feet above mean sea level. The OCWD diverts water releases from Prado Reservoir into spreading basins (large, porous ponds, lakes, and pits) for percolation into groundwater aquifers in Orange County.

The Corps of Engineers works with the OCWD to conserve storm flows entering the reservoir during non-flood conditions and release water at rates that permit its diversion into the spreading basins. Current operations permit the impoundment of water behind Prado Dam:

- Up to elevation 505 feet from March 1 to September 30 (the non-flood season).
- Up to elevation 494 feet from October 1 to February 28 (the potential flood season).

Historically, water conservation at Prado Reservoir has saved about 75 percent of the average annual flow in the river.

The Prado water releases are becoming increasingly important to Orange County's water supply. The county's water users rely on the Metropolitan Water District of Southern California to furnish up to 40 percent of their current demand. Since Metropolitan's supplies are less reliable and more costly, Orange County and other areas in Southern Ca...rnia must develop additional supply sources.

The Prado Basin Water Supply Feasibility Study

The feasibility study will evaluate alternatives (incluc no action) that would increase the water impoun year-round up to elevation 508 feet and permit the epment of holding ponds in the reservoir between ele tion 556 and 566 feet (see map to the right). Th rent reservoir outer limit is elevation 556 feet. Prado Dam is raised as part of the Santa Ana R Mainstem Flood Control Project (now under constructi early in the next decade, the reservoir's outer lin be elevation 566 feet.

The feasibility study will encompass plan formu design, cost estimation, and environmental, hydr geotechnical, institutional, economic, fish and wi cultural resource, and real estate investigations. study will include preparation of an *Environmen pact Statement* (EIS).

The Corps and the OCWD are cost-sharing the equally. As the non-federal study sponsor, the OCV be responsible for 100 percent of new construction operational costs if a project is approved and im mented.

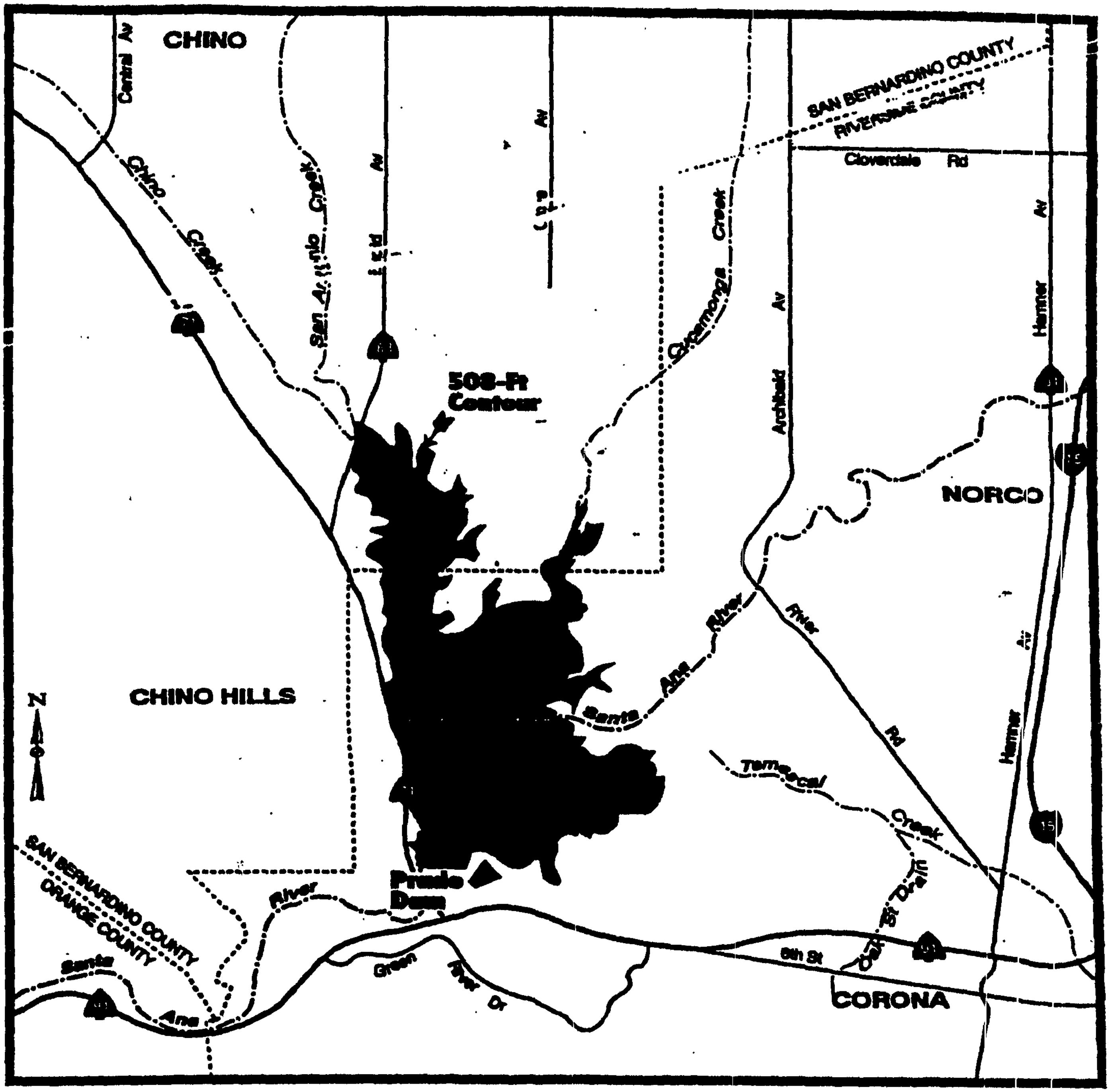
The November 17 Public Worksh

The purposes of the November 17 public workshop are give you the in-person opportunity to:

- Learn more about and comment on the p alternatives to increase storage for water con vation behind Prado Dam.
- Identify and discuss the potential impacts environment that the study's accompanying should address. In dealing with environmental sues, the workshop is also a public scoping ing as recommended by regulations of the Na Environmental Policy Act. A scoping meeting gi people the opportunity to help determine the of the EIS.

If you cannot attend the workshop but would like to ceive a workshop summary, contact:

Janice Pratte, Public Affairs Specialist
Orange County Water District
P.O. Box 8300
Fountain Valley, CA 92728-8300
(714) 378-3206
E-Mail: jpratte@ocwd.com



For More Information About the Study

Contact:

Gary Gunther, Prado Water Conservation Study Manager
Los Angeles District, U.S. Army Corps of Engineers
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Fountain Valley, CA 92728-8300

FIRST CLASS MAIL

RESPONSE SUMMARY

PUBLIC WORKSHOP AND ENVIRONMENTAL SCOPING MEETING ON THE POTENTIAL FOR INCREASING THE WATER CONSERVATION POOL AT PRADO DAM

NOVEMBER 17, 1997

On November, 17, 1997, the Orange County Water District (OCWD) and the Los Angeles District, U.S. Army Corps of Engineers (Corps), hosted a public workshop and environmental scoping meeting to present information about and elicit public comment and questions on a study of the potential for increasing the water conservation pool at Prado Dam. Approximately 50 people attended the meeting that was held in Corona.

Following presentations by the Corps and OCWD, the public was invited to comment on and ask questions about the study. Matters raised included socioeconomic impacts, effects on endangered and other species, effects on water quality, current and future recreation in the basin, OCWD issues, and miscellaneous project-related concerns. This summary presents public input and OCWD and Corps responses. If attendees believe that this summary does not accurately reflect public concerns, they are invited to contact:

Janice Pratte
OCWD
P.O. Box 8300
Fountain Valley, CA 92728

SOCIOECONOMIC ISSUES

1) What is the projected timetable for increasing the water levels? It is important for those of us with businesses in the basin to know what to expect and when to expect it.

Response. *The Environmental Impact Statement (EIS) will evaluate any mitigation necessary to achieve various additional levels of pooled water. It is necessary for the agencies to complete the negotiated mitigation measures before level changes are allowed. It is likely that the pool level between 495 and 500 feet in elevation will be pursued first. This would happen in the November to February timeframe each year if significant storms were to occur. As a result, an inundation to this level could occur as early as one year after the EIS is completed and approved by the Corps of Engineers and a mitigation plan is approved by the Corps and U.S. Fish and Wildlife Service. At this time we expect that the EIS will be completed in 18 months. Since it began in July 1997, we expect it to be completed at* *the end of 1998. At that time, a better estimate of initial inundation timing may be possible.*

2) If the water conservation pool is raised to elevation 508, my dog training facility will be inundated.

Response. *The feasibility study will provide a detailed analysis of potential economic impacts from all of the proposed alternatives. All impacts identified as National Economic Development (NED) costs will be included as project costs. NED costs are compared with NED benefits to determine the alternative with the greatest net benefits (the NED plan). The EIS also will address the economic impact of the inundation on all the concessionaires within the basin.*

3) We have recently made improvements to our duck hunting area in response to the last inundation. We are concerned that a higher water pool will destroy these improvements. In addition, historically, we are able to make these repairs during times of the year when water levels are low. If the water conservation pool is at elevation 508 year-round, in the future we won't have an opportunity to make such repairs.

Response. *The elevation to which the water will be held and the duration have not been determined at this time. There are no record hydrologic situations where the water would be at a 508-foot elevation for prolonged periods. Pools must be fully emptied by the end of August each year for dam maintenance. The EIS will address all the impacts associated with impounding the water to the elevations associated with each alternative. Historically, a 508-foot elevation storage level would have been possible only rarely. In 6 of the last 29 years, water has risen up to elevation 510 feet or higher for brief periods.*

4) The airport hangers on the west end of the airport flood when the water rises to elevation 513 feet. If the conservation pool is permanently at 508 feet, the hangers will be under water all the time.

Response. *The lowest elevation of the airport, the west end, is at least 5 feet above the maximum pool being considered for water conservation. The hangers will not be inundated by a water conservation pool. An increase in dam releases of water during storm events will maintain the appropriate water levels. However, as the airport is located within a flood control basin, the potential for being flooded as a result of winter floods will continue.*

5) What will the effects be on the hunting area when the water conservation pool is raised?

Response. *The hunting recreational activity in the area behind Prado Dam has consistently been identified as a secondary use pursuant to the primary objectives of flood control and water conservation. In the future, the areas below 508 feet may be subject to more frequent inundation, depending upon the final results of the study and storm activity.*

6) If your long-range goal is to have water stored to elevation 566, what will happen to the businesses that will be inundated?

Response. *Elevation 566 refers to the flood control pool that will be possible once Prado Dam is raised as part of the Santa Ana River Mainstem Flood Control Project. The current situation allows all businesses below elevation 556 feet to be legally flooded as a result of either flowage easements or wording in their leases. Leaseholders in the Prado basin all have contracts that state that the land could be flooded as a result of winter floods. The current study of increased water conservation in the basin is looking at a maximum elevation of 508 feet.*

7) In the socioeconomic report, consider the cost of reclamation when the water recedes, including what the costs will be in 2010 dollars, and the impact of having to redevelop a clientele each time businesses are interrupted by flooding.

Response. *As part of the feasibility report, the Corps will evaluate the costs and benefits of the proposed alternatives. The cost analysis will include increased operating costs that could be incurred by businesses in the basin. All benefits and costs will be displayed in current fiscal-year equivalents. The analysis will not incorporate benefit and cost estimates in future dollars, as this is inconsistent with Corps standard analysis procedures.*

8) You must consider the well being of people upstream of the dam, as well as downstream.

Response. *Any impacts to people, environmental, and commercial activities associated with the proposed alternatives will be analyzed and documented in the feasibility report and the EIS.*

9) Will the Corps act as a mediator between leaseholders and OCWD?

Response. *The term "mediator" was inappropriately used at the meeting. The Corps will be conducting studies to determine benefits and costs from water conservation. In this respect, the Corps will be providing a base of information for determining losses from water conservation operations that may aid in OCWD/leaseholder negotiations concerning those losses. The OCWD is responsible for all costs associated with water conservation.*

10) Will there be a financial impact assessment comparing the benefits to Orange County with the costs to Riverside and San Bernardino counties?

Response. *The feasibility report will present the benefits and costs of the proposed alternatives. The sources of the benefits and costs will not be segregated by county, but rather by type of benefit/cost (e.g., water conservation benefits and environmental mitigation costs, construction costs, increased operating costs to businesses, etc.) Corps analysis requires that benefit/cost analysis be conducted based upon resource benefits and costs to the nation. Regional impacts and losses will not be quantified in the feasibility report.*

ENDANGERED AND OTHER SPECIES ISSUES

11) Why are you now concerned with endangered species that weren't originally resident in the reservoir area.

Response. *There are numerous species whose habitat types are within Prado Basin and who have now set up residence within the area. If these species are currently listed on the Endangered Species List, Federal law requires that the EIS address potential impacts to them.*

12) When we want to clean up the area around the airport, it is difficult for us to get a permit because of the proximity to nesting grounds. Why are the Corps and OCWD permitted to inundate the same area?

Response. *The Corps and OCWD are required by law to follow all laws and regulations. This means that they also have to mitigate for any impacts that their project may cause.*

13) What effect will the recent American Bald Eagle sightings have on the plans?

Response. *The bald eagle does not nest within Prado Basin; thus, the increased water pool level will not have an effect on the bald eagle.*

14) If the increased water pool displaces wildlife, the wildlife will relocate and create the same kinds of environmental mitigation problems in a new place.

Response. *The EIS will address the displacement of wildlife by the increased water pool and the proposed mitigation for the areas inundated.*

15) Your presentation did not address the potential impacts on the Santa Ana sucker or the arroyo chub. Both of these species inhabit the Prado Basin and will be impacted by your project.

Response. *We will conduct surveys of the Santa Ana sucker and arroyo chub as part of the study. We will propose mitigation, if it is required.*

16) **What are the design and environmental plans for the upstream holding ponds? Will they be established wetlands?**

Response. We will develop the design and plans for any upstream holding ponds during the study. We will address whether they will function as wetlands later in the study.

17) **You should consider that:**

- **Any increase in water storage capacity will increase the size of water impoundment and, therefore, will provide additional grounds for mosquito breeding, which, in turn, will cause an increase in mosquito populations.**
- **Any increase in water impoundment will cause additional work for the Northwest Mosquito and Vector Control District and, thus, negatively affect its resources.**

Response. We will address mosquito control in the EIS. If necessary, OCWD and the Northwest Mosquito and Vector Control District will negotiate a separate agreement to fully address additional possible mosquito population increases due to an increase in water conservation activities.

WATER QUALITY ISSUES

18) **You need to consider whether an increase in the pool will cause greater evaporation and, thus, a higher salt content.**

Response. The increase in evaporation and any increase in salt content will be evaluated as part of any proposed alternatives. Water pooling and resultant evaporation in warm weather months are unlikely due to meager rainfall. Additionally, winter weather conditions would result in minimal evaporation, which would not have a significant effect on salt concentration in the pool. Salts are assessed as total dissolved solids (TDS). Given that storm water has a TDS level of approximately 250mg/L, the incremental increase would be approximately 1 percent or 2.5mg/L. This level is far better than an alternative supply from the Colorado River, which has a TDS of approximately 700mg/L, while the Santa Ana River base flow is approximately 600mg/L TDS.

19) **The project description states that the storage of floodwaters will decrease the salt concentration. Will the salt concentrations be reduced enough to create assimilative capacity in the Santa Ana River forebay? Has the increase of TDS from increased evaporation in the ponds been considered in determining that the salt concentration would decrease? Will OCWD be conducting studies to determine the assimilative capacity?**

Response. The first runoff event of the season generally is of poorer quality than the base flow as it pic~~ up the pollutants left in the storm sewers and culverts. Following this initial event, each successive storm brings higher *quality runoff into the basin. Concentration of pollutants should decrease with increasing dilution. It is likely that OCWD will attempt to calculate the extent to which as assimilative capacity is created.*

20) Other impoundments in the area have problems with dense algal blooms and fish kills. Therefore, it is assumed that algal blooms and fish kills may occur behind Prado Dam. What will you do to control the algal growth and prevent the fish from being killed. Will more nutrient removal be necessary? Will OCWD pay for the necessary improvement to the treatment plants to remove nutrients? Will artificial aeration of the impounded water be necessary?

Response. *The temporary nature of potential water pools negates opportunities for blooms and subsequent fish kills. Nonetheless, we will analyze this in the EIS.*

21) It is unclear if this project will provide the necessary dilution to meet the health department's regulations for percolation of reclaimed wastewater. With this project, will the appropriate dilutions be obtained?

Response. *The first runoff of the season generally is of poorer quality than the base flow as it picks up all the pollutants left in the storm sewers and culverts. Following this initial event, each successive storm brings much higher quality runoff into the basin. Concentrations of pollutants should decrease with increasing dilution. In addition, the general improvement of water coming out of Prado Dam results in an improvement in the quality of water percolating into the basin.*

22) In your presentation you mentioned that the construction of the present "duck ponds" behind Prado Dam is improving the water quality by removing nitrogen. What will happen to this nitrogen removal when the area is flooded? You failed to mention that the ponds have deteriorated the water quality by increasing the salt concentration of Santa Ana River water.

Response. *Severe storms could have a negative effect on the nitrogen removing capabilities of the constructed wetlands if levees were destroyed and water flow into the ponds ceased. If no physical changes occur during a storm and if the pool remains for more than a few weeks, denitrification occurs just as in the ponds. Given that the storm flows already would have diluted the base nitrogen levels, the ensuing denitrification of the conservation pool would produce nitrogen levels at the outlet of the dam that are substantially lower than non-pool conditions.*

Studies indicate that salt concentrations of Prado outflow due to evaporation in the ponds are negligible. There is an average 1.5-percent increase in salt concentration with the ponding, and TDS levels remain less than the basin plan objective of 700mg/L TDS.

OCWD ISSUES

23) What is the current level of water in Orange County's principal groundwater basin?

Response. *Current levels of groundwater are static. However, the last drought (1986-1992) left the basin with 100,000 acre-feet of water less than is present today. Increased water demands will continue to be of concern to the Orange County groundwater basin levels. Population projections indicate that water demands will increase by about 30 percent over the next 20 years.*

24) Does OCWD plan to sell the water to other parties? If so, will it recompense those who are impacted by the increased water pool?

Response. *The Orange County Water District Act prohibits the district from selling water to other than its customers or exporting it out of existing boundaries.*

RECREATION ISSUES

25) What types of recreation are there currently in the basin, and what types of recreation do you envision in the future?

Response. *Recreational opportunities currently consist of duck and pheasant hunting club concessions, a sporting clay club concession, dog training activities, and bird watching.*

26) Are there equestrian trails in the basin? If so, where do they go.

Response. *There are no concessions for equestrian trails within the acreage managed by the Corps or OCWD.*

MISCELLANEOUS ISSUES

27) How long will it take for the reservoir to silt up and eliminate any extra conservation storage capacity?

Response. *When Prado Dam was designed, eventual silting 100 years into the future was taken into consideration. While siltation would occur over time throughout the pooled area, the space replaced by silt would not change the benefits of potential water conservation, as projected. Significant space would remain for over 100 years.*

28) Is the purpose of Prado Dam being changed from flood control to water conservation?

Response. *No. Flood control is the primary purpose of Prado Dam, and water conservation activities must be conducted in accordance with the dam's primary purpose.*

29) Who owns the land in Prado Basin? What kind of easement does the Corps have through the land? Are there any easements for water conservation?

Response. *OCWD owns the land and water rights for 2,400 acres of land directly behind Prado Dam. An additional 7,500 acres of land behind the dam are the property of the Federal government and are managed by the Corps.*

30) Who owns the Santa Ana River when it enters Riverside County from San Bernardino County?

Response. *OCWD owns the water rights, title, and interest in Santa Ana River water flowing into Prado Reservoir up to elevation 512 feet.*

31) Do Riverside and San Bernardino counties have to agree to a new water conservation plan before it can be implemented?

Response. *Riverside and San Bernardino counties have opportunities for input to the planning and EIS process, as do all other potentially interested parties. Their formal agreement is not required.*

ISSUES RAISED BY THE CITY OF CORONA

32) Information provided in the flier conflicts with the presentation on November 17, 1997, at the Corona Fundamental Intermediate School. That is, the flier indicates that this study will evaluate alternatives that would increase the water impoundment year-round up to an elevation of 508 feet and permit the development of holding ponds in the reservoir between elevations 556 and 566 feet. At the meeting you indicated an increase of water storage to 505 feet.

Response. *The study and the EIS will evaluate increasing intermittent water storage at various levels, with 508 feet as the highest elevation. Additionally, the feasibility of allowing holding ponds for occasional short-term pooling at appropriate locations between 556 and 566 feet in elevation will be examined for water conservation and environmental enhancement.*

33) Raising the conservation pool behind Prado Dam will adversely impact the structural integrity of several City of Corona facilities, including the Corona Municipal Airport, wastewater facilities, pipelines, roadways, and bridges.

Response. *The proposed project will examine the potential for water conservation pooling no higher than 508 feet. The EIS will evaluate any negative impacts on structures and facilities up to 508 feet. None of the City of Corona facilities are located at or below this elevation.*

34) The inundation of existing sensitive habitat in the basin will displace valuable habitat to endangered species and other wildlife in the basin. Wildlife will be forced to move to fringes of the basin, further worsening Corona's ability to operate and maintain its facilities within the basin. The City is especially concerned about the impact of higher concentrations of birds on the safe operation of the airport and the ability to clean its drainage facilities in the basin.

Response. *If sensitive habitat is to be inundated, mitigation via construction of nearby alternative habitat sites will occur. It has been a long-standing goal of all jurisdictional agencies to protect the Least Bell's vireo in the area; this effort will continue. Because of the rapidly increasing Vireo population (19 pairs in 1986 versus 204 pairs in 1997), this endangered bird has already moved to fringes of the former habitat area. Increasing the impoundment level would not have any additional effect on the vireo.*

35) The Prado Basin area is prone to seismic liquefaction. Increasing the water table in the basin may expand the liquefaction factor to basin fringes and, possibly, beyond.

Response. *If liquefaction is a potential issue, it will be addressed in the EIS.*

36) The project will need to conduct an impact evaluation of public parklands, recreational areas, and existing recreational leases.

Response. *As part of the project, we will evaluate all public and recreational facilities.*

37) The City of Corona wonders why, on the one hand, a mega-size pooling project is receiving federal funding and support, when, on the other hand, the City is being exacted over $600,000 for alleged impacts on sensitive habitat due to possible pooling that may be caused by planned direct discharge to the basin from our ongoing wastewater plant expansion.

Response. *The project study is cost-shared 50/50 by Federal and local funding. This is legally allowed, as the authorization for Prado Basin includes water conservation as a project purpose along with flood control. If implemented, the project will include extensive mitigation to help compensate for negative effects on sensitive species and habitat. The extent of mitigation required has not been determined at this time, but is likely to include habitat creation, Arundo donax removal, and other items such as cowbird trapping.*

38) The project will need to evaluate the impact of increased morning fog on surrounding busy freeways and streets and on the Corona Municipal Airport.

Response. *If fog is perceived to be a problem, it will be evaluated as part of the EIS.*

39) The project needs to evaluate the impact of increased mosquito and fly populations and the effect of odor on surrounding residences and businesses within and around the basin.

Response. *As with other potential impacts, these will be addressed fully in the EIS. If necessary, there will be independent negotiations between OCWD and the Northwest Mosquito and Vector Control District to mitigate any increase in mosquito or fly populations.*

40) The City of Corona supports issues raised in the workshop concerning impacts of the project on private properties and interests.

Response. *So noted.*

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U.S. FISH AND WILDLIFE SERVICE COORDINATION ACT REPORT

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92009

In Reply Refer To:
FWS-WRIV-1540.2
FWCOE-057

JAN 1 9 2005

Ruth B Villalobos
Chief, Planning Division
U.S. Army Corps of Engineers
Los Angeles District
P.O. Box 532711
Los Angeles, California 90053-2325

Attn Alex Watt, Environmental Resources Branch, Planning Division

Re. Fish and Wildlife Coordination Act Report for the Prado Basin Water Supply Feasibility Study

Dear Ms. Villalobos:

In your letter dated December 23, 2004, you requested our written concurrence that the Draft Fish and Wildlife Coordination Act Report for the above referenced project be considered the Final Report. We provided you a Revised Draft Fish and Wildlife Coordination Act Report on March 22, 2001. By this correspondence, we concur that the March 22, 2001 Revised Draft Report may serve as the Final Report. This concurrence is provided as fulfillment of the Fiscal Year 1999 Scope of Work W81EYN83311976 dated November 27, 1998, which committed us to provide a Draft and Final Report for this project. The Report describes the biological conditions existing in the study area at the time of the report and assesses the potential impacts of implementing each of three alternatives on fish and wildlife resources. The Report was prepared in accordance with the Fish and Wildlife Coordination Act and constitutes the Final Report of the Secretary of the Interior as required by section 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

If you have any questions regarding this correspondence please contact Jill Terp at (760) 431-9440, extension 221.

Sincerely,

Jill Terp
for

Karen A. Goebel
Assistant Field Supervisor

TAKE PRIDE IN AMERICA

DRAFT FISH AND WILDLIFE COORDINATION ACT REPORT

for the

Prado Basin Water Supply Feasibility Study, Riverside County, California

Prepared for
U.S. Department of the Army
Corps of Engineers
Los Angeles District

Prepared by
U.S. Department of the Interior
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Carlsbad Fish and Wildlife Office
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November 1999

United States Department of the Interior

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Ref: FP/COE-057

NOV 1 8 1999

Colonel John P. Carroll
District Engineer, Los Angeles District
U.S. Army Corps of Engineers
Los Angeles District
P.O. Box 532711
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Attn: Alex Watt and Lois Goodman, Environmental Resources Branch

Re: Draft Fish and Wildlife Coordination Act Report for the Prado Basin Water Supply Feasibility Study

Dear Colonel Carroll:

Enclosed is our Draft Fish and Wildlife Coordination Act Report (Report) for the U.S. Army Corps of Engineers' Prado Basin Water Supply Feasibility Study. We provide this Report as partial fulfillment of the Fiscal Year 1999 Scope of Work W81EYN83311976 dated November 27, 1998, which committed us to provide a Draft and Final Report for this project. The enclosed Report describes the existing biological conditions in the study area and assesses the potential impacts of implementing each of three alternatives on fish and wildlife resources. This Report is prepared in accordance with the Fish and Wildlife Coordination Act and does not constitute the final report of the Secretary of the Interior as required by section 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

If you have any questions regarding our Report please contact Jill Terp, Project Biologist, or John Hanlon, Chief, Branch of Federal Projects, at (760) 431-9440.

Sincerely,

Jim A. Bartel
Assistant Field Supervisor

cc: Orange County Water District, Craig Miller
CDFG, Raul Rodriguez

EXECUTIVE SUMMARY

The Prado Basin Water Supply Feasibility Study involves changes to current water conservation levels. The U.S. Army Corps of Engineers (Corps) asked us to examine three proposed alternatives; one for operation prior to dam raising construction, and the Corps' preferred and Orange County Water District's (District) preferred post-construction alternatives. The pre-construction alternative (Alternative 8) permits water levels to 498 feet in non-flood season (September 1-February 28), and to 505 feet during flood season (March 1-August 31). Maximum water release rates would be 5,000 cubic feet per second (cfs) which is the current capacity of the outflow structures in the dam. The Corps' preferred alternative (Alternative 3) permits water levels during flood season of 500 feet, and 505 feet in non-flood season. Maximum water release rates would be 7,400 cfs with the upgraded outflow structures in the dam. The District's preferred alternative (Alternative 5) would allow inundation to 508 feet year-round. Maximum water release rates would be 25,900 cfs with the upgraded outflow structures in the dam.

Implementation of any of the three alternatives will result in both direct and indirect significant impacts to biological resources. Specifically, the aspects of the alternatives that will impact resources in the study area are: 1) increasing the areal extent of inundation and/or 2) increasing the duration of inundation. For post-construction alternatives, additional significant impacts would occur to downstream channels and riparian vegetation from the increased water volume release of the new dam outlet gates. Evaluation of the impacts assumes that the condition will be one of permanent inundation at the particular elevational contour(s) of that alternative.

Between 353.6 and 1,440.6 acres of willow and eucalyptus woodland, river and sandy wash, freshwater pond and marsh, and fallow agricultural field will be directly impacted by the alternatives (Table 5). Pooling water during non-flood season, when riparian species are least adapted to withstand flood events, would lead to the loss of habitat types below that level. In addition to the direct loss of acreage noted above through flooding, there would be additional impacts to the habitat immediately above that contour due to the altered hydrology. The impacts from each alternative would destroy or detrimentally alter elements of the critical habitat designated for the federally endangered least Bell's vireo and southwestern willow flycatcher, and thus imperil the continued survival of these species. There would be loss of 30.9 to 42.3 percent of least Bell's vireo nests due to inundation of the Basin.

Creating a reservoir by impounding water behind Prado Dam would also be detrimental to native fish species. These proposed water conservation alternatives create freshwater aquatic habitat consisting of pooled water, thereby decreasing the extent of stream habitat for the native Santa Ana sucker and arroyo chub. Pooling will increase habitat for carp, bullfrog, and green sunfish that are non-native predators on or competitors with native fish.

We recommend that the Corps and District not implement any of the proposed alternatives due to the detrimental effects on critical habitat of listed species, but instead further consider and study other means of water conservation or water procurement to meet the needs of the District.

PREFACE

This document constitutes the Draft Fish and Wildlife Coordination Act Report in partial fulfillment of the Fiscal Year 1999 Scope of Work W81EYN83311976 dated November 27, 1998, agreed upon by our respective agencies regarding the U.S. Army Corps of Engineers' proposed Prado Basin Water Supply Feasibility Study. This document 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 of 1969, as amended.

Our analysis of this project and the recommendations provided herein are based on information in: 1) the Scope of Work and documents provided to us by the Corps; 2) scientific literature and other data contained in our files; 3) limited site visits by Service personnel; and 4) our best collective professional judgement. Our goals in this analysis were to identify and evaluate the impacts of the proposed projects on fish and wildlife resources and habitats in the immediate vicinity of the project area and to determine the value of the area from a local and regional perspectives.

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INTRODUCTION

The Santa Ana River watershed originates in the San Gabriel, San Bernardino, and San Jacinto mountains. It encompasses a drainage of about 2,450 square miles (3,943 square kilometers (km)) and is the single largest river system in southern California. Prado Dam is located on the Santa Ana River about 30 miles (48 km) upstream from the Pacific Ocean. It controls runoff from about 2,255 square miles (3,629 square km) of the drainage. Dam construction was completed in 1941 by the U.S. Army Corps of Engineers (Corps) with the Congressionally-authorized purpose of providing flood control for the downstream area of Orange County.

Prado Dam is a 106 foot high rolled-earthfill structure with a current crest elevation of 566 feet above mean sea level (msl). Its accompanying detached concrete spillway crests at 543 feet msl. Initially, the dam provided flood protection for a 70-year flood event. However, with increased urban runoff from the surrounding area and accumulated sediment behind the dam, the flood control capacity of the dam has been reduced. In 1988, the Corps issued a Main Report and Supplemental Environmental Impact Statement of the Phase II General Design Memorandum for the Santa Ana River Mainstem Project (Corps 1988) that outlined plans including increasing the dam height by about 28 feet (8.5 meters (m)) and spillway height by 20 feet (6.1 m), and other improvements to the dam outlet structures and spillway that would improve the dam's capacity to control flooding in a 190-year flood event. The dam raising project has not yet been constructed.

Water conservation, in addition to flood control, has taken place at Prado Dam since at least the late 1960's. Water conservation retains excess water behind the dam for regulated release that allows the District to percolate the discharge in their downstream spreading basins. Water retention levels and impact minimization measures associated with water conservation were outlined in Biological Opinions issued by the U.S. Fish and Wildlife Service (Service) in 1993 and 1995 (Biological Opinion 1-6-93-F-7 dated February 25, 1993, and 1-6-95-F-28 dated April 20, 1995). Current agreements permit water to be pooled to 494 feet during the flood season (September 1-February 28), and be retained to 505 feet during the non-flood season (March 1-August 31) (Figure 1). During the non-flood season, the District must release a flow equal to the maximum recharge capacity of the downstream basins or a maximum flow of 500 (cfs), whichever is greater. Water must be released at a greater flow rate if the water level exceeds 505 feet.

Impact minimization measures for the current water conservation project implemented by the District included monetary contributions to establish a conservation fund used to remove the non-native invasive plant *Arundo donax* (arundo) from the Santa Ana River watershed, to establish least Bell's vireo (*Vireo bellii pusillus*) and southwestern willow flycatcher (*Empidonax trailii extimus*) monitoring and brown-headed cowbird (*Molothrus ater*) trapping programs in the Basin, and to create riparian habitat. These minimization measures were to offset some of the loss of value and function of habitat below the 505 foot level.

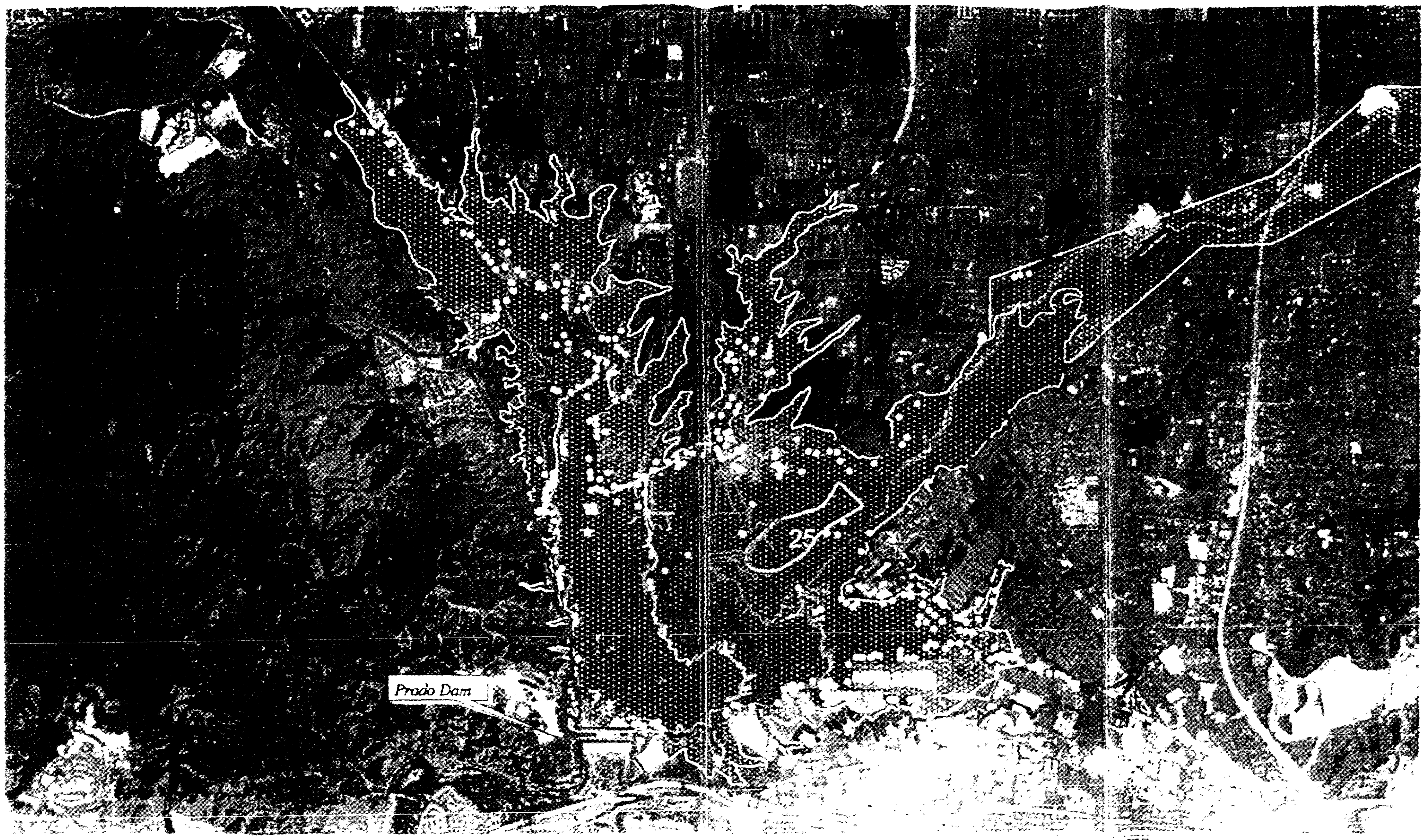

Figure 1: Prado Basin Water Conservation Alternative Contours and Least Bell's Vireo Critical Habitat Map

The purpose of the Prado Basin Water Supply Feasibility Study is to determine the feasibility of increasing water supply and conservation storage at Prado Dam. Currently, the District meets about 60 percent of water demand for their service area from sources within the District. This percentage is expected to decrease as population growth increases water demand. The District wants to obtain additional low-cost sources of water to meet demand. Increasing the water conservation pool behind Prado Dam would provide an additional local water supply.

Other means of water conservation and procurement the District could implement include encouraging a reduction of the District's service area population growth, offering extensive retrofit programs for low-flow fixtures, encouraging municipalities to adopt high density, multi-use land planning measures and low-water use landscaping, offsite water storage in holding tanks or within instream channels downstream of the dam, removal of sediment accumulated behind the dam to increase capacity; and purchase of water from other supplies within or outside of the state.

DESCRIPTION OF PROJECT AREA

The climate of coastal southern California is characterized by warm, dry summers and cool, relatively wet winters. Typical winter temperatures range from 40-60°F while 65-95°F can be expected during the summer months. Precipitation consists almost entirely of winter rainfall, averaging about 15 inches per year in the area.

The general area of the Prado Basin is divided by the Riverside, San Bernardino, and Orange county lines. Prado Dam was built near the confluences of the Chino, Mill, and Temescal creeks with the Santa Ana River. The water flow of the Santa Ana River is now perennial in the area. Inputs include stormwater, irrigation runoff, and treated wastewater discharge from several tributaries. The area immediately surrounding Prado Basin is a matrix of agriculture, residential and commercial development, and open space. The human population in the area is about 300,000 and includes the cities of Corona, Norco, Chino, and Chino Hills and the unincorporated areas of the three counties. The area also supports a population of about one-half million dairy cattle. Concerns about dairy water runoff and treated sewage effluent discharge, which may contain high levels of nitrates, led to construction of water quality ponds within Prado Basin. Water is diverted from the main Santa Ana River channel into a series of freshwater settling ponds where aquatic vegetation and microbes remove nitrates.

DESCRIPTION OF THE THREE PROPOSED PROJECT ALTERNATIVES

The Prado Basin Water Supply Feasibility Study involves changes to current water conservation levels. The Corps examined eight project alternatives, which appear to be only one actual alternative as defined by the Corps' Planning Manual (Corps 1996). The eight alternatives represent variations on a single alternative that propose holding water at differing levels dependent on time of year and whether construction to raise Prado Dam had occurred. These do not meet the Corps' own definition of alternatives, which must be significantly differentiated-- from each other (Corps 1996). The Corps asked us to examine three proposed alternatives; one for operation prior to dam raising construction, the Corps' preferred post-construction alternative, and the District's preferred post-construction alternative.

Pre-Construction Alternative (Alternative 8):

This alternative permits maximum water pool levels to 498 feet in the non-flood season and to 505 feet during the flood season (Figure 1). Maximum water release rates would be 5,000 cfs which is the current capacity of the outflow structures in the dam.

Corps' Preferred Alternative (Alternative 3):

This alternative would allow a maximum pool level during the flood season of 500 feet, and 505 feet in non-flood season (Figure 1). Maximum water release rates would be 7,400 cfs with the upgraded outflow structures in the dam.

District's Preferred Alternative (Alternative 5):

The maximum pool would be at 508 feet year-round. Maximum water release rates would be

25,900 cfs with the upgraded outflow structures in the dam (Figure 1).

DESCRIPTION OF BIOLOGICAL RESOURCES IN THE PROJECT AREA

Vegetation Communities

Prado Dam creates a basin of over 11,000 acres (4,500 hectares (ha)) which includes much of Chino Creek. About 5,900 acres (2,400 ha) contains wetland habitats, including open water, freshwater marsh, and willow woodland. The willow woodland, the largest single stand in southern California of about 3,600 acres (1,457 ha), consists mainly of black willow (*Salix gooddingii*) and arroyo willow (*Salix lasiolepis*), with few cottonwoods (*Populus fremontii*) and sycamores (*Platanus racemosa*). The freshwater marsh habitat is dominated by cattails (*Typha* sp.) and reeds (*Scirpus* sp.) (Zembal et al. 1985).

Riparian vegetation is adapted to the natural fluvial processes associated with that habitat. The presence of the dam and its operation for water conservation and flood control have substantially altered those scour and deposition dynamics. Extensive mudflats have developed near the dam due to sediment accumulation and prolonged inundation, eliminating the native vegetative understory and overstory. In other areas, plant community succession has reduced the understory without subsequent replacement, resulting in monotypic stands of the flood-tolerant black willow. Where understory is present it consists of various herbaceous species such as bur-marigold (*Bidens* sp.), sunflower (*Helianthus annuus*), cockleburr (*Xanthium strumarium*), mulefat (*Baccharis salicifolia*), tule potato (*Sagittaria latifolia*), sedges (*Cyperus* sp.), sowthistle (*Sonchus oleraceus*), dock (*Rumex* sp.), nettles (*Urtica holosericea*), and wild grape (*Vitis girdiana*). The area has been invaded by exotic species, in particular arundo and castor bean (*Ricinus communis*). These invasive plants, especially arundo, have degraded or destroyed large tracts of former willow woodland in the Basin and along the Santa Ana River.

The Basin includes upland areas, stands of eucalyptus (*Eucalyptus* sp.), and fallow agricultural fields along its fringe. Within and adjacent to the Basin, developed areas include the City of Corona's municipal airport, active agricultural fields, dairy farms, housing and commercial developments, and municipal parks. In the Basin about 50 settling ponds covering 700 acres (283 ha) are operated by the District for water quality improvement. Water is diverted from the Santa Ana River into this system in an effort to reduce nitrates and other chemicals.

Downstream of Prado Dam, the Santa Ana River is bounded by steep canyon walls and areas where development has encroached into the floodplain. The stability of the alluvial channel sediment depends on the equilibrium dynamics of inflow and outflow of sediment which are driven by water velocity and conditions upstream. Currently, the reach of the Santa Ana River below the dam is degrading since Prado Dam retains sediment that would otherwise contribute to deposition. Tributaries below Prado Dam do not contribute enough sediment to compensate for losses. Vegetation in this reach consists of willow, cottonwood, mixed riparian woodlands, riparian scrub, alluvial scrub, freshwater marsh, and arundo thickets. Developed areas, including the Green River golf course, encroach onto the floodplain.

Fish

Most of the fish species found within Prado Basin and its tributaries are non-native introductions. Of these, the most abundant are flathead minnow (*Pimephales promelas*), western mosquitofish (*Gambuisa affinis*), and common carp (*Cyprinus carpio*). Two native species found in the area are Santa Ana sucker (*Catostomus santaanae*), a species proposed for federally threatened status, and arroyo chub (*Gila orcutti*). Table 1 lists fish species that occur or potentially occur in Prado Basin and its environs.

Table 1. Fish species that occur or potentially occur in Prado Basin and environs. Status codes are PT = proposed for federally threatened status, CSC = California State or Department of Fish and Game species of special concern, S = sensitive taxa.

Species Name	Scientific Name	Status
Flathead minnow	*Pimephales promelas*	
Sailfin molly	*Poecelia latipinna*	
Western mosquitofish	*Gambuisa affinis*	
Common carp	*Cyprinus carpio*	
Threadfin shad	*Dorosoma petenense*	
Goldfish	*Carassius auratus*	

Species Name	Scientific Name	Status
Brown bullhead	*Ameiurus nebulosus*	
Black bullhead	*Ameiurus melas*	
Yellow bullhead	*Ameiurus natilis*	
Bluegill	*Lepomis macrochirus*	
Channel catfish	*Ictalurus punctatus*	
Green sunfish	*Lepomis cyanellus*	
Largemouth bass	*Micropterus salmoides*	
Mozambique tilapia	*Tilapia mossambica*	
Redbelly tilapia	*Tilapia zillii*	
Prickly sculpin	*Cottus asper*	
Santa Ana sucker	*Catostomus santaanae*	PT
Arroyo chub	*Gila orcuttii*	CSC, S

Amphibians and Reptiles

The most frequently observed amphibians and reptiles in Prado Basin are Pacific treefrog (*Hyla regilla*), the non-native bullfrog (*Rana catesbeiana*) and African clawed frog (*Xenopus laevis*), western fence lizard (*Sceloporus occidentalis*), and side-blotched lizard (*Uta stansburiana*). Table 2 lists amphibian and reptile species known to occur or that potentially occur in Prado Basin and its environs.

Table 2. Amphibian and reptile species that occur or potentially occur in Prado Basin and environs. Status codes are FE = federally endangered, FT = federally threatened, CSC = California State or Department of Fish and Game species of special concern, S = sensitive taxa.

Species Name	Scientific Name	Status
Pacific slender salamander	*Batrachoceps pacificus major*	
Western spadefoot toad	*Scaphiopus hammondi*	CSC, S
Western toad	*Bufo boreas*	
Arroyo toad	*Bufo microscaphus californicus*	FE, CSC
Pacific treefrog	*Hyla regilla*	
California red-legged frog	*Rana aurora*	FT, CSC
Leopard frog	*Rana pipiens*	
Bullfrog	*Rana catesbeiana*	
African clawed frog	*Xenopus laevis*	
Western pond turtle	*Clemmys marmorata*	CSC, S
Spiny softshell turtle	*Apalone spinifera*	
California legless lizard	*Anniella pulchra*	
Southern alligator lizard	*Elgaria multicarinatus*	
Orange-throated whiptail	*Cnemidophorus hyperythrus*	CSC, S
Coastal western whiptail	*Cnemidophorus tigris multiscutatus*	S
Western fence lizard	*Sceloporus occidentalis*	
Side-blotched lizard	*Uta stansburiana*	
Long-nosed leopard lizard	*Gambelia wislizenii*	
Coastal banded gecko	*Coleonyx variegatus abbotti*	S
Western skink	*Eumeces skiltonianus*	
Gilbert's skink	*Eumeces gilberti*	
San Diego horned lizard	*Phrynosoma coronatum blainvillei*	CSC, S
Western blind snake	*Leptotyphlops humilis*	
Coastal rosy boa	*Lichanura trivirgata roseofusca*	S
Western ringneck snake	*Diadophis punctatus*	S
Western yellow-bellied racer	*Coluber constrictor*	

Species Name	Scientific Name	Status
Red coachwhip	*Masticophis flagellum*	
Striped racer	*Masticophis lateralis*	
Coast patch-nosed snake	*Salvadora hexalepis virgultea*	CSC, S
California glossy snake	*Arizona elegans occidentalis*	S
San Diego gopher snake	*Pituophis melanoleucas annectens*	
California kingsnake	*Lampropeltis getulus*	
Western long-nosed snake	*Rhinocheilus lecontei*	
South coast garter snake	*Thamnophis sirtalis*	S
Two-striped garter snake	*Thamnophis hammondii*	S
California black-headed snake	*Tantilla planiceps*	
Red diamond rattlesnake	*Crotalus ruber*	
Southern Pacific rattlesnake	*Crotalus viridis*	

Birds

Over 175 species of birds have been recorded at Prado Basin due to the wide variety of aquatic and terrestrial habitats present. Of these species, about 100 may breed in the area. Others are transient species that rely on the area as a stopover point during spring or winter migration, or are winter residents. Table 3 lists bird species that occur or potentially occur in Prado Basin and its environs.

Table 3. Bird species that occur or potentially occur in Prado Basin and environs. Status codes are FE = federally endangered, FT = federally threatened, SE = State endangered, CSC = California State or Department of Fish and Game species of special concern, S = sensitive taxa.

Species Name	Scientific Name	Status
Pied-billed grebe	*Podilymbus podiceps*	
Eared grebe	*Podiceps nigricollis*	
Western grebe	*Aechmophorus occidentalis*	
Double-crested cormorant	*Phalacrocorax auritus*	CSC
American bittern	*Botaurus lentiginosus*	
Least bittern	*Ixobrychus exilis*	CSC, S
Great blue heron	*Ardea herodias*	
Great egret	*Ardea alba*	
Snowy egret	*Egretta thula*	
Cattle egret	*Bubulcus ibis*	
Green heron	*Butorides virescens*	
Black-crowned night heron	*Nycticorax nycticorax*	
White-faced ibis	*Plegadis chihi*	CSC
Wood stork	*Mycteria americana*	CSC
Turkey vulture	*Cathartes aura*	
Greater white-fronted goose	*Anser albifrons*	
Snow goose	*Chen caerulescens*	
Canada goose	*Branta canadensis*	
Wood duck	*Aix sponsa*	
Green-winged teal	*Anas crecca*	
Mallard	*Anas platyrhynchos*	
Northern pintail	*Anas acuta*	
Blue-winged teal	*Anas discors*	
Cinnamon teal	*Anas cyanoptera*	
Northern shoveler	*Anas clypeata*	
Gadwall	*Anas strepera*	

Species Name	Scientific Name	Status
American widgeon	*Anas americana*	
Canvasback	*Anas valisineria*	
Redhead	*Aythya americana*	
Ring-necked duck	*Aythya collaris*	
Greater scaup	*Aythya marila*	
Lesser scaup	*Aythya affinis*	
Bufflehead	*Bucephala albeola*	
Ruddy duck	*Oxyura jamaicensis*	
Osprey	*Pandion haliaetus*	CSC
White-tailed kite	*Elanus leucurus*	
Northern harrier	*Circus cyaneus*	CSC
Sharp-shinned hawk	*Accipiter striatus*	CSC
Cooper's hawk	*Accipiter cooperii*	CSC
Red-shouldered hawk	*Buteo lineatus*	
Swainson's hawk	*Buteo swainsoni*	
Red-tailed hawk	*Buteo jamaicensis*	
Golden eagle	*Aquila chrysaetos*	CSC
American kestrel	*Falco sparverius*	
Peregrine falcon	*Falco peregrinus*	SE
Merlin	*Falco columbarius*	
Ring-necked pheasant	*Phasianus colchicus*	
Common peafowl	*Pavo cristatus*	
California quail	*Callipepla californica*	
Virginia rail	*Rallus limicola*	
Sora	*Porzana carolina*	
Common moorhen	*Gallinula chloropus*	

Species Name	Scientific Name	Status
American coot	*Fulica americana*	
Black-bellied plover	*Pluvialis squatarola*	
Killdeer	*Charadrius vociferus*	
Black-necked stilt	*Himantopus mexicanus*	
American avocet	*Recurvirostra americana*	
Greater yellowlegs	*Tringa melanoleuca*	
Lesser yellowlegs	*Tringa flavipes*	
Willet	*Catoptrophorus semipalmatus*	
Spotted sandpiper	*Actitis macularia*	
Western sandpiper	*Calidris mauri*	
Least sandpiper	*Calidris minutilla*	
Dunlin	*Calidris alpina*	
Long-billed dowitcher	*Limnodromus scolopaceus*	
Common snipe	*Gallinago gallinago*	
Ring-billed gull	*Larus delawarensis*	
California gull	*Larus californicus*	
Herring gull	*Larus argentatus*	
Caspian tern	*Sterna caspia*	
Rock dove	*Columba livia*	
Band-tailed pigeon	*Columba fasciata*	
Spotted dove	*Streptopelia chinensis*	
Mourning dove	*Zenaida macroura*	
Common ground dove	*Columbina passerina*	
Yellow-billed cuckoo	*Coccyzus americanus*	SE
Greater roadrunner	*Geococcyx californianus*	
Barn owl	*Tyto alba*	

Species Name	Scientific Name	Status
Western screech-owl	*Otus kennicottii*	
Great horned owl	*Bubo virginianus*	
Burrowing owl	*Athene cunicularia*	CSC, S
Long-eared owl	*Asio otus*	CSC
Vaux's swift	*Caetura vauxi*	CSC
White-throated swift	*Aeronautes saxatalis*	
Black-chinned hummingbird	*Archilochus alexandri*	
Anna's hummingbird	*Calypte anna*	
Costa's hummingbird	*Calypte costae*	
Rufous hummingbird	*Selasphorus rufus*	
Allen's hummingbird	*Selasphorus sasin*	
Belted kingfisher	*Ceryle alcyon*	
Acorn woodpecker	*Melanerpes formicivorus*	
Red-breasted sapsucker	*Sphyrapicus ruber*	
Nuttall's woodpecker	*Picoides nuttallii*	
Downy woodpecker	*Picoides pubescens*	
Hairy woodpecker	*Picoides villosus*	
Northern flicker	*Colaptes auratus*	
Olive-sided flycatcher	*Contopus cooperi*	
Western wood-pewee	*Contopus sordidulus*	
Southwestern willow flycatcher	*Empidonax trailii extimus*	FE, SE
Black phoebe	*Sayornis nigricans*	
Say's phoebe	*Sayornis saya*	
Ash-throated flycatcher	*Myiarchus cinerascens*	
Cassin's kingbird	*Tyrannus vociferans*	
Western kingbird	*Tyrannus verticalis*	

Species Name	Scientific Name	Status
Loggerhead shrike	*Lanius ludovicianus*	
Least Bell's vireo	*Vireo bellii pusillus*	FE, SE
Hutton's vireo	*Vireo huttoni*	
Warbling vireo	*Vireo gilvus*	
Western scrub jay	*Aphelocoma californica*	
American crow	*Corvus brachyrhynchos*	
Common raven	*Corvus corax*	
Horned lark	*Eremophila alpestris*	
Purple martin	*Progne subis*	CSC
Tree swallow	*Tachycineta bicolor*	
Violet-green swallow	*Tachycineta thalassina*	
Northern rough-winged swallow	*Stelgidopteryx seripennis*	
Cliff swallow	*Hirundo pyrrhonota*	
Barn swallow	*Hirundo rustica*	
Oak titmouse	*Baeolophus inornatus*	
Bushtit	*Psaltriparus minimus*	
Cactus wren	*Campylorhynchus brunneicapillus*	CSC
Rock wren	*Salpinctes obsoletus*	
Bewick's wren	*Thryomanes bewickii*	
House wren	*Troglodytes aedon*	
Marsh wren	*Cistothorus palustris*	
Ruby-crowned kinglet	*Regulus calendula*	
Blue-gray gnatcatcher	*Polioptila caerulea*	
Western bluebird	*Sialia mexicana*	
Mountain bluebird	*Sialia currucoides*	
Swainson's thrush	*Catharus ustulatus*	

Species Name	Scientific Name	Status
Hermit thrush	*Catharus guttatus*	
American robin	*Turdus migratorius*	
Wrentit	*Chamaea fasciata*	
Northern mockingbird	*Mimus polyglottos*	
California thrasher	*Toxostoma redivivum*	
European starling	*Sturnus vulgaris*	
American pipit	*Anthus spinoletta*	
Cedar waxwing	*Bombycilla cedrorum*	
Phainopepla	*Phainopepla nitens*	
Orange-crowned warbler	*Vermivora celata*	
Yellow warbler	*Dendroica petechia*	
Yellow-rumped warbler	*Dendroica coronata*	
Black-throated gray warbler	*Dendroica nigrescens*	
Townsend's warbler	*Dendroica townsendi*	
Hermit warbler	*Dendroica occidentalis*	
Common yellowthroat	*Geothlypis trichas*	
Wilson's warbler	*Wilsonia pusilla*	
Yellow-breasted chat	*Icteria virens*	
Red-crested cardinal	*Paroaria coronata*	
Spotted towhee	*Pipilo maculatus*	
California brown towhee	*Pipilo crissalis*	
Rufous-crowned sparrow	*Aimophila ruficeps*	CSC, S
Lark sparrow	*Chondestes grammacus*	
Savannah sparrow	*Passerculus sandwichensis*	
Song sparrow	*Melospiza melodia*	
Lincoln's sparrow	*Melospiza lincolnii*	

Species Name	Scientific Name	Status
Golden-crowned sparrow	*Zonotrichia leucophrys*	
Dark-eyed junco	*Junco hyemalis*	
Black-headed grosbeak	*Pheucticus melanocephalus*	
Blue grosbeak	*Guiraca caerulea*	
Lazuli bunting	*Passerina samoena*	
Red-winged blackbird	*Agelaius phoeniceus*	
Tricolored blackbird	*Agelaius tricolor*	CSC, S
Western meadowlark	*Sturnella neglecta*	
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	
Brewer's blackbird	*Euphagus cyanocephalus*	
Great-tailed grackle	*Quiscalus mexicanus*	
Brown-headed cowbird	*Molothrus ater*	
Hooded oriole	*Icterus cucullatus*	
Bullock's oriole	*Icterus bullockii*	
Purple finch	*Carpodacus purpureus*	
House finch	*Carpodacus mexicanus*	
Lesser goldfinch	*Carduelis psaltria*	
Lawrence's goldfinch	*Carduelis lawrencei*	
American goldfinch	*Carduelis tristis*	
House sparrow	*Passer domesticus*	

Mammals

Table 4 lists mammal species that occur or potentially occur in Prado Basin and environs. Of these species, Virginia opossum (*Didelphis virginiana*), black rat (*Rattus rattus*), and domestic cat (*Felis domesticus*) are introduced species (Zembal et al. 1985). Mountain lion (*Felis concolor*), a wide-ranging species, may use the drainage below the dam to access Chino Hills and Santa Ana Mountains. No systematic surveys for bat species have been conducted in the area, but bats are likely using the area at least for foraging.

Table 4. Mammal species that occur or potentially occur in Prado Basin and environs. Status codes are CSC = California State or Department of Fish and Game species of special concern, S = sensitive taxa.

Species Name	Scientific Name	Status
Virginia opossum	*Didelphis virginiana*	
Ornate shrew	*Sorex ornatus*	
Yuma myotis	*Myotis yumanensis*	S
Long-eared myotis	*Myotis evotis*	S
California myotis	*Myotis californicus*	
Small-footed myotis	*Myotis leibii*	
Western pipistrelle	*Pipistrellus hesperus*	
Big brown bat	*Eptesicus fuscus*	
Spotted bat	*Euderma maculatum*	CSC, S
Townsend's big-eared bat	*Corynorhinus townsendii*	CSC, S
Pallid bat	*Antrozous pallidus*	CSC
Brazilian free-tailed bat	*Tadarida brasiliensis*	
Western mastiff bat	*Eumops perot is*	CSC, S
San Diego black-tailed jackrabbit	*Lepus californicus*	CSC
Desert cottontail	*Sylvilagus audubonii*	
California ground squirrel	*Spermophilus beecheyi*	
Botta's pocket gopher	*Thomomys bottae*	
California pocket mouse	*Perognathus californicus*	

Species Name	Scientific Name	Status
San Diego pocket mouse	*Chaetodipus fallax fallax*	S
Pacific kangaroo rat	*Dipodomys agilis*	
Western harvest mouse	*Reithrodontomys megalotis*	
Deer mouse	*Peromyscus maniculatus*	
San Diego desert woodrat	*Neotoma lepida*	CSC
Dusky-footed woodrat	*Neotoma fuscipes*	
California meadow vole	*Microtus californicus*	
Black rat	*Rattus rattus*	
House mouse	*Mus musculus*	
Coyote	*Canis latrans*	
Gray fox	*Urocyon cinereoargenteus*	
Racoon	*Procyon lotor*	
Long-tailed weasel	*Mustela frenata*	
Striped skunk	*Mephitis mephitis*	
Bobcat	*Felis rufus.*	
Feral cat	*Felis domesticus*	
Mountain lion	*Felis concolor*	S
Mule deer	*Odocoileus hemionus*	

Sensitive Species

Plants

Only one sensitive plant species is known or expected to occur in the Prado Basin. The many-stemmed dudleya *(Dudleya multicaulis)* is considered a sensitive species (classified 1B) by the California Native Plant Society (CNPS 1997). This plant is found in two small populations on the upland perimeter of the basin.

Fish

Southern California coastal drainages have a depauperate native freshwater fish fauna. Santa Ana sucker, proposed for federally threatened status (64 CFR 3915), is a southern California endemic that occurs within the project area (Swift et al. 1993). This species is the smallest sucker species in California, rarely exceeding 6 inches in standard length. This small size has probably been selected for by the large 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 small pools where small fish that can tolerate warm water with low oxygen levels have the best chance for survival.

Habitat for the Santa Ana sucker occurs primarily in the many small braided channels and rivulets that occur throughout the alluvial fan portion of the Santa Ana River and its tributaries. 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. This sucker breeds primarily during the spring or wet months of the year. During drier months, non-native species that are otherwise highly competitive but not adapted to the fluctuating environment and water temperatures will die off.

Recent surveys have located Santa Ana suckers within the Santa Ana River both upstream and downstream of Prado Dam, but not in the Basin between Prado Dam and the 508 foot contour line. Santa Ana suckers found nearest to the 508 ft level were located near the Corona Airport within 1 km of that contour line. Below Prado Dam there is no suitable breeding habitat. Individuals found below Prado Dam are effectively removed from the breeding population upstream of the Basin. Diversion of water from the Santa Ana River into the water quality improvement ponds apparently diverts Santa Ana suckers into that system as well. This may be a dead end, since pond conditions are not conducive to their survival and also contain non-native predator species.

Arroyo chub is 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. This species has been recorded from the Santa Ana River and several tributaries in Riverside and San Bernardino counties (Swift et al. 1993).

Amphibians and Reptiles

The arroyo toad is a federally endangered species (59 CFR 64859) and a California Department of Fish and Game Species of Special Concern. Arroyo toads were historically found along drainages in southern California from San Luis Obispo to San Diego County and into Mexico. Within the United States, the species has been extirpated from an estimated 75 percent of its former range. The range of the arroyo toad includes the project area and potential habitat exists in the Basin and Santa Ana River, however, no records exist for the species here. Arroyo toad are found further west in San Juan Creek in southern Orange County.

Rivers that have shallow, gravelly pools adjacent to sandy terraces provide habitat for the arroyo toad. Breeding occurs on large streams with persistent water from late March to mid-June. Eggs are deposited and larvae develop in shallow pools with minimal current, little or no emergent vegetation, and where the base is sand or small gravel substrate overlain with silt. After metamorphosis (June-July) the juveniles remain on bordering gravel bars until the pool no longer persists. Adults excavate shallow burrows on terraces where they shelter during the day when surfaces are damp, or during longer intervals in the dry season.

The primary threats to this species are habitat destruction and degradation, 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, sand mining, human disturbance, and grazing. Exotic predators, such as bullfrog, African clawed frog, and green sunfish can have a major impact on already reduced populations.

Dams have a significant effect on downstream habitat quality. Artificially regulated flows disrupt the natural processes that produce the terrace and pool habitats required by arroyo toads. Unseasonal water releases may prevent breeding and seasonal releases may wash away eggs and larvae. Siltation from increased stream flow from upstream disturbances may affect survival by covering food supply and inhibiting feeding by larval arroyo toads. The species is especially sensitive to stream diversions due to its breeding well after the normal rainy season. Water diversions that alter the normal flows degrade habitats and adversely affect arroyo toads by leading to the early drying of breeding pools, restricting the period essential for rapid growth when newly-metamorphosed arroyo toads can forage on damp gravel bars, and the loss of damp subsurface soil that may result in high adult mortality during later summer and early fall.

Over the past 20 years, at least 60 species of fishes have been introduced to the western 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 toads and may have contributed to regional extirpations. Most streams with populations of arroyo toads also have populations of introduced bullfrogs. Adult bullfrogs are highly predatory and believe to prey on adult arroyo toads. Artificially maintained perennial flows below dams enhance the habitat for bullfrogs to the detriment of arroyo toads.

Western spadefoot is a California State Species of Special Concern. The species is found mainly in lowland areas in vernal pools, washes, river floodplains, playas, and alkali flats. Western spadefoot toads prefer open areas with sandy or gravelly soil and can be found in valley and foothill grasslands, chaparral, sage scrub, and pine-oak woodlands. They breed from January to May in quiet streams and are found throughout much of western California (Stebbins 1985). About 80 percent of the western spadefoot toad's former habitat has been developed or converted to uses that are incompatible with the continued existence of the species (Jennings and Hayes 1994).

California red-legged frog is a federally threatened species (61 CFR 25832) that was formerly widespread in Pacific slope drainages (Jennings and Hayes 1994). It is one of two subspecies of red-legged frogs on the Pacific coast distributed throughout most of lowland California. 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 includes the project area. The species has disappeared from about 99 percent of its former range in southern California.

Habitat for California red-legged frog consists of dense, shrubby riparian vegetation, near deep, still or slowly moving water. Permanent water sources are vital for persistence of populations, although adults use aquatic and terrestrial habitats and may be found in ephemeral streams. Vegetated, terrestrial riparian areas may provide important wintering habitat as red-legged frogs estivate in small mammal burrows and moist leaf litter up to 85 feet from water (Rathburn et al.

1993).

The breeding season for California red-legged frog begins in late November and may last through late April. Egg masses are deposited on emergent vegetation so that they float on the surface (Hayes and Miyamoto 1984). Eggs hatch within two weeks of fertilization, and larvae metamorphose in four to five months.

Reasons for the decline of California red-legged frogs include the loss of habitat and introduction of non-native, predatory species such as bullfrogs and crayfish (*Procambarus* sp.). Wetland alterations include stream channelization, vegetation clearing, water diversions, and reservoir creation. Reservoirs have an additional impact since they are frequently stocked with exotic predators.

The western pond turtle 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. Western pond turtles 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, thus its status as a California Department of Fish and Game Species of Special Concern. Records indicate the presence of western pond turtles in Prado Basin (Zembal et al. 1985).

The orange-throated whiptail is a species which may be in decline. Its preferred habitat is low-elevation (below 2,950 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). Suitable habitat is present in the study area, although the species has not been observed in the area.

The coastal western whiptail is a species which may be in decline. 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 loss of habitat and fragmentation of its habitat by agriculture and urbanization. This species was commonly found along the southern edge of the Basin and below Prado Dam (Zembal et al. 1985).

The coastal banded gecko's range encompasses western California and northern Baja California, Mexico (Stebbins 1966). The species, which may be in decline due to habitat loss, occurs in scrub vegetation where there are rocky outcrops. The species may occur locally in low numbers in the Basin (Zembal et al. 1985).

The range for the San Diego horned lizard includes western southern California and northern Baja California, Mexico. This species is found in sandy areas, and feeds on native harvester ants. They likely occur on the fringes of the Basin, and have been found below Prado Dam (Zembal et al. 1985). The species is of special concern due to loss of habitat, and displacement of its native ant food source by non-native Argentine ants (*Iridomyrmex humilis*).

The coastal rosy boa is a species that may be in decline. It 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, therefore, within the project area. However, this species has not been recorded from Prado Basin.

Western ringneck snakes are found in woodland, forest, and chaparral, especially moist areas along streams. This species is often found under rocks or logs during the day and tends to avoid open or barren areas. Ringneck snakes were found in proximity to the project area and habitat exists for them within the Basin, but no records for the Basin are known.

Records for coast patch-nosed snake exist for Temescal Wash (Zembal et al. 1985) but the species has not been found recently and limited habitat is present in the Basin. The species is generally found in grassland, chaparral, sagebrush, and desert scrub (Stebbins 1985) and prefers washes, sandy flats and rock areas (Zeiner et al. 1988). Its distribution includes San Bernardino County but distribution details are unknown. This species is apparently a broad generalist in both habitat and diet. The coast patch-nosed snake population may be in decline.

The California glossy snake is a species found in desert, chaparral, sagebrush, hardwood, and annual grass habitats. Records exist for the general vicinity of the Basin (Glaser 1970) but no recent records exist for the Basin. Some suitable habitat is present in the project area for this species.

Suitable habitat for the south coast garter snake occurs below Prado Dam and where the Santa Ana River enters the Basin. The species was found by Robertson and Shipman (1974). This species inhabits marsh and upland habitats near permanent water with areas of riparian vegetation.

The two-striped garter snake has been found in the vicinity of the Basin (Glaser 1970). Suitable habitat probably exists along the drainage below Prado Dam and where the Santa Ana River enters the Basin. This species is a highly aquatic snake, rarely found far from water, inhabiting rocky areas bordered by willow or other dense riparian vegetation.

Birds

Four species in Table 3 are Federal or State endangered, while the others are species of concern or sensitive species due to threats to their nesting habitats. The peregrine falcon was delisted on Aug 25, 1999, from the Federal endangered species list (64 CFR 46542) but is a State endangered species. Peregrine falcons are infrequent winter visitors to Prado Basin. Of particular concern in Prado Basin regarding loss or threat to nesting habitat are three Federal or State listed species which will be the only bird species addressed here; least Bell's vireo, southwestern willow flycatcher, and yellow-billed cuckoo.

The least Bell's vireo (vireo), a federally and State endangered species, was listed in 1986 (51CFR 16482). The vireo was formerly found in valley bottom riparian habitats from Tehama County, California southward locally to northwestern Baja, California, Mexico in the south, and as far east as the Owens Valley, Death Valley, and along the Mojave River (Grinnell and Miller 1944). Except for a few outlying pairs, the species is currently restricted to southern California south of the Tehachapi Mountains and northwestern Baja California (Garrett and Dunn 1981).

The vireo is a small, olive-gray, migratory songbird that nests and forages almost exclusively in riparian woodland habitats (Garrett and Dunn 1981; Gray and Greaves 1981; Miner 1989). All subspecies of Bell's vireo (*Vireo bellii*) are almost exclusively insectivorous (Chapin 1925) and highly territorial (Barlow 1962; Fitch 1958; Salata 1983).

Vireos generally begin to establish breeding territories by late March (Garrett and Dunn 1981; Salata 1983; Hays 1989; Pike and Hays 1992). Most breeding vireos depart their breeding grounds by the third week of September and very few are found wintering in the United States (Garrett and Dunn 1981; Pike and Hays 1992; Salata 1983).

Territory sizes of nesting least Bell's vireos range from one to four acres (Gray and Greaves 1981). Although the vireo occupies home ranges that typically range in size from 0.2 to 1.82 acres, a few may be as large as 4 acres. In some areas, least Bell's vireos will also use adjacent upland habitats for foraging (Salata 1983).

The least Bell's vireo is apparently more restricted in its choice of nesting habitat than other subspecies of Bell's vireo (RECON 1988). Least Bell's vireo nesting habitat typically consists of well-developed overstories, understories, and low densities of aquatic and herbaceous cover (Hays 1986; Hays 1989; Salata 1983; Zembal 1984; Zembal et al. 1985). The understory frequently contains dense subshrub or shrub thickets. These thickets are often dominated by sandbar willow (*Salix hindsiana*), mule fat, young individuals of other willow species such as arroyo or black willow, and one or more herbaceous species (Salata 1983; Zembal 1984; Zembal et al. 1985). Significant overstory species include mature arroyo willows and black willows. Occasional cottonwoods and western sycamores occur in some least Bell's vireo habitats. Coast live oak (*Quercus agrifolia*) may also make locally important contributions to the overstory.

As much as 90 percent of the original extent of riparian woodland in California has been eliminated, and most of the remaining 10 percent is in a degraded condition. It appears that least Bell's vireos nesting in areas containing a high proportion of degraded habitat have lower productivity (e.g., hatching success) than those in areas of high quality riparian woodland (Pike and Hays 1992). Additionally, widespread habitat losses have fragmented most remaining populations into small, disjunct, widely dispersed subpopulations (Franzreb 1989). Habitat fragmentation negatively affects abundance and distribution of neotropical migratory songbirds, in part by increasing incidence of nest predation and parasitism (Small and Hunter 1988).

Least Bell's vireos are sensitive to many forms of human disturbance including noise, night lighting, and consistent human presence in an area. Excessive noise can cause vireos to abandon an area. Noise levels above 60 dB can significantly decrease the reproductive success of least Bell's vireos. Greaves (1989) hypothesized that the lack of breeding least Bell's vireos in apparently suitable habitat was due to human disturbances (e.g., bulldozers, off-highway vehicles, and hiker travel). He further suggested that buffer zones between natural areas and surrounding degraded and disturbed areas could be used to increase the suitability of some least Bell's vireo habitat.

The features or elements of habitat that are essential to the conservation of the least Bell's vireo can be described as riparian woodland vegetation that generally contains both canopy and shrub layers, and includes some associated upland habitats. General activities that could cause destruction or adverse modification of least Bell's vireo habitat include 1) removal or destruction of riparian vegetation, 2) thinning of riparian growth, especially near ground level, 3) removal or destruction of adjacent upland habitats used for foraging, and 4) increases in human-associated or human-induced disturbances. Specific actions that could adversely affect least Bell's vireo critical habitat include stream channelization, water impoundment or extraction, water diversion, intensive recreation, and development.

Because of the decline of the vireo (Salata 1986), attributable in part to the combined, perhaps synergistic, effects of the widespread destruction of riparian habitats and brood-parasitism by the brown-headed cowbird (Garrett and Dunn 1981), the species was listed as endangered. In 1986, the year of its listing, only about 300 pairs were thought to exist in its range. That year Prado Basin hosted about 19 vireo pairs. A steady increase in numbers of pairs and territorial male vireos has been noted over the intervening years. Now, Prado Basin supports one of the largest concentrations of nesting least Bell's vireos, second only to the Santa Margarita River in San Diego County. In 1998, 270 pairs were present in the Basin, including Mill, Chino, and Temescal Creeks. Increases in the vireo population are credited at least in part to prudent management practices, including trapping and removing nest parasite brown-headed cowbirds from the area.

The southwestern willow flycatcher (flycatcher) is a federally and State endangered species. It is one of four subspecies of the willow flycatcher recognized in North America (Hubbard 1987; Unitt 1987; Browning 1993). The southwestern willow flycatcher is a relatively small, insectivorous bird with a whitish throat, grayish-green back, a light olive breast, and a pale yellowish belly. The flycatcher occurs in riparian habitats along rivers, streams, and other wetland habitats where dense growths of willows, mulefat, arrowweed, buttonbush, or other plants of similar structure and form are present (Grinnell and Miller 1944; Phillips 1948; Hubbard 1987; Unitt 1987; Brown and Trosset 1989; Whitfield 1990; Brown 1991). Overstories in occupied habitats are often composed of willows or cottonwoods (Unitt 1987; Whitfield 1990; Brown 1991). Of particular importance to the flycatcher is the riparian ecosystem that contains thickets of riparian shrubs and small trees above the water's surface, or areas where such vegetation may become established (Muiznieks et al. 1994). Water needs to be available throughout the May through September breeding season, and vegetation must be within 328 feet (100 meters) of the water's edge. These riparian communities provide both nesting and foraging habitat for the species.

The flycatcher was once considered widely distributed and common in California, occurring wherever suitable habitat existed in the Los Angeles Basin, San Bernardino, Riverside and San Diego counties, and the lower Colorado River (Grinnell and Miller 1944; Unitt 1987; Willet 1912, 1933). California once may have supported the majority of nesting flycatchers. Currently in California, this species exists only in small disjunct groups and was thought to be extirpated from the lower Colorado River (Hunter et al. 1987; Unitt 1987; Rosenburg et al. 1991). Surveys conducted by Robert McKernan of the San Bernardino County Museum observed several southwestern willow flycatchers along the Lower Colorado River during 1996 and 1997. The southwestern willow flycatcher was listed as endangered in 1995 (60 CFR 10694). In 1987, Unitt estimated the population at well under 1,000 pairs and probably closer to 500 pairs, but in California believed that only 87 pairs were likely present.

The population decline is primarily due to the loss and fragmentation of riparian habitat, brood parasitism by brown-headed cowbirds, invasion of riparian habitat by exotic species such as tamarisk (*Tamarix* sp.) and giant reed, and predation. Human activities that can affect southwestern willow flycatchers include excessive noise, excessive dust (coats the leaves of the plants and reduces populations of insect or prey species), night lighting, and consistent human presence in an area. Habitat rarity, and small, isolated populations of flycatchers make the species increasingly susceptible to local extirpation through stochastic events such as flood, fire, brood parasitism, predation, and land development (Small and Hunter 1988). Throughout the known range of this species, occupied riparian habitats tend to be widely separated.

Within Prado Basin, few southwestern willow flycatchers have been found breeding in the past 15 years. Only five territorial flycatchers were found in the area in 1987, and in the past ten breeding seasons only 15 flycatcher fledglings have been seen (Pike et al. 1998). In 1996, five nests were found, and in 1997 only two were located. In 1998, three territorial males were found, and apparently only four young were raised by one of those males with his mate. In 1999, three pairs, one territorial male, and three nests were found. One nest was depredated, while the other two produced five fledglings. One nest was located west of the Corona Airport, and the other in the northwestern portion of the Basin at the Chino Creek drainage (Loren Hays, Fish and Wildlife Service, pers. comm.).

The yellow-billed cuckoo is a State endangered species whose North American range is restricted to the lower 48 states. Its range in California is in the southern half of the state, and its population is declining in most areas of its range. The yellow-billed cuckoo inhabits open woodland, especially with dense undergrowth, parks, riparian woodland, and thickets. It forages by gleaning prey from leaves and branches while perched, by gleaning while hovering (as with berries or other fruit), and by hawking. The yellow-billed cuckoo's main prey items are insects, especially hairy caterpillars, bird eggs, frogs, lizards, berries and fruit (Ehrlich et al. 1988; Scott 1987).

Unlike other members of the cuckoo family, yellow-billed cuckoos are nest parasites only very rarely, and then eggs are usually laid in the nests of others of the same species (Ehrlich et al. 1988). Apparently a small population of yellow-billed cuckoos were found yearly in Prado Basin in the 1980's (Zembal et al. 1985, Hays 1987). From three to seven individuals of this secretive species were found during breeding season. In more recent years, between 1994 and 1997, only one individual has been located. Pike et al. (1998) note that inundation of a greater area since 1995 has coincided with the decline in number of this sensitive species.

Mammals

Six of the sensitive mammal species listed for Prado Basin are bats; the Yuma myotis, long-eared myotis, spotted bat, Townsend's big-eared bat, pallid bat, and western mastiff bat. These species' populations may be in decline or there may be relatively little information about their current status. There have been no systematic surveys for bats at Prado Basin.

The San Diego black-tailed jackrabbit's range extends from San Luis Obispo southward 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 (USFWS 1999). Zembal et al. (1985) note the San Diego black-tailed jackrabbit as regularly seen along the fringe of the riparian habitat or in large open areas along the river and reservoir.

The San Diego pocket mouse is a California State Species of Special Concern. Its range extends from San Bernardino County south to the U.S./Mexico border (Hall 1981). This species occurs in a wide variety of habitats including alluvial fans, dry desert slopes, and pinyon-juniper woodlands. At lower desert elevations, the pallid San Diego pocket mouse densities have been recorded as high as 39 per hectare (Lackey 1996). This species is known to occur within the study area.

The range of the San Diego desert woodrat is virtually all of southern California, extending northward along the coast to Monterey County and along the Coastal Range to San Francisco Bay. It occurs in rock outcrops, rocky cliffs and slopes in coastal sage scrub, pinyon-juniper, cactus, and other desert habitats. At Prado Basin, the species is found on the fringe of the Basin where suitable habitat is present.

The mountain lion is a widespread but uncommon resident ranging from sea level into the mountains. Mountain lions require riparian and brush areas with rock outcrops and follow migrating mule deer, their main prey. Home ranges may be from three to fifteen square miles. Development that fragments habitat restricts mountain lion movement and increases their chance of encounter with humans to the detriment of this species.

IMPACTS OF THE THREE ALTERNATIVES ON BIOLOGICAL RESOURCES

Over the past 100 years about 90 percent of wetland habitats have been lost in California (Dahl 1990). Federal policy is one of "no net loss" of wetlands. Riparian habitats, one component of wetlands, are considered sensitive within southern California since about 97 percent of riparian habitat has been lost(Faber et al. 1989). This is a rare and biologically productive habitat (Dahl and Johnson 1991), and the additional loss of riparian habitat as a result of this project would contribute to national, State, and regional losses.

Implementation of any of the three alternatives will result in both direct and indirect impacts to biological resources. Specifically, the aspects of the alternatives that will impact resources in the study area are: 1) increasing the areal extent of inundation and/or 2) increasing the duration of inundation. For the post-construction alternatives, additional impacts could occur to downstream channels and riparian vegetation from the increased water volume release as a result of enlarged outlet gates.

As Prado Dam is currently operated, water is not consistently pooled to the 494 foot level in flood season, nor to 505 feet in non-flood season. Water is held at those levels for some period of time, that period being a function of inflow volume from precipitation, runoff, and wastewater discharge, and the needs of flood control, water conservation, and required minimum discharge. However, establishment of inundation levels with any of the three proposed alternatives creates the likelihood of pooling water consistently at the levels described. Therefore, evaluation of the impacts must assume that the condition will be one of permanent inundation at the particular elevational contour(s) of that alternative.

Inundation causes depletion of oxygen to tree roots, accumulation of carbon dioxide in the soil, establishment of anaerobic conditions, and accumulation of toxins in roots and the surrounding soil (Blom and Voesenek 1996), resulting in reduced level of growth (Kozlowski 1984). Flood tolerant woody species may use ethanolic fermentation in the short term to maintain energetic needs, but the soil must return to oxygenated soil conditions, or make morphological adaptations to obtain oxygen. If inundation is prolonged beyond the individual species' tolerance levels, die back of the root system or the entire plant may occur (Blom and Voesenek 1996, Cole 1995). Even the most flood tolerant of species, such as black willow, may not survive permanent inundation. Herbaceous vegetation generally has a lesser tolerance for flooding than woody plants.

Discharge of water from Prado Dam poses threats to the downstream habitat. Construction of new outlet structures will allow releases up to 25, 900 cfs. Scour of the channel and floodplain will occur resulting in channel degradation. Because Prado Dam traps the upstream sediment, the water released from Prado Dam is nearly sediment free. Release at high rates erodes soil, removes vegetation, moves cobble, rock, and boulders, and can cause armoring of the channel. High rates of discharge can be a significant factor in causing streambank erosion, and resulting in loss of riparian habitat.

Direct and Indirect Impacts

Habitat acreage affected by each of the three proposed alternatives are presented in Table 5. The acreages are the amount of habitat between the 494 foot and the 498, 500, 505, and 508 foot levels. The table does not include the additional habitat acreages below the 494 foot level. which we requested from the Corps. The Corps did not supply those acreages since the vegetational component is not constant and they feel that they have mitigated for areas below 494 feet (Alex Watt, Corps, pers. comm.).

Table 5. Acreage of vegetation and habitat communities directly impacted by proposed alternatives within Prado Basin..

	Pre-construction Alternative (Alternative 8)		Corps' Preferred Alternative (Alternative 3)		District's Preferred Alternative (Alternative 5)	
Vegetation Communities	**Flood 498 ft**	**Non-flood 505 ft**	**Flood 500 ft**	**Non-flood 505 ft**	**Flood 508 ft**	**Non-flood 508 ft**
Willow Woodland	216.1 ac 87.6 ha	632.7 ac 256.4 ha	341.7 ac 138.5 ha	632.7 ac 256.4 ha	914.8 ac 370.7 ha	914.8 ac 370.7 ha
Willow and Riparian Scrub	0	0	0	0	4.8 ac 1.9 ha	4.8 ac 1.9 ha

	Pre-construction Alternative (Alternative 8)		Corps' Preferred Alternative (Alternative 3)		District's Preferred Alternative (Alternative 5)	
Vegetation Communities	**Flood 498 ft**	**Non-flood 505 ft**	**Flood 500 ft**	**Non-flood 505 ft**	**Flood 508 ft**	**Non-flood 508 ft**
Arundo Scrub	0	0	0	0	11.5 ac 4.7 ha	11.5 ac 4.7 ha
Herbaceous Riparian	0	0	0	0	12.6 ac 5.1 ha	12.6 ac 5.1 ha
Freshwater Pond	92.2 ac 37.4 ha	221.3 ac 89.7 ha	143.5 ac 58.1 ha	221.3 ac 89.7 ha	283.1 ac 114.7 ha	283.1 ac 114.7 ha
Freshwater Marsh	8.0 ac 3.2 ha	10.1 ac 4.1 ha	8.9 ac 3.6 ha	10.1 ac 4.1 ha	10.6 ac 4.3 ha	10.6 ac 4.3 ha
Riverine	2.2 ac 0.9 ha	4.8 ac 1.9 ha	2.9 ac 1.2 ha	4.8 ac 1.9 ha	6.9 ac 2.8 ha	6.9 ac 2.8 ha
Sandy Wash	0.3 ac 0.1 ha	3.8 ac 1.5 ha	1.3 ac 0.5 ha	3.8 ac 1.5 ha	8.1 ac 3.3 ha	8.1 ac 3.3 ha
Eucalyptus Woodland	11.5 ac 4.7 ha	28.0 ac 11.3 ha	15.1 ac 6.1 ha	28.0 ac 11.3 ha	40.0 ac 16.2 ha	40.0 ac 16.2 ha
Eucalyptus and Willow Woodland	3.5 ac 1.4 ha	9.7 ac 3.9 ha	5.2 ac 2.1 ha	9.7 ac 3.9 ha	13.4 ac 5.4 ha	13.4 ac 5.4 ha
Fallow Field	19.8 ac 8.0 ha	82.1 ac 33.3 ha	28.0 ac 11.3 ha	82.1 ac 33.3 ha	134.8 ac 54.6 ha	134.8 ac 54.6 ha
TOTAL ACREAGE	**353.6 ac 143.3 ha**	**992.5 ac 402.1 ha**	**546.6 ac 221.4 ha**	**992.5 ac 402.1 ha**	**1440.6 ac 583.7 ha**	**1440.6 ac 583.7 ha**
Discharge rates (cfs)	5,000		7,400		25,900	

Pre-Construction Alternative (Alternative 8): Under this alternative, 353.6 acres (143.3 ha) consisting of willow and eucalyptus woodland, river and sandy wash, freshwater pond and marsh, and fallow agricultural field would be directly impacted at 498 feet (Table 5). A total of

992.5 acres (402.1 ha) of these same habitat types would be directly impacted at 505 feet. Pooling of water at the 498 foot level during the flood season would lead to the direct loss of 353.6 acres of habitat, of which 216.1 acres (87.6 ha) are willow woodland and 106.2 acres (43 ha) are mostly native habitat (except for some eucalyptus and the created freshwater ponds). Pooling water for this alternative during the non-flood season, when riparian species are least adapted to withstand inundation, would lead to the loss of the habitat types below the 505 foot level. The loss would include 632.7 acres (256.4 ha) of willow woodland and 249.7 acres (101.1 ha) of mostly native habitat.

In addition to the direct loss of acreage noted above through inundation, there would be additional impacts to the habitat immediately above that contour due to the altered hydrology. Persistent water will have an effect out some distance beyond its immediate edge due to soil saturation, capillary action, and microclimate alteration. In some areas, only the most flood tolerant of plants would persist, shifting the existing monotypic black willow forest to a higher contour level, with concomitant shifts of other communities also to higher contours or resulting in their direct loss. Those losses of and/or changes to the plant community immediately above the inundation contour from inundation effects are difficult to evaluate, since they are dependent on a variety of factors including the elevational gradient, soil type, and current plant community. The border of much of the basin has a steep elevational gradient, therefore, plant community changes in these areas will be more abrupt, while within the basin and riverbed, changes would occur over a wider area where the elevation change is more gradual. These impacts will lead to the permanent loss or alteration of plant and habitat communities.

An area designated as critical habitat for a species contains the following constituent elements: 1) space for individual and population growth and for normal behavior; 2) food, water, or other nutritional or physiological requirements; 3) cover or shelter; 4) sites for breeding, reproduction, or rearing of offspring; and 5) habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species. The impacts from the pre-construction Alternative 8 would destroy or detrimentally alter elements of the critical habitat designated for the federally endangered least Bell's vireo and southwestern willow flycatcher, and imperil the continued survival of these species.

Of the 307 vireo nests located in the Basin in 1999, 95 (30.9 percent) were below the 505 foot contour (Figure 1). Persistent flooding to the 505 foot level during breeding season would mean the loss of over 30 percent of the nesting area for the Basin's vireo breeding population. This will preclude their ability to breed and force them to seek alternative nesting sites higher up in vegetation or in other areas that may be less suitable for successful reproduction. Prado Basin has already experienced a shift of vireo use of lower elevations in the southern basin to more eastern and elevationally higher areas due to habitat changes from current water conservation practices (Biological Opinion 1-6-95-F-28). This shift has moved a large portion of the breeding population nearer to the Corona Airport, increasing negative noise effects on breeding vireos, and also closer to dairies, agricultural, and ruderal habitats, subjecting breeding vireos to increased nest parasitism by brown-headed cowbirds.

While no flycatcher nests were found below 505 feet in recent breeding seasons, loss of habitat up to the 505 foot contour and subsequent changes to elevations above that from inundation effects may negatively affect the habitat needed by this species. The loss of willow woodland and the loss or change of other habitat communities would result in the loss of breeding and foraging habitat for the flycatcher and vireo.

Impounding water and creating a reservoir behind Prado Dam would have significant adverse affects on native fish species. Freshwater aquatic habitat consisting of pooled, non-flowing water decreases the extent of stream habitat for the native Santa Ana sucker and arroyo chub. In Alternative 8, 2.2 - 4.8 acres of flowing river habitat would be lost (Table 5). Pooling will increase habitat for exotic species such as bass, carp, bullfrog, and green sunfish, all predators on native species. Pooling creates standing water which increases stagnation, accumulation of nutrients, eutrophication, elevates water temperatures, and decreases dissolved oxygen. These conditions are unsuitable for native fish.

Corps' Preferred Alternative (Alternative 3): Under this alternative, 546.6 acres (221.4 ha) consisting of willow and eucalyptus woodland, river and sandy wash, freshwater pond and marsh, and fallow agricultural field would be directly impacted at 500 feet, and 992.5 acres (402.1 ha) at 505 feet (Table 5). Pooling of water at the 500 foot level during the flood season would lead to the direct loss of 546.6 acres of habitat, of which 341.7 acres (138.5 ha) are willow woodland and 161.8 acres (65.5 ha) are mostly native habitat (except for some eucalyptus and the created freshwater ponds). Pooling water for this alternative during the non-flood season, the when riparian species are least adapted to withstand inundation would lead to the loss of the habitat types below the 505 foot level. The loss would include 632.7 acres (256.4 ha) of willow woodland and 249.7 acres (101.1 ha) of mostly native habitat.

The same type of impacts described in the prior section for the pre-construction Alternative 8 will occur for Alternative 3, except with a greater loss of acreage due to inundation to the 500 foot level during the flood season and alterations to habitats directly above the 500 and 505 foot contours. This alternative would have significant adverse effects on elements of critical habitat for the vireo and flycatcher, and would impact vireo nests as described for Alternative 8. The significant adverse impacts on native fish species noted for Alternative 8 would occur to a greater extent with Alternative 3, with 2.9 - 4.8 acres of river habitat lost to inundation (Table 5).

Alternative 3 would also have downstream impacts resulting from the increased releases from the new outlet structures in Prado Dam. Release at 7,400 cfs of sediment-free water would scour the channel causing channel degradation, remove riparian vegetation from the floodplain, and move cobble and rock leading to armoring of the channel. Release at this rate could remove habitat used by least Bell's vireo and other riparian obligate species such as the western pond turtle. Santa Ana sucker moved downstream from behind Prado Dam are effectively removed from the breeding population. There is no evidence of breeding downstream of Prado Dam. Individuals are physically prevented by Prado Dam from returning upstream.

District's Preferred Alternative (Alternative 5): Under this alternative, a total of 1,440.6 acres (583.7 ha) of willow and eucalyptus woodland, river and sandy wash, freshwater pond and marsh, fallow agricultural field, and arundo scrub and herbaceous cover at 508 feet would be directly impacted year-round (Table 5). Implementation of this alternative would impact 914.8 acres (370.7 ha) of willow woodland during the flood and non-flood seasons. An additional 339.5 acres (137.5 ha) of mostly native habitat would be affected year-round.

The same significant adverse impacts to vegetation communities and sensitive species as noted for Alternatives 8 and 3 will result from this alternative but over even greater acreage. Of the 307 vireo nests located in the Basin in 1999, 130 (42.3 percent) were below the 508 foot contour (Figure 1). Persistent flooding to the 508 foot level during the breeding season would mean the loss of over 42 percent of the nesting area for the Basin's vireo breeding population. As noted previously, this will preclude the vireo's ability to breed and force them to seek alternative nesting sites higher up in vegetation or in other areas that may be less suitable for successful reproduction. While no flycatcher nests were found below 508 feet in recent breeding seasons, loss of habitat up to the 508 foot contour and subsequent changes to elevations above that from inundation effects may negatively affect the breeding and foraging areas needed by this species. The significant adverse impacts on native fish species noted for Alternative 8 would occur to a greater extent with Alternative 5, with 6.9 acres of river habitat lost to inundation (Table 5).

Impacts downstream from the release of up to 25,900 cfs will include scour and degradation of the channel without subsequent deposition due to the release of sediment free water. Release at this rate would scour the channel, remove riparian vegetation from the floodplain, move cobble and rock, and lead to armoring of the channel. Release at this rate could remove habitat used by least Bell's vireo and other riparian obligate species such as the western pond turtle. Santa Ana sucker moved downstream from behind Prado Dam will be effectively removed from the breeding population. There is no evidence of breeding downstream of Prado Dam. Individuals are physically prevented by Prado Dam from returning upstream.

Cumulative Impacts

Since the presence of the dam precludes natural flood scour and deposition dynamics associated with natural riparian systems, portions of the vegetation community within the Basin have become senescent, lacking the young, seral stage of a healthy riparian community. Where the understory is lacking, there is little use of the habitat by least Bell's vireo or southwestern willow flycatcher. While there may be opportunities to restore some understory in areas where it has been lost, the altered dynamics of the riparian system within the Basin by current flood control and water conservation and the proposed water conservation alternatives will lead to continued loss of this component necessary for breeding vireos and flycatchers.

The loss of this understory component of habitat has resulted in a shift of use by vireos and flycatchers over time to more northern and eastern portions of the Basin and to areas higher in elevation where nests are closer to dairies, agricultural, or ruderal areas where brown-headed cowbirds are abundant. Pushing nesting vireos, flycatchers, and other riparian birds closer to brown-headed cowbird concentrations increases the potential for nest parasitism. The changes have also shifted vireo and flycatcher use closer to the Corona Airport increasing noise impacts from aircraft masking vocalizations vital for successful breeding and survival. Presence of the airport increases human disturbance near riparian areas, has the potential for release of toxic materials from the airport into nearby habitat, and increases risk of fire from flammable materials stored at the facility or from aircraft crashes.

The Santa Ana River and Prado Basin contain many non-native species, in part as a result of the changed dynamics due to Prado Dam. Non-native plants and animals are detrimental to native species, as they reduce habitat function for native species and may be direct competitors or predators. Implementation of any of these alternatives enhances conditions for non-native species, while detrimentally altering conditions for native species.

Additional impacts have come from various unauthorized activities within the Basin, such as tree trimming, vegetation clearing, and filling of riparian habitat. Some of these activities have resulted in enforcement by the Corps while many others have gone unresolved. At least five illegal clearing or filling activities are currently being investigated.

SUMMARY

The Prado Basin Water Supply Feasibility Study involves changes to current water conservation levels. The Corps asked us to examine three proposed alternatives; one for operation prior to dam raising construction and two post-construction; the Corps' preferred alternative and the District's preferred alternative. The pre-construction alternative (Alternative 8) permits water levels to 498 feet during the non-flood season (September 1-February 28), and to 505 feet during the flood season (March 1-August 31). The current maximum water release rate is 5,000 cfs. The Corps' preferred alternative (Alternative 3) permits water levels during the flood season up to 500 feet, and to 505 feet during the non-flood season. The maximum water release rate would be 7,400 cfs with the upgraded outflow structures in Prado Dam. The District's preferred alternative (Alternative 5) would allow inundation up to 508 feet year-round. The maximum water release rate would be 25,900 cfs with the upgraded outflow structures in Prado Dam.

Implementation of any of the three alternatives will result in significant adverse direct and indirect impacts to biological resources within Prado Basin and downstream of Prado Dam. Specifically, the aspects of the alternatives that will impact resources in the study area are: 1) increased areal extent of inundation and/or 2) increased duration of inundation. For the post-construction alternatives, additional impacts could occur to downstream channels and riparian vegetation from increased water releases from the new Prado Dam outlet gates. Evaluation of the impacts assumes that the condition will be one of permanent inundation at the particular elevational contour(s) of that alternative.

Between 353.6 and 1,440.6 acres of willow and eucalyptus woodland, river and sandy wash, freshwater pond and marsh, and fallow agricultural field will be directly impacted by the proposed alternatives (Table 5). Pooling water during the non-flood season when riparian species are least adapted to withstand inundation, would lead to the loss of habitat types below that level. In addition to the direct loss of acreage noted above through inundation, there would be additional impacts to the habitat immediately above that contour due to the altered hydrology. The impacts from each alternative would destroy or detrimentally alter elements of the critical habitat designated for the federally endangered least Bell's vireo and southwestern willow flycatcher, and thus imperil the continued survival of these species.

Impounding water and creating a reservoir behind Prado Dam would have significant adverse effects on native fish species. These proposed water conservation alternatives create freshwater aquatic habitat consisting of pooled, non-flowing water, decreasing the extent of stream habitat for the native Santa Ana sucker and arroyo chub. Pooling will degrade water quality and increase habitat for exotic species such as bass, carp, bullfrog, and green sunfish, all predators on or competitors with native fish.

RECOMMENDATIONS

The Fish and Wildlife Coordination Act states that "... wildlife conservation shall receive equal consideration and be coördinated with other features of water-resource development programs through the effectual and harmonious planning, development, maintenance, and coordination of wildlife conservation ..." All three alternatives have significant adverse impacts to proposed species and to listed species and their critical habitats. While project sponsors may propose measures to offset or minimize adverse impacts, we are unaware of any offsetting measures at this time.

We, therefore, recommend that:

1) The Corps initiate formal consultation pursuant to section 7(a)(2) of the Endangered Species Act of 1973 (Act), as amended, on the endangered least Bell's vireo and southwestern willow flycatcher.

2) The Corps initiate conferencing pursuant to section 7(a)(4) of the Act on the proposed threatened Santa Ana sucker.

3) The Corps and District consider and study other means of water conservation or water procurement.

4) The Corps implement the following minimization measures <u>prior</u> to implementation of each water conservation alternative:

a) For Alternative 8, create 872.7 acres and enhance another 872.7 acres of riparian woodland for a total of 1,745.4 acres.

b) For Alternative 3, create 872.7 acres and enhance another 872.7 acres of riparian woodland for a total of 1,745.4 acres.

c) For Alternative 5, create 1,240.9 acres and enhance another 1,240.9 acres of riparian woodland for a total of 2,481.8 acres.

5) The Corps ensure that all of the following performance criteria for successful creation

and enhancement of riparian woodland are met:

a) Created and enhanced areas are in proximity to the area of impact;

b) Created and enhanced areas are deemed "acceptable" vireo or flycatcher habitat through their occupancy by breeding vireos or flycatchers; or are demonstrated to the satisfaction of the Corps and the Service to be not significantly (statistically) different in structure and composition from Prado Basin vireo-occupied habitat; or that the Corps and Service biologists unanimously agree that the habitat has the appropriate "niche-gestalt" characteristics (James 1971) for occupation by breeding vireos or flycatchers;

c) Plantings shall consist of native plant species common to the area including understory plants in proportions observable in the adjacent, extant riparian habitat;

d) Created and enhanced areas shall be maintained over the life of the particular project alternative, to include weeding watering and any other necessary maintenance activities.

6) The Corps ensure a minimum water flow of 40 cfs within the Santa Ana River (measured at or near gage number 11066460 at Van Buren Boulevard) for 50 years beginning with the implementation of any project alternative. If it becomes necessary for additional water to be introduced into the river to meet this minimum flow requirement, the additional water introduced to the river will meet or exceed the quality of the

receiving waters in all parameters.

If any of the proposed alternatives for water conservation at Prado Dam are modified, please notify the U.S. Fish and Wildlife Service so that we can advise you if it is necessary to revise or prepare a new Fish and Wildlife Coordination Act Report.

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D BIOLOGICAL ASSESSMENT

Draft Biological Assessment

PRADO DAM WATER CONSERVATION AND SUPPLY STUDY

Prepared for:

U. S. Fish and Wildlife Service
Carlsbad Field Office
Carlsbad, California

Prepared by:

U. S. Army Corps of Engineers
Los Angeles District
Planning Division, Environmental Resources Branch
Los Angeles, California

May 2001

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1 INTRODUCTION

The U. S. Army Corps of Engineers (USACE), in concert with the Orange County Water District (OCWD), proposes to store more water behind Prado Dam both during the flood season (October 1 to February 28) and non-flood season (March 1 to September 30) for the purpose of additional water conservation. This proposed change in operations to supply additional water conservation is anticipated to begin on an interim basis while improvements to Prado Dam (including raising the dam and spillway and constructing a new intake structure and outlet conduits in the dam) are underway, and continue indefinitely after these improvements are made. The area affected by the project includes Prado Basin up to the 505-foot (ft) elevation line, as well as the portion of the Santa Ana River below the dam to Weir Canyon Road 11. 2 kilometers (km) (7.4 miles [mi]) downstream. Within the affected area lies designated critical habitat for the federally endangered least Bell's vireo (*Vireo bellii pusillus*) and southwestern willow flycatcher (*Empidonax traillii extimus*), and suitable or potentially suitable habitat for the federally threatened Santa Ana sucker (*Catostomus santaanae*).

Water conservation at Prado Dam has been part of the dam design since its construction in 1941. In 1985, a hydrology and water conservation study of Prado Reservoir was prepared. In 1990, the water control plan was revised to introduce a buffer pool from elevations 490 (the debris pool) to 494 ft. The debris pool is essential to prevent debris from entering and plugging the outlet works during flood-control releases through the dam. The buffer pool is the amount of excess water (above 490 ft) that can be stored behind the dam during the flood season. The buffer pool enables the water control manager to limit releases from Prado Dam. This allows the water control manager to coordinate with OCWD to release water downstream at rates that facilitated Orange County Water District's (OCWD) groundwater recharge activities. In 1988, an analysis for the operation of Prado Dam for water conservation was conducted. In 1993, the current operation for water conservation at Prado Dam was approved, which allowed the buffer pool elevation to increase from elevation 494 ft to elevation 505 ft during the non-flood season (March 1 to September 30). During the flood season (October 1 to February 28), the buffer pool at Prado Dam is at elevation 494 ft. A no jeopardy biological opinion was issued by the U. S. Fish and Wildlife Service (USFWS) for this action. In August 1999, a revised biological assessment was issued to provide information to impacts on threatened and endangered species and their critical habitat listed since 1993, and a no jeopardy biological opinion was again issued in February 2000. This biological assessment is being prepared to disclose impacts on federally listed species that may result from proposed additional water conservation measures..

Surveys completed by the USFWS and OCWD in 1986-1999 and the USACE in 1998 and 1999 indicate that one or more federally protected species may be present in the vicinity of the project site. Pursuant to Section 7(a) of the federal Endangered Species Act (ESA), this biological assessment was prepared to determine whether protected species or their critical habitat are likely to be affected by the proposed action. Information presented in this document will also be used to determine whether or not formal consultation pursuant to the ESA is required.

Upon receiving a final report and request for consultation from the USACE, the USFWS will, if necessary, enter into such consultation. Formal consultation culminates in the issuance by the USFWS of a Biological Opinion, which contains its finding of whether: (1) the action is likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of its critical habitat (a jeopardy opinion), or (2) the action is not likely to jeopardize the continued existence of a listed species or result in adverse modification of its critical habitat (a no jeopardy opinion). A jeopardy opinion includes reasonable and prudent alternatives to the proposed action, if any. If appropriate, a non-jeopardy opinion may specify reasonable and prudent measures to be taken that will result in a reduction in the amount or extent of take.

The objective of this report is to provide the USFWS with the necessary information regarding the anticipated impacts on federally listed species occurring, or with the potential to occur, in the project area. The project area is defined as all areas that may be affected directly or indirectly by the proposed action, rather than only the immediate area of the action.

2 PROJECT SETTING

The Santa Ana River is the largest drainage system in southern California, extending from the San Bernardino Mountains to the Pacific Ocean. The USACE is currently implementing new flood control measures on the Santa Ana River as part of the Santa Ana River Mainstem Project. These measures include construction of the Seven Oaks Dam in Santa Ana Canyon near the base of the San Bernardino Mountains, raising Prado Dam at the Prado Flood Control Basin (Prado Basin) and channelizing the lower Santa Ana River. In conjunction with raising Prado Dam and expanding the capacity of its intake structure and outlet conduits, the USACE proposes to store more water behind the dam for conservation purposes.

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, and are 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 from Prado Basin.

The proposal to store a greater amount of water behind Prado Dam for water conservation responds to local concerns regarding future water supply sources, continued regional population growth, dwindling imported water supplies, and continued increases in the cost of water. More specifically, the objective of the currently proposed water conservation and supply project is to increase the use of water retention space behind the dam between storms and after the flood season. During the flood and non-flood seasons, the water levels behind the dam would be drawn down by releasing water at a rate commensurate with downstream diversion and groundwater recharge needs. However, when unfavorable weather is forecast during the flood season, the water level behind the dam would be drawn down, if necessary, to accommodate anticipated flood flows. For the most part, the main purpose of Prado Dam is to assist in providing flood protection for communities downstream of the dam. However, between storms and after the flood season, the basin could be used to store water temporarily with outflow no greater than the capacity of the groundwater recharge basins downstream of the dam. When the dam output is regulated in this manner, the water retained can be used to recharge the groundwater aquifer, one of the major sources of water supply for the Orange County region.

2.1 PROJECT LOCATION

The Prado Flood Control Basin is located in the northwestern portion of Riverside County and southwestern corner of San Bernardino County (Exhibit 1). Prado Basin, as defined by the 172.5-m (566-ft) elevation contour, encompasses approximately 4,600 hectares (ha) (11,400 acres [ac]) surrounding the Santa Ana River northeast of the junction of the Riverside Freeway (SR-91) and the Corona Expressway

(SR-71) and west of Interstate 15 (I-15) (Exhibit 2). The basin is bordered by the cities of Corona to the south and east, and Norco to the east. The USACE administers approximately 2,950 ha (7,300 ac) of federally owned lands in the basin, most of which is leased out for recreation purposes. The OCWD administers approximately 970 ha (2,400 ac) in the basin. The Santa Ana River drainage area includes the southwestern slopes of the San Gabriel, San Bernardino, and San Jacinto mountains, as well as the broad alluvial valleys of Riverside and San Bernardino counties. The total drainage area above Prado Dam covers 946 km² (2,450 mi²), ranging in elevation from sea level to 11,985 feet at Mount San Gorgonio.

The project area also includes an approximately 12-km (7.5-mi) portion of the Santa Ana River extending downstream from Prado Dam to Weir Canyon Road. This area of the river lies within the County of Riverside, County of Orange, and a small portion of the County of San Bernardino.

2.2 PHYSICAL SETTING

The Santa Ana River drainage comprises the largest watershed in Southern California, stretching from the San Bernardino Mountains to the sea. The Prado Basin, located at the convergence of Chino Creek, Mill/Cucamonga Creek, and Temescal Wash with the Santa Ana River, is relatively flat with gently-sloping hillsides around most of its perimeter. The soils within the basin consist of alluvial deposits of sands with smaller lenses of silt, gravel, and clay. The Santa Ana River and its tributaries in this region are now perennial streams due to year-round water use and resultant runoff from urban areas upstream, especially the cities of San Bernardino and Riverside. Downstream of Prado Dam, the Santa Ana River meanders naturally through Santa Ana Canyon for 12 km (7.5 mi) except for a 4.5 km (3 mi) revetment. From Weir Canyon to the sea, the river has been channelized. The entire floodplain downstream of Prado Basin consists of approximately 3,370 km² (1,300 mi²), including about 181 km² (70 mi²) of coastal plain.

2.3 BIOLOGICAL SETTING

The biological resources in the Prado Basin and the Santa Ana River below Prado Dam are described in detail in the *Preliminary Draft Prado Dam Water Conservation and Supply Study EIS* (USACE 2000a), and are summarized below.

The Prado Basin supports 1,650 ha (4,100 ac) of riparian habitat, mostly willow woodland (Exhibit 3). The present biological condition of the basin was created by the construction of Prado Dam in 1941. Due to a combination of the high groundwater table, storm flow accumulation held in the reservoir, sewage treatment plant effluent, and irrigation runoff, a perennial flow now occurs in the river. It has fostered and sustains an extensive wetland habitat in the basin. Currently, the riparian woodlands in the basin comprise the largest single stand of this habitat type in Southern California (Zembal *et al.* 1985). Additionally, the reach of the Santa Ana River between the dam and Weir Canyon Road comprises 128 ha (315 ac) of wetland habitats, of which 96 ha (238 ac) is willow or cottonwood-willow riparian (Exhibit 4). Other habitats present within the basin and this downstream reach are riparian scrub, freshwater pond and marsh, perennial stream and associated sandy wash, and the non-native giant reed and eucalyptus forest plant communities (Exhibits 3 and 4).

An estimated 311 species of vascular plants representing 65 families have been identified in the Prado Basin and surrounding areas (Zembal *et al.* 1985). Approximately one-third (99 species) are typically associated with floodplain and riparian habitats; two-thirds (200 species) are found both in riparian and upland communities. About 100 species are non-native plants, a small number of which are remnants of previous cultivation in the area. The dominant plant community in the basin is willow woodland. A small number of riparian woodland species are responsible for much of the plant cover in the basin, chief among them Goodding's black willow (*Salix gooddingii*). The dominant plant community in the river between the dam and Weir Canyon is cottonwood and cottonwood-willow forest. A more thorough discussion of the various plant communities present within the project footprint and the representative plant species found within each can be found in the *Draft Prado Dam Water Conservation and Supply Study EIS*.

The upper floodplain within the basin and the lower section of the river near Weir Canyon are dominated in places by giant reed or arundo (*Arundo donax*), an invasive weed which in the past 30-50 years has displaced many of the dense stands of native willows that were once present (Exhibits 3 and 4).

Fifteen species of fishes have been found in the Prado Basin within the Santa Ana River and its three tributaries, Chino Creek, Cucamonga/Mill Creek, and Temescal Creek (OCFCD 1997; present study), 13 of which were recorded in the present survey. Most of these occur in the area affected by the project, at least seasonally. Two, the Santa Ana sucker, a federally threatened species, and arroyo chub (*Gila orcutti*), a species of special concern, are native to Southern California; the remainder are non-native introductions, mostly from the eastern United States. Easily, the two most abundant species in the basin are the flathead minnow (*Pimephales promelas*) and mosquitofish (*Gambusia affinis*). These two, along with the carp (*Cyprinus carpio*), comprise about 95 percent of the total fish population in the basin (Swift, unpubl. data).

The diversity of amphibians and reptiles in the project area is modest. Seven species of amphibians and 14 species of reptiles have been documented in the Prado Basin and surrounding area (Glasser 1970; Robertson and Shipman 1974; Zembal *et al.* 1985). One additional amphibian and 15 additional reptile species probably also occur in the project area based on their known range and habitat preferences. Of these, the southwestern pond turtle (*Clemmys marmorata pallida*), the San Diego horned lizard (*Phrynosoma coronatum*), and silvery legless lizard (*Anniella pulchra*) are species of special concern. One other so designated, the orange-throated whiptail (*Cnemidophorus hyperythrus*), may be found occasionally in the project area but has yet to be confirmed.

The Pacific treefrog (*Hyla regilla*), the non-native bullfrog (*Rana catesbeiana*), and the African clawed frog (*Xenopus laevis*) are the most commonly observed amphibians in the basin. In upland areas, mostly outside the zone affected by the project, the western toad (*Bufo boreas*) is often encountered. The western fence lizard (*Sceloporus occidentalis*) is the most frequently encountered reptile in most plant associations within the basin. The side-blotched lizard (*Uta stansburiana*), which may actually be more abundant, is concentrated in upland areas. The western whiptail (*Cnemidophorus tigris*) is also found primarily outside the affected area in upland scrubland habitats around the perimeter of the basin. The western skink (*Eumeces skiltonianus*) also inhabits remnant scrublands, but only occurs in low numbers. The gopher snake (*Pituophis melanoleucus*) is the most frequently observed snake in the basin. It is found both in uplands and in drier riparian habitats. As in the basin, the western fence lizard and side-blotched lizard are the two most commonly encountered species in the river drainage between the dam and Weir Canyon.

Birds are the most conspicuous wildlife on the site. Among the most common breeding birds are the American crow (*Corvus brachyrhynchos*), house finch (*Carpodacus mexicanus*), barn swallow (*Hirundo rustica*), European starling (*Sturnus vulgaris*), mourning dove (*Zenaida macroura*), song sparrow (*Melospiza melodia*), brown-headed cowbird (*Molothrus ater*), and bushtit (*Psaltriparus minimus*). Conspicuous nesting waterbird species in the basin include the double-crested cormorant (*Phalacrocorax auritus*), great blue heron (*Ardea herodias*), black-crowned night-heron (*Nycticorax nycticorax*), and green heron (*Butorides virescens*). Common birds of prey are the white-tailed kite (*Elanus leucurus*), red-shouldered hawk (*Buteo lineatus*), red-tailed hawk (*Buteo jamaicensis*), and American kestrel (*Falco sparverius*). In all, more than 200 species of birds have been recorded in the Prado Basin (Zembal *et al.* 1985). Of these, approximately 95 to 100 breed in the basin.

A substantial raptor population resides in the basin. Their numbers are significantly augmented in winter with several migrant species that breed farther north. The open fields are important for raptor foraging; the taller willows and eucalyptus are used for nesting, roosting and perching. Eleven species have bred in the basin area, including the white-tailed kite, Cooper's hawk (*Accipiter cooperii*), a species of special concern, golden eagle (*Aquila chrysaetos*), western screech-owl (*Otus asio*), and long-eared owl (*Asio otus*). Moderate numbers of raptors from other regions, including relatively rare species such as the peregrine falcon (*Falco peregrinus*) and merlin (*Falco columbarius*), winter in the basin along with the resident species.

The double-crested cormorant, great blue heron, and black-crowned night-heron are conspicuous breeders among the larger waterbirds, although present in very localized concentrations. The tree swallow (*Tachycineta bicolor*) is abundant locally, especially in the vicinity of dead trees with cavities where it nests. The red-winged blackbird (*Agelaius phoeniceus*) and marsh wren (*Cistothorus palustris*) are locally abundant nesters, as is the pied-billed grebe (*Podilymbus podiceps*), ruddy duck (*Oxyura jamaicensis*), and American coot (*Fulica americana*). The mallard (*Anas platyrhynchos*) and cinnamon teal (*Anas cyanoptera*) are more widely scattered.

Shorebirds known to nest in the basin include the killdeer (*Charadrius vociferus*), American avocet (*Recurvirostra americana*), black-necked stilt (*Himantopus mexicana*), and spotted sandpiper (*Actitis macularia*). Marsh-nesting birds include the American bittern (*Botaurus lentiginosus*), Virginia rail (*Rallus limicola*), common moorhen (*Gallinula chloropus*), common yellowthroat (*Geothlypis trichas*), song sparrow, and tricolored blackbird (*Agelaius tricolor*).

Only two regular breeders, the western meadowlark (*Sturnella neglecta*) and horned lark (*Eremophila alpestris*), are abundant in the upland grasslands, largely outside the affected area. The burrowing owl (*Athene cunicularia*) also nests in this habitat but in much lower numbers. These open upland habitats also comprise the single most heavily used foraging areas for most species of the large resident and wintering raptor population, as well as for the loggerhead shrike (*Lanius ludovicianus*), a species that has suffered noticeable declines in recent years.

Species that nest in the eucalyptus groves include the Anna's hummingbird (*Calypte anna*), northern flicker (*Colaptes auratus*), Cassin's kingbird (*Tyrannus vociferans*), American crow, European starling, Bullock's oriole (*Icterus bullockii*), and house finch. Nests of the red-tailed hawk and red-shouldered hawk are found regularly in the eucalyptus trees as well, probably because these are often the tallest trees available. Oriole and kingbird nests are locally concentrated in eucalyptus trees.

The most commonly encountered winter visitors in the riparian forests are the ruby-crowned kinglet (*Regulus calendula*) and yellow-rumped warbler (*Dendroica coronata*). Lincoln's sparrow (*Melospiza lincolnii*) and the white-crowned sparrow (*Zonotrichia leucophrys*) are found where more understory growth is present. In open areas, the American pipit (*Anthus rubescens*) and savannah sparrow (*Passerculus sandwichensis*) are commonly observed in winter. The Say's phoebe (*Sayornis saya*), western bluebird (*Sialia mexicana*), and mountain bluebird (*Sialia currucoides*) are also conspicuous as they forage along fencerows in open areas.

Egrets, including the cattle egret (*Bubulcus ibis*), snowy egret (*Egretta thula*), and great egret (*Ardea alba*), are most common in winter, although a few non-breeding individuals may remain through the summer. Numbers of European starlings increase substantially in winter on the small cattle feedlots where flocks often number well into the thousands. Many shorebirds winter in the Prado Basin and forage along the open pond margins and edges of the reservoir. Largest in numbers are the least sandpiper (*Calidris minutilla*) and long-billed dowitcher (*Limnodromus scolopaceus*); while observed regularly in far fewer numbers are the western sandpiper (*Calidris mauri*), greater yellowlegs (*Tringa melanoleuca*), and several other species.

Winter concentrations of waterfowl in the Prado Basin are at least as large as those on any of the Southern California coastal lagoons, and the basin may host the largest wintering populations of some species. Winter numbers of Canada geese (*Branta canadensis*), for example, are very high. The wintering waterfowl resources in the basin are vast and are exploited by several waterfowl hunt club operators. Sixteen species of waterfowl have been found in the project area, many numbering in the thousands. The most abundant are green-winged teal (*Anas crecca*), mallard, cinnamon teal, northern shoveler (*Anas clypeata*), American wigeon (*Anas americana*), ring-necked duck (*Aythya collaris*), and ruddy duck.

Bird species breeding in the river reach between Prado Dam and Weir Canyon are typical of other cottonwood and willow woodland communities in Southern California; however, some species that are rare or absent in other such communities are well represented here. Among these is the endangered least Bell's vireo, which is discussed at length in Section 4. Others, such as the Cooper's hawk, yellow warbler (*Dendroica petechia*), and yellow-breasted chat (*Icteria virens*), all California species of special concern, and the red-shouldered hawk and blue grosbeak, among others, are also well represented in this stretch of river. More common and widespread species that are typical examples of breeding birds in this section of river are the house wren (*Troglodytes aedon*), common yellowthroat, California towhee (*Pipilo crissalis*), song sparrow, black-headed grosbeak (*Pheucticus melanocephalus*), lesser and American goldfinches (*Carduelis psaltria* and *C. tristis*), and house finch. Species present during migration and in winter are generally the same as those present in the Prado Basin.

Twenty-three species of mammals, including three non-native species, have been observed in the Prado Basin. Annotated records for all the observed mammals are included in Zembal *et al.* (1985). The California ground squirrel (*Spermophilus beecheyi*) is easily the most frequently encountered small mammal in the project area. Annual grasslands and heavily grazed pastureland provide ideal habitat for this species. Botta's pocket gopher (*Thomomys bottae*) may be equally common but is seldom observed, as it spends most of its time below ground.

The coyote (*Canis latrans*) is the most commonly encountered of the seven carnivore species documented in the basin. The next most frequently encountered carnivores or partial carnivores are the raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and long-tailed weasel (*Mustela frenata*). The bobcat (*Felis rufus*) probably occurs regularly throughout the basin but in relatively low numbers. Feral cats (*Felis domesticus*) are also frequently observed in the project area.

Mule deer (*Odocoileus hemionus*) tracks are occasionally observed in the basin. The agricultural fields, along with the dense cover of willow forest, may provide support for a small deer herd in the basin proper. However, the largest numbers of deer in the region reside outside the basin in the nearby lower Santa Ana River and canyon areas and in the Chino Hills (OCFCD 1997).

Six species of mammals found in the basin are listed in the California Hunting Regulations with seasons and limits set by the State Fish and Game Commission. The mule deer is a designated big game animal, the Audubon cottontail (*Sylvilagus audubonii*) and black-tailed jackrabbit (*Lepus californicus*) resident small game animals, the gray fox (*Urocyon cinereoargenteus*) and raccoon fur-bearing mammals, and the bobcat (*Lynx rufus*) a regulated non-game mammal.

Mammals utilizing the Santa Ana River below the dam are typical of those in the Prado Basin, but for wide ranging species such as the mountain lion, this portion of the Santa Ana River serves as an important link between the basin and the Santa Ana Mountains and Chino Hills to the west and south (see next section). In addition to serving as an important corridor for wildlife movement, the river also serves as a major breeding area for riparian species (OCFCD 1997). The nearly continuous riparian woodland is of high value because of its species richness and structural diversity.

3 DESCRIPTION OF PROJECT ALTERNATIVES

Pursuant to National Environmental Policy Act (NEPA) requirements, five alternatives for water conservation at Prado Dam, including the NEPA-mandated No Action Alternative, were defined in the *Preliminary Draft Prado Dam Water Conservation and Supply Study EIS* (USACE 2000a). Additionally, four interim alternatives were identified, one of which would be implemented only during construction of the Prado Dam and Spillway improvements. As each of these alternatives would affect endangered species in the project area in different ways, the alternatives formulation process and each alternative ultimately chosen for full consideration are addressed in this Biological Assessment.

3.1 PURPOSE AND NEED

The purpose of the proposed action is to increase conservation of surplus water at Prado Dam. Water demands within the OCWD service area have remained relatively constant for the past few years. However, the County of Orange foresees a future growth trend, and the inevitable population increase will demand more water. To reduce the need for expensive imported water supplies, OCWD has initiated several water management projects to enhance groundwater supplies, including water conservation at Prado Dam. Although the Dam's primary operation function is for flood control, changes have occurred in its operation to allow flows from the Santa Ana River to be held back during the flood and non-flood seasons. By releasing this retained water slowly to OCWD's recharge facilities, a portion of the river flow that would otherwise discharge into the ocean is conserved.

3.2 EXISTING DESIGN AND OPERATION OF PRADO DAM FACILITIES

Prado Dam is a compacted multi-zoned earth-filled embankment with a crest length of approximately 670 m (2,200 ft), and a height of approximately 32 m (106 ft) above the original streambed. The top of the embankment is 9.5 m (30 ft) wide and paved with asphaltic concrete, forming a roadway across the dam. The top of the spillway crest is at elevation 543 feet and the top of the dam is at elevation 566 feet. The Phase II General Design Memorandum, which included structural revisions to Prado Dam, was approved in 1988; however, the improvements have not yet been completed. The improvements would result in raising the spillway crest by 6.1 m (20 ft) and the top of the dam by 8.7 m (28.4 ft) to elevation 171.6 m (563 ft) and 181.2 m (594.4 ft), respectively. The outlet works are located in the west abutment of the dam and consist of (1) an approach channel, (2) a 59.5 m (195 ft) long intake structure, (3) a 180.3 m (591 ft) long double box conduit, and (4) a 111.6 m (366 ft) long rectangular concrete outlet channel. The additional Phase II GDM features that have not been completed include modification of the flood gates changes to the maximum release rates from Prado Dam due to improvement in Reach 9.

The long term recharge capacity for the facilities downstream from Prado Dam averages 500 cubic feet per second (cfs). OCWD has estimated that discharge will increase to 580 cfs in the future. During the flood season, under the current operation plan for Prado Dam, when the water surface is below elevation 494ft, the release varies from 0 to 600 cfs, depending on the capacity at the downstream spreading grounds. When the water surface elevation exceeds elevation 494 ft, releases are stepped up to a maximum of 5000 cfs. During the non-flood season, when the water surface is below elevation 505 ft, releases vary between 0 and 650 cfs, while maintaining a running average of 500 cfs as long as water remains behind the dam.

3.3 ALTERNATIVES FORMULATION PROCESS

In initial identification, development, and screening of alternatives, the federal objective is to provide the maximum water conservation benefits to the Prado Basin service area. Opportunities to provide additional water conservation are limited by the flood control capacity of the Prado Basin and by environmental constraints. A number of water conservation alternatives were addressed during the preparation of the reconnaissance studies for Prado Dam. The reconnaissance study entitled *Seven Oaks and Prado Dams Water Conservation Study* (USACE 1992a) evaluated five alternatives and the *Prado Dam Water Supply Reconnaissance Report* (USACE 1996) evaluated nine alternatives. One of the alternatives evaluated in each of the two studies was identical, leaving the following 13 alternatives:

- Winter Flood Forecasting to Elevation 498 ft - Seasonal Pool to Elevation 512 ft;
- Winter Flood Forecasting to Elevation 508 ft - Seasonal Pool to Elevation 512 ft;
- Flood Forecasting Year-Round to Elevation 498 ft;
- Flood Forecasting Year-Round to Elevation 505 ft;
- Flood Forecasting Year-Round to Elevation 508 ft;
- Winter Flood Forecasting to Elevation 494 ft - Seasonal Pool to Elevation 505 ft;
- Winter Flood Forecasting to Elevation 498 ft - Seasonal Pool to Elevation 505 ft;
- Winter Flood Forecasting to Elevation 499 ft - Seasonal Pool to Elevation 505 ft;
- Winter Flood Forecasting to Elevation 500 ft - Seasonal Pool to Elevation 505 ft;
- Winter Flood Forecasting to Elevation 501 ft - Seasonal Pool to Elevation 505 ft;
- Winter Flood Forecasting to Elevation 502 ft - Seasonal Pool to Elevation 505 ft;
- Winter Flood Forecasting to Elevation 503 ft - Seasonal Pool to Elevation 505 ft; and
- Winter Flood Forecasting to Elevation 504 ft - Seasonal Pool to Elevation 505 ft.

The 1996 reconnaissance report identified an additional two alternatives for which a detailed evaluation was considered unwarranted:

- Santa Ana River Polishing Ponds; and
- Peripheral Water Conservation Holding Ponds (Between Elevations 556 and 566 ft).

3.4 ALTERNATIVES ELIMINATED FROM FURTHER ANALYSIS

Subsequent to the preparation of the reconnaissance reports during the course of the feasibility study, 9 of the 15 alternatives were eliminated from further consideration. Following are the 9 alternatives:

- Winter Flood Forecasting to Elevation 498 ft - Seasonal Pool to Elevation 512 ft;
- Winter Flood Forecasting to Elevation 508 ft - Seasonal Pool to Elevation 512 ft;
- Flood Forecasting Year-Round to Elevation 498 ft;

- Winter Flood Forecasting to Elevation 501 ft - Seasonal Pool to Elevation 505 ft;
- Winter Flood Forecasting to Elevation 502 ft - Seasonal Pool to Elevation 505 ft;
- Winter Flood Forecasting to Elevation 503 ft - Seasonal Pool to Elevation 505 ft;
- Winter Flood Forecasting to Elevation 504 ft - Seasonal Pool to Elevation 505 ft;
- Santa Ana River Polishing Ponds; and
- Peripheral Water Conservation Holding Ponds (Between Elevations 556 and 566 ft.).

3.5 ALTERNATIVES CARRIED FORWARD

In the *Preliminary Draft Prado Dam Water Conservation and Supply Study EIS* (USACE 2000a), nine alternatives were considered, including the No Action alternative, four post-construction, and four pre-construction or interim alternatives. In the BA, only the preferred alternatives are considered (Alternatives 2, 3, and 8 in the EIS/EIR). Reflecting the results of the alternatives formulation and evaluation process, two post-construction water conservation alternatives and one pre-construction alternative are being considered for Prado Dam. The alternatives analyzed in this Biological Assessment are referred to below as Alternative 1: flood season water conservation up to elevation 498 ft and non-flood season water conservation up to elevation 505 ft (the National Economic Development [NED] Alternative); Alternative 2: flood season water conservation up to 500 ft and non-flood season water conservation up to elevation 505 ft (the Locally Preferred Alternative); and Alternative 3: temporary flood season water conservation up to elevation 498 ft and non-flood season water conservation up to elevation 505 ft (the Pre-Construction Alternative).

3.5.1 EXISTING WATER CONSERVATION AT PRADO BASIN

When inflow to Prado Dam is greater than the percolation capacity of the downstream spreading grounds, the existing Debris Pool (elevation 490 ft) can be utilized for water conservation at any time during the year. The existing operation schedule calls for controlled releases up to 600 cfs until the reservoir reaches elevation 490 ft. During the flood season, encroachment into the Flood-Control Pool can occur up to elevation 494 ft (Buffer Pool) for water conservation purposes, when weather conditions are favorable. When the threat of unfavorable weather is forecast, the reservoir will be drawn down enough as low as 490 ft to accommodate the anticipated inflow volume from the storm(s) to ensure there is storage available for flood control operations.

During the non-flood season, water can be held up to elevation 505 ft (Seasonal Pool) for water conservation purposes. Beginning the 1st of March, the maximum allowable water surface elevation for conservation is linearly increased at approximately 1.1 feet per day from elevation 494 ft to elevation 505 ft on the 10th of March. The pool may be maintained as high as elevation 505 ft until the 30th of September (see Exhibit 5). However, if maintenance is required, the reservoir must be evacuated before the 1st of September. If summer flood runoff occurs in the month of September, the dam can be operated for water conservation up to elevation 505 ft, provided that the impoundment doesn't interfere with maintenance requirements. Releases from Prado Dam during water conservation operations are based on the estimated rate that the downstream spreading channel can percolate while maintaining the minimum release criteria. If hydrologic forecasts and reservoir conditions indicate that the water surface elevation will exceed elevation 505 ft, water control personnel at the Reservoir Operation Center (ROC) will match inflow with outflow. Above elevation 505 ft, the reservoir is put in full flood control mode and outflows can be made up to the downstream channel capacity of the Santa Ana River (approximately 30,000 cfs).

Under current water conservation operations, the water conservation pool encompasses approximately 1,080 ac during the flood season up to elevation 494 ft, and 2,125 ac during the non-flood season up to elevation 505 ft. The current operation presently allows for up to 8,435 ac-ft of water storage during the flood season and 25,750 ac-ft during the non-flood season. For future conditions, water storage would be 2,700 ac-ft during the flood season and 15,770 ac-ft during the non-flood season. Tables 1 (present conditions) and 2 (future conditions) show the duration of inundation at various elevations within the Prado Reservoir during 2-, 5-, 10-, 25-, 50-, and 100-year storm events. As an example, during a 100-year flood event, elevation 505 ft would be inundated with water for approximately 135 days under the present condition and 165 days under the future conditions. Tables 1 and 2 also show that the average number of days of per year at elevation 505 ft is 9 days for present conditions and 12 days for future conditions.

During the flood season, the USACE has safety regulations for release rates from Prado Dam. These regulations require that release rates accommodate the evacuation of the reservoir down to the Debris Pool (elevation 490 ft) within a 24-hour period to ensure there is storage available for flood control. To drain the reservoir from elevation 494 ft to 490 ft within 24 hours, a maximum release rate of 2,500 cfs from the Phase II gates would be attained by incrementally increasing the release rate of 625 cfs every half-hour, in accordance with the USACE Water Control Manual. The frequency of inundation of this downstream area under current operations is the existing inundation frequency which is once every 2 years.

TABLE 1
CURRENT INUNDATION DURATIONS FOR PRADO RESERVOIR
PRESENT CONDITIONS
Flood Season Water Conservation with Forecasting to 494.0 ft +
Non-Flood Season Water Conservation to 505.0 ft

Frequency (Years)	Duration of Inundation (Days) at Various Elevations (ft)										
	470	480	490	494	498	500	505	510	520	530	540
2	115	55	25	8	0	0	0	0	0	0	0
5	160	140	103	80	45	23	3	0	0	0	0
10	210	190	155	125	88	70	25	6.5	0	0	0
25	270	240	210	190	160	145	80	11	4	0	0
50	340	310	290	250	205	180	100	14	6.5	1.5	0
100	360	330	310	275	240	215	135	16	8.5	4	1

TABLE 2
CURRENT INUNDATION DURATIONS FOR PRADO RESERVOIR
FUTURE CONDITIONS
Flood Season Water Conservation with Forecasting to 498.0 ft +
Non-Flood Season Water Conservation to 505.0 ft

Frequency (Years)	Duration of Inundation (Days) at Various Elevations (ft)										
	470	480	490	494	498	500	505	510	520	530	540
2	185	150	110	60	5	0	0	0	0	0	0
5	230	205	180	140	100	75	5.5	1.5	0	0	0
10	260	235	210	175	130	105	40	7	2	0	0
25	310	265	245	225	190	170	100	12	6.5	0	0
50	350	335	310	290	255	225	130	15	8.5	3.5	0
100	360	350	335	315	275	255	165	18	11	6	2.5

3.5.2 ALTERNATIVE 1: FLOOD SEASON WATER CONSERVATION TO 498 FT; NON-FLOOD SEASON WATER CONSERVATION TO 505 FT

This is the Corps' National Economic Development (NED) Post-Construction Alternative. This alternative (Alternative 2 in the EIS) could increase the water conservation level within Prado Reservoir to elevation 498 feet during the flood season. Under present conditions, this increase could inundate up to 352 additional acres (33 percent increase) and impound up to 5,205 additional acre-feet (62 percent increase) of water for conservation purposes during the flood season, compared to existing operations. Under future conditions, this alternative could inundate up to 301 additional acres (44 percent increase) and impound up to 4,025 additional acre-feet (149 percent increase) of water for conservation purposes during the flood season. No increase in the water conservation level is proposed during the non-flood season. Inundation and impoundment values during the non-flood season could be greater than the current operation under both present and future conditions. The greater inundation and impound values could occur because the flood pool under this alternative (i.e. elevation 498 ft.) could have more water going into the non-flood season than the flood pool under current operations (i.e. 494 ft. elevation). Tables 3 (present conditions) and 4 (future conditions) show the duration of inundation at various elevations within the Prado Reservoir under present and future conditions during 2-, 5-, 10-, 25-, 50-, and 100-year events.

When inflow to Prado Reservoir is greater than the percolation capacity of the downstream spreading grounds, the existing Debris Pool (elevation 490 ft) can be utilized for water conservation at any time during the year. The existing operation schedule calls for controlled releases up to 600 cfs until the reservoir reaches elevation 490 ft. During the flood season, encroachment into the Flood-Control Pool could occur up to elevation 498 ft (Buffer Pool) for water conservation purposes when weather conditions are favorable. When the threat of unfavorable weather is forecast, the reservoir could be drawn down as low as 490 ft to accommodate the anticipated inflow volume from the storm(s) (as low as 490 ft.) to ensure there is storage available for flood control operations.

TABLE 3
INUNDATION DURATIONS FOR PRADO RESERVOIR WITH ALTERNATIVE 1
PRESENT CONDITIONS
Flood Season Water Conservation with Forecasting to 498.0 ft +
Non-Flood Season Water Conservation to 505.0 ft

Frequency (Years)	Duration of Inundation (Days) at Various Elevations (ft) *(Increase from Current Operations - Present Conditions)*										
	470	480	490	494	498	500	505	510	520	530	540
2	115	65	35	18	0	0	0	0	0	0	0
	0	*10*	*10*	*10*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
5	170	150	113	90	55	33	4	0	0	0	0
	10	*10*	*10*	*10*	*10*	*10*	*1*	*0*	*0*	*0*	*0*
10	210.	190	170	145	108	90	25	6.5	0	0	0
	0	*0*	*15*	*20*	*20*	*20*	*0*	*0*	*0*	*0*	*0*
25	270	240	210	195	170	155	80	11	4	0	0
	0	*0*	*0*	*5*	*10*	*10*	*0*	*0*	*0*	*0*	*0*
50	340	315	305	290	235	195	105	15	7	2	0
	0	*5*	*15*	*40*	*30*	*15*	*5*	*1*	*.5*	*.5*	*0*
100	360	330	325	305	255.	225	140	19	8.5	4	1
	0	*0*	*15*	*30*	*15*	*10*	*5*	*3*	*0*	*0*	*0*
Annual Average	89	74	59	48	33	26	9.5	1.5	0.5	0	0
	2	*4*	*5*	*6*	*4*	*4*	*0.5*	*0*	*0*	*0*	*0*

As with current operations during the non-flood season, water can be held up to elevation 505 ft (Seasonal Pool) for water conservation purposes. Beginning the 1st of March, the maximum allowable water surface elevation for conservation is linearly increased from elevation 498 ft to elevation 505 ft on the 10th of March (see Exhibit 6). The pool may be maintained as high as elevation 505 ft until the 30th of September. However, if maintenance is required, the reservoir must be evacuated before the 1st of September. If summer flood runoff occurs in the month of September, the dam can be operated for water conservation up to elevation 505 ft, provided that the impoundment doesn't interfere with maintenance requirements. Releases from Prado Dam (350-650/500 cfs running average) during water conservation operations would be based on the estimated rate that the downstream spreading channel can percolate while maintaining minimum release criteria. If hydrologic forecasts and reservoir conditions indicate that the water surface elevation will exceed elevation 505.0 ft, water control personnel at the ROC would match inflow with outflow. Above elevation 505.0 ft, the reservoir is in full flood control mode and outflows can be made up to the downstream capacity of the Santa Ana River channel (which is approximately 30,000 cfs).

TABLE 4
INUNDATION DURATIONS FOR PRADO RESERVOIR WITH ALTERNATIVE 1 FUTURE CONDITIONS
Flood Season Water Conservation with Forecasting to 498.0 ft + Non-Flood Season Water Conservation to 505.0 ft

Frequency (Years)	Duration of Inundation (Days) at Various Elevations (ft) *(Increase from Current Operations - Future Conditions)*										
	470	480	490	494	498	500	505	510	520	530	540
2	185	160	145	110	40	3	0	0	0	0	0
	0	*10*	*35*	*50*	*35*	*3*	*0*	*0*	*0*	*0*	*0*
5	240	230	210	180	125	95	8.5	2.5	0	0	0
	10	*25*	*30*	*40*	*25*	*20*	*3*	*1*	*0*	*0*	*0*
10	270	255	240	200	145	120	45	8	2	0	0
	10	*20*	*30*	*25*	*15*	*15*	*5*	*1*	*0*	*0*	*0*
25	310	290	270	245	210	185	105	14	6.5	0	0
	0	*25*	*25*	*20*	*20*	*15*	*5*	*2*	*0*	*0*	*0*
50	350	340	335	330	295	260	140	16	9	3.5	0
	0	*5*	*25*	*40*	*40*	*35*	*10*	*1*	*.5*	*0*	*0*
100	360	350	345	340	305	285	170	20	11	6	2.5
	0	*0*	*10*	*25*	*30*	*30*	*5*	*2*	*0*	*0*	*0*
Annual Average	120	112	103	88	59	44	14	2	1	0	0
	3	*9*	*15*	*20*	*13*	*7*	*2*	*0*	*0*	*0*	*0*

During the flood season, the USACE has safety regulations for release rates from Prado Dam. These regulations require that release rates accommodate the evacuation of the reservoir down to the Debris Pool (elevation 490 ft) within a 24-hour period to ensure there is storage available for flood control. To drain the reservoir from elevation 498 ft to 490 ft, a maximum release rate of 5,000 cfs from the Phase II gates would be attained by incrementally increasing the release rate by 625 cfs every half-hour in accordance with the USACE Water Control Manual. The downstream inundation area associated with a maximum release rate of 5,000 cfs is shown on Exhibit 7. The frequency of inundation of this downstream area with this alternative would increase from once every 12 years without the project to once every 2 years with the project.

3.5.3 ALTERNATIVE 2: FLOOD SEASON WATER CONSERVATION TO 500 FT; NON-FLOOD SEASON WATER CONSERVATION TO 505 FT

This is the OCWD Locally Preferred Alternative. This alternative (Alternative 3 in the EIS) could increase the water conservation level within Prado Reservoir to elevation 500 feet during the flood season. Under present conditions, this increase could inundate up to 512 additional acres (47 percent increase) and impound up to 8,085 additional acre-feet (96 percent increase) of water for conservation purposes during the flood season, compared to existing operations. Under future conditions, this alternative could inundate up to 475 additional acres (70 percent increase) and impound up to 6,064 additional acre-feet (225 percent increase) of water for conservation purposes during the flood season. No increase in the water conservation level is proposed during the non-flood season. Inundation and impound values during the non-flood season would be the same as the under present water conservation operations under both present and future conditions. Tables 5 (present conditions) and 6 (future conditions) show the duration of inundation at various elevations within the Prado Reservoir during 2-, 5-, 10-, 25-, 50-, and 100-year events.

TABLE 5
INUNDATION DURATIONS FOR PRADO RESERVOIR WITH ALTERNATIVE 2
PRESENT CONDITIONS
Flood Season Water Conservation with Forecasting to 500.0 ft +
Non-Flood Season Water Conservation to 505.0 ft

Frequency (Years)	Duration of Inundation (Days) at Various Elevations (ft) *(Increase from Current Operations - Present Conditions)*										
	470	480	490	494	498	500	505	510	520	530	540
2	120	65	40	23	4	0	0	0	0	0	0
	5	*10*	*15*	*15*	*4*	*0*	*0*	*0*	*0*	*0*	*0*
5	175	155	118	100	75	63	11	0	0	0	0
	15	*15*	*15*	*20*	*30*	*40*	*8*	*0*	*0*	*0*	*0*
10	210	190	170	145	113	100	35	7	0	0	0
	0	*0*	*15*	*20*	*25*	*30*	*10*	*.5*	*0*	*0*	*0*
25	270	240	215	200	180	160	90	11	4	0	0
	0	*0*	*5*	*10*	*20*	*15*	*10*	*0*	*0*	*0*	*0*
50	340	315	305	290	240	210	115	15	6.5	1.5	0
	0	*5*	*15*	*40*	*35*	*30*	*15*	*1*	*0*	*0*	*0*
100	360	330	325	305	270	240	145	19	8.5	4	1
	0	*0*	*15*	*30*	*30*	*25*	*10*	*3*	*0*	*0*	*0*

When inflow to Prado Dam is greater than the percolation capacity of the downstream spreading grounds, the existing Debris Pool (elevation 490 ft) can be utilized for water conservation at any time during the year. The existing operation schedule calls for controlled releases up to 600 cfs until the reservoir reaches elevation 490 ft. During the flood season, encroachment into the Flood-Control Pool could occur up to elevation 500 ft (Buffer Pool) for water conservation purposes, when weather conditions are favorable. When the threat of unfavorable weather is forecast, the reservoir could be drawn down as low as 490 ft to accommodate the anticipated inflow volume from the storm(s) (as low as 490 ft.) to ensure there is storage available for flood control operations.

TABLE 6
INUNDATION DURATIONS FOR PRADO RESERVOIR WITH ALTERNATIVE 2 FUTURE CONDITIONS
Flood Season Water Conservation with Forecasting to 500.0 ft + Non-Flood Season Water Conservation to 505.0 ft

Frequency (Years)	Duration of Inundation (Days) at Various Elevations (ft) *(Increase from Current Operations - Future Conditions)*										
	470	480	490	494	498	500	505	510	520	530	540
2	185	160	145	110	40	3	0	0	0	0	0
	0	*10*	*35*	*50*	*35*	*3*	*0*	*0*	*0*	*0*	*0*
5	240	230	210	180	125	95	8.5	2.5	0	0	0
	10	*25*	*30*	*40*	*25*	*20*	*3*	*1*	*0*	*0*	*0*
10	270	255	240	200	145	120	45	8	2	0	0
	10	*20*	*30*	*25*	*15*	*15*	*5*	*1*	*0*	*0*	*0*
25	310	290	270	245	210	185	105	14	6.5	0	0
	0	*25*	*25*	*20*	*20*	*15*	*5*	*2*	*0*	*0*	*0*
50	350	340	335	330	295	260	140	16	9	3.5	0
	0	*5*	*25*	*40*	*40*	*35*	*10*	*1*	*.5*	*0*	*0*
100	360	350	345	340	305	285	170	20	11	6	2.5
	0	*0*	*10*	*25*	*30*	*30*	*5*	*2*	*0*	*0*	*0*
Annual Average	120	113	103	88	61	47	18	2.5	1	0	0
	3	*10*	*15*	*20*	*15*	*10*	*6*	*0.5*	*0*	*0*	*0*

As with current operations during the non-flood season, water can be held up to elevation 505 ft (Seasonal Pool) for water conservation purposes. Beginning the 1st of March, the maximum allowable water surface elevation for conservation is linearly increased from elevation 500 ft to elevation 505 ft on the 10th of March (see Exhibit 8). The pool may be maintained as high as elevation 505 ft until the 30th of September. However, if maintenance is required, the reservoir must be evacuated before the 1st of September. If summer flood runoff occurs in the month of September, the dam can be operated for water conservation up to elevation 505 ft, provided that the impoundment does not interfere with maintenance requirements. Releases from Prado Dam during water conservation operations would be based on the estimated rate that the downstream spreading channel can percolate while maintaining the minimum release criteria. If hydrologic forecasts and reservoir conditions indicate that the water surface elevation will exceed elevation 505 ft, water control personnel at the ROC would match inflow with outflow. Above elevation 505 ft, the reservoir is in full flood control mode and outflows can be made up to the downstream capacity of the Santa Ana River channel (which is approximately 30,000 cfs).

During the flood season, the USACE has safety regulations for release rates from Prado Dam. These regulations require that release rates accommodate the evacuation of the reservoir down to the Debris Pool (elevation 490 ft) within a 24-hour period to ensure there is storage available for flood control. To drain the reservoir from elevation 500 ft to 490 ft, a maximum release rate of 7,400 cfs from the Phase II gates would be attained by incrementally increasing the release rate by 625 cfs every half-hour in accordance with the USACE 1994 Water Control Manual. The downstream inundation area associated with a maximum release rate of 7,400 cfs is shown on Exhibit 9. The maximum release rate of 7,400 cfs is correlated with a maximum water velocity of 14 feet per second (ft/s) and a minimum water velocity of 4 ft/s in the downstream area of the Santa Ana River. The frequency of inundation of this downstream area with this alternative would increase from once every 18 years without the project to once every 3 years with the project.

3.5.4 ALTERNATIVE 3: TEMPORARY FLOOD SEASON WATER CONSERVATION TO 498 FT; NON-FLOOD SEASON WATER CONSERVATION TO 505 FT

This alternative (Alternative 8 in the EIS) could temporarily increase the maximum water conservation level within Prado Reservoir to elevation 498 feet during the flood season, prior to the construction of the replacement release gates scheduled for completion in 2002. Under present conditions, this increase could inundate up to 352 additional acres (33 percent increase) and impound up to 5,205 additional acre-feet (62 percent increase) of water for conservation purposes during the flood season, compared to existing operations. Inundation and impound values during the non-flood season would be the same as under current water conservation operations. Table 7 (present conditions) shows the duration of inundation at various elevations within the Prado Reservoir during 2-, 5-, 10-, 25-, 50-, and 100-year events.

When inflow to Prado Dam is greater than the percolation capacity of the downstream spreading grounds, the existing Debris Pool (elevation 490 feet) can be utilized for water conservation at any time during the year. The existing operation schedule calls for controlled releases up to 600 cfs until the reservoir reaches elevation 490 feet. During the flood season, encroachment into the Flood-Control Pool could occur up to elevation 498 feet (Buffer Pool) for water conservation purposes, when weather conditions are favorable. When the threat of unfavorable weather is forecast, the reservoir could be drawn down to accommodate the anticipated inflow volume from the storm(s) (as low as 490 ft.) to ensure there is storage available for flood control operations.

As with current operations during the non-flood season, water can be held up to elevation 505 feet (Seasonal Pool) for water conservation purposes. Beginning the 1st of March, the maximum allowable water surface elevation for conservation is linearly increased from elevation 498 feet to elevation 505 feet on the 10th of March (see Exhibit 6). The pool may be maintained as high as elevation 505 feet until the 30th of September. However, if maintenance is required, the reservoir must be evacuated before the 1st of September. If summer flood runoff occurs in the month of September, the dam can be operated for water conservation up to elevation 505 feet, provided that the impoundment doesn't interfere with maintenance requirements. Releases from Prado Dam during water conservation operations would be based on the estimated rate that the downstream spreading channel can percolate while maintaining minimum release criteria. If hydrologic forecasts and reservoir conditions indicate that the water surface elevation will exceed elevation 505.0 ft, water control personnel at the ROC would match inflow with outflow. Above elevation 505.0 ft, the reservoir is in full flood control mode and outflows can be made up to the downstream capacity of the Santa Ana River channel (which is approximately 5,000 cfs).

TABLE 7
INUNDATION DURATIONS FOR PRADO RESERVOIR WITH ALTERNATIVE 3 – PRESENT CONDITIONS

Frequency (Years)	Duration of Inundation (Days) at Various Elevations (ft) *(Increase from Current Operations - Present Conditions)*										
	470	480	490	494	499	500	505	510	520	530	540
2	115	65	35	18	0	0	0	0	0	0	0
	0	*10*	*10*	*10*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
5	170	150	113	90	55	33	4	0	0	0	0
	10	*10*	*10*	*10*	*10*	*10*	*1*	*0*	*0*	*0*	*0*
10	210	190	170	145	108	90	25	6.5	0	0	0
	0	*0*	*15*	*20*	*20*	*20*	*0*	*0*	*0*	*0*	*0*
25	270	240	210	195	170	155	80	11	4	0	0
	0	*0*	*0*	*5*	*10*	*10*	*0*	*0*	*0*	*0*	*0*
50	340	315	305	290	235	195	105	15	7	2	0
	0	*5*	*15*	*40*	*30*	*15*	*5*	*1*	*0.5*	*0.5*	*0*
100	360	330	325	305	255	225	140	19	9	4	1
	0	*0*	*15*	*30*	*15*	*10*	*5*	*3*	*0.5*	*0*	*0*
Annual Average	89	74	59	48	33	26	9.5	1.5	0.5	0	0
	2	*4*	*5*	*6*	*4*	*4*	*0.5*	*0*	*0*	*0*	*0*

During the flood season, the USACE has safety regulations for release rates from Prado Dam. These regulations require that release rates accommodate the evacuation of the reservoir down to the Debris

Pool (elevation 490 ft) within a 24-hour period to ensure there is storage available for flood control. To drain the reservoir from elevation 498 ft to 490 ft within 24 hours, a maximum release rate of 5,000 cfs from the existing gates would be attained by incrementally increasing the release rate by 625 cfs every half-hour in accordance with the USACE 1994 Water Control Manual. The downstream inundation area associated with a maximum release rate of 5,000 cfs is shown on Exhibit 7. The frequency of inundation of this downstream area with this alternative would increase from once every 12 years to once every two years.

Subsequent to the completion of the new outlet gates at Prado Dam, project Alternative 1 or 2 would be implemented for continued long term water conservation operations.

4 SPECIES ACCOUNTS

All federally protected species potentially occurring in the project vicinity were evaluated with respect to their potential for being affected adversely by implementation of the proposed action. For each, a "no effect" determination or a "may effect" determination was made based on the best available scientific evidence.

4.1 NO EFFECT DETERMINATION

The following plants and wildlife would not be affected by the proposed action because their occurrence on the project site is considered unlikely. In most instances, no suitable habitat is present or, if present, there is no historical record of the species in the project vicinity. One federally threatened bird of prey and one state endangered bird of prey may use the site incidentally for foraging on rare occasions during winter or periods of migration.

4.1.1 PLANTS

Two federally endangered species have been identified in the Santa Ana River drainage within ca. 50 km (ca. 30 mi) of the Prado Basin.

4.1.1.1 Santa Ana River Woolly-Star

The Santa Ana River woolly-star (*Eriastrum densifolium* ssp. *sanctorum*) is a state and federally endangered species. Its habitat is alluvial fan (floodplain) scrub and chaparral along the Santa Ana River below 450 m (1,500 ft) elevation. It was formerly found in Orange County and is still found in San Bernardino County, but is not known from Riverside County (Skinner and Pavlik 1994). The only known extant populations of this species occur in the Santa Ana River drainage upstream of Prado Basin between 335 m (1,100 ft) and 630 m (2,065 ft) in the vicinity of Redlands (Burk *et al.* 1989) and (formerly?) in Lytle Creek (Zembal and Kramer 1984). It was formerly found in the Santa Ana River Canyon in Orange County, where it was last collected in 1927 (Zembal and Kramer 1984) at locations currently absent suitable habitat. It is no longer known from any locality closer than 36 km (22 mi) from the upper reaches of Prado Basin. During the course of botanical surveys in the mid-1980s (Zembal *et al.* 1985), the USFWS did not find this species or its potential habitat in the Prado Basin. Nor was it found in the reach of the Santa Ana River between Prado Dam and Weir Canyon during botanical surveys conducted in 1991 (OCFCD 1997). Accordingly, it has been determined that the proposed action would have no direct, indirect, or cumulative effect on this subspecies.

4.1.1.2 Slender-horned Spineflower

The slender-horned spineflower (*Dodecahema leptoceras*), a state and federally endangered species, occurs in alluvial fan (floodplain) scrub and chaparral well upstream of the project site. It is not known from the vicinity of Prado Basin. No potential habitat occurs in the project area for this species. Therefore, it has been determined that the proposed action would have no direct, indirect, or cumulative effect on this species.

4.1.2 AMPHIBIANS

One federally endangered and one federally threatened amphibian species have been recorded historically within the Santa Ana River watershed, but both may now be extirpated from the area.

4.1.2.1 Arroyo Southwestern Toad

Although the Prado Basin and Santa Ana River, Prado Dam – Weir Canyon reach, may contain marginal habitat for the arroyo southwestern toad (*Bufo microscaphus californicus*), a federally endangered species (USFWS 1995a), no records for this area are known. Jennings and Hayes (1994) suggest it may be extirpated from the Santa Ana River drainage system. No sightings or sign of this species in the project area were recorded during surveys conducted according to USFWS protocol for this species during 33 days between May 2 and August 6, 1999.

Originally, this species was found in foothill regions of Southern California from San Luis Obispo County to Baja California. It historically occurred along nearly the entire length of many drainages below the mountains, including coastal areas, but now survives generally in the headwaters as small isolated populations. The nearest known extant population occurs along San Juan Creek in southern Orange County. It is a habitat specialist, requiring exposed, shallow, gravel- or sand-based pools with low current velocity and little marginal vegetation in streams free of predatory fishes (Jennings and Hayes 1994). Owing to absence of suitable habitat and the failure to detect this species in focused surveys conducted for this species in 1999, the proposed action would have no direct, indirect, or cumulative effect on this subspecies.

4.1.2.2 California Red-legged Frog

The California red-legged frog (*Rana aurora draytonii*), a federally threatened species (USFWS 1996), is found in the coast ranges of California and the foothills of the Sierra Nevada. Currently, this frog is known to occur only in very few locations in Southern California. It formerly occurred in the Prado Basin, as evidenced by the presence of a small population of tadpoles on the south shore of the basin in Temescal Creek found during surveys in 1983 and 1984 (Zembal *et al.* 1985); but it is now believed to be extirpated from the area. According to Jennings (1988) and Hayes and Jennings (1988), this species is found in dense, shrubby riparian vegetation, usually arroyo willow (*Salix lasiolepis*), cattails (*Typha* spp.), and bulrushes (*Scirpus* spp.) associated with deep (≤0.7 m; ≤2 ft), still or slow-moving water. Reasons for its relatively rapid decline are poorly understood, although loss of habitat and competition with non-native frogs and fish are thought to be important factors. Although suitable habitat still exists on the project site, an increasing number of non-native predators in the basin, such as bullfrogs and various non-native predatory fishes, has eliminated this species from the area. It was not recorded during surveys conducted according to USFWS protocol for this species during 33 days between May 2 and August 6, 1999; therefore, the proposed action is not expected to have an adverse direct, indirect, or cumulative effect on this subspecies.

4.1.3 BIRDS

Several species of federally threatened or endangered bird species are known to occur or potentially occur in the general vicinity of the Prado Basin. Formerly included among these, the peregrine falcon (*Falco peregrinus*), has recently been removed from the list of federally endangered species (USFWS 1999a). The others are addressed below.

4.1.3.1 Bald Eagle

The southern bald eagle (*Haliaeetus leucocephalus leucocephalus*), a federally threatened species, has recently been proposed for removal from the list of Threatened and Endangered Species (USFWS 1999b). It may, on rare occasions, forage incidentally in the Santa Ana River drainage, including the project vicinity, when water is present. There is a wintering population of bald eagles at Big Bear Lake in the upper Santa Ana River watershed, and the nearest nesting sites are on Santa Catalina Island where it has been recently re-introduced. Implementation of the proposed action is not anticipated to have any measurable effect on this species.

4.1.3.2 California Gnatcatcher

The federally threatened California gnatcatcher (*Polioptila californica*) is found in coastal sage scrub habitats principally in San Diego, Orange, and western Riverside counties. Although remnants of coastal sage scrub vegetation potentially occupied by gnatcatchers remain on the hillsides above the Santa Ana River downstream of Prado Dam, this upland vegetation association should not be adversely affected by implementation of any of the project alternatives.

4.2 MAY AFFECT DETERMINATION

Three federally protected species, the least Bell's vireo, southwestern willow flycatcher, and Santa Ana sucker, have been determined to breed on or near the project site, and designated critical habitat for the two bird species is present. Additionally, one state endangered species, the yellow-billed cuckoo (*Coccyzus erythropthalmus*), has been determined to breed in the basin, at least occasionally. The proposed action is likely to have an adverse effect on all four species. Critical habitat for the vireo and the flycatcher is defined in this document as encompassing all native riparian vegetation within the project footprint above the dam (elevation 494-505 ft). Although suitable and occupied nesting habitat for these two species is found throughout the river floodplain below the dam to Weir Canyon, this area is outside the geographical zone of designated critical habitat for these two species. The areal extent of each riparian vegetation type within these two areas is provided in Tables 8 and 9.

Traditional impact analyses involve direct, predictive, and usually short-term or finite, cause-and-effect relationships. As such, assessing the nature and significance of these impacts is typically rather straightforward. However, unlike more "traditional" projects, this water conservation and supply study pertains strictly to the operation of a water resource management facility; it involves no construction or other activities having the potential for generating short-term impacts. Thus, all potential project impacts – direct or indirect, on-site or off-site, temporary or ongoing – fall within the definition of long-term. The agent through which the impacts of facility operation are physically exerted is inundation. Vegetation and wildlife of terrestrial, emergent, and even aquatic habitats may be adversely affected by inundation; the specific nature and severity of effect varying with organism type and character of inundation. Chief among the many variable parameters of inundation governing its ultimate environmental consequences are areal extent, duration, depth, rate of formation, flow velocity, and turbidity. These parameters are subject to a vast array of influences, primary sources of which include storms, drainage system, river hydraulics, channel substrate and vegetation, subsurface hydrology, and of course, artificial control. So numerous, variable, interactive, dynamic, episodic, and complex are the factors determining the physical character of inundation and the nature of its interaction with affected organisms, predictive impact assessment is severely constrained. With this in mind, it should be noted that, by necessity, the impact analyses that follow are often subjective and highly speculative in nature. In the interest of protecting the fragile biological resources that are the subject of this assessment, reasonable worst-case scenarios are assumed throughout.

4.2.1 LEAST BELL'S VIREO

The least Bell's vireo (*Vireo bellii pusillus*) was listed as endangered in 1986 (USFWS 1986). It is a common breeding summer visitor in the Prado Basin. This small songbird formerly was common to locally abundant from Tehama County, California, to Baja California, Mexico (Grinnell and Miller 1944). It nests in riparian habitats that typically consist of red willow (*Salix laevigata*) or Goodding's black willow with a dense understory of narrow-leaved willow (*Salix exigua*), arroyo willow, mulefat (*Baccharis salicifolia*), and some herbaceous species. Cottonwoods (primarily *Populus fremontii*), western sycamore (*Platanus racemosa*), and coast live oak (*Quercus agrifolia*) may also contribute to the overstory in some areas.

Least Bell's vireos arrive in Southern California in late March (exceptionally, early March). Males usually arrive several days to a week prior to females (Barlow 1962). Fall migration commences in July and is generally over by the first week of September when all birds have departed for their wintering grounds in western Mexico.

The least Bell's vireo has declined as a result of the combined, perhaps synergistic, effects of habitat destruction and heavy brood parasitism by the brown-headed cowbird (*Molothrus ater*). Cowbird numbers in the region have steadily increased for some time with the expansion of cattle ranching in California (Franzreb 1989). Another important limiting factor in the decline of the least Bell's vireo is considered to be the destruction and fragmentation of riparian habitat as a result of residential and industrial development, which have increased the demand for water projects in least Bell's vireo habitat (Olson and Gray 1989).

As a result of the decline in numbers of breeding vireos and the dramatic reduction in the species' range in California, it was listed as endangered by the California Department of Fish and Game (CDFG) on 27 June 1980 under the California ESA of 1970. The USFWS proposed listing the least Bell's vireo on 3 May 1985, and it was listed on 2 May 1986 under the federal ESA of 1973 (USFWS 1986).

Intensive surveys of historical breeding sites conducted in the 1970s and 1980s indicated that least Bell's vireo populations had become highly localized, with breeding confined to four coastal counties (Santa Barbara, Ventura, Los Angeles, and San Diego) and three inland counties (Inyo, San Bernardino, and

Riverside) (Goldwasser 1978; Goldwasser *et al.* 1980; USFWS 1986). Since then, breeding pairs have become established in a few areas of Orange County and at additional sites in the above seven counties.

In 1986, when the bird was federally listed, a total of 397 territorial males were estimated to exist in the entire range of the species (Salata and Hays 1991). By 1997, the number had increased to an estimated 1,700 territorial males (Pike *et al.* 1998). This reflects an apparent overall increase in just over a decade of 428 percent.

4.2.1.1 Existing Conditions

4.2.1.1.1 Status in Prado Flood Control Basin

The number of territorial pairs (= the number of females present, all of which are assumed to be paired) in the Prado Basin and contiguous reach of the Santa Ana River has increased from 19 in 1986 (5 percent of the total population) when the species was listed to 270 in 1998 and 224 in 1999 (see Exhibit 10) (Pike et al. 1998, 1999). The number of successfully fledged birds has likewise increased from 20 in 1986 to a minimum of 489 in 1999 (see Exhibit 11). These increases have been attributed, in large part, to an intensive, ongoing cowbird trapping program in the region. As a result of these trapping efforts, the average number of young fledged per pair, after temporarily tripling in 1989 and 1990, appears to have stabilized at about two times what it was in 1986. The fact that roughly the same amount of habitat that was present in 1986 can support nearly 15 times the number of breeding pairs as were present in 1986 also suggests that, at least locally, cowbird parasitism, not loss of habitat, was the chief factor in the bird's decline. On a regional basis, however, habitat loss has been a major contributor, especially in areas where once suitable riparian habitat has been lost altogether or become so degraded that it can no longer support any critical vireos.

4.2.1.1.2 Status in the Santa Ana River Below Prado Dam

Although the USFWS does not conduct annual surveys for this species in this section of the Santa Ana River, it is known that they are present as confirmed by the few privately funded studies that have been conducted. In the Santa Ana River between the dam and Weir Canyon, 24 pairs were recorded in 1999 during the course of 8 surveys conducted between 10 April and 31 July according to USFWS protocol (Exhibit 12). All were located in the first 3 km (2 mi) between the dam and the railroad crossing at the east end of the Green River Golf Course. At least 6 pairs produced young, but special searches for nests and young were not conducted.

There is enough suitable habitat in this reach of the river to support well over a hundred pairs of vireos; thus their absence from nearly 9.5 km (6 mi) of river with suitable habitat is a puzzle. The vireos that are present may be part of the large vireo population in the basin where an ongoing cowbird trapping program is conducted. Cowbirds were easily the most common bird observed in this reach of the river, especially in the lower portions, and this may account, at least partially, for the lack of vireos farther downstream. Other factors may include habitat degradation from human intrusion (multiple trails along the river, especially near Prado Dam and Featherly Park, eliminate the shrubby understory) and freeway noise.

4.2.1.1.3 Status of Critical Habitat

Critical habitat is defined in Section 3(5)(A) of the federal ESA as: (i) the specific areas within the geographical area occupied by a species on which are found those physical or biological features essential to the conservation of the species and that may require special management considerations or protection, and (ii) specific areas outside the geographical area occupied by a species at the time it is listed, upon determination that such areas are essential for the conservation of the species. Section 3(5)(C) further indicates that in most cases, critical habitat should not encompass the entire geographical area that can be occupied by the species. Requirements for critical habitat include at a minimum: (1) enough space for both individual and population growth; (2) food, water, air, light, minerals, or other nutritional or physiological requirements of the species; (3) cover or shelter; (4) sites for breeding, reproduction, and rearing of offspring; and (5) habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of the species.

The physical and biological habitat features that support feeding, nesting, roosting, and sheltering essential to the conservation of the vireo are described as "riparian woodland vegetation that generally contains both canopy and shrub layers, and includes some associated upland habitats" (USFWS 1994). This definition effectively includes all of Prado Basin to elevation 543 ft and some areas at higher elevations, such as the mainstem of the Santa Ana River, and portions of Chino, Mill/Cucamonga, and Temescal creeks. It does not include any habitat in the Santa Ana River below Prado Dam.

In the Prado Basin, vireos are found preferentially in willow woodland with a tree overstory of Goodding's black willow and a shrub understory dominated by arroyo willow, mulefat, and hoary nettle (*Urtica dioica* ssp. *holosericea*). In the downstream portion of the Santa Ana River, vireos are found in similar habitat, although it has no legal standing as critical habitat in this stretch of the river; although this has not been included in the geographic area of critical habitat as determined by the USFWS (1994). Openings within or adjacent to vireo territories are typically composed of herbaceous and aquatic vegetation with invading seedling or sapling willows and mulefat. Vireo-occupied habitat usually contains a high degree of vertical stratification with overlapping cover types: uneven age stands of mature overstory trees and a shrub understory. Within this woodland community, small openings are often present within and immediately adjacent to the vireo territories. Tree canopy cover ranges from 50 to 75 percent, and shrub cover ranges from 50 to 90 percent.

4.2.1.1.4 Recovery and De-Listing

The prime objective of the Draft Recovery Plan for the Least Bell's Vireo (USFWS 1998) is delisting of the vireo. In order for this to be accomplished, the USFWS must first ascertain that circumstances have changed sufficiently that the following listing factors no longer prevail or continue to adversely affect the vireo: (1) the present or threatened destruction, modification, or curtailment of its habitat or range; (2) disease or predation; (3) the inadequacy of existing regulatory mechanisms; and (4) other natural or manmade factors affecting its continued existence. Delisting may occur when the following criteria are met or exceeded for five consecutive years: (1) designated populations or metapopulations, each consisting of several hundred pairs, are protected and managed at 11 designated Southern California sites; (2) stable populations, each consisting of several hundred pairs, have become established and are protected and managed at three designated sites in the Central Valley; and (3) threats are reduced or eliminated so that vireo populations at the 14 designated sites are capable of persisting without significant human intervention, or perpetual endowments are secured for cowbird trapping and exotic plant control in riparian habitat occupied by vireos.

Pike *et al.* (1998) have recommended that, to ensure the recovery of the vireo population in the Prado Basin, the USFWS should: (1) restore and protect all habitats comprising native plant communities and natural physical features, (2) control or remove all noxious, non-native plants and animals from riparian habitats, and (3) restrict human presence and activities in or near least Bell's vireo home ranges.

4.2.1.2 Direct Impacts

4.2.1.2.1 Impacts Within Prado Basin

For the two post-construction alternatives (the NED and Locally Preferred alternatives), long-term operational impacts on the least Bell's vireo and its critical habitat are assessed using inundation durations at various elevations under both present and future conditions. Current operational impacts are assessed for the one pre-construction alternative. These impacts are assessed based on 2-, 5-, 10-, 25-, 50-, and 100-year flood events, as well as the length of inundation averaged over a 100-year period (see Tables 1 through 7). Inundation during the flood season (October 1 through the end of February) and the non-flood season (March 1 through September 30) are examined separately with respect to impacts. The present condition (post-construction) assumes that the approved Phase II GDM dam improvements have been completed. The future condition takes into account projected urban development in the upper watershed with its concomitant increase in surface water run-off leading to a greater volume of inflow into the basin, as well as the accumulation of sediments in the basin over time. Operation of Alternative 3 would occur during the pre-construction period (prior to 2003), which includes the use of the existing gate structures at the dam, as well as watershed conditions for the year 2001.

The principal environmental consequences of increasing the amount of water stored behind Prado Dam for flood control and water conservation are: (1) alterations in the amount and distribution of riparian vegetation types in the basin and, (2) in spring, potential flooding of least Bell's vireo nests following a major storm event late in the season (addressed in the biological assessment for existing water conservation (USACE 1999). Predicting the nature of and attempting to quantify alterations in riparian vegetation is a nearly insurmountable task, especially in light of the highly variable annual inundation profiles. For example, under current practices, the water conservation pool is allowed to rise to elevation 494 ft during the months of October through February and to elevation 505 ft between March and September. However, in dry years these levels are not achieved and in wet years the elevation 494-ft level is exceeded for flood control purposes following heavy storms. Even with no action, the present inundation profile will change over time as surface runoff increases with the build-out of urbanizing areas in the Santa Ana River watershed upstream (*e.g.*, Norco, Corona, Riverside, San Bernardino) and sediments build up in the basin. This future "baseline" condition is also analyzed below.

Under existing operations for present conditions, the reservoir pool reaches elevation 494 ft 42 days per year on average and elevation 505 ft only 9 days per year(Table 1). This is expected to increase to 68 and 12 days per year, respectively, for future conditions without any change in existing operations (Table 2). By increasing the flood season water conservation pool (the Buffer Pool) to elevation 498 ft (NED

Alternative), the number of days of inundation at elevation 494 ft is only expected to increase by an average of 6 additional days (14 percent) per year. The most dramatic increase in the water conservation pool to elevation 500 ft (Locally Preferred Alternative) would result in an increased duration of inundation at elevation 494 ft of 9 days per year (21 percent increase) under present conditions and 20 days per year under future conditions.

Perhaps more important than average reservoir levels is extreme conditions associated with major storm events (see Tables 1 through 7). For example, little if any direct impacts on the endangered least Bell's vireo are likely to occur if the seasonal pool is at elevation 505 ft 12 more days per year than under existing operations. However, one spring storm event that raises the level to elevation 505 ft at a time when normal levels would be much lower may flood (and thus destroy) dozens of vireo nests, significantly impacting vireo nesting success for that year. For this reason, inundation levels are also analyzed based on 2-, 5-, 10-, 25-, 50-, and 100-year storm events.

For present conditions under existing operations, inundation levels will reach elevation 494 ft, the existing flood season water conservation objective, an average of 42 days per year. This objective would be exceeded approximately every 5 years (a five-year storm event) when inundation levels would be expected to reach or exceed elevation 494 ft for 80 days. This duration of inundation increases significantly with storm events of increasing magnitude. For example, a 100-year storm would raise the reservoir level to or higher than elevation 494 for 275 days (nine months) and to elevation 505 ft for 135 days (four and one half months). Under the various project alternatives discussed below, both average inundation levels and major storm event inundation periods are expected to increase accordingly and exert increasingly greater long-term operational impacts on biological resources.

Birds, Nests, and Eggs

Operational impacts on the least Bell's vireo would include slightly increased duration of habitat inundation and a slightly reduced risk of nest inundation at the lower elevations following major storm events late in the flood season. Usually under conditions of late storm events, the water elevation would be 4 ft higher 4 days earlier, prior to the vireo's arrival. This could still constitute "take" under the Endangered Species Act, if vireos that nested between elevations 490 ft and 494 ft the previous season were forced to move under high water conditions. However, these nests have a greater risk of "take" by harm through direct inundation with current operations.

Impacts on least Bell's vireo habitat and nests would be substantially the same under the NED Alternative, the Locally Preferred Alternative, and the Pre-Construction Alternative as described in the above paragraph. Approximately 28 pairs of least Bell's vireos bred between elevations 494 and 498 ft in 1999 (LED and Pre-Construction Alternatives), and 43 pairs bred between elevations 494 and 500 ft in 1999 (Locally Preferred Alternative) (see Table 10 and accompanying map of least Bell's vireo territories within Prado Basin in 1999).

TABLE 10
MALE LEAST BELL'S VIREO TERRITORIES WITHIN THE PROJECT SITE IN 1999

Elevational Gradient	Territorial Males	Elevational Gradient	Territorial Males
Below 494 ft	15	Below 494 ft	15
494-495 ft	15	494-495 ft	15
495-496 ft	8	494-496 ft	23
496-498 ft	5	494-498 ft	28
498-499 ft	4	494-499 ft	32
499-500 ft	11	494-500 ft	43
500-505 ft	32	494-505 ft	75
505-508 ft	31	494-508 ft	106
Above 508 ft	215	494 ft and above	321

Critical Habitat

The predominant vegetation type in the basin between elevations 494 and 505 ft is willow woodland (approximately 256 ha or 633 ac). This plant community constitutes a major portion of least Bell's vireo critical habitat. A complex mosaic of understory vegetation, also an important component of critical habitat for this species, develops along the edges of the mature willow woodland and along the banks of stream channels. Significant understory vegetation generally does not develop in the interior of the willow forest due to competition. Altering the inundation profile may alter the pattern and extent of understory vegetation over time, but the extent to which it would be altered under such complex circumstances is not possible to quantify.

Understory vegetation factors importantly in the breeding success of this endangered species in the basin. Any overall reduction in the amount of understory vegetation may have a significant adverse effect on the vireo's breeding success, as discussed below.

However, the current water conservation program that causes periodic habitat inundation to a maximum of 505 ft elevation during the Spring has been in place since 1993. The carrying capacity of designated critical habitat in the Basin during that baseline year was manifest in the size of the vireo population to be supportive of at least 138 territorial male vireos, and 123 pairs, producing a minimum of 247 fledglings. By the year 2000, that same habitat supported a minimum of 357 territorial males, and 281 pairs of vireos, producing 649 fledglings. In spite of the visible effects of periodic inundation over 8 years, critical habitat in the Prado Basin now supports well more than twice the vireos it did. This is probably due in large part to the effective management that was instituted to offset the potential impacts of water conservation by increasing habitat quality.

Alternative 1 (NED Alternative)

Implementation of Alternative 1 would result in the inundation of 89.0 ha (219.6 ac) of critical vireo habitat (willow woodland and riparian scrub) for an average of 5 more days per year (6 more days per year at elevation 494 ft and 4 more days at elevation 498 ft) than under existing operations (Table 3).

Major storm events would increase the continuous period of inundation at all elevations below 505 ft, depending on the intensity of the storm and the conservation pool elevation. For example, at elevation 494 ft, a 2-year storm event would increase the inundation duration by 10 days, a 10-year storm by 20 days, and a 50-year storm by 40 days during the flood season (Table 3). However, at elevation 505 ft, the inundation period is not increased significantly under this alternative (only by 5 days following a 50-year or greater storm event).

A number of plant species within the willow woodland habitat are adapted to flooded conditions, ranging from "tolerant" to "very tolerant" of inundation. Tolerant species, including most willow species, can withstand flooding for most of one growing season. Very tolerant species (*e.g.*, black willow, easily the most common willow in the basin) can be inundated for two or more growing seasons without deleterious effects (USFWS 1997b). In fact, both tolerant and very tolerant species exhibit new root development during periods of inundation. Willow woodland (inclusive of understory), however, may be affected differently, depending on the depth of inundation (*e.g.*, submerged soils only, understory level, or canopy level) and the number of consecutive years of inundation. Long periods of inundation resulting in super-saturated soils have been known to cause mature black willows to fall over (V. Smith, pers. comm.).

Reflecting the uncertainty of potential effects associated with various levels and durations of inundation, implementation of the pre-construction alternative (Alternative 3) may or may not have an adverse impact on willow woodland habitat. From a biological standpoint, such impacts would be temporary, relatively short term, and less than significant.

Riparian scrub, another component of vireo critical habitat, is not present at or below elevation 505 ft. With implementation of Alternative 1, the annual inundation period is not expected to increase above elevation 505 ft. Only a 50-year storm or greater would be expected to increase the period of inundation in the riparian scrub community under existing operations, and then only by 1-3 days.

As mentioned earlier, understory vegetation is also an important component of the vireo's nesting habitat (USFWS 1994). Extensive periods of flooding at elevations where most understory vegetation has developed may result in its temporary reduction. Although impossible to quantify, any reduction, even for two seasons, in the amount of understory vegetation would represent a significant adverse impact. Interestingly, prolonged periods of inundation that may result in a reduction of existing understory vegetation are the same conditions that may also cause mature black willows to topple, creating new "understory" vegetation. Vireos in the basin readily nest in recently fallen willows that retain their foliage (V. Smith pers. comm.). Irrespective of new "understory" vegetation that may be created, increased inundation levels resulting from implementation of Alternative 1 although relatively modest, are considered to be adverse and significant.

Alternative 2 (Locally Preferred Alternative)

Under present conditions, implementation of Alternative 2 would result in the inundation of 140.6 ha (346.9 ac) of critical vireo habitat between elevations 494 and 500 ft for an average of 10 days per year more than existing operations (Table 5) and 15 more days per year under future conditions with existing operations (Table 6).

Implementation of Alternative 2, under present conditions, would result in an increased period of inundation at elevations 494 ft of 15 days following a 2-year storm, 20 days following a 10-year storm, and 40 days following a 50-year storm, compared to existing operations. Under future conditions with existing operations, this increases to 50 and 25 days respectively for 2-year and 5-year events, but does not increase further with a 50-year event.

Inundation of willow woodland habitat would not be significantly greater under Alternative 2, and impacts on this component of vireo critical habitat would remain not significant. Likewise, increased inundation of riparian scrub would remain at 3 days or less, even following a 50- or 100-year storm event, and thus, would be not significant. Initially, as under Alternative 1, the increased number of days of inundation may result in a temporary reduction of the amount of understory vegetation that is an important component of vireo critical habitat. As under Alternative 1, impacts on understory vegetation resulting from implementation of Alternative 2 would remain significant.

Alternative 3 (Pre-Construction Alternative)

Impacts under this alternative are the same as under the NED Alternative; however, only for a three-year period rather than the 50-year life of the project.

4.2.1.2.2 Impacts Within the Floodplain Between Prado Dam and Weir Canyon

The operation plan for water conservation requires that the flood season pool be evacuated down to the debris pool elevation (490 ft) within 24 hours prior to forecasted major storms to accommodate anticipated increased rate of inflow.

The maximum release rates required to evacuate the flood season conservation pool within 24 hours have been calculated for the existing condition, both post-construction alternatives (Alternatives 1 and 2), and the pre-construction alternative (Alternative 3). These rates are described below and shown in Table 11, along with the associated minimum and maximum velocities of water flow downstream of Prado Dam and upstream of Weir Canyon Road.

Impacts on biological resources downstream of Prado Dam associated with these increased release rates and velocities are of three forms: increased frequency and magnitude of inundation outside the normal stream channel, the force of rushing water against the vegetation in the channel, and channel improvements necessary to accommodate large flows without destroying channel integrity.

Impacts associated with inundation downstream are not unlike those associated with raising the flood forecasting and water conservation pools above the dam. However, impacts associated with the force of rushing water on vegetation downstream of Prado Dam are not easily evaluated. Two measurements of stream force, shear stress (pounds of pressure per square foot) and stream power (foot-pounds per second per square foot), have been calculated for each of the release rates associated with the project alternatives. However, translating these values into real world conditions is problematical. The impact of 8.6 lbs/ft² of shear stress or 104.9 ft-lbs/s/ft² of stream power on a 25-cm (12-in) dbh cottonwood tree or a 2.5-cm (1-in) dbh mulefat bush depends upon the type of substrate in which the plant is rooted, root depth, health of the plant, flow characteristics of the stream at the point of impact, bank stability, and the downstream consequences of upstream damage. For example, a poorly anchored plant in shallow, loose sand would be toppled long before a well anchored plant in a deep loam or clay substrate. The water force may break the trunk of an unhealthy plant before that of a healthy plant. Trees that have been uprooted upstream, perhaps along with parts of manmade structures such as buildings and bridges, being carried downstream in the rush of water, would have a domino effect on plants downstream. One large tree carried downstream by the flood waters would cause damage that would otherwise not occur if the tree had been healthy or more firmly anchored and remained standing. In addressing the problems inherent in designing erodible channels, Chow (1959) stated, "The behavior of flow in an erodible channel is influenced by so many physical factors and by field conditions so complex and uncertain that precise design of such channels...is beyond the realm of theory."

TABLE 11
MAXIMUM RELEASE RATES FROM PRADO DAM AND ASSOCIATED VELOCITIES

Alternative	Flood Pool Elevation (ft)	Debris Pool Elevation (ft)	Difference (vertical ft)	Maximum Release Rate (cfs)		Velocity (ft/s)
				Existing Gates	GDM Gates	Min. and Max.
Current	494	490	4	—	2,500	
1	498	490	8	—	5,000	
2	500	490	10	—	7,400	4-14
3	498	490	8	5,000	—	

Few, if any, studies have addressed the issue of vegetation damage due to stream power and shear stress from a predictive standpoint (see Phillips *et al.* 1998). However, a number of reports have described the damage caused by flood flows in streams, both natural and below dams. But every stream course is different and every storm event is different. Comparisons cannot be made between one stream, or even one stretch of one stream and another, nor between one storm event and the next, as vegetation weakened in one storm may be toppled in the next, milder storm. The U. S. Soil Conservation Service conducted a series of experiments in the late 1940s on manufactured channels lined with various types of grasses. The results of these studies are presented in Chow (1959). Among other findings, they determined that Bermuda grass (the most resistant in their study) could withstand velocities of 1.8-2.4 m/sec (6-8 ft/sec) in erosion-resistant soils and 1.2-1.8 m/sec (4-6 ft/sec) in easily eroded soils. While these studies have little bearing on the effects of stream velocity on complex vegetation communities with grasses, shrubs, and trees, they do suggest that velocities as low as 1.8 m/sec (6 ft/sec) can cause scouring of herbaceous vegetation, even in relatively non-erodible channels. At release rates of 210 cms (7,400 cfs) (Alternative 2) downstream of Prado Dam, maximum velocities are more than twice this amount (Table 11), suggesting that a 210 cms (7,400 cfs) release can cause considerable scouring of the channel. Empirical evidence supports this.

Before Prado Dam was constructed in 1941, Santa Ana River flood flows passed through the narrow canyon below present-day SR-71 with enough force to remove most of the riparian floodplain vegetation approximately once every 20-30 years, returning the vegetation to an early successional stage. Since construction of the dam, water releases have been regulated, with a limit of 8.5 cms (300 cfs) when flood-flow releases are not necessary. Flood-flow releases generally have not exceeded 71 cms (2,500 cfs). These releases maintain the high water table in the canyon and the thick phreatophytic cottonwood and willow forests along the margins of the stream course. The result, however, is a smaller but more stable and mature riparian habitat than was originally present. On four occasions since 1941, releases have reached or exceeded 144 cms (5,100 cfs): in 1969, 170 cms (6,000 cfs) in 1980, 144 cms (5,100 cfs) in 1983, and 150 cms (5,300 cfs) in 1993, an average of once every 14.5 years.

According to at least one source, considerable vegetation was lost in the 1969 flood as a result of controlled releases up to 144 cms (5,100 cfs) (USACE 1988). This being the case, similar impacts would be presumed to have occurred during flood flows in excess of 142 cms (5,000 cfs) in the other three years. However, empirical evidence suggests otherwise. Although, residents and employees living or working downstream of the dam have observed noticeable scouring in the stream channel as a result of the two most recent events (1983 and 1993), only a relatively small proportion of the herbaceous and woody understory vegetation was lost. Little, if any, significant damage to overstory woody vegetation occurred (G. Arrowsmith, pers. comm.).

In the following analysis of impacts, certain assumptions have been made:

1. The extent of impacts on riparian vegetation from various flow velocities cannot be determined directly, nor can they be quantified.

2. All releases to evacuate the buffer pool will take place prior to March 1.

In order to compute mitigation costs, impacts must be quantified, even if such an exercise is somewhat arbitrary. The following additional assumptions have been made in an attempt to quantify impacts:

1. Within the channel, the understory is knocked down and some is ripped out. Trees less than 10-cm (4-in) dbh will be knocked down, but trees greater than 10-cm (4-in) dbh will not.

2. No impacts will occur outside the channel for flows less than 142 cms (5,000 cfs).

3. With flows in excess of 142 cms (5,000 cfs) every 2-4 years, riparian habitat will not be allowed to fully recover between events.

4. Understory and trees of less than 10-cm (4-in) dbh are assumed to occupy 30 percent of the total area of riparian woodland habitat. For all practical purposes, 50 percent of this will be permanently impacted because of limited recruitment during periods between maximum flow events.

5. Trees greater than 10-cm (4-in) dbh will continue to grow.

The frequency of releases from Prado Dam would increase dramatically over present conditions for some alternatives. For moderate releases that remain within the existing low-flow channel, as under Alternative 1, the increase in frequency should have little adverse impact in the short term, but may have a significant adverse impact on an additive basis as sediments in the channel are washed away over time and not replenished. Releases potentially generated with the short-term alternative (Alternative 3) should not have an additive adverse impact because it would only be in effect for about three years, but in conjunction with long-term alternatives, one of which would replace it, the additive impact is likely to be adverse and significant.

Releases under Alternative 2, and to a lesser extent Alternative 1, would likely cause significant adverse impacts because small to moderate amounts of least Bell's vireo nesting habitat would be lost. Owing to the high frequency of these releases with the proposed water conservation objectives, this vegetation often may not have sufficient time to fully regenerate before the next maximum release, resulting in a steady deterioration of nesting habitat in the low-flow channel. Areas of nesting habitat inundated under each alternative are given in Table 12.

TABLE 12
AREAL EXTENT OF HABITAT INUNDATED DOWNSTREAM OF PRADO DAM

Alternative	Maximum Release (cfs)	Area Inundated ha (ac)	Riparian Habitat Inundated ha (ac)
Current	2,500	—	—
1	5,000	106.0 (261.6)	59.3 (146.4)
2	7,400	144.9 (357.7)	71.0 (175.3)
3	5,000	106.0 (261.6)	59.3 (146.4)

Birds, Nests, and Eggs

Impacts on critical habitat of the least Bell's vireo are discussed above. Although not included within the designated geographic range of critical habitat, habitat below the dam is occupied by vireos, and loss or deterioration of this habitat has the same adverse effects on least Bell's vireos.

As nesting, foraging, and sheltering habitat plays an integral part in the welfare of any endangered animal, it is difficult to separate one from the other in any impact analysis. In this section only direct impacts on birds, their offspring, eggs, or nest are considered. As maximum releases are only necessary prior to impending major storm events, it is anticipated that all or virtually all releases would occur prior to April when the vireos commence nesting. Therefore, it is not likely that active nests would be destroyed even under the maximum releases associated with Alternative 2, even though the habitat that supports these birds and their nests may be destroyed.

Alternative 1 (NED Alternative)

At releases of 142 cms (5,000 cfs), water would remain in the low-flow channel, and, as discussed above, no releases should occur during the nesting season.

Alternative 2 (Locally Preferred Alternative)

Under this alternative, only minor flooding, primarily in the vicinity of Green River Golf Course, would occur during a maximum release of 210 cms (7,400 cfs). Releases would take place during the flood-forecasting season or very early in the non-flood season (early March) when this species is absent or, perhaps, just arriving on its breeding grounds.

Alternative 3 (Pre-Construction Alternative)

Impacts under this alternative are the same as under the NED Alternative; however, only for a three-year period rather than the 50-year life of the project.

Nesting Habitat

The predominant vegetation downstream of Prado Dam and upstream of Weir Canyon Road is cottonwood and cottonwood-willow woodland, a plant community that is well suited for the least Bell's vireo. Small amounts of riparian scrub contribute to the total amount of vireo nesting habitat downstream of Prado Dam and upstream of Weir Canyon Road. These two plant communities are analyzed together as components of vireo habitat.

Alternative 1 (NED Alternative)

At releases of 142 cms (5,000 cfs), water flow would remain in the low-flow channel. Historical evidence from similar events arguably demonstrates that no significant adverse impacts on riparian vegetation occur during such release rates. For purposes of impact analysis associated with Alternative 2 below, the 142 cms (5,000 cfs) release rate is considered the baseline upon which impacts on riparian vegetation from greater releases are based. Flood flows within the channel would inundate approximately 59.3 ha (146.4 ac) of nesting habitat.

Alternative 2 (Locally Preferred Alternative)

At a maximum release rate of 210 cms (7,400 cfs) associated with implementation of Alternative 2, water would overflow the low-flow channel bank in a few places, inundating an additional 11.7 ha (28.9 ac) of vireo nesting habitat (total = 71.0 ha or 175.3 ac) for up to 24 hours. A minor amount of scouring may result in the removal of small amounts of understory vegetation. For each individual event this would be considered a less than significant impact; however, the frequency of maximum releases of 210 cms (7,400 cfs) is anticipated to increase from once every 18 years without the proposed water conservation, as is currently the case, to once every three years with the proposed water conservation. With this substantial increase in frequency, additive adverse impacts on vireo nesting habitat are likely to be significant.

Alternative 3 (Pre-Construction Alternative)

Impacts under this alternative are the same as under the NED Alternative; however, only for a three-year period rather than the 50-year life of the project.

4.2.1.3 Indirect and Off-Site Impacts

Indirect impacts on the least Bell's vireo will result from direct impacts on its nesting habitat. These impacts are discussed in Section 4.2.1.2.1 under the subheading Critical Habitat. Off-site impacts are also anticipated. Suitable nesting habitat exists outside the project footprint both above elevation 505 ft (about 246 pairs in 1999 – Table 10) and below elevation 494 ft within the basin (about 15 pairs in 1999 – Table 10). Increases in frequency and duration of inundation of these areas would also occur under Alternatives 1 and 2, and temporarily under 3. Tables 1 through 7 provide inundation profiles for current operations and each of the three project alternatives for elevations from 490 ft to 540 ft. The increase in inundation of habitat above 505 ft is negligible under all alternatives; and the relative few days of inundation at these higher elevations are likely to come prior to the nesting season. The increase in inundation duration at elevations below 494 ft, on the other hand, is significantly greater and would be expected to have a significant adverse impact on vireo critical habitat below elevation 494 ft by further retarding the growth of understory vegetation; however, the impact on vireo habitat above 505 ft elevation is not anticipated to be adverse, and may even be beneficial. The minor increase in number of days of inundation above 505 ft may, in fact, encourage slightly more growth of understory vegetation in some years than at present.

Likewise, indirect impacts on vireos in the river floodplain below the dam would result from direct impacts on its nesting habitat (Section 4.2.1.2.2, subheading Nesting Habitat). No off-site impacts are anticipated from impacts in Reach 9. Below Weir Canyon Road, the river is channelized, and there is no suitable nesting habitat for vireos.

4.2.1.4 Cumulative Impacts

One other major disturbance-producing activity planned for implementation within or adjacent to the riparian areas in the Prado Basin has been identified: the construction of levees to protect existing facilities around the perimeter of the basin in conjunction with raising Prado Dam and Spillway as part of the Santa Ana River Mainstem Project. This would also entail the construction of temporary haul roads and the removal of 3.7 million m^3 (4.8 million yd^3) of material from two borrow sites. Construction of one levy will indirectly impact at least one pair of vireos through removal of occupied critical habitat (USACE 2000b). Use of these haul roads and borrow sites has the potential to impact vireos indirectly through the generation of noise from heavy equipment excavating the site for fill material. Noise levels exceeding 60 d(BA) in the vicinity of nesting vireo pairs have been identified as adverse and potentially significant. Such noise levels may result from borrow site operations near active vireo territories along Mill Creek and Chino Creek and levee construction in all areas of the basin. The prospective borrow site on the south side of the basin near Temescal Wash is not in the near vicinity of any recent vireo territories; thus, noise impacts from this site are not likely to be significant.

Downstream, between the Prado Dam and Weir Canyon Road, berms would be constructed to protect the integrity of the stream channel in this reach of the Santa Ana River. This activity is also expected to have an adverse effect on this species. Two other projects are planned or recently completed in the vicinity, upstream of the basin: the Zone 2 Norco Bluffs stabilization project just upstream and on the other side of I-15 from the project site, which was recently completed, and the Zones 3-5 Norco Bluffs bluff toe stabilization project just downstream of I-5. These activities may have a slight but insignificant effect on riparian areas within the basin, with a possible slight increase in sedimentation from particulates washed downstream during construction.

4.2.1.5 Mitigation Measures

The USACE recognizes the necessity of a vireo management strategy and habitat compensation to achieve restoration and maintenance of habitat that may be altered, diminished in value, or lost as a result of this project. USACE is engaged in ongoing coordination with USFWS and other resource agencies for purposes of formulating and implementing management strategies designed to reduce or eliminate potential impacts on listed species resulting from continuing water conservation planning in Prado Basin.

The general mitigation policy of the resource agencies, as well as USACE, reflects the definitions of mitigation provided in the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) guidelines. In order of preference, these are:

1. avoiding impacts by not taking a certain action or parts of an action;
2. minimizing impacts by limiting the degree or magnitude of the action and its implementation;
3. rectifying impacts by repairing, rehabilitating, or restoring the affected environment;
4. reducing or eliminating impacts over time by preservation and maintenance operations during the life of the action;
5. compensating for impacts by replacing or providing substitute resources or environments.

USFWS and Environmental Protection Agency (EPA) policies both state that each of these five elements represent the preferred sequence of priorities by which to approach any mitigation planning process, emphasizing that all options for achieving 1st-order mitigation must be fully exhausted before moving to the next level. An evaluation of alternatives presented in this biological assessment, along with the results of mitigation negotiations conducted to date between the above agencies and USACE, indicate that the top four approaches to mitigation are generally incompatible with operation of Prado Dam in a manner to maximize water conservation benefits through increased storage capacity and a release regimen unavoidably affecting additional land within the basin. Therefore, the mitigation plan is limited primarily to compensation for impacts by replacement of habitat values, or otherwise providing substitute resources.

USACE's goal for accomplishing adequate mitigation of impacts resulting from water conservation operations at Prado Basin is 100 percent compensation for lost wildlife habitat values through a combination of ongoing habitat enhancement and resource management through the Santa Ana River Watershed Program..

Mitigation for maintaining a water conservation pool at elevation 494 ft during the flood season and a water conservation pool elevation 505 ft during the non-flood season has already been negotiated under the 1992 water conservation agreement (USACE 1992b). In that agreement it was assumed that all habitat values within the flood season pool (to elevation 494 ft) would be lost, and that 50 percent of the habitat values in the non-flood season water conservation pool (between elevations 494 and 505 ft) would be lost. Under the currently proposed program, using the Locally Preferred Alternative (Alternative 2) as an example, the flood season pool would be raised from elevation 494 to 500 ft. Therefore, habitat values originally compensated for at 50 percent between these elevations would now be compensated an additional amount based on the number of additional days the basin would be inundated at 500 ft following a "worst case" 100-year storm event (Table 13). For example, under present conditions, the basin is flooded at the 500-ft level for 215 days following a 100-year storm. If the flood-season water conservation pool is maintained at 500 ft instead of 494 ft, the basin would be flooded for 240 days at 500 ft. This represents an 11.6 percent increase in number of days of inundation.

As 50 percent of the habitat between 494 and 500 feet has already been mitigated, additional mitigation under Alternative 2 is therefore calculated at 11.6 percent for the remaining 50 percent of vireo critical habitat between elevations 494 and 500 ft not previously mitigated. Habitat values lost between elevations 498 and 505 ft have already been fully mitigated under the previous agreement. Table 13 shows the mitigation costs associated with each alternative.

Alternative 1 (NED Alternative)

Impacts within the Basin would include the following: 87.6 ha (216.1 ac) of willow woodland and 1.4 ha (3.5 ac) of mixed eucalyptus and willow woodland for a total of 89.0 ha (219.6 ac). To compensate for these impacts, the following measures are recommended.

1. The entire 89.0 ha (219.6 ac) have already been mitigated at 50 percent. To phrase it another way, 44.5 ha (109.8 ac) have already been mitigated at 100%. An additional 6.3 percent mitigation (or 2.8 ha [6.9 ac]) for impacts on the remaining 44.5 ha (109.8 ac) is all that is required based on the additional number of days of inundation at 498 ft in a 100-year flood event. The local sponsor will restore a minimum of 2.8 ha (6.9 ac) of vireo nesting habitat by planting understory adjacent to suitable woodlands at priority locations in the Basin. The locations and planting scheme will be subject to the approval of the USFWS.

2. The local sponsor will provide compensation to the Trust Fund to continue restoration of riparian habitat in the upper watershed. The compensation will total $172,500.

Impacts downstream of the Basin include the understory associated with 59.3 ha (146.4 ac) of native riparian vegetation. Understory is assumed to occupy 30 percent of the total area, or 17.8 ha (43.9 ac). Only about 50 percent of the understory, or about 8.9 ha (22.0 ac) will be impacted.

3. The local sponsor will restore a minimum of 8.9 ha (22.0 ac) of vireo nesting habitat within the Prado Basin by providing understory in pure woodlands, as above.

4. The local sponsor will provide additional support through the Trust Fund for watershed restoration of $550,000.

Alternative 2 (Locally Preferred Alternative)

Impacts within the basin would include effective loss of the following: 138.5 ha (341.7 ac) of willow woodland and 2.1 ha (5.2 ac) of mixed eucalyptus and willow woodland, for a total of 140.6 ha (346.9 ac). To reduce these impacts below the level of significance, the following measures are recommended.

1. The entire 140.6 ha (346.9 ac) have already been mitigated at 50 percent; an additional 11.6 percent mitigation for the remaining 70.2 ha (173.5 ac), or 8.1 ha (20.1 ac), is all that is required based on the additional number of days of inundation at 500 ft in a 100-year flood event. The local sponsor would acquire 8.1 ha (20.1 ac) for restoration. This land will be obtained from a 45.4-ha (112-ac) parcel within Prado Basin that is available for restoration.

2. The local sponsor would provide compensation to the Trust Fund for maintenance of the 8.1 ha (20.1 ac) of riparian habitat that will be acquired for restoration. The total compensation will be $25,000/ac for a total of $502,500.

Impacts in the reach of river below the dam would include loss of understory vegetation associated with 71.0 ha (175.3 ac) of native riparian vegetation. Understory is assumed to occupy 30 percent of the total area or 21.3 ha (52.6 ac). About 50 percent of the understory, or about 10.7 ha (26.3 ac), would be impacted.

3. The local sponsor will acquire 10.6 ha (26.3 ac) from the remaining 37.2 ha (91.9 ac) of the original 45.4-ha (112-ac) parcel within the Prado Basin that is available for mitigation.

4. The local sponsor will provide compensation to the Trust Fund for maintenance of the 10.6 ha (26.3 ac) of riparian habitat that will be acquired for restoration. The total compensation will be $25,000/ac for a total of $657,500.

Alternative 3 (Pre-Construction Alternative)

Impacts within the Basin would include the following: 87.6 ha (216.1 ac) of willow woodland and 1.4 ha (3.5 ac) of mixed eucalyptus and willow woodland for a total of 89.0 ha (219.6 ac). To reduce these impacts, the following measures are recommended.

1. The entire 89.0 ha (219.6 ac) have already been mitigated at 50 percent. An additional 6.3 percent mitigation on the remaining 44.5 ha (109.8 ac), or 2.8 ha (6.9 ac), is all that is required based on the additional number of days of inundation at 498 ft in a 100-year flood event. The local sponsor will acquire 2.8 ha (6.9 ac) for restoration. This land will

be obtained from a 45.4-ha (112-ac) parcel within Prado Basin that is available for restoration.

2. The local sponsor will provide compensation to the Trust Fund for maintenance of the 2.9 ha (6.9 ac) of riparian habitat that will be acquired for restoration. The total compensation will be $25,000/ac for a total of $172,500.

Impacts downstream of the Basin include the understory associated with 59.3 ha (146.4 ac) of native riparian vegetation. Understory is assumed to occupy 30 percent of the total area, or 17.8 ha (43.9 ac). Only about 50 percent of the understory, or about 8.9 ha (22.0 ac) will be impacted.

3. The local sponsor will acquire 8.9 ha (22.0 ac) from the remaining 42.5 ha (105.1 ac) of the original 45.4-ha (112-ac) parcel within the Prado Basin that is available for mitigation.

4. The local sponsor will provide compensation to the Trust Fund for maintenance of the 8.9 ha (22.0 ac) of riparian habitat that will be acquired for restoration. The total compensation will be $25,000/ac for a total of $550,000.

In addition to the above, in the event that the water conservation pool rises late in the flood season or in the early non-flood season as the result of late winter storms, threatening existing occupied vireo nests, OCWD, in cooperation with USFWS, will dedicate personnel to physically relocate these nests to minimize the impact from the higher water conservation pool.

4.2.2 SOUTHWESTERN WILLOW FLYCATCHER

The willow flycatcher (*Empidonax traillii*), like the least Bell's vireo, is a riparian obligate species present in the United States only during the summer months. Birds that breed in Southern California are representative of the subspecies *extimus*, the southwestern willow flycatcher. The first birds arrive in Prado Basin in early May, rendering it one of the last of Southern California's non-resident breeding birds to arrive. Females follow shortly after the males, and nesting commences by the end of May. Most young are fledged by July, and the last birds to depart have left the basin by late August, although migrants, presumably of other subspecies from farther north, may be seen occasionally through September.

As with the least Bell's vireo, the southwestern willow flycatcher has declined as a result of habitat destruction and fragmentation, along with heavy brood parasitism by the brown-headed cowbird. As a result of the precipitous decline in numbers of breeding flycatchers and reduction in the species' range, it was listed as endangered by the USFWS on 27 February 1995 under the federal ESA of 1973 (USFWS 1995b).

The southwestern willow flycatcher's breeding range includes Southern California, Arizona, New Mexico, western Texas, southwestern Colorado, southern Nevada and Utah, and northwestern Mexico. Unitt (1987) estimated that the population was "well under 1,000 pairs, more likely 500." By the mid-1990s, despite the discovery of previously unknown populations, the population was estimated to be between 300 and 500 pairs, with "more than 75 percent of the locations where flycatchers are found having five or fewer territorial birds and up to 20 percent of the locations having single, unmated individuals" (USFWS 1997a).

4.2.2.1 Existing Conditions

4.2.2.1.1 Status in Prado Flood Control Basin

Although willow flycatchers were monitored sporadically as early as 1993 in the basin, it was not until 1996 that they were closely monitored on an annual basis. Seven home ranges were detected in 1996, with pairs found in four home ranges (Pike *et al.* 1996). Two of these pairs produced a total of four fledglings. In 1997, six willow flycatchers were present in the basin, at least two of which were paired (Pike *et al.* 1997). Both successfully raised young. The first birds arrived on 7 May. Five of the six were returning to territories occupied the previous year. In 1998, only three home ranges were located, with one pair producing four young. The other two males were unpaired (Pike *et al.* 1998). In 1999, five home ranges were located, with three pairs producing five young.

All known flycatcher territories in the basin have been in proximity of water-filled creeks or channels. In addition, territories have incorporated overgrown clearings with at least a few moderately tall, often dense, willows. Among the five nests found in 1996, two were in arroyo willows, one was in a red willow, one was in a narrow-leaved willow, and one was in a tamarisk (*Tamarix* sp.). Two of the five nests produced a total of four fledglings. Of the other three nests, two were predated and the other contained a cowbird egg and was abandoned. Willow flycatchers have bred in the north, west, and south portions of the basin.

Since first discovered in the basin in 1987, no more than seven territorial flycatchers have been present in any one year, and 24 fledglings in all have been observed over the past 13 breeding seasons (through 1999), 20 of these in the last five seasons (Collins *et al.* 1992; Pike *et al.* 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999). Flycatchers have bred almost exclusively in a patch of riparian scrub southwest of the west end of the Corona Airport runway at or above the 508-ft elevation line. Table 14 clearly indicates that the species' status as a breeder in the basin is tenuous. Prado Basin is one of the few places in Southern California where *E. t. extimus* still breeds.

4.2.2.1.2 Status in the Santa Ana River Below Prado Basin

In 1999, three surveys were conducted in Reach 9 between 15 May and 10 July according to USFWS protocol; no flycatchers were found. Because the willow flycatcher sings less frequently and its songs are less audible than the vireo, traffic noise from the nearby freeway may have masked the presence of one or more pairs, so the negative survey results should not be considered conclusive.

4.2.2.1.3 Critical Habitat

Designated critical habitat for this species (USFWS 1997b) includes dense thickets of riparian shrubs and trees, both native and exotic, in the riparian ecosystem located within the 100-year floodplain. It also includes areas where dense riparian vegetation is not present, but may become established in the future. The species composition of vegetation ranges from nearly monotypic stands to multiple species stands with a structure ranging from simple, single stratum patches as low as 3 m (10 ft) in height and lacking a distinct overstory to complex patches with multiple strata and canopies nearing 18 m (59 ft) in height. Vegetation patches may be uniformly dense throughout, or occur as a mosaic of dense thickets interspersed with small openings, bare soil, open water, or shorter, sparser vegetation. These patches may be relatively dense, linear contiguous stands or irregularly-shaped mosaics of dense vegetation with open areas. In size, these habitat patches may vary considerably, with some as small as 0.8 ha (2 ac) and others as large as several hundred hectares. The Prado Basin and Santa Ana River upstream to near the City of Riverside is one of seven areas designated as critical habitat in California and one of 18 such areas rangewide. Habitat in the river below Prado Dam has not been designated as critical habitat.

TABLE 14
WILLOW FLYCATCHER NESTING SUCCESS IN PRADO BASIN

Year	Territories	Pairs	Nests	Fledglings
1987	0	0	0	0
1988	NA	1	1	2
1989	NA	NA	NA	0
1990	NA	NA	NA	0
1991	5	3	1-2	2
1992	NA	NA	NA	0
1993	3	3	1	0
1994	5-6	2+	NA	0
1995	3	1	1	3
1996	7	4	2	4
1997	6	2	2	4
1998	3	1	1	4
1999	5	3	3	5

NA – Not available because no survey was conducted.

Essentially all areas of least Bell's vireo critical habitat above the dam encompass southwestern willow flycatcher habitat. Therefore, impacts on willow flycatcher critical habitat and mitigation for loss of this critical habitat are considered the same for both species.

4.2.2.1.4 Recovery and De-Listing

The prime objective of the Draft Recovery Plan for the southwestern willow flycatcher is the essentially same as that outlined above for least Bell's vireo.

4.2.2.2 Direct Impacts

Because willow flycatchers do not arrive on their breeding grounds until mid-May and do not commence nesting before the end of May, it is highly unlikely that any storm event this late in the season would be of such magnitude as to raise the reservoir pool high enough to destroy flycatcher nests. Also, willow flycatchers do not normally nest in this portion of the basin. Nor would releases from the dam, no matter how great, directly impact birds downstream of the dam, their nests, or their eggs, as this species has not been found nesting below the dam. Therefore, no adverse direct impacts on the birds are foreseen.

Impacts on this species' critical habitat are expected to be similar to those for the least Bell's vireo under all alternatives (see above).

4.2.2.3 Indirect and Off-site Impacts

As with the least Bell's vireo, no indirect impacts on the flycatcher or its critical habitat are foreseen. At present, the few flycatchers that nest in the basin are found off-site above 505 ft elevation; however, land within the basin at and above this elevation is unlikely to be inundated during the flycatcher nesting season (late May to August), even following a 100-year flood event (see Tables 1 through 7). Thus, no off-site impacts on the southwestern willow flycatcher or its critical habitat are foreseen.

As no flycatchers have been recorded nesting in the river floodplain below the dam, no indirect or off-site impacts are foreseen at the present time.

4.2.2.4 Cumulative Impacts

Cumulative impacts in Prado Basin on the southwestern willow flycatcher are expected to be similar to those on the least Bell's vireo, however, more restricted, as flycatchers currently only nest in one small area on the south side of the basin near the west end of the Corona airstrip. No cumulative impacts are anticipated in the river floodplain below the dam, as no flycatchers have been recorded nesting in that area.

4.2.2.5 Mitigation Measures

Mitigation measures for this species are included in those described for the least Bell's vireo above. However, the local sponsor will reassign one existing vireo monitor to full time population research on the southwestern willow flycatcher in an attempt to gain a better understanding of why this species has not responded to current management for the vireo and flycatcher and their critical habitat in the Basin. As part of its commitment to work closely and coordinate with the USFWS, the local sponsor will submit an annual work plan for both vireo and flycatcher studies in the Basin.

4.2.3 SANTA ANA SUCKER

The Santa Ana sucker (*Catostomus santaanae*) was listed as a federally threatened species in April 2000 (USFWS 2000a). This species, along with the arroyo chub and speckled dace, make up a sensitive aquatic community designated the south coastal minnow/sucker stream community. The Santa Ana sucker is typically found in small to medium-sized flowing streams, usually less than 8 m (25 ft) in width, with depths ranging from a few centimeters to over a meter. Its original range consisted of the Los Angeles, Santa Ana and San Gabriel river systems within the Los Angeles Basin (Smith 1966). Now, it is confined to the Santa Ana River, Tujunga Wash in the Los Angeles River system (possibly extirpated), and in the upper San Gabriel River system. Suitable survey conditions for this species extend throughout the year, but in the lower basin the best time to survey is only during periods of low water when the flowing stream habitat it inhabits is not inundated.

4.2.3.1 Existing Conditions

Although introduced fishes now predominate along the lower portions of the Santa Ana River, where they have largely eliminated the native species, small numbers of the Santa Ana sucker still exist in the basin and the Santa Ana River between Prado Dam and Weir Canyon where they are confined to the main branch of the river. Between 27 June and 17 August 1998, surveys were conducted at 25 stations along the Santa Ana River between Norco and Weir Canyon, and along the three tributaries within the Prado Basin. A total of 42 Santa Ana suckers were found, all in the mainstem of the Santa Ana River; however, none were found within the 494-505 ft zone or downstream to the dam. The nearest station where the species was recorded (16 individuals) was at Station 8 just NNW of the Corona Airport and about 1.5 km upriver of the 505-ft contour line. All suckers examined were juveniles or young of the year, and their numbers appear to be highly transitory, suggesting that the main breeding populations are farther upstream. The Santa Ana River in the Norco region may serve as a nursery. Suckers found below the dam are effectively isolated from the gene pool upstream of Prado Dam. Although limited spawning habitat may be found in this reach of the river, it is not yet clear whether suckers breed in Reach 9. Some of the side drainages appear to have suitable substrate for spawning (*e.g.*, Chino Creek between Central Avenue and Euclid Avenue) but may be too polluted.

4.2.3.2 Direct Impacts Within Prado Basin

Alternative 1 (NED Alternative)

Implementation of Alternative 1 would result in the inundation and loss of significant flow in a 160-m (525-ft) length of the Santa Ana River (suckers have not been found in the three tributaries in the basin) between 494 and 498 ft for an average of 6 more days at elevation 494 ft and 4 more days at elevation 498 ft compared to existing operations. Because suckers are not known to spawn in this portion of the Santa Ana River (they spawn upstream; only juveniles and young of the year are typically found within the basin), this increased duration of inundation would have no adverse direct impact on sucker populations in the portion of the Santa Ana River within the basin.

Alternative 2 (Locally Preferred Alternative)

Implementation of Alternative 2 would result in inundation and loss of significant flow in a 365-m (1,200-ft) length of the Santa Ana River between elevations 494 and 500 ft for an average of 10 more days per year under present conditions and 15 more days per year under future conditions compared to existing operations. This slight increase over Alternative 1 would have no adverse direct impact on sucker populations in the portion of the Santa Ana River within the basin.

Alternative 3 (Pre-Construction Alternative)

Impacts under this alternative are the same as under the NED Alternative; however, only for a three-year period rather than the 50-year life of the project.

4.2.3.3 Direct Impacts Within the River Between Prado Dam and Weir Canyon

Alternative 1 (NED Alternative)

Releases from Prado Dam would adversely affect populations of suckers below the dam. Some suckers are likely to pass through the release gates during maximum releases under this alternative. As limited spawning areas exist in the river below the dam, many of these suckers would be effectively removed from the gene pool. Additionally, many suckers already below the dam are likely to be carried farther downstream past the drop structure at Weir Canyon. Suckers below Weir Canyon Road cannot return upriver past this drop structure, and no habitat for this species exists below the drop structure. Impacts on this species are therefore adverse and significant.

Alternative 2 (Locally Preferred Alternative)

Impacts on suckers under this alternative would be incrementally greater than under the pre-construction alternative both in terms of individuals flushed through the dam and downstream below Weir Canyon with each release, and in terms of long-term reduction in populations above the dam in conjunction with the increased frequency of releases over many years. Therefore, impacts on the species would be adverse and significant.

Alternative 3 (Pre-Construction Alternative)

Impacts under this alternative are the same as under the NED Alternative; however, only for a three-year period rather than the 50-year life of the project.

4.2.3.4 Indirect and Off-Site Impacts

Increasing the size of the reservoir pool, on average, over that of current operations for water conservation, even if only for a few days a year on average, may create conditions for an expansion of the population of aquatic predator base in the reservoir pool. As many of these predators (bass, bullfrogs, etc.) prey on young suckers, the potential for significant adverse indirect impacts on the Santa Ana sucker in the basin exists.

4.2.3.5 Cumulative Impacts

One other major disturbance-producing activity has been identified within and adjacent to the Santa Ana River and other stream channels in the Prado Basin: the construction of levees to protect existing facilities around the perimeter of the basin in conjunction with raising Prado Dam and Spillway as part of the Santa Ana River Mainstem Project. This would also entail the construction of temporary haul roads and the removal of 3.7 million m^3 (4.8 million yd^3) of material from two borrow sites. Use of these borrow sites has the potential to impact suckers directly through the generation of sediments and other pollutants that, without preventive measures, would enter the channels.

Downstream of the dam, berms would be constructed to protect the integrity of the stream channel in this reach of the Santa Ana River. This activity is also expected to have an adverse effect on this species. Two other projects are planned or recently completed in the vicinity, upstream of the basin: the Zone 2 Norco Bluffs stabilization project just upstream and on the other side of I-15 from the project site, which was recently completed, and the Zones 3-5 Norco Bluffs bluff toe stabilization project just downstream of I-5. These activities may result in a slight increase in sedimentation from particulates washed downstream during construction and would potentially degrade foraging ability and, if any exist, spawning areas. The River diversion associated with the Zones 3-5 Norco Bluffs project may also have an adverse effect on suckers.

4.2.3.6 Mitigation Measures

Direct impacts on Santa Ana Suckers and their potential spawning habitat downstream of Prado Dam are considered to be adverse and significant regardless of project alternative, but are largely attributable to the flood control project. To compensate for impacts in this reach of the Santa Ana River, the local sponsor will prepare a Santa Ana Sucker Management Plan, an outline of which is provided in Appendix C of the EIS (USACE 2000a). This plan will be initiated at project approval and implemented adaptively thereafter for the life of the project. The focus of the plan will be to restore and manage the aquatic, riverine environment for native fishes through the Basin. The plan will be adaptive so that adjustments can be made as needed.

An integral part of the management plan will be an aquatic predator control plan. Non-native fishes and amphibians that thrive in ponds and sluggish streams have been introduced throughout the region and have proliferated especially in the Prado Basin. If these predators can be maintained in low numbers, or even eradicated, it is expected that sucker populations will benefit significantly.

OCWD will provide in-kind services or cash contributions of $25,000 annually for the first five years and $10,000 annually for 45 years toward the implementation of the sucker management plan. Implementation has three basic components: habitat enhancement, aquatic predator control, and sucker monitoring. Habitat enhancement will be initiated with completion of the plan and proceed adaptively with management and monitoring for the 50-year project life. The most likely areas for creating or enhancing sucker spawning habitat should be along the stretch of river between Interstate 15 on the upstream end and River Road on the downstream end, as well as in Reach 9, as suckers are already present in these sections, at least seasonally. This would be accomplished cooperatively with the Ad Hoc Sucker Committee.

Between River Road and the dam, the emphasis will be on aquatic predator control and enhancement of tghe riverine environment. The objective is to significantly reduce the populations of these predators along this stretch of seasonally flooded river within the basin proper, and maintain their numbers at this lower level (it may not be feasible to eliminate aquatic predators altogether). This, in conjunction with enhancement of the riverine environment, will provide safer passage of suckers through the Basin.

The Santa Ana sucker population in the river between I-15 to Weir Canyon will be monitored annually during the 50-year life of the projects, and adjustments made to the implementation strategy as needed to facilitate the recovery of sucker populations and encouraging sucker spawning along this stretch of the Santa Ana River. A by-product of the sucker management plan will be a healthier aquatic environment for all native fish species in the river, including the arroyo chub.

5 CONCLUSIONS

Implementation of either the NED or Locally Preferred action would result in the ebb and flow of critical habitat for the least Bell's vireo and willow flycatcher as inundation levels of the basin behind Prado Dam fluctuate widely from year to year. The least Bell's vireo is known to breed in substantial numbers on and in the vicinity of the project site, and one or more pairs of southwestern willow flycatcher breeds annually nearby. On a long-term basis, the area of suitable habitat in the basin for these two species would be expanded over the current condition through project mitigation. Direct impacts on vireo and flycatcher nests from late-season flooding would be mitigated by re-locating active nests higher above the flood pool. Indirect impacts on the vireo and flycatcher would result from direct impacts on their nesting habitat. Off-site impacts are anticipated above Prado Dam. The Buffer Pool (elevations below 494 feet) will be flooded more frequently than at present, with a likely decrease in the amount of critical habitat for the vireo over time. No off-site impacts are anticipated below the dam.

The Santa Ana sucker is found within the project footprint, primarily as juveniles in the upper basin and juveniles and adults below the dam. Significant direct impacts on this species downstream of Prado Dam are likely as a result of increased volumes and frequency of releases of water through the dam. Potentially significant smpacts from a higher water conservation pool behind the dam would result from possible proliferation of aquatic predator species in the larger (on average) reservoir pool. As mitigation for these impacts, OCWD would participate in the preparation and implementation of a management plan for the sucker in the watershed, including a predator control program.

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TABLE 8
AREAL EXTENT OF VEGETATION COMMUNITIES BETWEEN 494 AND 505 FEET IN THE PRADO BASIN

Vegetation Communities	Current Operations		Alternative 1		Alternative 23		Alternative 3	
	Flood 494 ft	Non-Flood 505 ft	Flood 498 ft	Non-Flood 505 ft	Flood 500 ft	Non-Flood 505 ft	Flood 498 ft	Non-Flood 505 ft
Willow Woodland	0 ha 0 ac	256.4 ha 632.7 ac	87.6 ha 216.1 ac	256.4 ha 632.7 ac	138.5 ha 341.7 ac	256.4 ha 632.7 ac	87.6 ha 216.1 ac	256.4 ha 632.7 ac
Willow Woodland/ Riparian Scrub	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac
Arundo	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac
Herbaceous Riparian	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac	0 ha 0 ac
Freshwater Pond	0 ha 0 ac	89.7 ha 221.3 ac	37.4 ha 92.2 ac	89.7 ha 221.3 ac	58.1 ha 143.5 ac	89.7 ha 221.3 ac	37.4 ha 92.2 ac	89.7 ha 221.3 ac
Freshwater Marsh	0 ha 0 ac	4.1 ha 10.1 ac	3.2 ha 8.0 ac	4.1 ha 10.1 ac	3.6 ha 8.9 ac	4.1 ha 10.1 ac	3.2 ha 8.0 ac	4.1 ha 10.1 ac
Riverine (Freshwater Aquatic)	0 ha 0 ac	1.9 ha 4.8 ac	0.9 ha 2.2 ac	1.9 ha 4.8 ac	1.2 ha 2.9 ac	1.9 ha 4.8 ac	0.9 ha 2.2 ac	1.9 ha 4.8 ac
Sandy Wash	0 ha 0 ac	1.5 ha 3.8 ac	0.1 ha 0.3 ac	1.5 ha 3.8 ac	0.5 ha 1.3 ac	1.5 ha 3.8 ac	0.1 ha 0.3 ac	1.5 ha 3.8 ac
Eucalyptus Woodland	0 ha 0 ac	11.3 ha 28.0 ac	4.7 ha 11.5 ac	11.3 ha 28.0 ac	6.1 ha 15.1 ac	11.3 ha 28.0 ac	4.7 ha 11.5 ac	11.3 ha 28.0 ac
Eucalyptus/ Willow Woodland	0 ha 0 ac	3.9 ha 9.7 ac	1.4 ha 3.5 ac	3.9 ha 9.7 ac	2.1 ha 5.2 ac	3.9 ha 9.7 ac	1.4 ha 3.5 ac	3.9 ha 9.7 ac
Fallow Field	0 ha 0 ac	33.3 ha 82.1 ac	8.0 ha 19.8 ac	33.3 ha 82.1 ac	11.3 ha 28.0 ac	33.3 ha 82.1 ac	8.0 ha 19.8 ac	33.3 ha 82.1 ac
TOTAL:	0 ha 0 ac	402.1 ha 992.5 ac	143.3 ha 353.6 ac	402.1 ha 992.5 ac	221.4 ha 546.6 ac	402.1 ha 992.5 ac	143.3 ha 353.6 ac	402.1 ha 992.5 ac

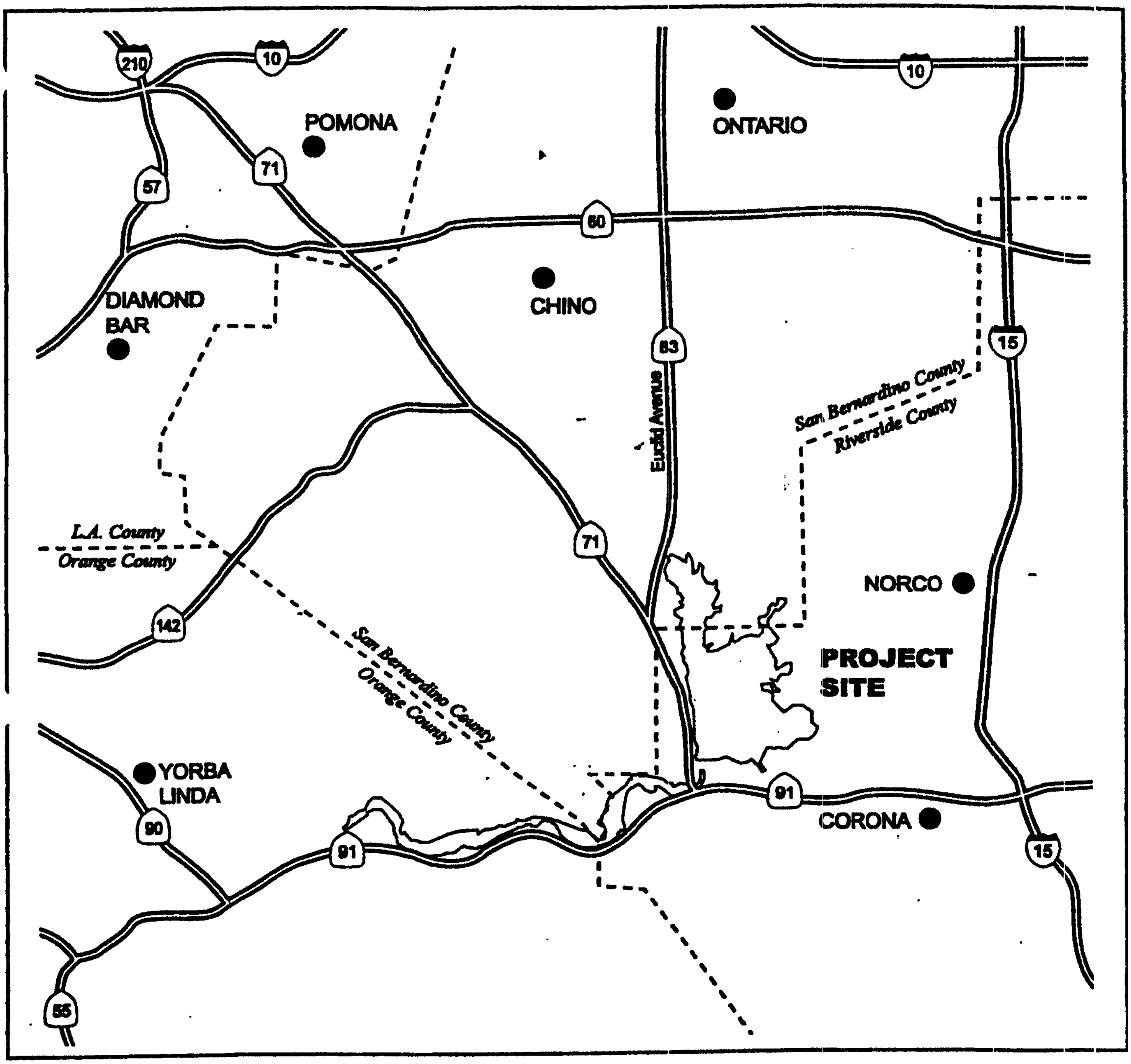
TABLE 9
AREAS OF RIPARIAN HABITAT INUNDATED IN THE SANTA ANA RIVER BELOW PRADO DAM TO WEIR CANYON AT DIFFERENT RELEASE RATES

Habitat	Release Rate	Total Area Inundated	Percent Inundated	Total Area
Cottonwood/Willow Riparian	5,000 cfs	141.2 ac	59.3	
Cottonwood/Willow Riparian	7,400 cfs	167.1 ac	70.2	
Cottonwood/Willow Riparian	14,900 cfs	223.5 ac	93.9	
Cottonwood/Willow Riparian	25,900 cfs	232.4 ac	97.6	
Cottonwood/Willow Riparian				238.1 ac
Riparian Scrub	5,000 cfs	5.2 ac	12.0	
Riparian Scrub	7,400 cfs	8.2 ac	18.9	
Riparian Scrub	14,900 cfs	26.2 ac	60.4	
Riparian Scrub	25,900 cfs	29.7 ac	68.4	
Riparian Scrub				43.4 ac
Arundo	5,000 cfs	21.8 ac	65.7	
Arundo	7,400 cfs	26.4 ac	79.5	
Arundo	14,900 cfs	32.0 ac	96.4	
Arundo	25,900 cfs	32.6	98.2	
Arundo				33.2 ac

TABLE 13
PRADO DAM WATER CONSERVATION
MITIGATION COSTS

Alternative	Zone	Habitat Flooded (ac)*	Understory Impacted (ac)	Mitigation Level	Area to Mitigate (ac)	Minus 112-ac Donation	Cost @ $45,000/ac	Maintenance @ $25,000/ac on Restored Land	Contribution (Subtotal)	Contribution (Total)
MITIGATION FOR IMPACTS ABOVE PRADO DAM										
1	494-498	54.9	---	6.3%	6.9	-105.1	$0.00	$172,500	$172,500	
2	494-500	86.8	---	11.6%	20.1	-91.9	$0.00	$502,500	$502,500	
3	494-498	54.9	---	6.3%	6.9	-105.1	$0.00	$172,500	$172,500	
MITIGATION FOR IMPACTS BELOW PRADO DAM										
1	494-498	146.4	43.9	50%	22.0	-83.1	$0.00	$550,000	$550,000	$722,500
2	494-500	175.3	52.6	50%	26.3	-65.6	$0.00	$657,500	$657,500	$1,160,000
3	494-498	146.4	43.9	50%	22.0	-76.2	$0.00	$550,000	$550,000	$722,500

* For impacts above Prado Dam, the acreage is 50% of the total amount flooded because 50% of this flooded habitat has already been fully mitigated under the previous Water Conservation agreement.



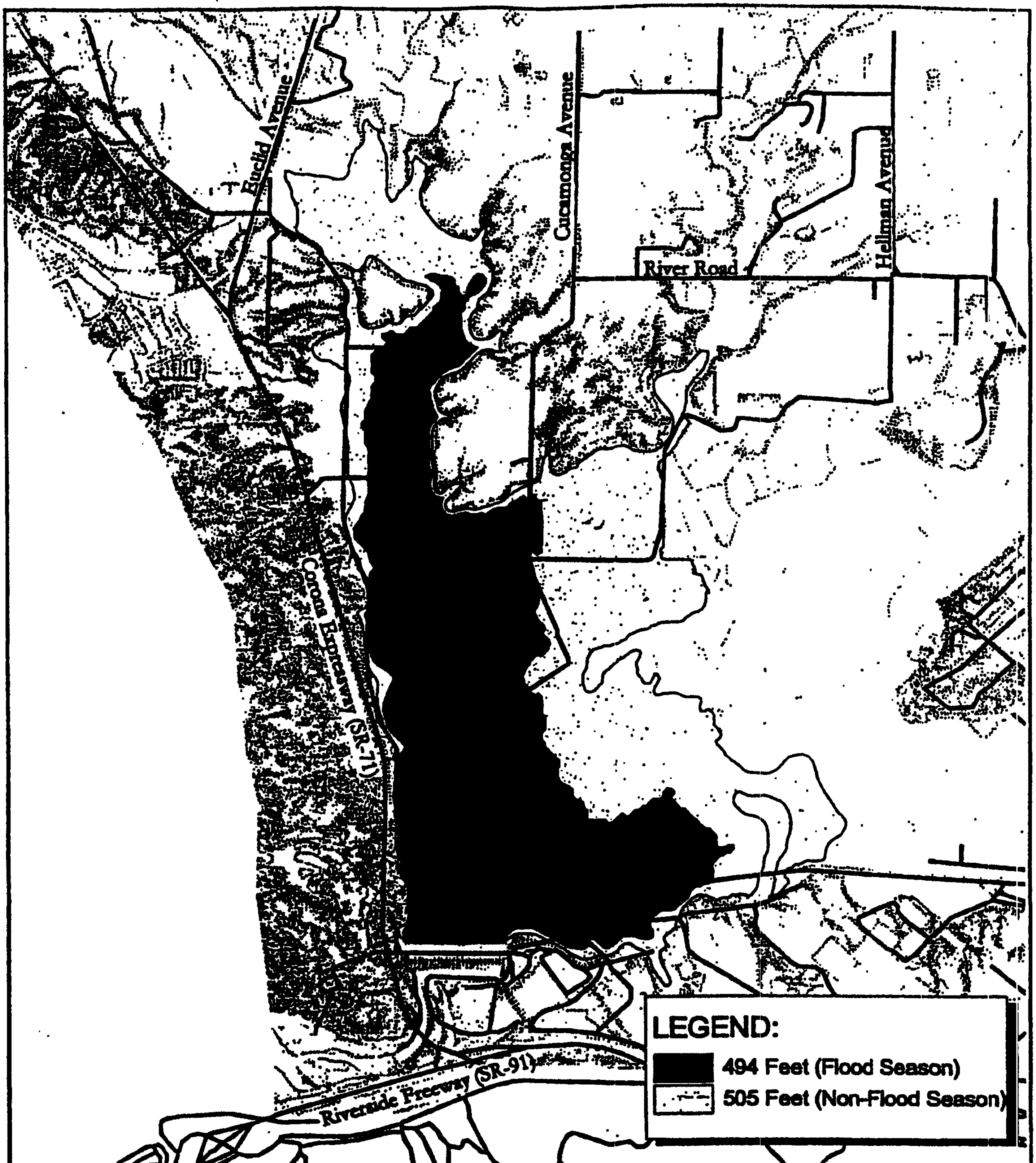
LMI
Larry Munsey International

Exhibit 1
Local Vicinity Map

2.5 1.25 0 2.5
SCALE IN MILES

Prado Dam Water Conservation And Supply Study
Biological Assessment

00210002 • 6/01



LMI
Larry Mumsey International

exhibit 5

Current Operations - Long Term Water Conservation Levels

NORTH

Feet	3348	1674	0	3348
Meters	1021	510	0	1021

Prado Dam Water Conservation and Supply Study
Biological Assessment

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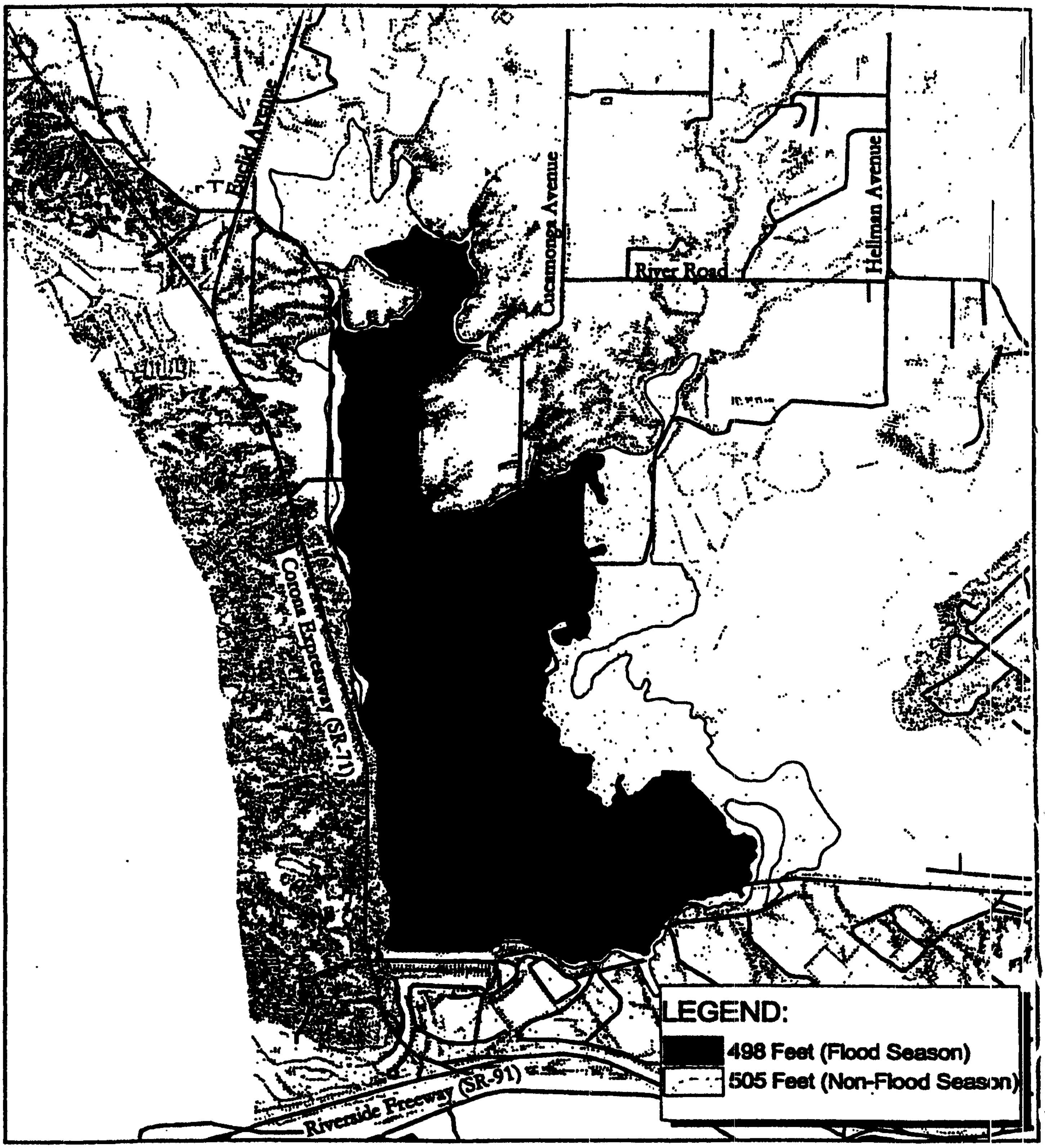

exhibit 6

LMI
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Alternatives 1 and 3 - Long-Term and Interim Water Conservation Levels

NORTH

Feet 3348 1674 0 3348

Meters 1021 510 0 1021

Prado Dam Water Conservation and Supply Study
Biological Assessment

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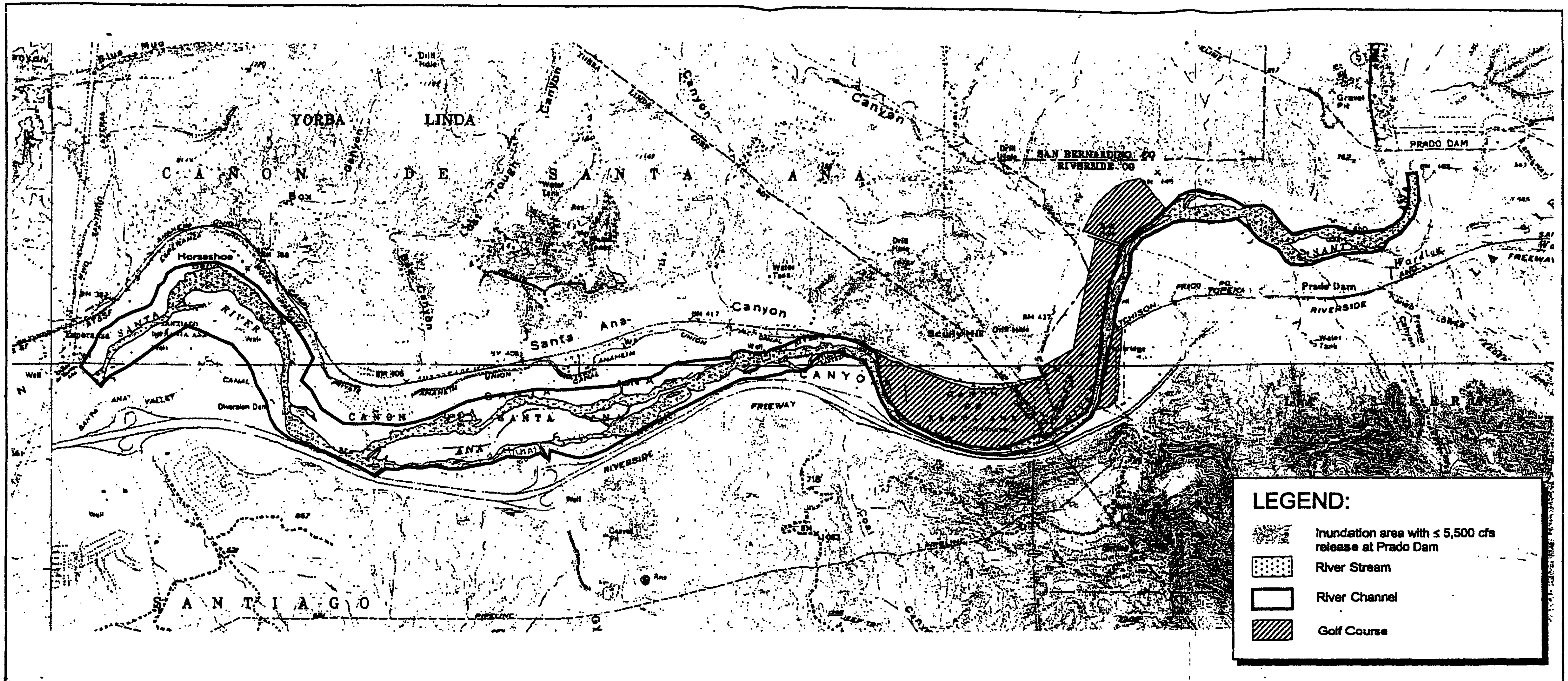


Source: Surel Raster Maps 1999.

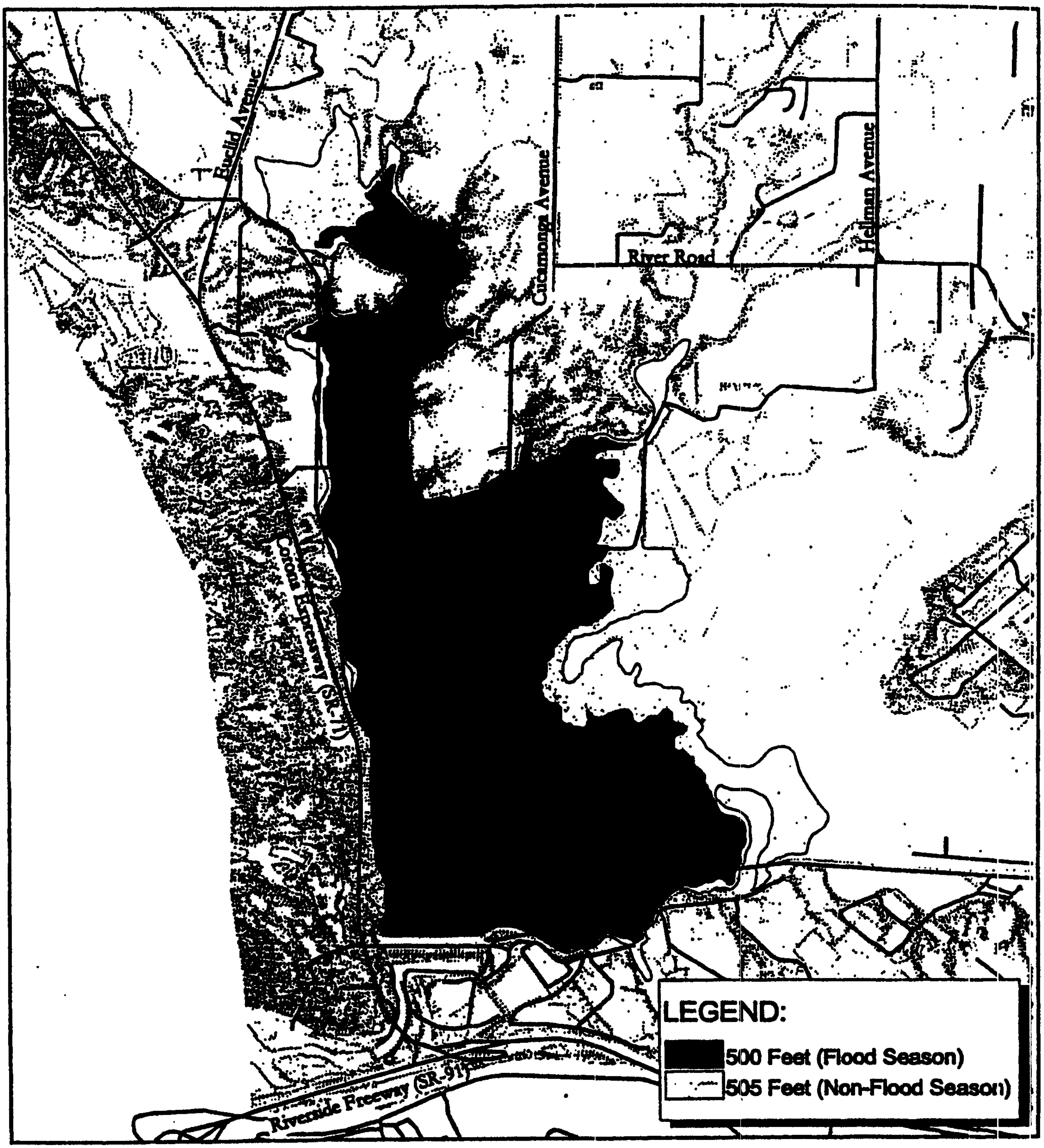
LMI
Larry Munsey International

NORTH
Feet 2500 1250 0 2500
Meters 700 350 0 700

00020201 • 5/01

exhibit 7
Maximum Downstream Inundation Areas Under Alternatives 1 and 3

Prado Dam Water Conservation and Supply Study
Biological Assessment



LMI
Larry Munsey International

exhibit 8

Alternative 2 - Long-Term Water Conservation Levels

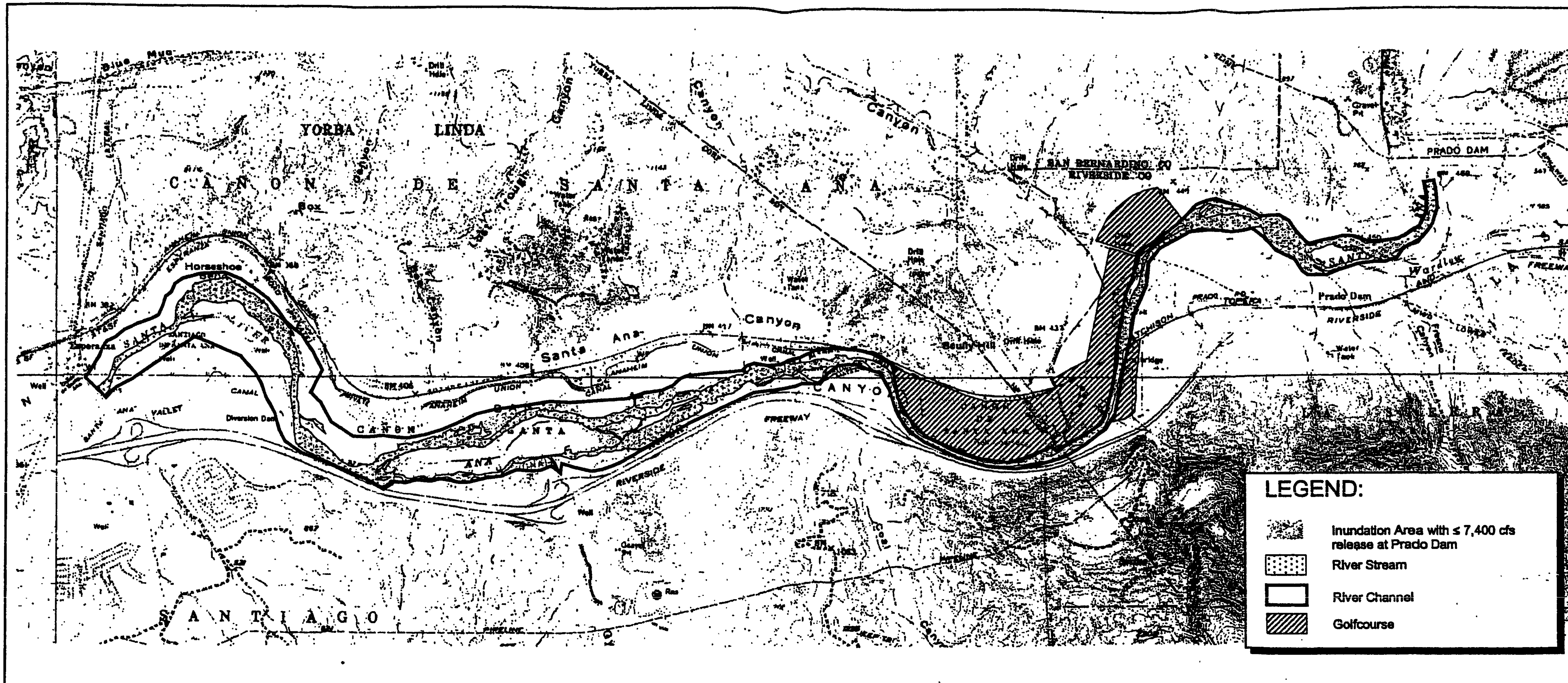
NORTH

Feet 3348 1674 0 3348

Meters 1021 510 0 1021

Prado Dam Water Conservation and Supply Study
Biological Assessment

00020201 • 5/01



Source: Surel Raster Maps 1999.

LMI
Larry Munsey International

NORTH

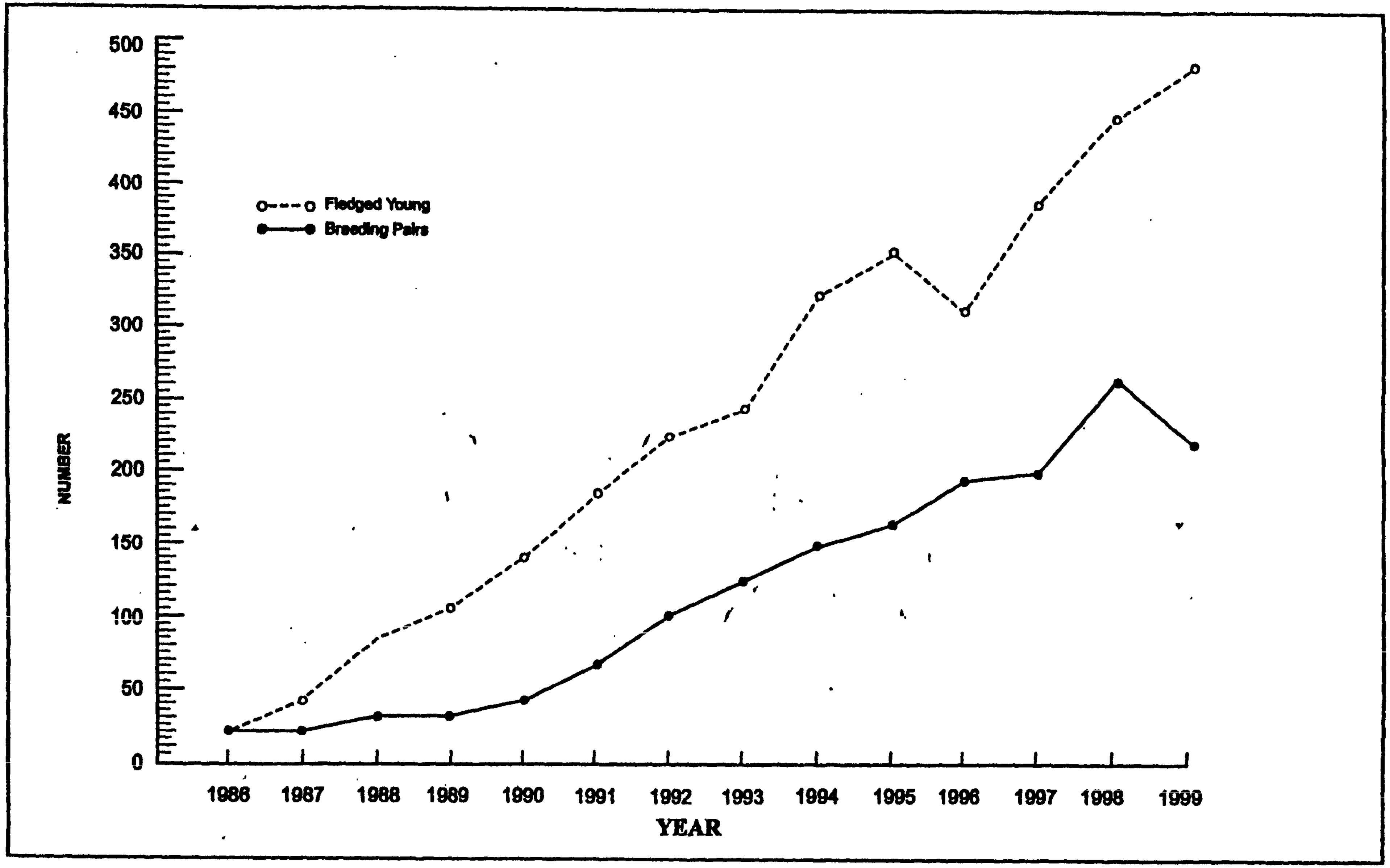
Feet	2500	1250	0	2500
Meters	700	350	0	700

00020201 • 5/01

exhibit 9

Maximum Downstream Inundation Areas Under Alternative 2

Prado Dam Water Conservation and Supply Study
Biological Assessment



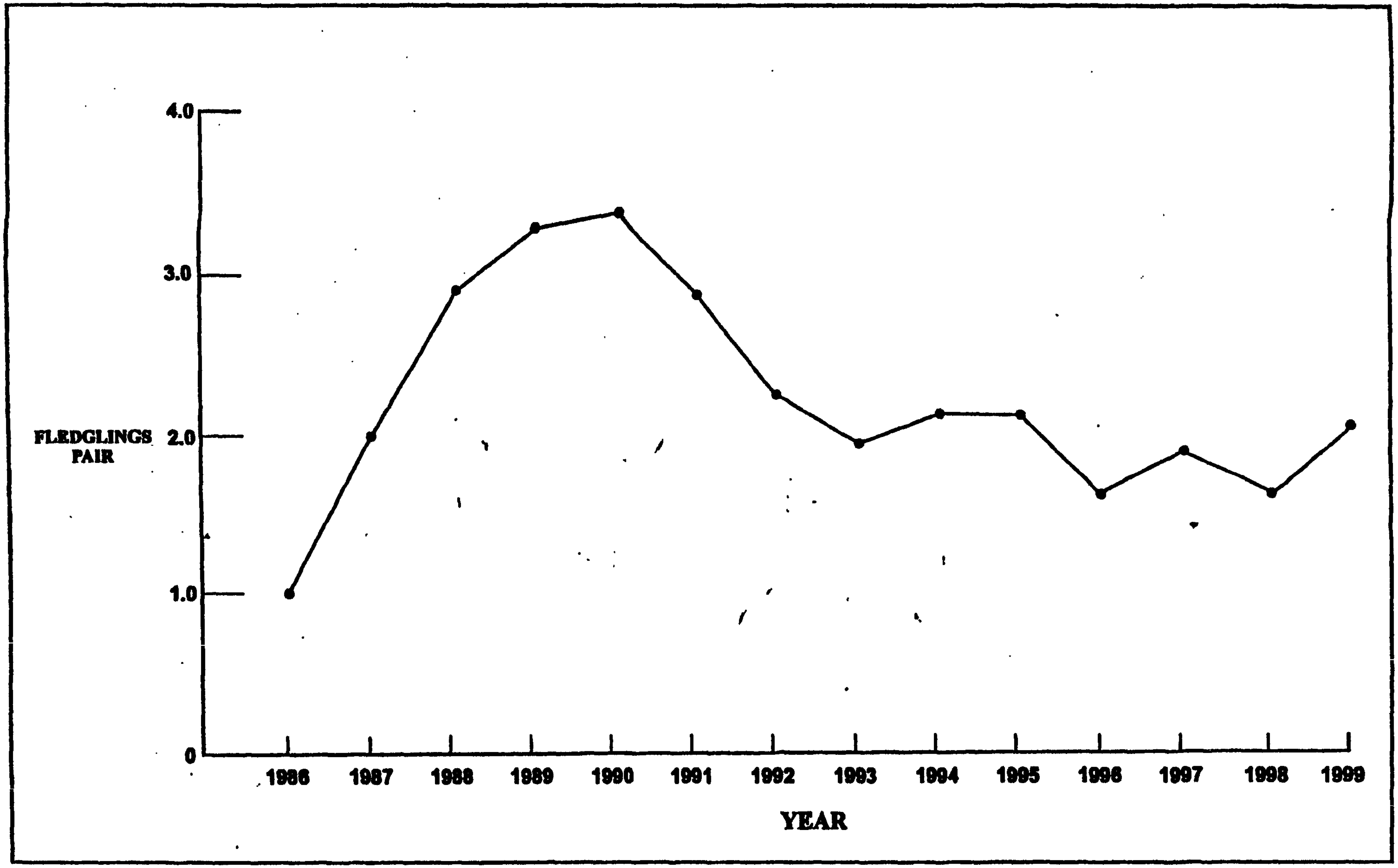
Larry Munsey International

Exhibit 10

Least Bell's Vireo Breeding Success, 1986-1999

Prado Dam Water Conservation And Supply Study
Biological Assessment

00210002 • 5/01



Larry Munsey International

Exhibit 11

Least Bell's Vireo Average Number of Fledglings Produced Per Pair, 1986-1999

Prado Dam Water Conservation And Supply Study
Biological Assessment

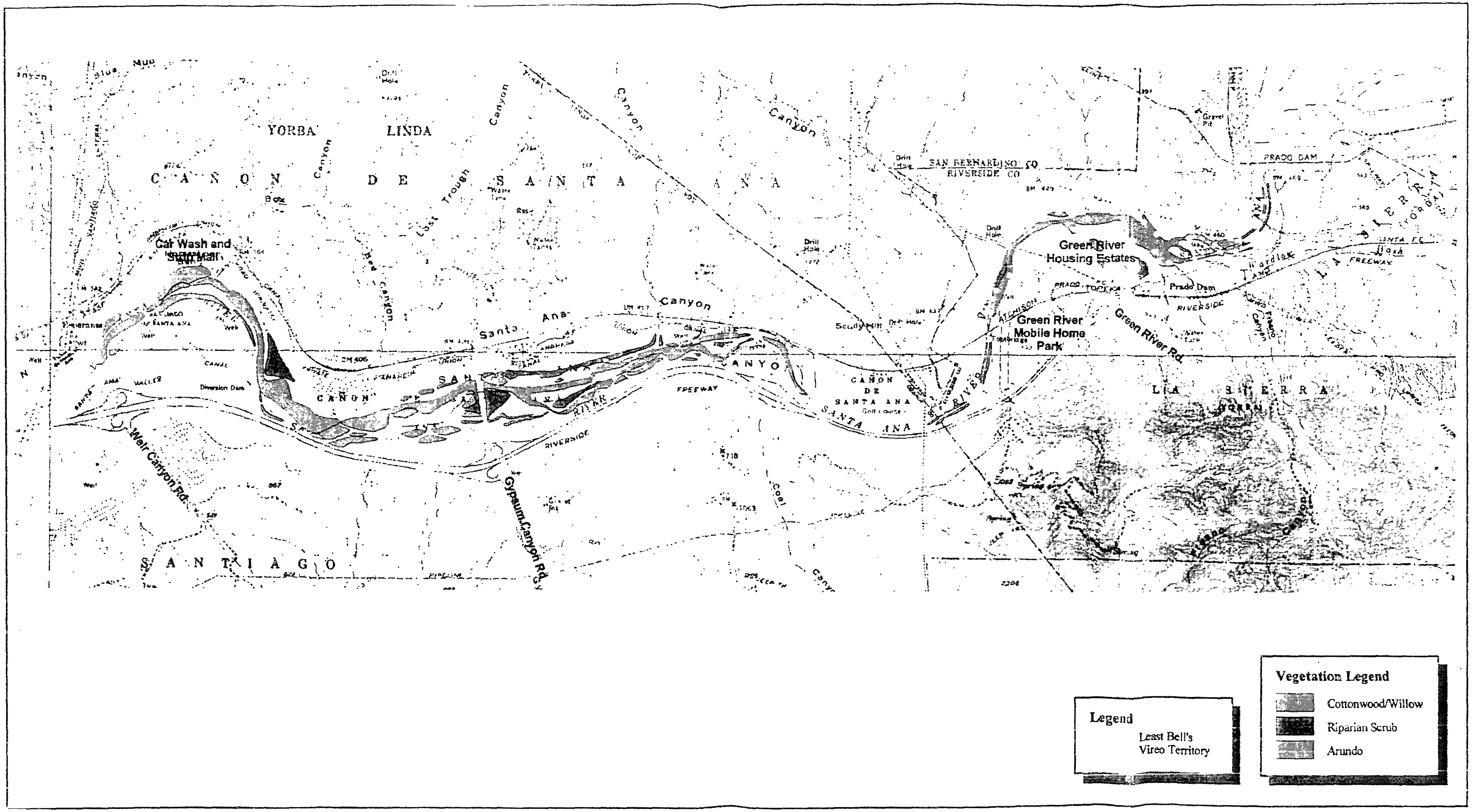


exhibit 12

Least Bell's Vireo Territories, Reach 9

Supplemental EIS and Project EIR for Prado Basin
Including Stabilization of the Bluff Toe at Norco Bluffs

LMI
Larry Munsey International

NORTH
Feet 2000 1000 0 2600
Meters 800 400 0 800

00020101 • 4/2000

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OUTLINE OF THE MANAGEMENT OF THE SANTA ANA SUCKER AND EXOTIC AQUATIC SPECIES IN THE PRADO BASIN ENVIRONS

DRAFT CONSERVATION PROGRAM
FOR THE SANTA ANA SUCKER (*Catostomus santaanae*)
WITHIN THE SANTA ANA RIVER WATERSHED
Revision Date: December 3, 2004

I. BACKGROUND

The Santa Ana sucker (*Catostomus santaanae*, "sucker") currently resides in portions of the Los Angeles, San Gabriel, Santa Ana, and Santa Clara River watersheds. Over the past 30 years, the range of the sucker has been significantly reduced within all four watersheds. It is estimated that 75 percent of its native range has been lost (64 FR 3915). In response to this decline in status, the U.S. Fish and Wildlife Service (Service) proposed listing the sucker as a federally threatened species on January 26, 1999 (64 FR 3915). The final rule listing the sucker as a federally threatened species was published on April 12, 2000 (65 FR 19686). Critical habitat was designated for the Santa Ana sucker on February 27, 2004 (69 FR 8839).

Largely because of a concern for the decline in the population of the sucker, an informal group of local, regional, State, and Federal agencies formed the Ad-Hoc Santa Ana Sucker Discussion Team, now known as the Santa Ana Sucker Conservation Team (Conservation Team) in the spring of 1998. The objective of the Conservation Team was to identify and implement measures that would contribute to the survival and recovery of the sucker, primarily within the Santa Ana River (SAR) watershed. Through a coordinated effort by the Conservation Team, research priorities and funding sources were identified with the result that three separate studies were completed during 1999 and 2000. The first study examined the affects of physiochemical variables such as stream discharge and water quality on the sucker. A second study examined migration patterns, predatory fish relationships, and the use and importance of tributaries for the sucker. The final study focused on developing conservation strategies for the recovery of the sucker in the SAR.

As an outgrowth of these studies, the Conservation Team proposed a Conservation Program (Program) for the sucker for an initial term of five years, commencing on September 1, 2000. The Program was developed based on the *Conservation Program for the Santa Ana Sucker in the Santa Ana River, Southern California* (SMEA, 1999, see Appendix A) and was designed to foster open, collaborative conservation efforts funded primarily by agencies with a stake in the SAR. Through consultation with the Service, the original Program has since been revised to include specific conservation measures intended to minimize potential adverse affects of existing maintenance activities for flood control, water conservation, water treatment and discharge on the sucker.

In conjunction with development of the Program, the Conservation Team has continued to fund research studies to further investigate the biology and ecology of the sucker. Reports generated as a result of the Conservation Team=s efforts are summarized in Appendix A. In addition, the Conservation Team has produced annual progress reports documenting maintenance and operations activities conducted in the SAR by agencies within the Conservation Team since September 2001.

II. PURPOSE

The Program's primary purpose is to promote the long-term survival and recovery of sucker in the SAR through a comprehensive and integrated, watershed-wide effort. The Program also provides guidelines for specific types of on-going activities (Covered Activities) with the potential to adversely affect the sucker. The following Covered Activities are included in the Program: 1) vehicle crossing for operation and maintenance purposes, 2) maintenance of existing flood control structures, 3) low-flow channel maintenance, 4) earthen dike and levee repair, 5) vegetation maintenance, 6) operation and maintenance of wastewater treatment plants, and 7) operation and maintenance of constructed wetlands and recharge basins. The Program promotes sucker conservation by implementing research, restoring and creating habitat, instituting measures to avoid or minimize adverse affects to suckers from Covered Activities, and providing a framework for monitoring of the status of the sucker in the SAR.

III. PROGRAM ELEMENTS

A. Participants and the Conservation Team

Participants are defined as agencies or individuals that agree to implement the Program, attend monthly Program meetings, and provide financial support to the Program.

The following agencies were Participants in the Program between 2001 and 2004:

$ City of Riverside Regional Water Quality Control Plant (RWQCP)
$ The Rapid Extraction and Infiltration (RIX) Facility which is operated by City San Bernardino Municipal Water Department and owned by the Colton/San Bernardino Regional Tertiary Treatment and Water Reclamation Facility
$ Orange County Water District (OCWD)
$ Orange County Resources and Development Management Department (OCRDMD)
$ Riverside County Flood Control and Water Conservation District (RCFCD)
$ Riverside County Transportation Department (RCTD)
$ San Bernardino County Flood Control District (SBCFCD)
$ Orange County Sanitation District (OCSD)

The Conservation Team is comprised of the Participants, state and federal agencies, and members of the scientific community. In addition to the above named Participants, the Conservation Team included the following agencies and individuals between 2001 and 2004:

$ U.S. Fish and Wildlife Service (Service)
$ U.S. Army Corps of Engineers (Corps)
$ California Department of Fish and Game (CDFG)
$ San Marino Environmental Associates (SMEA)
$ Dr. Camm Swift
$ California Regional Water Quality Control Board (RWQCB) - Santa Ana Region
$ U.S. Geological Survey (USGS)
$ Chino Basin Watermaster
$ Inland Empire Utilities Agency

B. Program Administration

The Program will be formally administered by the Participants based upon the majority action of the Participants in consultation with the Conservation Team. Notwithstanding the foregoing, without the approval of an affected Participant, neither the Participants nor the Conservation Team:

$ May amend the Program or make determinations that would increase the funding required of such affected Participant; or

$ Restrict the right of an affected Participant to terminate its participation in the Program.

The Participants may select one or more public agencies to administer the Program or elements thereof (Administrator). Among other things, the Administrator shall prepare an Annual Operating Plan, for the coming year and may be authorized by the Participants to engage scientists, consultants, and other subcontractors to undertake elements of an approved Annual Operating Plan. At this time, the Santa Ana Watershed Project Authority (SAWPA), a joint powers agency of the five major water districts within the watershed, has been appointed the Administrator subject to further action by the Participants.

The Annual Operating Plan will contain proposed research and conservation activities, a proposed budget and any modifications to the Program. The Annual Operating Plan will commence on September 1st of each year and expire on August 31st of the following year. Proposed Annual Operating Plans for the coming year will be submitted to the Conservation Team by July 31st and shall be approved by the Participants and the Service by August 31st. An Annual Operating Plan may be revised if necessary in the same manner as it was originally approved.

The Participants shall not be obligated or liable with respect to the carrying out of the Program, including, but not limited to, the acts of the Administrator or contractors engaged by the Administrator, in excess of the funds provided or committed to. With respect to the Program, there is no partnership, joint venture or agency relationship among or with respect to the Participants or any Participant and the Administrator. In administering the Program or any element thereof, the Administrator shall act as an independent contractor and shall take responsibility with respect to the contracts, services arrangement and engagements entered into by it.

The Conservation Team will conduct the Program in an open, public, and collaborative manner with the affected constituency of agencies and interests, including, but not limited to the biologists for the various agencies that have participated in the development of the Program. They will conduct monthly meetings, open to the public, on the progress of the Program and any proposed revisions or extensions.

C. Coverage for Incidental Take of the Sucker

Some incidental take of suckers may occur in the course of carrying out Covered Activities despite the implementation of impact minimization measures that have been included in the Program. Implementation of the Program's research and habitat improvement measures may also result in some incidental take of suckers, even though the purpose of these actions is to contribute to the species' conservation. Section 9 of the Act prohibits the "take" (e.g., harm, harassment, pursuit, injury, kill) of federally listed wildlife. "Harm" is further defined to include habitat modification or degradation where it kills or injures wildlife by impairing essential behavioral patterns including breeding, feeding, or sheltering. Take incidental to otherwise lawful activities can be authorized under section 7 (Federal consultations) and section 10 (private permits) of the Act.

The Service initiated formal consultation with the U. S. Army Corps of Engineers on the Santa Ana Sucker Conservation Program and its associated Covered Activities on January 27, 2003. Since then, the Service and the Conservation Team have been conducting meetings, site visits, and discussions on project development. The Service will issue a Programmatic Biological Opinion (BO) on the Program after fully evaluating effects of the Program on federally listed species. If it is determined that the Program will not jeopardize the continued existence of the sucker and other federally listed species, then some anticipated level of incidental take stemming from the implementation of the Covered Activities and sucker conservation efforts will be authorized. Those Participants that are included in the BO will be exempt from section 9 prohibitions against take as long they adhere to the Program guidelines and the incidental take statement. New Participants in the Program may seek incidental take authorization for projects that can be categorized as Covered Activities, through an amendment to the BO.

This Program is designed to minimize the adverse affects of on-going operations and maintenance activities on the sucker. New construction or new operations that deviate significantly from the Covered Activities may require separate consultation with the Service.

D. Adaptive Management

It is anticipated that knowledge gained through long-term monitoring and research will be used to reevaluate the Program over time. For example, a change in the status of the species or new information pertaining to a particular aspect of life history of the sucker could result in changes to the minimization measures associated with one or more Covered Activities. In addition, new activities may be added to the Program and existing Covered Activities may be modified. Through application of adaptive management the Program will remain "evergreen" in nature.

All proposed modifications to the Program, will be reviewed by the Service on an annual basis. If it is determined that the proposed changes may substantively alter affects to the sucker, then reinitiation of formal Section 7 consultation, pursuant to the Act, will be required to determine if the changes can be formally adopted.

E. Funding Obligations

The Program will initially be funded based on fiscal year 2003-2004 contribution levels which totaled $125,000 for that year. Contribution levels may increase yearly upon approval of Participants, after consultation with the Service. Yearly increases shall be limited to the Consumer Price Index (CPI). Total Program funding may also be increased if additional agencies join the Program as Participants. Although the Participants are responsible for funding the Program, other sources, including private, State, and Federal funding will be solicited to augment funding from the Participants.

Unless otherwise directed by the Participants, funds for the Program will be deposited and held in a dedicated fund (Conservation Fund) managed by the Administrator. Pursuant to this agreement, the Participants will deposit specified amounts in the Conservation Program Fund on presentation of an invoice by the Administrator. Funds will only be disbursed in accordance with an approved Program and budget. The budget shall include administrative costs, consultant costs and contingency funds. Administrative costs and contingency funds shall not exceed thirty percent of the total Program funding for a given year. The expenditure of Program funds from the Conservation Fund will require approval of the Service, which will be accomplished through the approval of the Annual Operating Plan and budget.

F. Reporting Requirements

Annual reports of the previous year's research and management accomplishments will be prepared by the Program Administrator. These reports will be provided to the Conservation Team and the Service by December 31st of each year. Reports will include two components: 1) Research and Monitoring, and 2) Covered Activities.

The Research and Monitoring portion of the report will include the following information: 1) an executive summary of significant actions that were accomplished; 2) results and analysis of all monitoring and research completed during the year; 3) location and condition of any habitat restoration efforts; 4) assessment of the current status of the sucker in the SAR; and 5) recommendations for future research efforts.

The Covered Activities portion of the report will include the following information for each Participant in the Program: 1) an executive summary of all Covered Activities that were conducted; 2) estimates of the amount of habitat disturbed and disturbance type (*i.e.*, permanent or temporary); 3) observations of federally listed species or their sign in the vicinity of instream activities; 4) estimates of incidental take; 5) any other pertinent data concerning the implementation of measures to avoid or minimize adverse affects to the sucker and an explanation of any failure to meet such measures; 6) any anticipated changes in the project description, modifications to the Program and/or new activities that will be proposed; and 7) recommendations.

G. Termination of the Program or Participation

The Program may be terminated upon 60 days written notice in the event that if, by the commencement of any Plan year, the Participants have failed to approve an Annual Operating Plan and budget for that year. In addition, the Program may be terminated at any time prior to the end of the term (including approved extensions) upon 90 days prior written notice with two-thirds approval of the Participants.

Any Participant may terminate its participation in the Program upon 90 days prior written notice to the other Participants and to the Service. Upon termination by a Participant, the terminated Participant shall have no further obligation except for funds then deposited with the Administrator or for accrued or then reasonably unavoidable costs and expenses. The terminated Participant shall no longer be covered by the BO and incidental take statement for this Program.

The Service will review annually, or as needed, the activities conducted by Participants for consistency with the BO. If the Service determines that the activities of an individual Participant are no longer in accord with the project description, as outlined in the BO, the Service will notify the Participant and the Army Corps of Engineers in writing and if appropriate, request reinitiation of consultation.

IV. RESEARCH AND MONITORING

Each year, the Participants and the Service will approve specific research, monitoring and habitat improvement projects to be included in the Annual Operating Plan and implemented in the coming year. The Annual Operation Plan will include a description of each project which clearly identifies the purpose and need for project, location, and methods for evaluating the success of the project. In order to monitor the success of the Program, in terms of its contribution to the survival and conservation of the sucker, the following long-term goals have been identified:

$ Develop and implement a program for long-term monitoring of the status of sucker and its habitat in SAR watershed[1];

[1] The monitoring program will be designed to provide sufficient statistical power to

$ Conduct sufficient research to determine the essential habitat features, life history strategies and water quality conditions for the sucker;

$ Develop and implement a habitat enhancement plan for the SAR watershed;

$ Identify sources of exotic species in the SAR watershed and establish an effective removal program.

Initial Program efforts will focus on research and monitoring. Research will provide information that will assist with the design of habitat improvement projects and the future management of the sucker in the SAR. Results from these studies will be incorporated into the Program and move the focus of the Program accordingly. The development of a monitoring program for evaluating the status of the sucker population in the SAR will be critical to tracking the success of the Program over the long-term.

V. COVERED ACTIVITIES

Guidelines for conducting on-going operation and maintenance activities known to occur in the Santa Ana River were developed by the Service, with input from the Participants in the Program, so as to avoid or minimize impacts to the sucker. As a result of this effort, eight categories of activities have been designated as Covered Activities under the Program. For each Covered Activity conducted by a Participant, all applicable general measures as well as measures specified under the particular Covered Activity will be implemented.

Unless otherwise specified, the following measures will apply to all areas of the SAR and it=s tributaries within potential sucker habitat. For the purposes of this Program, potential sucker habitat is defined as all soft bottom reaches of the SAR and it's tributaries which contain flowing water contiguous with areas of occupied habitat during some portion of the year. Potential habitat does not include diversion channels to or from recharge basins or constructed wetlands. Occupied habitat includes all areas of the SAR and it's tributaries that have been surveyed for the sucker, with positive results, within 5 years of initiation of the Covered Activity.

Detailed project descriptions of activities conducted by each Participant will be incorporated in

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detect trends in population dynamics within the SAR watershed with 90% confidence, as well as the effects of habitat, aquatic variables, and management actions on sucker populations. The program will include an evaluation of all potential habitat (as defined in Section V).

the BO. Specific conservation measures proposed by each Participant for incorporation in the BO may deviate from the guidelines provided in this Program based on the intensity, frequency, and geographic location of the activity; however, they must provide an equivalent amount of protection for the sucker.

Implementation of some Covered Activities will require the involvement of a qualified biologist. A qualified biologist is defined, for the purpose of this Program, as an individual that has a minimum of 30 hours of supervised observation of the sucker and has been approved by the Service (specific details on what will be required of a qualified biologist will be included in an appendix to this document). Approval is dependent upon the submission of the name(s), any permit numbers, résumés, and at least three references to the Service at least 15 days prior to the initiation of the defined activities. References must be familiar with the relevant qualifications of the proposed biologist.

Activities conducted in response to an emergency situation are not considered Covered Activities under the Program. An emergency is a situation involving an act of God, disasters, casualties, national defense or security emergencies, etc., and includes response activities that must be taken to prevent imminent loss of human life or property (50 CFR ' 402.05). If emergency actions may affect federally listed species and/or critical habitats, Participants should notify the Service prior to conducting the actions if possible. The Service will then offer recommendations to minimize the effects of the emergency actions on listed species or their critical habitat.

A. General Avoidance and Minimization Measures

1. Prior to conducting Covered Activities, Participants and/or their contractors will implement a sensitive resources education program to ensure that all personnel on site (including surveyors, construction engineers, employees, contractor=s employees, supervisors, inspectors, and all visitors not escorted by trained personnel) are fully informed of the biological sensitivities associated with the project. All personnel will be required to attend this program prior to working in sensitive areas. The names and signatures of all personnel that have completed the education program will be kept on file by the Participant while the personnel is on site during implementation of Covered Activities and for a minimum period of five years.

2. During the implementation of Covered Activities in Categories I-V at least one individual will be responsible for ensuring all personnel on the project site have access to the avoidance and minimization measures included in this Program and/or the BO as appropriate, and that all measures are being fully implemented. This person will be onsite at all times while the project is being conducted.

3. Prior to conducting Category I (maintenance of crossings only), II, III, or IV Covered Activities that involve water diversion or disturbance to water flow within all potential sucker habitat, Participants must have a qualified biologist conduct a survey for suckers or otherwise assume the project site is occupied. If suckers are present within the project footprint, they must

be removed and relocated prior to and during instream activities. A qualified biologist will oversee the execution of the relocation efforts within the project site. Suckers will be captured and relocated upstream of the project footprint, to an area previously designated by the qualified biologist. Prior to the relocation effort, a blocking net will be placed immediately upstream of the project area. If high flows preclude the effective placement of a blocking net, the qualified biologist may choose to implement alternative measures to minimize impacts to the sucker and relocate suckers downstream of the project site to an area that is not affected by the project.

Captured suckers will be retained in river water in insulated, aerated, and covered containers. Temperature, dissolved oxygen levels, and fish behavior (*e.g.*, fish gulping at surface may indicate overcrowded conditions and subsequent low dissolved oxygen levels) should be recorded once an hour until relocation to ensure ambient river water quality levels are maintained. The physical condition of the suckers should be recorded including gender if detectable from external examination and the presence of external parasites or lesions. Suckers will be relocated within four hours of capture to appropriate areas in the vicinity of the affected reach(es). Any Santa Ana speckled dace *(Rhinichthys osculus* spp.), arroyo chubs (*Gila orcutti*), or other native fish that are captured should be retained in river water in insulated, aerated, and covered containers, as necessary. Native fishes should be relocated as soon as possible to appropriate areas in the vicinity of the affected reach(es) as determined by the qualified biologist. Any exotic fish that are captured should not be released back into the affected reach(es) or other areas supporting native fish. All data collected during the relocation effort and any alternative measures implemented under the direction of the qualified biologist will be submitted to the Program Administrator for inclusion in the annual report for the Program.

4. If any potential habitat for the sucker is temporarily removed while conducting Covered Activities in Categories II and III, the habitat must be restored to identical or better[2] conditions after the activity is completed. If potential habitat is permanently removed, an equivalent amount and quality of habitat must be created within the same drainage prior to or concurrent with completion of the project. All habitat restoration and creation efforts conducted in areas with perennial flow will be monitored for a period of a 12 months after project completion to evaluate the status of the habitat. A physical description of the restored or created habitat, including channel width, depth, length; vegetation structure; algal structure; and substrate structure will be recorded on a quarterly basis. Monitoring results will include a comparison of the restored or created habitat with habitat that was temporarily or permanently removed and will be submitted to the Program Administrator for inclusion in the annual report for the Program.

5. Participants will implement the following measures while conducting activities adjacent to or within the active low-flow channel in potential sucker habitat:

$ Equipment maintenance will not be performed within or near any stream channel where

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[2] Examples of Abetter@ habitat for the sucker include a meandering channel, diversity of substrate (including sand, gravel, cobble and boulders), and vegetated and undercut banks.

petroleum products or other pollutants from the equipment may enter these areas under any flow;

$ No debris, cement, concrete, or washings thereof, or other construction related materials or wastes, oil or petroleum products will be allowed to enter into or be placed where it may be washed by rainfall or runoff into the wetted channel;

$ Nonnative vegetation debris, construction debris, and trash associated with maintenance and repair activities will not be deposited within 150 feet of the high water mark;

$ Participants will employ best management practices to reduce siltation and turbidity during all activities that require disturbance to the wetted channel; and

$ Vehicles that will operate within the wetted channel will be free of fluid leaks, external oil, and grease.

B. Categories of Covered Activities

Category I: Vehicle Crossing for Operation and Maintenance Purposes

Vehicles, including heavy machinery, can cross the Santa Ana River or its tributaries (with the exceptions of Rialto Drain and Sunnyslope Creek) if necessary to conduct a Covered Activity. This category does not apply to maintenance activities conducted within the wetted channel. Vehicles may not cross an active stream channel for purposes other than transportation of equipment, materials and personnel. Participants and/or their contractors will avoid crossing an actively flowing channel with vehicles to the maximum extent practicable. If this cannot be avoided, Participants will avoid or minimize adverse effects to the sucker by implementing the following measures:

1. Cross only at designated crossings, approved by the Service;
2. Stabilize approaches with vegetation and protect approaches and crossings with river rock when necessary to prevent erosion;
3. Maintain crossings between outside the spawning and nursery season of the sucker (September 1 and February 28/29);
4. Avoid crossing between March 1 and May 31;
5. If vehicular crossing cannot be avoided between March 1 and May 31, specific measures to minimize impacts to the sucker will be developed with individual Participants;
6. Minimize the number of crossings by consolidating trips;
7. Cross at no more than 5 miles per hour;
8. Cross at right angles to the main channel; and
9. Ensure that all vehicles that will operate instream are free of fluid leaks, external oil, and grease.

Category II: Maintenance of Existing Flood Control Structures

Existing flood control structures are defined to include levees, groins, riprap bank-stabilization structures, drop structures, and grade stabilizers. Maintenance of existing flood control structures includes the following activities: 1) repairing or replacing rip-rap where it has been destroyed through floods, erosion, or vandalism and 2) the modification or replacement of hard bank stabilization structures (concrete lining or soil cement), groins and drop structures, when they fail or are otherwise compromised, with structures that will have equal or less impact on the channel. Alternatives to replacing existing structures include providing bank stabilization by adding riparian vegetation, changing the slope of the bank to reduce the probability for slope failure, implementing soil bioengineering, maintaining or returning the floodplain to a natural state, or increasing channel width. Drop structures may also be modified to provide fish passage for the sucker. Participants will avoid or minimize effects to the sucker from the maintenance of existing flood control structures by implementing the following measures:

1. Conduct activities that require water diversion or other disturbance to the wetted channel between September 1 and February 28/29, which is outside the spawning and nursery season of the sucker;

2. If weather conditions or a maintenance backlog prevents a Participant from completing all necessary maintenance between September 1 and February 28/29, additional maintenance may be conducted between June 1 and August 31 if:

    a. surveys for suckers are conducted weekly by a qualified biologist, from just upstream to 300 feet downstream of the existing structure, beginning four weeks prior to conducting maintenance; and

    b. no spawning adults or juvenile suckers (< 25 mm) are encountered during each of the four surveys.

3. Maintain temporary water diversions for a maximum of two weeks.

Category III: Low-Flow Channel and Tributary Channel Maintenance

Sediment may be periodically removed from an existing low-flow or tributary channel to maintain its capacity. In addition, low-flow channels that are encroaching upon levees or groins may be redirected to prevent damage to the existing structures. Participants will avoid or minimize effects to the sucker from low-flow channel maintenance by implementing the following measures:

1. Conduct activities that require water diversion or other disturbance to the wetted channel between September 1 and March 14, which is outside the spawning and nursery season of the sucker;

2. If weather conditions or a maintenance backlog prevents a Participant from completing all necessary maintenance between September 1 and February 28/29, additional maintenance may be conducted between June 1 and August 31 if:

    a. surveys for suckers are conducted weekly by a qualified biologist, from just upstream to 300 feet downstream of the existing structure, beginning four weeks prior to conducting maintenance; and

    b. no spawning adults or juvenile suckers (< 25 mm) are encountered during each of the four surveys;

3. In all areas without perennial flow, conduct maintenance only when the channel is dry; and

4. Quantify sediment that is permanently removed from the river bed and submit this information to the Program Administrator for inclusion in the Annual Report.

Category IV: Earthen Dike and Levee Repair

Earthen dike and levee repair includes the replacement or repair of those dikes and levees that are regularly breached by storm events (*i.e.*, OCWD diversion dike located downstream of River Road Bridge). Participants will avoid or minimize effects to the sucker from the repair of earthen dikes and levees by implementing the following measures:

1. Maintain dikes or levees in such a way as to allow passage of the sucker through areas of potential habitat; and

2. Conduct repairs between September 1 and February 28/29 to the maximum extent practicable.

Category V: Vegetation Maintenance

Native and nonnative vegetation (as defined in Table 1) may be maintained for the purpose of the sustaining the capacity of the existing flood control facilities. The removal of nonnative vegetation is important for the recovery of the sucker within the SAR. Many nonnative plant species reduce the diversity of riparian vegetation and remove water from the SAR in excess of native vegetation. Due to the variability in the level of vegetation maintenance required to sustain flood capacity within different portions of the watershed, specific measures to avoid adverse impacts to the sucker from native vegetation maintenance will be developed with individual Participants. The following general measures will be implemented by all Participants that conduct vegetation maintenance in potential sucker habitat:

1. Apply only aquatic-approved herbicides such as Aquamaster (Rodeo) for vegetation treatment and train employees in the correct method of herbicide application. Do not spray herbicides over or into actively flowing water;

Table 1. Nonnative plant species that may occur in the vicinity of the Santa Ana River watershed.

Common Name	Species Name
tree of heaven	*Ailanthus altissima*
giant reed	*Arundo donax*
Australian saltbush	*Atriplex semibaccata*
black mustard	*Brassica nigra*
iceplant	*Carpobrotus edulis*
bull thistle	*Cirsium vulgare*
poison hemlock	*Conium maculatum*
jubata grass	*Cortaderia jubata*
pampas grass	*Cortaderia selloana*
artichoke thistle	*Cynara cardunculus*
eucalyptus	*Eucalyptus sp.*
fennel	*Foeniculum vulgare*
English ivy	*Hedera helix*
ice plant	*Malephora crocea*
crystalline iceplant	*Mesembryanthemum crystallinum*
myoporum	*Myoporum laetum*
tree tobacco	*Nicotiana glauca*
fountain grass	*Pennisetum setaceum*
castor bean	*Ricinus communis*
russian thistle	*Salsola tragus*
chinese tallow	*Sapium sebiferum*
tamarisk	*Tamarix gallica, T. parviflora*
tamarisk, salt cedar	*T. chinensis, T. ramosissima*
periwinkle	*Vinca major*
spiny cocklebur	*Xanthium spinosum*
marestail	*Hippuris vulgaris*
kochia	*Kochia californica*
yellow starthistle	*Centaurea solstitialis*
alligator weed	*Alternanthera philoxeroides*
ragweed	*Ambrosia artemisiifolia*
sowthistle	*Sonchus oleraceus*

London rocket (mustard)	*Sisymbrium irio*
lambsquarters	*Chenopodium album*
field bindweed	*Convolvulus arvensis*

2. Conduct all vegetation removal from outside the wetted channel;

3. Avoid removing vegetation within 10 feet of the wetted channel between March 1 and August 31;

4. Vegetation removal activities conducted within 10 feet of the wetted channel between March 1 and August 31 will be monitored by a qualified biologist to ensure there is no disturbance to the wetted channel; and

5. Minimize the number of pedestrian crossings of the wetted channel.

Category VI: Operation and Maintenance of Wastewater Treatment Plants

UNDER DEVELOPMENT

Category VII: Operation and Maintenance of Constructed Wetlands and Recharge Basins
Constructed wetlands and recharge basins are facilities that require conveyance of flow from the main river channel through a diversion channel or pipeline to a pond or series of ponds located adjacent to the main river channel. Participants will avoid or minimize effects to the sucker from the operation and maintenance of constructed wetlands and recharge basins by implementing the following measures:

1. Ensure that diversion channels to and from constructed wetlands and recharge basins have mechanisms to reduce immigration by the sucker and emigration of nonnative predators and competitors; and

2. Develop and implement a nonnative species removal program in constructed wetlands.

F BIOLOGICAL OPINION

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
2730 Loker Avenue West
Carlsbad, California 92008

In Reply Refer To:
FWS-WRIV-2102.3

JUL 0 1 2002

Colonel Richard G. Thompson
District Engineer
U.S. Army Corps of Engineers, Los Angeles District
P.O. Box 532711
Los Angeles, California 90053-2325

Attn: Alex Watt, Environmental Coordinator

Re: Biological Opinion for the Prado Dam Water Conservation and Supply Study, Orange, Riverside, and San Bernardino Counties, California

Dear Colonel Thompson:

This document transmits our biological opinion based on our review of the proposed Prado Dam Water Conservation and Supply Study and its effects on federally threatened and endangered species and their critical habitats, in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). The biological opinion considers the possible effects of the proposed action on the federally endangered least Bell's vireo (*Vireo bellii pusillus*, "vireo") and its designated critical habitat, endangered southwestern willow flycatcher (*Empidonax traillii extimus*, "flycatcher"), and threatened Santa Ana sucker (*Catostomus santaanae*, "sucker"). Your July 3, 2001, letter requesting the initiation of formal consultation on the revised project was received by us on July 10, 2001.

This biological opinion is based on information provided in the May 2001, *Draft Biological Assessment for the Prado Dam Water Conservation and Supply Study* (Draft BA), site visits, and correspondence, notes and information compiled during the course of our consultation with your agency (Corps) and the project proponent, Orange County Water District (District). This information and other references cited in this biological opinion constitute the best available scientific information on the status and biology of the species considered. The complete administrative record for this consultation is on file at the Carlsbad Fish and Wildlife Service Office (CFWO).

Consultation History

We have consulted informally with the Corps since November 1998 and provided draft and revised draft Fish and Wildlife Coordination Act Reports (dated November 18, 1999, and March

22, 2001, respectively) for use in planning for this project. Meetings attended by the Corps, District and CFWO to discuss the project and measures to offset project-related effects to federally listed species and their habitats were held in 1999 on July 1 and December 12; in 2000 on April 25, August 2, August 9, August 19, October 11, November 21; and in 2001 on January 9 and October 24. Since many of our biological concerns with this water conservation project were related to our concerns with the Santa Ana River Mainstem Project (Mainstem), we encouraged the Corps to postpone consultation on this project until the issuance of the biological opinion on Mainstem. However, the Corps requested initiation of formal consultation, which was begun on July 10, 2001, prior to issuance of the Mainstem biological opinion on December 5, 2001. We requested an extension of formal consultation to allow time for completion of the Mainstem biological opinion and review of requested biological and hydrological information. We provided a draft project description of the proposed action to the Corps and District on January 10, 2002, and held a telephone conference call on Janaury 29, 2002, to discuss the proposed conservation measures outlined in the draft project description. We held a telephone conference call with the District on February 5, 2002, to further discuss proposed conservation measures, and a second draft project description was provided to the Corps and District on February 11, 2002. The District responded to the second draft project description by telephone on February 19, 2002. Formal consultation was extended to Friday, April 19, 2002, by agreement of the Corps via electronic mail on March 27, 2002. We provided our draft biological opinion on Monday, April 22, 2002. We received your response to the draft and request for a final biological opinion on June 26, 2002.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The general area of the Prado Basin is divided by the Riverside and San Bernardino county lines, while the Orange County line is downstream of the Basin. Prado Dam was built just downstream of the confluences of Chino, Mill, and Temescal creeks with the Santa Ana River. The water flow in much of the Santa Ana River is perennial due to inputs of stormwater, urban runoff, and treated wastewater discharge into the river and several tributaries. The area immediately surrounding Prado Basin is a matrix of agriculture, residential and commercial development, and open space.

Prado Dam is a 106-foot-high rolled-earthfill structure with a current crest elevation of 566 feet above mean sea level. Its detached concrete spillway crests at 543 feet. When constructed, the dam provided flood protection for a 100-year flood event. However, with increased urban runoff from the surrounding area and accumulated sediment behind the dam, the flood control capacity of the dam has been reduced. In 1988, the Corps issued a Main Report and Supplemental Environmental Impact Statement of the Phase II General Design Memorandum for the Santa Ana River Mainstem Project (Corps 1988) that outlined construction plans, including increasing the dam height by about 28 feet and spillway height by 20 feet and other improvements to the dam outlet structures and spillway that would improve the dam's capacity to control flooding in a 190-year flood event. The dam and spillway-raising portion of the project has not yet been built, but in Reach 8 downstream of the dam, concrete drop structures and bank protection have been completed.

Water conservation, in addition to flood control, has taken place at Prado Dam since at least the late 1960s. Water conservation retains excess water behind the dam for regulated release that allows the District to percolate the discharge in their downstream spreading basins. Water retention levels and impact minimization measures associated with current water conservation practices were outlined in biological opinions issued by the U.S. Fish and Wildlife Service (Service) in 1993, 1995, and 2000 (Biological Opinion 1-6-93-F-7 dated February 25, 1993, Biological Opinion 1-6-95-F-28 dated April 20, 1995, and Biological Opinion 1-6-99-F-75 dated February 10, 2000). Current agreements permit water to be pooled to an elevation of 494 feet during the flood season (October 1 through the end of February) and to 505 feet during the non-flood season (March 1 to September 30). During the non-flood season, the District must release a flow equal to the maximum recharge capacity of the downstream basins or a running average of 500 cubic feet per second (cfs), whichever is greater. Water must be released at a greater flow rate if the water level exceeds 505 feet, to get the water's elevation back at or below 505 feet as quickly as possible.

Impact minimization measures by the District and Corps for currently implemented water conservation included monetary contributions to establish a conservation fund used to remove the non-native invasive plant *Arundo donax* ("arundo") from the Santa Ana River watershed, the creation of riparian habitat, establishment of a vireo and flycatcher monitoring program, and implementation of brown-headed cowbird (*Molothrus ater*, "cowbird") trapping in Prado Basin. These measures were to offset the anticipated loss of half the function and value to habitat between 494 and 505 feet. In addition, the consultation required that, if vireo or flycatcher nests were imperiled by impounded water up to 505 feet, District personnel would relocate nests to higher elevations to prevent loss of eggs or nestlings. Incidental take for the vireo from the current water conservation project included harm to 90 pairs from alteration to habitat from impounded water. Impacts to the sucker, which was federally listed on April 12, 2000 (65 FR 19686), were not addressed in previous biological opinions.

This opinion addresses the incremental effects from additional water conservation during the flood season for vireo and flycatcher and the full project effects on the sucker. All conservation measures and terms and conditions of previous biological opinions on water conservation (i.e., Biological Opinion 1-6-93-F-7 dated February 25, 1993, Biological Opinion 1-6-95-F-28 dated April 20, 1995, and Biological Opinion 1-6-99-F-75 dated February 10, 2000) remain in effect and are not superceded by this opinion.

The proposed Prado Dam Water Conservation and Supply Study would implement changes to the current water conservation practices. The Corps examined eight project alternatives that proposed holding water at differing levels depending on time of year and whether Mainstem construction to raise Prado Dam had been completed. The Corps asked CFWO to examine two proposed alternatives; one for operation prior to dam-raising construction and the Corps' National Economic Development (NED) post-construction alternative.

The pre-construction alternative would permit water elevation levels to 498 feet (a 4-foot increase from the current 494 foot level) during the flood season and to 505 feet (the current level) during the non-flood season. This inundation at 498 feet is an annual average increase of 13.8 percent over the current water conservation practice. Water release rates from the dam for 5-year to 50-year floods would be 5,000 cfs, which is the current capacity of the outflow structures. The life of this alternative is anticipated to be 2 to 3 years; that is, until Mainstem construction is completed.

The Corps' NED post-construction alternative would allow a maximum pool level during the flood season of 498 feet and 505 feet during the non-flood season, the same levels as in the pre-construction alternative above. However, water release rates with the upgraded outflow structures in the dam would be 5,000 cfs during a 5-year to 10-year flood; 8,760 cfs during a 25-year flood; and 18,500 cfs during a 50-year flood. Maximum release through the gates will be 30,000 cfs. The life of this alternative is anticipated to be 50 years, once Mainstem construction is completed.

Both of these alternatives would increase inundation at the 498 foot level by an annual average of 13.8 percent (a 4-day increase over the current 29 days of inundation). The acreage between 494 and 498 feet is 219.6 acres, of which one-half of the value and function has been offset under prior water conservation agreements; thus, 109.8 acres may be additionally affected by increased inundation from this project. A 13.8 percent increase in effects to 109.8 acres equates to 15.2 acres of additional inundation effects within the Basin that were not offset through prior water conservation agreements. In addition, 22 acres of riparian habitat will be affected downstream of the Basin through water releases necessitated by the increased elevation. Therefore, a total of 37.2 acres of riparian habitat will be affected by either alternative.

The following conservation measures have been proposed to offset project-related effects to vireo and its critical habitat, flycatcher, and sucker:

1. With concurrence from CFWO, the Corps and/or District will acquire and protect in perpetuity via a conservation easement 37.2 acres within Prado Basin for restoration of riparian habitat prior to implementation of either alternative. This acreage is calculated from 37.2 acres of impact at a 1:1 ratio. The restoration will be done outside of areas that are already mitigation areas. A detailed map that delimits the restoration area will be provided to CFWO. To accomplish restoration of the acquired acreage:

   a. Compensation to the Santa Ana River Conservation Trust Fund (SARCTF) for restoration, maintenance, and management in perpetuity of the 37.2 acres will be made in the amount of $25,000 per acre for a total of $930,000. This compensation will be made on or before the time of implementation of the habitat restoration plan. SARCTF will provide a detailed report to CFWO annually on the use of these funds for this restoration area.

   b. A detailed habitat restoration plan for the 37.2-acre restoration site will be submitted to CFWO and California Department of Fish and Game (CDFG) for review and concurrence within three months of implementation of either the pre- or post-construction project alternative. The Corps will notify CFWO in writing of the date of implementation of either the pre- or post-construction project alternative and identify the date that the restoration plan will be submitted to CFWO and CDFG. The habitat restoration plan implementation will begin as soon as possible after CFWO and CDFG concurrence on the plan, with restoration activities conducted between September 15 and March 15 of each calendar year unless specifically authorized to do otherwise by CFWO and CDFG.

If it is necessary to conduct weeding or other restoration and/or creation activities outside of this period, then authorizations from CFWO and CDFG will be obtained in advance to preclude the unauthorized take of federally listed species which is increasingly likely as the restored/created habitat matures. The restoration plan must, at a minimum, include the following components: 1) plant material and seed mix; 2) planting and seeding methods; 3) salvage methods for vegetation and topsoil; 4) preparation of sites and implementation of planting; 5) a proposed monitoring and reporting schedule; and 6) remediation measures to be implemented if initial restoration efforts are unsuccessful.

c. The Corps and/or the District will notify CFWO and CDFG via written report when restoration and/or creation efforts in a given area are deemed successful by your agency based on the success criteria in the restoration plan. Each report must include quantitative evidence that the structure and composition of the revegetated area is statistically similar (i.e., not significantly different) to habitat occupied by vireos in the vicinity or other willow woodland habitats with understory as characterized by Zembal *et al.* (1985) and Zembal (1986). If the success criteria have been completely satisfied, then CFWO will concur in writing that restoration and/or creation requirements for that given area have been successfully attained.

d. The Corps and/or the District will ensure that all lands in the designated restoration area are not used for any purpose that would change or otherwise interfere with their value as wildlife habitat or a wildlife corridor (e.g., erect permanent or temporary structures, night lighting, or facilitate the ingress of domestic animals, exotic animals, or non-native plants).

e. The taking and use of cuttings from willow riparian, riparian scrub, marsh, or aquatic habitats will be prohibited except with the prior approval of CFWO and CDFG. Also, all water conveyance infrastructure in restoration areas and adjacent areas will be constructed and operated to avoid the flooding of vireo habitat in the action area. Imported water, including water used for irrigation, will not be allowed to flood or otherwise degrade existing or replacement habitats.

f. The use of rodenticides, herbicides, insecticides, or other chemicals that could potentially harm federally listed species will be prohibited.

2. The Corps and/or District will monitor vireo territories in Prado Basin within the 498 to 505 foot elevation for a 5-year period beginning with implementation of either project alternative. The baseline number of vireo territories within this area will be submitted to CFWO for review and concurrence at the beginning of project implementation. Should the number of vireo nesting territories show a statistically significant ($\alpha \leq 0.05$) decline over the 5-year period within these elevations, then the Corps and/or District will restore and protect in perpetuity an additional 37.2 acres of riparian habitat within Prado Basin and provide funding at a level to adequately implement, monitor, manage and assure success of that restored habitat area.

3. The Corps and District will commit to ongoing vireo and flycatcher population monitoring within the Prado Basin for the life of the project. Termination of monitoring will be subject to mutual agreement by the Corps, District, and CFWO. The District will make available one

existing vireo monitor to aid in population research on the flycatcher. As part of the commitment to population monitoring, historical and current vireo and flycatcher locations in Prado Basin will be digitally mapped. Digital mapping will be done annually for the life of the project. The District will submit an annual work plan for both vireo and flycatcher research to CFWO for review and concurrence.

4. A detailed eradication plan for Prado Basin for the removal of exotic, invasive animals that are competitors or predators on the sucker will be submitted to CFWO for review and concurrence within three months of implementation of either alternative. The plan will include goals and objectives, methods, efficacy assessment, reporting requirements and funding assurances. Funding for this plan's development and implementation will be assured by the Corps and/or District at the level required to achieve the plan's goals and objectives.

STATUS OF THE SPECIES

Least Bell's vireo

The least Bell's vireo is a neotropical, migratory, insectivorous songbird that nests and forages almost exclusively in riparian woodland habitats in California and northern Baja California, Mexico (Garrett and Dunn 1981, Gray and Greaves 1981, Miner 1989, AOU 1998). Vireos generally begin to arrive from their wintering range in southern Baja California and, possibly, mainland Mexico to establish breeding territories by mid- to late-March, though a singing vireo was detected on territory on March 2, 1994 (Garrett and Dunn 1981; Salata 1983a, b; Hays 1989; Pike and Hays 1992; Service, unpublished data). The large majority of the breeding vireos typically depart their breeding grounds by the third week of September, and only a few vireos are found wintering in California or the United States as a whole (Barlow 1962; Nolan 1960; Garrett and Dunn 1981; Ehrlich *et al.* 1988; Salata 1983a, b; Pike and Hays 1992).

Vireo nesting habitat typically consists of riparian woodlands with well-developed overstories, understories, and low densities of aquatic and herbaceous cover (Zembal 1984; Zembal *et al.* 1985; Hays 1986, 1989; Salata 1983a; RECON 1988). The understory frequently contains dense subshrub or shrub thickets. These thickets are often dominated by sandbar willow (*Salix hindsiana*), mule fat (*Baccharis salicifolia*), young individuals of other willow species, such as arroyo willow (*S. lasiolepis*) or black willow (*S. gooddingii*), and one or more herbaceous species (Salata 1983a, b; Zembal 1984; Zembal *et al.* 1985). Significant overstory species include mature arroyo willows and black willows. Occasional cottonwoods (*Populus* spp.) and western sycamore (*Platanus racemosa*) occur in some vireo habitats, and there additionally may be locally important contributions to the overstory by coast live oak (*Quercus agrifolia*).

Though the vireo occupies home ranges that typically range in size from 0.5 to 4.5 acres (RECON 1988), a few may be as large as 7.5 acres (Service 1998). In general, areas that contain relatively high proportions of degraded habitat have lower productivity (hatching success) than areas that contain high quality riparian woodland (Jones 1985, RECON 1988, Pike and Hays 1992).

The vireo was historically described by multiple observers as common to abundant in the appropriate riparian habitats from as far north as Tehama County, California, to northern Baja California, Mexico (Grinnell and Storer 1924, Willett 1933, Grinnell and Miller 1944, Wilbur 1980). The past, unparalleled decline of this California landbird species (Salata 1986, Service 1986) has been attributed, in part, to the combined, perhaps synergistic effects of the widespread destruction of riparian habitats, habitat fragmentation, and brood-parasitism by cowbirds (Garrett and Dunn 1981).

Reductions in vireo numbers in southern California and the San Joaquin and Sacramento valleys were evident by the 1930s and were "apparently coincident with increase of cowbirds which heavily parasitize this vireo" (Grinnell and Miller 1944). Widespread habitat losses fragmented most remaining populations into small, disjunct, and widely dispersed subpopulations. The historic loss of wetlands (including riparian woodlands) in California has been estimated at 91 percent (Dahl 1990). Much of the potential habitat remaining is infested with alien plants (e.g., arundo) and exotic animals (e.g., cowbirds).

During the past decade, the vireo has begun to recover at several locations (e.g., Prado Basin) within its range due to relatively intensive recovery efforts. Approximately 2,000 vireo territories were detected within California during 2000 (Service, unpublished data). The largest population of vireos continues to be located on Marine Corps Base, Camp Pendleton in San Diego County. In recent years, the populations of vireos at Camp Pendleton and the Prado Basin collectively represented approximately 60 percent of all known territories within California and the United States as a whole.

Habitat fragmentation negatively affects abundance and distribution of neotropical migratory songbirds, in part by increasing incidence of nest predation and parasitism (Whitcomb *et al.* 1981, Small and Hunter 1988). Also, vireos are sensitive to many forms of human disturbance including noise, night lighting, and consistent human presence in an area. Excessive noise can cause vireos to abandon an area. Greaves (1989) hypothesized that the lack of breeding vireos in apparently suitable habitat was due to human disturbances (e.g., bulldozers, off-highway vehicles, and hiker travel) and further suggested that buffer zones between natural areas and surrounding degraded and disturbed areas could be used to increase the suitability of some habitat for vireos.

Habitat destruction and brood-parasitism by the cowbird continue to be the primary threats to the survival and recovery of this species. Riparian woodland vegetation containing both canopy and shrub layers, combined with adjacent upland habitats, are essential to the conservation of the vireo. The following activities continue to destroy or degrade habitat for vireos: 1) removal of riparian vegetation; 2) invasion of exotic species (e.g., arundo, cowbird); 3) thinning of riparian growth, especially near ground level; 4) removal or destruction of adjacent upland habitats used for foraging; 5) increases in human-associated or human-induced disturbances; and 6) flood control activities, including dams, channelization, water impoundment or extraction, and water diversion. The draft recovery plan for the vireo identified two major causes of vireo population decline as cowbird-nest parasitism and habitat loss and degradation. Recovery efforts are focused on addressing these two issues.

Because of the documented, drastic decline in abundance and distribution, the vireo was listed as an endangered species by the State of California in 1980. The vireo was listed as a federally endangered species by the Service on May 2, 1986 (51 *Federal Register* 16474). Critical habitat for this species, which includes all riverine and flood plain habitats with appurtenant riparian vegetation in the Prado Basin below the elevation of 543 feet upstream on the Santa Ana River to the Norco Bluffs area and beyond to the vicinity of the Van Buren Boulevard crossing, was designated on February 3, 1994 (59 *Federal Register* 4845).

Southwestern willow flycatcher

The southwestern willow flycatcher is a relatively small, insectivorous songbird that is one of five subspecies of the willow flycatcher (Hubbard 1987, Unitt 1987, Browning 1993). Although previously considered conspecific with the alder flycatcher (*Empidonax alnorum*), the willow flycatcher is distinguishable from that species by morphology (Aldrich 1951), song type, habitat use, structure and placement of nests (Aldrich 1953), eggs (Walkinshaw 1966), ecological separation (Barlow and MacGillivray 1983), and genetic distinctness (Seutin and Simon 1988).

The breeding range of the flycatcher includes southern California, southern Nevada, Arizona, New Mexico, and western Texas (Hubbard 1987, Unitt 1987, Browning 1993). The species may also breed in southwestern Colorado, but nesting records are lacking. Past records of breeding in Mexico are few and confined to extreme northern Baja California and Sonora (Unitt 1987, Howell and Webb 1995). Flycatchers winter in Mexico, Central America, and northern South America (Phillips 1948, Ridgely 1981, AOU 1983, Stiles and Skutch 1989, Ridgely and Tudor 1994, Howell and Webb 1995).

Breeding flycatchers are often present and singing on territories in mid-May (rarely in late April in southern California). Flycatchers are generally gone from breeding grounds in southern California by late August (The Nature Conservancy 1994) and are scarce in the United States after mid-October (Garrett and Dunn 1981).

The flycatcher breeds in riparian habitats along rivers, streams, and other wetland habitats where dense growths of willows (*Salix* spp.), coyote-bush (*Baccharis* spp.), arrowweed (*Pluchea sericea*), buttonbush (*Cephalanthus occidentalis*) [not found in southern California], or other plants of similar structure and configuration are present. The flycatcher nests in thickets of trees and shrubs approximately 13 to 23 feet or more in height with dense foliage from approximately 0 to 13 feet above ground. Overstories are often present in occupied habitats and composed of willows or cottonwoods or, in some portions of the species' range, tamarisks (*Tamarix* spp.) (Phillips 1948; Grinnell and Miller 1944; Whitmore 1977; Hubbard 1987; Unitt 1987; Whitfield 1990; Service 1993, 1995). Nesting flycatchers generally prefer areas with surface water nearby (Bent 1960, Stafford and Valentine 1985, Harris *et al.* 1986).

All three resident subspecies of the willow flycatcher (*E. t. extimus, E. t. brewsteri*, and *E. t. adastus*) were once considered widely distributed and common within California wherever suitable habitat existed (Grinnell and Miller 1944). The historic range of *E. t. extimus* in California apparently included all lowland riparian areas of the southern third of the State. Nest and egg collections indicate the bird was a common breeder along the lower Colorado River near

Yuma in 1902 (T. Huels, University of Arizona, *in litt.*). Willett (1933) considered the bird to be a common breeder in coastal southern California. Most recently, Unitt (1987) concluded that *E. t. extimus* was once fairly common in the Los Angeles basin, the San Bernardino/Riverside area, and San Diego County.

Throughout the known range of the flycatcher, occupied riparian habitats have been, and remain, widely separated by vast expanses of relatively arid lands. However, the species has suffered the extensive loss and modification of these cottonwood-willow riparian habitats due to grazing, flood control projects, and other water or land development projects (Klebenow and Oakleaf 1984, Taylor and Littlefield 1986, Unitt 1987, Dahl 1990, Service 1995). Changes in riparian plant communities have resulted in the reduction, degradation, and elimination of nesting habitat for the flycatcher, curtailing the ranges, distributions, and numbers of western subspecies, including *E. t. extimus* (e.g., Klebenow and Oakleaf 1984, Taylor and Littlefield 1986, Unitt 1987, Ehrlich *et al.* 1992).

The species is also impacted by a variety of other factors, including brood parasitism by cowbirds (Unitt 1987; Ehrlich *et al.* 1992; Service 1995). Parasitism rates of flycatcher nests have ranged from 50 to 80 percent in California (Whitfield 1990; M. Whitfield and S. Laymon, unpublished data) to 100 percent in the Grand Canyon in 1993 (Service 1993). Mayfield (1977) concluded that a species or population might be able to survive a 24 percent parasitism rate but that much higher losses "would be alarming." In any case, a composite of all current information indicates continuing declines, poor reproductive performance, and continued threats to most of the extant populations of flycatchers (e.g., Whitfield and Laymon (Kern River Research Center, *in litt.*, 1993); Service 1993, 1995, unpublished data).

Available information suggests that the abundance and distribution of breeding flycatchers in California have declined substantially, such that only small, disjunct nesting groups remain (e.g., Unitt 1987, Service 1995). Status reviews or analyses conducted before the listing of the flycatcher considered extirpation from California to be possible in the foreseeable future (Garrett and Dunn 1981, Harris *et al.* 1986). Unitt (1987) reviewed historical and contemporary records of the flycatcher throughout its range and determined that the species had declined precipitously during the last 50 years. He argued that the flycatcher was faring poorly throughout much of its breeding range and postulated that the "total population of the subspecies is well under 1,000 pairs; I suspect that 500 is more likely" (see also Monson and Phillips 1981, Garrett and Dunn 1981, Service 1995). Despite recent, relatively intensive surveys in much of the historic range of the species, the United States population is now estimated at 900 to 1,100 pairs (Service, unpublished data, 2001). The species is apparently extirpated or exceedingly rare in Mexico (Howell and Webb 1995).

Only six permanent breeding sites for the flycatcher remain in California. Only the populations along the Kern and San Luis Rey rivers contain 20 or more nesting pairs. Despite the virtual elimination of impacts from livestock grazing to the large and important flycatcher population on the south fork of the Kern River (Harris *et al.* 1986, Whitfield 1990), numerical declines in the population levels were observed in 1991 and 1992. Fortunately, increases in nesting success were realized in 1992 and 1993. These increases were attributed to removing cowbird eggs or nestlings found in southwestern willow flycatcher nests and cowbird trapping (Whitfield and

Laymon, Kern River Research Center, *in litt.*, 1993). The Kern River population consisted of 23 pairs in 1999 (U.S. Geological Survey, Biological Resources Division [USGS/BRD], unpublished data). Forty-seven pairs were detected along the upper San Luis Rey River in 1999 where cowbird numbers have also been reduced by trapping (USGS/BRD, unpublished data).

Although four other nesting groups were known in southern California in 1996, all but one of these consisted of four or fewer nesting pairs in recent years (Service, unpublished data). A total of 104 pairs of flycatchers were recorded in California in 1996, and the available data indicate that approximately 100 pairs were present in the state in 1998 (Service, unpublished data). More intensive survey efforts in 1999 resulted in the detection of 160 territories that contained 117 confirmed pairs (Service and USGS/BRD, unpublished data).

The southwestern willow flycatcher was listed as a federally endangered species throughout its range on February 27, 1995 (59 *Federal Register* 10693). Breeding flycatchers are listed as state endangered by California and Arizona. As identified in the draft recovery plan for the southwestern willow flycatcher (Service 2001), the conservation needs of the species include preventing the loss of flycatcher habitat, habitat restoration, cowbird trapping, and research designed to evaluate the efficacy of measures intended to minimize or reduce impacts.

Santa Ana sucker

The Santa Ana sucker is a small, short-lived member of the Catostomidae family that is endemic to the Los Angeles, San Gabriel, and Santa Ana rivers. Historically, the sucker occupied the Los Angeles, San Gabriel, and Santa Ana rivers from near the Pacific Ocean to their uplands (Swift *et al.* 1993). Although the sucker was described as common in the 1970s (Moyle 1976), recent surveys indicate that the species has experienced declines throughout most of its range (Moyle *et al.* 1995, Swift *et al.* 1993) and persists in isolated, remnant populations. Approximately 70 to 80 percent of the sucker's historic range in the Los Angeles, San Gabriel, and Santa Ana rivers has been destroyed or altered to such an extent to make it unsuitable for occupation.

The sucker only occupies portions of Big Tujunga Creek between the Big Tujunga and Hansen dams along the Los Angeles River. Recent surveys indicate that the sucker is relatively rare downstream of the Big Tujunga Dam, including the vicinities of Delta Flat and Wildwood but relatively abundant near Stoneyvale (Wickman 1996).

The sucker is found only in the west, east, and north forks of the San Gabriel River above the Morris Dam. In the west fork, Haglund and Baskin (1992, 1995, 1996) found the sucker from the Cogswell Reservoir to the confluence of the north and west forks. In the east fork, the sucker was observed during surveys by Saiki (2000) and Knowles (1999). The California Department of Fish and Game detected suckers in the north fork just above its confluence with the west fork, sections of the west fork, and one section of the east fork (Deinstadt and Ally 1997). The east fork appeared to have the highest relative abundance, followed by sections of the west and north forks. The population of suckers in the north fork is small, and the population in the west fork appears to be declining.

The sucker occupies reaches of the Santa Ana River between the City of San Bernardino and the vicinity of Anaheim. During 1999 and 2000, the sucker was collected between the Rapid Infiltration and Extraction (RIX) facility in Colton and Prado Dam and was relatively abundant in the upstream portions of this reach (Swift 2001). Baskin and Haglund (2001) detected eight adult and two juvenile suckers downstream of Prado Dam between Weir Canyon Road and the Imperial Highway. Chadwick and Associates (1996) hypothesized that tributaries are the primary source of suckers for the Santa Ana River population because abundances were highest in these areas during their surveys. However, Swift (1999) detected a relatively low abundance of suckers in only four tributaries (i.e., Rialto Drain, Sunnyslope Creek, Evans Lake Drain, and Anza Park Drain).

There is a population of suckers in the Santa Clara River that is thought to be introduced, although this presumption is based on the absence of the species from early collections rather than any documented records of introduction (Bell 1978). Portions of this population have apparently hybridized with the Owens sucker (*Catostomus fumeiventris*; Hubbs *et al.* 1943) and, as a result, this population is not included within the range of the native sucker.
The sucker is fairly general in its habitat requirements, occupying both low-gradient, lowland reaches and high-gradient, mountain streams where water temperatures are less than 22° Celsius. However, the sucker appears to fare best in small to medium streams with higher gradients, clear water, and coarse substrates, such as the East Fork of the San Gabriel River. Flowing water is essential, but flows can range from slight to swift. The sucker can tolerate seasonal turbidity, but Saiki (2000) found that their relative abundance is negatively correlated with turbidity.

The sucker is typically associated with gravel, cobble, and boulder substrates, although it is also found over sand and mud substrates. *Catostomus* spp. produce demersal, adhesive eggs that are thought to be adapted to spawning habitat with boulders, cobble, and gravel rather than shifting sands or mud (Moyle 1976). Saiki (2000) found the sucker to be most common near cobble, boulders, and man-made structures in the San Gabriel River. During sampling in the Santa Ana River, Swift (1999) found that suckers comprised 38 percent of the catch in a habitat dominated by gravel and cobble, but only 2 percent of the catch in a habitat dominated by shifting sands. Conversely, no suckers were present in the Chino Creek, a tributary of the Santa Ana River, where gravel and cobble comprised a majority of the substrates. Water quality may have been reduced at that site, thus accounting for the lack of the sucker (Swift 1998).

The sucker feeds mostly on algae, diatoms, and detritus scraped from rocks and other hard surfaces. Aquatic insects comprise only a small component of their diet (Greenfield *et al.* 1970). They have a relatively short life span of three to four years but reach sexual maturity in one year and have high fecundity. For example, the fecundity of 6 females, ranging in size from 3.1 inches (78 millimeters) to 6.2 inches (158 millimeters), was 4,423 to 16,151 eggs (Greenfield *et al.* 1970). Spawning generally occurs from late March to early July, with the peak occurring in late May and June (Greenfield *et al.* 1970, Swift 2001).

Although little is known about sucker movements, other species in the Catostomidae family are known to be highly vagile and undertake spawning migrations (Tyus and Karp 1990). For example, juveniles of the mountain sucker, *Catostomus platyrhynchus*, swim downstream and then move back upstream to spawn (Moyle 1976). It is not known if the Santa Ana sucker follows this pattern; however, Swift (2000) reported that juveniles detected downstream of River Road in the Santa Ana River were likely the progeny of adults reproducing upstream. These suckers may need to return upstream to spawn.

Information on population dynamics of the sucker is lacking. However, frequent fluctuations between periods of low and high abundance may be characteristic of their populations due to the unpredictable fluvial systems they inhabit. Arid regions of California are subject to considerable environmental variation, particularly in year-to-year precipitation that occurs primarily as winter rains. Unpredictable flood events may contribute to catastrophic decreases in abundance by transporting suckers downstream past barriers to movement that essentially preclude any future contribution to the breeding population. Conversely, unpredictable droughts may contribute to decreases in abundance by stranding suckers in isolated pools where ambient conditions become unsuitable or they can be extirpated by predation. Although the sucker's high intrinsic reproductive rate should enable it to quickly repopulate once environmental conditions become more favorable (Moyle 1976), rapid decreases in abundance render small populations even more susceptible to chance extinctions, especially if unfavorable environmental conditions persist or reoccur before the populations can recover.

Few estimates of age-specific survival rates, age structures, sex ratios, or dispersal rates are available for populations of the sucker. Age classes of suckers in the San Gabriel River were normally distributed between zero and four years old during 1984 and 1994. In 1987 and 1995, however, young-of-the-year were preponderant and older age classes were lacking (Haglund and Baskin 1995, 1996). Density estimates in the Santa Ana River during winter of 1999 and 2000 were 0.02 to 1 fish per meter (Swift 2001). Density estimates in the San Gabriel River during 1997 were 0.03 to 0.13 fish per meter (Hernandez 1997).

Threats that may have contributed to the decrease in the status of the sucker include the following: 1) direct loss of suckers due to water diversions; 2) competition and predation from introduced non-native competitors and predators; 3) loss of connectivity; and 4) destruction and degradation of habitat through urbanization, channelization and other flood control structures, water diversion and withdrawal, suction dredging, reductions in water quality, and other activities (65 *Federal Register* 19686).

The construction of flood control and water diversion structures associated with urbanization has resulted in conversion of sucker habitat to unsuitable concrete-lined storm drains in the lower-most reaches of the Los Angeles, San Gabriel, and Santa Ana rivers (Moyle *et al.* 1995) and a substantial loss of habitat in the upper portions of these rivers and their tributaries. These structures have also contributed to the dewatering of extensive reaches of these rivers and their tributaries, thereby eliminating additional habitat for the sucker. For example, the Big Tujunga Creek Dam has eliminated flows along most of the Big Tujunga Creek during late summer and autumn of dry years. During these periods, the sucker is restricted to an approximate one mile stretch of the creek.

Historically, the Los Angeles, San Gabriel, and Santa Ana rivers flowed perennially throughout their length (McGlashan 1930). However, the withdrawal of ground and surface water has de-watered extensive portions of these rivers that now remain dry during non-flood periods, unless the discharge of treated wastewater effluent sustain flows (e.g., Santa Ana River downstream of the RIX facility). For example, surface flows along the Santa Ana River upstream of the City of Riverside have long been diverted to provide water for communities in western San Bernardino and Riverside counties. Although records from the 1940s (Anonymous 2000) indicate that the sucker was once a common resident in this reach, no suckers have been detected within the upper Santa Ana River in recent years (Jones & Stokes Associates 1997).

Remaining habitat for sucker is often degraded by a variety of factors, including sedimentation, ephemeral water flow, reduced water quality, and the presence of invasive species. Degraded habitat conditions may contribute to reduced growth, fecundity, and survival of suckers due to loss of prey items, reduction in foraging efficiency, and lack of nursery areas (Gibson 1994). High turbidity is strongly correlated with lower relative abundance of suckers, possibly due to a reduction in the availability of prey (e.g., loss of light for algal photosynthesis) and/or the inability of suckers to detect prey items in turbid waters (Saiki 2000).

Most of the existing flow in the lower Santa Ana River during the summer months is derived from treated wastewater discharged into the stream channel, primarily from the RIX treatment facility in Colton. Flows from this facility are reduced or terminated periodically when malfunctions cause reductions in discharge quality that exceed standards required by the State Regional Water Quality Control Board. The temporary reduction or termination of flows significantly reduce the amount of habitat available to suckers and could potentially strand them in dewatered sections of the stream. Also, because much of the Santa Ana River is maintained through treated water, contaminants within the treated water may adversely affect the sucker. Saiki (2000) reported that suckers inhabiting the Santa Ana River had significantly higher concentrations of dichlorodiphenyltrichloroethylene (DDT) and trans-Nonachlor than those in the San Gabriel River. Conversely, concentrations of arsenic and mercury were significantly higher in suckers inhabiting the San Gabriel River. However, all of these concentrations were lower than those found in a variety of freshwater species throughout the United States (Saiki 2000).

Recreational activities have contributed to the degradation of habitat for the sucker via erosion of stream banks, destruction of vegetation, and release of untreated human waste and other refuse. Off-highway vehicle activity may physically increase erosion and sedimentation and alter channel morphology. In addition, recreational suction dredging occurs in all counties occupied by the sucker. Suction dredging removes all substrates smaller than the diameter of the intake nozzle and deposits them as large, unstable piles just downstream from the dredge. As a result, suction dredging can locally increase turbidity, change channel topography, and decrease the abundance of aquatic insects (Harvey and Lisle 1998). Also, suction dredging appears to have significant negative effects to the early life stages (i.e., eggs, larvae, fry) that could pass through a suction dredge and be killed or injured (Harvey and Lisle 1998). For example, Griffith and Andrews (1981) found mortality rates of up to 100 percent for eggs and fry of cutthroat trout (*Oncorhynchus clarki*) and rainbow trout (*O. mykiss*) that passed through a suction dredge.

The introduction of exotic species may eliminate or reduce the abundance and distribution of native species via predation, competition, and ecosystem alteration (Moyle and Light 1996). Infestations of the invasive arundo have degraded extensive areas of habitat for the sucker by forming monotypic stands of marsh and slow-moving aquatic habitats. Although arundo may provide cover and a possible source of food for the sucker, its overall effects are likely more detrimental than beneficial (Baskin and Haglund 1999).

Moyle and Yoshiyama (1992) concluded that introduced brown trout (*Salmo trutta*) contributed to the extirpation of the sucker from the upper Santa Ana River in the San Bernardino Mountains. In addition, flood control and water diversion structures have contributed to conditions that are favorable to many predators and competitors of the sucker, including the common carp (*Cyprinus carpio*), largemouth bass (*Micropterus salmoides*), channel catfish (*Ictalurus punctatus*), green sunfish (*Lepomis cyanella*) and tilapia (*Oreochromis mossambicus*). Saiki (2000) reported that the relative abundance of the sucker was negatively correlated with the relative abundances of common carp and largemouth bass. Hence, the ponding of water (e.g., settling ponds, inundation pools for dams) essentially creates areas that are unsuitable for the sucker and serve as population sinks.

Flood control and water diversion structures on the Los Angeles, San Gabriel, and Santa Ana rivers have also reduced the status of the sucker by imposing barriers that preclude or impede movements within populations. Within the Santa Ana River, the sucker population is bisected by Prado Dam, which effectively blocks the movement of fish upstream. Hence, adults, larvae or juveniles that move downstream of Prado Dam are lost from the upstream portion of the breeding population. Hansen Dam on Big Tujunga Creek and the San Gabriel River Dam may contribute to similar effects. Smaller barriers such as gauging stations, culverts and drop structures also impede movements of suckers along each of these rivers. For example, suckers washed downstream of the Weir Canyon drop structure along the Santa Ana River during high flows are effectively removed from the breeding population. The importance of upstream migration for the sucker is not known at this time. However, it is apparent that spawning is rare below Prado Dam and appears to be concentrated between Mission Boulevard and Rialto Drain, well upstream of Prado Dam. Therefore, providing upstream passage to the sucker may be important to improving reproduction for this species.

All remaining populations of the sucker are at risk due to their small size. Most of the lowland river habitats have been destroyed, and the remaining populations of the sucker are low in numbers, with the exception of the population in the San Gabriel River. Although the sucker is, in places, locally common in what remains of their native range, the total population size of any one of these remaining populations is still relatively small. Small populations have a higher probability of extinction than larger populations because their low abundance renders them susceptible to stochastic (random, naturally occurring) events such as inbreeding, the loss of genetic variation, demographic problems like skewed variability in age and sex ratios, and catastrophes such as floods, droughts, or disease epidemics (Lande 1988, Saccheri *et al.* 1998).

Another factor that renders populations of the sucker vulnerable to stochastic events is isolation, which often acts in concert with small population size to increase the probability of extinction for populations. Altered fluvial processes and impediments to movement have fragmented the historic range of the sucker such that remaining reaches of occupied habitat now function independently of each other. Isolated populations are more susceptible to extirpation by accidental or natural catastrophes because their recolonization has been precluded. Hence, the extirpation of remnant populations during local catastrophes will continue to become more probable as development and barriers further constrict remaining populations.

The sucker was listed as a federally threatened species on April 12, 2000 (65 *Federal Register* 19686). Critical habitat was not designated at that time because the biological needs of the sucker were not sufficiently known to identify areas essential for conservation. The sucker is designated a "species of special concern" by the State of California.

ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR § 402.02) define the environmental baseline as the past and present effects of all Federal, State, or private actions and other human activities in the action area. Included in the environmental baseline are the anticipated effects of all proposed Federal projects in the action area that have undergone section 7 consultation and the effects of State and private actions which are contemporaneous with the consultation in progress.

The action area encompasses areas that would either be directly or indirectly affected by the proposed action, and not merely the immediate area involved in the action. Subsequent analyses of the environmental baseline, effects of the action, and levels of incidental take are based upon the action area as determined by our agency. We have described the action area in this consultation to include the Prado Flood Control Basin upstream of the dam and Reach 9 of the Santa Ana River downstream of the dam. Because our action area is a biological determination that must incorporate direct, indirect, and interrelated/interdependent effects to listed species and their habitats, our action area may differ from the scope of analysis used by your agency under the National Environmental Policy Act.

Least Bell's vireo

The vireo population in the Prado Basin and contiguous reaches of the Santa Ana River and Mill and Chino creeks has been actively studied and managed since 1986. Annual monitoring is conducted to estimate abundance and distribution, breeding chronology, reproductive success, and nest site preferences. Also, cowbirds present in vireo home ranges were routinely monitored, and modified Australian crow traps were deployed throughout the basin and the adjacent Santa Ana River in an attempt to control this brood-parasitic species.

Vireos nesting in the Prado Basin area demonstrate a strong preference for nesting and foraging in willows and mule fat (The Nature Conservancy 1997, Pike and Hays 2000). Fifty-four percent of all nests in 1997 for which data were available ($n = 239$) were placed in various willow species, while 40 percent were found in mule fat (The Nature Conservancy 1997).

Surveys indicate that the vireo population in the Prado Basin area has increased significantly from approximately 164 pairs in 1995 to a minimum of 336 pairs during the 2001 breeding season. This population continues to be the second largest overall and the largest north of San Diego County. Preliminary data from the 2001 breeding season suggest that there were a minimum of 444 vireo territories that contained approximately 336 mated pairs within the Prado Basin study area (Pike *et al.* 2001). Hoffman (2001) reported a total of 61 additional territories containing 44 pairs at select areas within the remainder of the Santa Ana River Watershed. Data for the 2000 breeding season in Prado Basin indicated the presence at least 357 territorial male vireos, 281 of which were paired (Pike and Hays 2000). Of the 336 territorial male vireos detected in the area in 1999, 224 were paired (Pike and Hays 1999). By contrast, 270 pairs were recorded in 1998, 195 pairs were detected in 1996, and 164 pairs were located in 1995 (Pike and Hays 1998). The reason for the decrease in the number of breeding pairs from 1998 to 1999 remains unknown.

A minimum of 714 known fledged young was detected within the Prado Basin study area during the 2001 breeding season, which was a 10 percent increase over the 1999 total of 649 (Pike *et al.* 2001). Nesting success in recent years has been relatively high; the data for 1999 (57 percent) and 2000 (71 percent) both exceeded the figures for 1997 (50 percent) and 1998 (41 percent) Pike and Hays 1999, 2000). By contrast, the average number of fledglings per breeding pair from 1999 to 2001 (2.2) remained well below the average (3.1) for the breeding seasons from 1988 to 1991. In recent years significantly fewer pairs have renested after successfully fledging young on their first attempt (Pike and Hays 1999, 2000; Pike *et al.* 2001).

The primary threats to the vireo in the Prado Basin area are habitat loss and degradation and nest parasitism by cowbirds. Recovery objectives and current range-wide management efforts are focused on addressing these two issues (Service 1998). For example, 2,785 cowbirds were trapped and removed from habitats for the vireo and flycatcher within the Prado Basin area during 2001, 2,587 cowbirds were removed in 2000, and 2,300 cowbirds were removed in 1999. Nest parasitism was at 13 percent in 2001, while in 2000 the rate had decreased to an all-time low of 8 percent (Pike and Hays 2000), likely due to the cowbird trapping efforts in riparian habitat and at adjacent cattle farms; parasitism rates had been as high at 39 percent in 1986 and 57 percent in 1993.

Vireo researchers at Prado Basin area have detected several apparently well-incubated clutches of vireos that failed to produce a single viable nestling (Hays 1989). Entire clutches failed to hatch in three cases, and all vireo nestling young failed to survive in two other instances during the early part of the 1988 breeding season. In 1994, four full clutches failed to hatch; one apparently infertile female is thought to be responsible for two of these clutches.

In 1997, a vireo nestling with a deformed upper mandible was observed (Pike and Hays 2000). Such abnormalities are often the expressed result of exposure to environmental contaminants. Abnormalities that often are attributable to toxic levels of various pollutants were detected in invertebrate specimens collected within the Prado Basin. Specifically, crayfish (*Procambius clarkii*) with abnormal appendages have been found, and several Chinese river clam (*Corbicula fluminea*) specimens exhibited shell ring patterns that indicated irregular growth (Service, unpublished data). Also, several age classes of Chinese river clams appeared to be missing from the aquatic habitats that were surveyed. This phenomenon may be the result of episodic, lethal exposures to toxic substances. Most importantly, preliminary data derived from the toxicological testing of abandoned vireo eggs from the Prado Basin have revealed the presence of dichlorodiphenylethylene (DDE), a metabolite of DDT, in concentrations that could cause eggshell thinning (Service, unpublished data).

The draft recovery plan for the vireo (Service 1998) calls for the protection and management of riparian and adjacent upland habitat in each identified population/metapopulation site (including the Santa Ana River) and a reduction of threats to the extent that: 1) the species no longer needs significant human intervention to survive; or 2) if human intervention is necessary, "... perpetual endowments are secured for cowbird trapping and exotic plant (*Arundo*) control in riparian habitat occupied by least Bell's vireos."

Critical habitat for the vireo includes all riverine and flood plain habitats with appropriate riparian vegetation in the Prado Basin below the elevation of 543 feet and upstream along the Santa Ana River through the Norco Bluffs area to the vicinity of the Van Buren Boulevard crossing. The action area contains a minimum of 3,500 acres of riparian habitats supporting the primary constituent elements of critical habitat. This critical habitat functions as a core area for vireos that is essential for the conservation of this species. Activities that could adversely affect these primary constituent elements include removal of riparian vegetation, thinning of riparian growth, especially near ground level, the invasion of exotic species (e.g., arundo), removal or destruction of adjacent upland habitats used by vireos for foraging, and flood control activities, including dams, channelization, water impoundment or extraction, and water diversion.

Southwestern willow flycatcher

The Prado Basin population is one of only six permanent southwestern willow flycatcher breeding sites that now exist in California. In 2001, the first flycatcher of the breeding season at the Prado Basin was detected on May 3 and the last (two juveniles) were noted on August 28 (Pike *et al.* 2001). Seven flycatcher home ranges were detected during the 2001 breeding season. Pike *et al.* (2001) indicate that three of the territorial birds paired and nested. A total of three young were fledged from two nests, the third nest was unsuccessful. Only one pair of flycatchers was detected during the 2000 breeding season; apparently only two young were fledged in the Prado Basin at that time (Pike and Hays 2000). By contrast, five flycatcher home ranges were detected within the Prado Basin during the 1999 breeding season. Pairs were eventually found in three of these home ranges; two of the three pairs produced a total of five fledglings (Pike and Hays 1999).

Flycatchers in the Prado Basin virtually always nest near surface water or saturated soil (The Nature Conservancy 1994). All known territories have been situated in relatively close proximity to water-filled creeks or channels. Nests have been placed as low as two feet above ground level. Of the five flycatcher nests found in 1996, two were placed in arroyo willow, one was found in a red willow (*Salix laevigata*), one was placed in a sandbar willow, and one was placed in a tamarisk. Both nests discovered during the 1997 season were in arroyo willows. In 2001, two nests were in arroyo willow and one in tamarisk.

Although flycatcher home ranges have been detected throughout much of the surveyed portions of the Prado Basin, successful breeding prior to 1996 had been detected only in North Basin and West Basin (Chino Creek). From 1996 to 1998 and again in 2000 and 2001, however, the only successful breeding occurred in the South Basin. No flycatcher home ranges have been detected in Reach 9 of the Santa Ana River (Service, unpublished data). Although trapping and removal of cowbirds have reduced nest parasitism and increased reproductive success of vireos in the

Prado Basin, similar results have not been seen for the flycatcher. The lack of a demonstrated relationship may reflect the low abundance of flycatchers in the area or that some other factor(s) are limiting the population.

While the unauthorized destruction of habitat within the action area has largely been curtailed, it has not completely ceased. During 1998, 1999, and 2000, property lessees of the Corps apparently mowed or cleared more than three acres of riparian habitat suitable for the vireo and flycatcher within the basin adjacent to Chino Creek. In addition, operations and maintenance work completed for the Corps in late 1998 resulted in the clearing of less than one acre of riparian habitat suitable for the vireo and flycatcher. Also, during autumn of 1999 approximately two acres of vireo habitat was destroyed or degraded in conjunction with the construction of roads, apparently on District property, in the western portion of the Basin. Most recently, seven ponds in the lower basin were created without apparent authorization. Staff in the Corps' Operations and Regulatory branches are currently working with CFWO to address these issues.

The primary threats to flycatcher within the action area essentially are the same as those identified affecting the vireo. The draft recovery plan for the flycatcher (Service 2001) calls for a minimum of 50 territories within the designated Santa Ana management unit and protection from identified threats to assure maintenance of the population over time.

Santa Ana sucker

The sucker has lost approximately 70 percent of its native range in the Santa Ana River; the portions of the Santa Ana River occupied by the sucker constitute approximately 60 percent of the entire remaining native range of the species. In the mid-1980s, Fisher (1999) reported observing numerous suckers at Imperial Highway. In Reach 9, researchers caught five suckers in 1991, one sucker in 1996, and five suckers in 1998 (Chadwick and Associates 1996, Swift 1998). The area downstream of the first drop structure downstream of Prado Dam contained appropriate habitat for sucker, including rocky to gravelly substrate, slow to moderate flowing water, and a mean depth of about 20 inches (Swift 1998). Thus, the relatively low density of suckers is apparently not due to a lack of habitat. In recent surveys, ten adult suckers were caught between Weir Canyon Road and Imperial Highway (Baskin and Haglund 2001).

Between the Hamner Avenue crossing of the Santa Ana River and Prado Dam, researchers caught 3 suckers in 1991, 76 in 1997, 22 in 1998, 5 in 1999, and 3 in 2000 (Chadwick and Associates 1996; Swift 1997, 1998, 1999, 2001). All 76 suckers caught in the Norco Bluffs area in 1997 were between 0.8 to 2.8 inches in length. Therefore, Swift (1997) hypothesized that this area was a nursery for the sucker. However, the substrate was mostly shifting sand and provided low food resources. Additionally, the presence of invasive competitors such as fathead minnow may limit the availability of diatoms and epiphytic green algae to the sucker. The fish caught in this area during other years were adults or the length information was not provided. It appears that this area may provide appropriate habitat to the sucker in some years.

The causes of sucker decline in the proposed project area are attributed to habitat degradation and destruction, increase in invasive species and loss of connectivity in recent years. Habitat quality and quantity have been reduced by increased turbidity and sedimentation upstream of the Prado

Dam and the construction and maintenance of flood control structures. Increased turbidity reduces the available light needed for photosynthetic processes for algae and visibility for prey searching. Sedimentation reduces available spawning habitat and food sources by covering favorable cobble and gravel substrate. The installation of hard bank stabilization structures along various areas of the Santa Ana River has also contributed to losses of habitat. These hard bank stabilization structures reduce habitat quality and quantity by reducing bank vegetation and increasing flow, thus encouraging the removal of larger-sized substrate. Habitat quality is further reduced by bank stabilization structures that remove pool-riffle complexes.

The status of the sucker in the action area has likely been adversely affected by increased predation and competition from invasive species. Banks stabilization structures, the Prado Dam reservoir, and the construction of wetlands have provided excellent habitat for invasive predatory and competitive species such as largemouth bass, channel catfish, carp, bluegill, green sunfish and mosquitofish (*Gambusia affinis*). Swift (2001) reported that carp and channel catfish were most common downstream of the Prado Dam, and green sunfish and largemouth bass rarely strayed from deep pools and slow-moving aquatic habitats. However, Baskin (2001) hypothesized that large numbers of mosquitofish observed in the mouth of the Sunnyslope Creek may be preying on recently spawned larval suckers.

As suckers are washed downriver, they are unable to return upstream due to the presence of several barriers. Four existing drop structures are present downstream of Prado Dam that probably prevent suckers from passing upstream due to their height and design. Additionally, Prado Dam almost certainly impedes passage, especially during low flows in the dry season, and during high flows and subsequent ponding upstream of the dam during flood seasons. Upstream of Prado Dam, the diversion at River Road provides another barrier. This diversion is a 12 to 36-inch earthen dam that diverts 70 percent of the water to wetlands managed by the Orange County Water District. The remaining water is diverted through culverts beneath the dam to the main river channel. Upstream of the culverts, water is ponded and provides habitat for exotic predators and competitors. Suckers are likely not able to swim upstream through the fast flowing water exiting the culverts and, should they succeed, then they must pass through ponds. The importance of upstream migration has been demonstrated for several species of lake suckers, including the cui-ui sucker (*Chasmistes cujus*), Sacramento sucker (*Catostomus occidentalis*), and Modoc sucker (*Catostomus microps*) (Moyle 1976; S. Reid, Service, Klamath Falls, OR, personal communication to L. Caskey, CFWO, April 2001). Where fish passage has been constructed for the lake suckers, fish locks have been successful in passing 150,000 to 700,000 suckers per day (B. Mefford, Bureau of Reclamation, Denver, CO, personal communication to L. Caskey, CFWO, March 2001).

The relatively low density of suckers downstream of Prado Dam may be due to several factors, including a lack of recruitment due to the small amount of suitable spawning habitat, relatively high density of exotic predators, and loss of habitat from the installation of flood control features (e.g., drop structures, bank stabilization, and low flow channels).

Because the status of the sucker is precarious and declining, long-term conservation depends on the implementation of the following conservation measures: 1) protection of remaining populations to ensure that they are independently viable with stable or increasing abundance and recruitment; 2) maintenance or restoration of adequate perennial flows necessary to support and create viable habitat in each river and tributary occupied by the sucker, including reaches that are currently dewatered; 3) maintenance or restoration of connectivity of habitat in each river and tributary occupied by the sucker, including the removal or modification of existing barriers to movement; 4) maintenance of water quality suitable for the sucker; and 5) removal of exotic species that degrade habitat and/or reduce the status of the sucker through predation or competition.

Habitats that are currently degraded could be improved in a number of ways. Naturally sinuous river channels should be encouraged throughout the historic range of the sucker, and ponded water should be reduced to a minimum and/or managed in such a way as to discourage entry by the sucker. In addition, water management plans and/or legal agreements should be developed to maintain adequate perennial flows in all rivers, particularly in the Santa Ana River where RIX facility shutdowns could strand the sucker in shallow pools. Furthermore, restoring flow to dry reaches with appropriate substrate could provide adequate habitat to support the reintroduction of suckers. In addition to flow, turbidity should be reduced through appropriate dam modifications, and the scope and intensity of recreational activities that adversely affect the sucker and its habitat should be limited. Habitat for sucker may also be improved by adding coarse material and boulders to the substrate. In areas where other listed species are not present, nursery habitats should be created and maintained by clearing emergent non-native vegetation and, if necessary, modifying stream banks to create shallow stream bank areas. Once habitat is created, it should be protected from human-induced high flows (e.g., dam releases) that could scour gravel and cobble substrate. One possible measure that could dissipate these high velocity flows is the installation of relief channels. Relief channels are constructed to divert high flows away from the main channel. An example of a relief channel is at the confluence of Sespe Creek and Santa Clara River. This relief channel appears to support a population of suckers, arroyo chubs and sticklebacks (Baskin and Haglund 1999).

An exotic species program should be implemented to remove vegetation such as arundo and competitors and predators of the sucker such as green sunfish, largemouth bass, carp, and channel catfish. Such a program would improve habitat for the sucker by reducing the amount of slow moving or standing water created by large stands of arundo and by decreasing the presence of exotic fish. Removal of invasive fish species is usually completed by chemical or mechanical means such as the use of seines, nets, and traps. Mechanical means would be the most effective and least harmful to the native fish species in the Santa Ana River.

Barriers that preclude or impede the movements of suckers should be removed or modified (e.g., installation of fish passage structures) so that individuals are no longer lost to the breeding population and can colonize currently unoccupied areas. Several types of fish passage are available including fish locks, vertical slot structures, and fish rock passageways. Vertical slot structures have been successful for the cui-ui sucker in the Truckee River, and natural fish passageways are being constructed for the Modoc sucker in a Pit River tributary (S. Reid, Service, personal communication to L. Caskey, CFWO, April 2001). The darting speed of small suckers is estimated to be 4 body lengths per second (e.g., a 6-inch-long sucker would have darting speed of 2 feet per second) (S. Reid, Service, personal communication to L. Caskey, CFWO, April 2001). However, the swimming speed and affinities of the sucker and other similar species should be examined more closely so that appropriate passageways can be constructed.

Because few specifics are known about the life history strategies, population dynamics, and habitat affinities of the sucker, research and monitoring should be initiated immediately. The Santa Ana Sucker Discussion Team has funded initial studies of the distribution, habitat affinities, and potential effects of contaminants, turbidity, and exotic species on the sucker population in the Santa Ana River. Additional studies should be funded to investigate additional areas and variables. Also, goals should be clearly defined for all measures implementing conservation needs, and the success of conservation efforts must be assessed through quantitative and qualitative monitoring.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action, that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by or result from the proposed action, and are later in time, but are still reasonably certain to occur.

Activities associated with, or resulting from, the proposed action could adversely affect the vireo and its critical habitat, flycatcher, and/or sucker in the following manner: 1) increased degradation of riparian and stream habitat in the reservoir pool due to more frequent, higher elevation pooling of water and, in turn, inundation effects to habitat; 2) increased degradation of habitat downstream of the dam due to potentially more frequent, higher rate discharges; 3) increased invasion of exotic species due to disturbance of habitats within the expanded reservoir pool area that are favorable to these species; and 4) effects to sucker from water conservation structures and diversions. Each of these categories of adverse effects are discussed in detail in the following sections.

Effects to sucker

Increased degradation of riparian and stream habitat in the reservoir pool due to more frequent, higher elevation pooling of water and, in turn, inundation effects to habitat: Impounding water and creating a larger reservoir behind Prado Dam would have adverse affects on the sucker. Approximately 2.2 to 4.8 acres of river habitat would be lost, at least temporarily, to impounded water (Table 8, draft BA). As flowing water reaches the conservation pool, its velocity drops and suspended sediment settles out; fines that settle create unsuitable bottom habitat for sucker. Freshwater aquatic habitat consisting of pooled, non-flowing water decreases the extent of natural stream habitat for sucker. Pooled, standing water has increased stagnation, accumulation of nutrients, eutrophication, elevated temperature, and decreased dissolved oxygen, which are conditions unsuitable for native fish.

While specific river enhancements to benefit sucker are not proposed as part of the conservation measures of this project, some habitat restoration for the sucker is being addressed through implementation of conservation measures under the Mainstem consultation. In addition, the District is a member of the Santa Ana Sucker Discussion Team (Sucker Team), which is developing a conservation program that will identify scientific study needs and species management options and work to implement a suite of activities, including habitat enhancement, to benefit the sucker.

Increased degradation of habitat downstream of the dam due to potentially more frequent, higher rate discharges from the dam: Scour of the downstream channel will contribute to the degradation of habitat for sucker. Suckers depend on gravel substrate because they scrape algae off of rocks for food and use these types of substrate for spawning. Although it is not known if suckers spawn in Reach 9, they have been detected in that area. It is reasonably certain that discharges in the range of 5,000 to 10,000 cfs will mobilize gravels, alter the river substrate, and decrease the availability of spawning habitat and food resources for the sucker downstream of Prado Dam. This substrate is unlikely to be replaced at a rate commensurate with its loss due to the barrier to gravel transport imposed by the dam. The loss of any spawning habitat downstream of the Prado Dam could limit reproduction by the sucker because there is little possibility for these fish to return to upstream spawning sites due to the barrier imposed by the dam. Even an infrequent, high-rate discharge event that reduces available spawning or larval habitat and, thereby, contributes to a decrease in recruitment could decrease the status of the species for years due to persistent effects (i.e., time lags) on local population dynamics.

Impacts to sucker from the increased flow and frequency include sweeping suckers from areas where there is great constriction and no refugia past Weir Canyon Bridge into Reach 8 and beyond of the Santa Ana River, loss of spawning habitat, and loss of food resources. Since there are no known spawning locations between Prado Dam and Weir Canyon Bridge, it is difficult to assess impacts to reproduction. Survival could be significantly reduced for any existing sucker population as food resources would be anticipated to decrease. Additionally, any suckers swept past the drop structure downstream of Weir Canyon Bridge would be moved to habitats that are less conducive to their survival. For example, between Weir Canyon Bridge and Imperial Highway Bridge, there is less canopy and refugia, and the river is highly fragmented by three drop structures. After Imperial Highway Bridge, water flow is extremely reduced, and little or no canopy and habitat, including appropriate substrate, exists. Therefore, it is likely any suckers swept below Weir Canyon would be lost to the known sucker populations.

Increased discharge rates may wash suckers past Weir Canyon, where they would not be able to return upstream past the several existing drop structures. These suckers would be lost to any breeding population downstream of Prado Dam because there is no known spawning habitat downstream of Weir Canyon. No specific measures under this proposed water conservation project are being proposed to address effects to sucker from being passed downstream in high flows; however under the Mainstem consultation, the Corps will design and implement an efficient, cost effective trap and haul program in coordination with the Service, CDFG and other experts. This program should reduce the number of suckers that would be permanently lost from the breeding population. In addition, the Sucker Team is working to initiate an intensive study of the species' status and distribution downstream of Prado Dam.

Increased invasion of exotic species due to disturbance of habitats within the expanded reservoir pool area that are favorable to these species: Increasing the water conservation pool will increase habitat for exotic animal species such as bass, carp, green sunfish, bullfrog, and crayfish, all of which are competitors with or predators on native fish, such as the sucker. The conservation measure proposed by this project to develop and implement an effective exotic animal species control program within the Basin will reduce the negative effects that these species have on sucker and other native fish.

Effects to sucker from water conservation structures and diversions: Under current water conservation practices, approximately 50 percent of the river is diverted into a channel just downstream of the River Road bridge for delivery to water quality ponds (polishing ponds). That diversion channel has good quality habitat and sucker have been found in it. However, in its current configuration, the diversion channel does not allow sucker to pass back into the main river, and the outflow of the diversion ends at the polishing ponds. The polishing ponds are areas of still water that contain species which are predators and/or competitors of the sucker. It is unlikely that sucker survive if they pass into the polishing ponds. In addition, the main river channel has culverts near the diversion channel that have a significant drop, preventing sucker that pass through the culvert from being able to move back upstream. Sucker that pass through the culverts there are effectively removed from any upstream breeding population. Conservation measures to be implemented under the Mainstem project include providing for year-round, bidirectional passage of suckers in both the main river channel and the diversion channel.

Effects to vireo and flycatcher

Increased degradation of riparian and stream habitat in the reservoir pool due to more frequent, higher elevation pooling of water and, in turn, inundation effects to habitat: Our agency voiced concerns about increased inundation effects not only due to higher levels of water conservation but also due to the ability of the dam to hold water more frequently and at a higher level once the new dam outlet gates are installed during Mainstem. With and without the Mainstem project inundation levels and durations were compared to determine if that project would result in prolonged inundation of vireo critical habitat or an increased potential for flooding of vireo nests following rare late spring storms. Your agency has maintained that the Mainstem project would not cause significant increases in inundation elevations or dwell times within habitat for vireos behind the dam due to the increased discharge capacity of the outlet works (Corps 2001a). Also, your staff has indicated that the dam will continue to be operated primarily for flood control purposes and that during late winter water will not be held longer or at higher elevations behind the dam in anticipation of water control activities up to 505 feet elevation following March 1. In addition, your agency maintains that any increases in inundation under future conditions will be the result of parameters (e.g., sedimentation and watershed development) not related to Mainstem or increased water conservation.

While we agree that the increased discharge capacity of the reconstructed dam could, under certain circumstances, reduce both the elevation and dwell time of water pooled behind the dam, it is evident that the inundation of wetland, riparian and upland habitats up to an elevation of 566 feet will be enabled by Mainstem, and therefore, the dwell time of impounded waters at all elevations, including those for water conservation, could be increased. As an example, the current water control manual (Corps 1994) provides for a range of release rates at all elevations from the debris pool to the elevation of the spillway (and above). Given that a stated objective of the manual is to accommodate water conservation whenever possible, the much larger post-Mainstem potential reservoir pool, and resulting decreased flood risk associated with storing water at higher elevations, it is reasonable to conclude that Mainstem will induce incremental damage to habitats occupied by the vireo and, possibly, the flycatcher, at the current winter water conservation 494 foot elevation and that same type of incremental damage will take place at the higher proposed water conservation level of 498 feet. The increased storage of water during the later winter could result in the degradation of riparian habitat and the understory that vireos require for nesting.

Although the effects of inundation on riparian habitat are relatively difficult to quantify, water conservation efforts may result in the following effects: 1) vegetation mortality that reduces the areal extent of willow riparian habitat; 2) reduction in species diversity, as plants intolerant of inundation are reduced within the basin; and 3) structural changes within the habitat, especially a loss of shrubby understory. Persistent water will have an effect out some distance beyond its immediate edge due to soil saturation, capillary action, and microclimate alteration. In some areas, only the most inundation tolerant plants would persist, potentially expanding the existing monotypic black willow forest to a higher contour level, with concomitant shifts of other vegetation communities also to higher contours or resulting in their direct loss. These losses or changes to the plant community depend on a variety factors including the elevational gradient, soil type, and current plant community. The border of much of Prado Basin has a steep elevational gradient; therefore, plant community changes in these areas will be more abrupt, while within the Basin and riverbed, changes would occur over a wider area where the elevation change is more gradual.

The primary effects to the vireo and flycatcher include a reduction in the carrying capacity of the area due to decreased availability of habitat and a reduction in recruitment due to decreased foraging and nesting locations. Since monitoring for the vireo began, there has been a shift in the distribution of vireo nesting territories from lower elevations in the southern basin to more eastern and higher elevation areas due to habitat changes, particularly the loss of shrubby understory, from current water conservation practices (Biological Opinion 1-6-95-F-28 dated April 20, 1995). This shift has moved a large portion of the breeding population nearer to the Corona Airport, increasing the number of vireos subject to potentially adverse noise effects and closer to dairies, agricultural and ruderal habitats, which could subject breeding vireos to increased nest parasitism by cowbirds.

We anticipate that the increased pooling of water during winter months when Prado Dam is operated for flood control (October 1 to February 28) is not likely to directly threaten individual vireos or flycatchers because these species are typically not present in the project area during this time period. Vireos typically arrive in the Prado Basin and southern California from their wintering grounds in mid- to late March, with territory establishment and nesting taking place from March through late July (Pike and Hays 1999). Dispersal of fledglings and mature adults typically occurs in August and September. Flycatchers typically arrive in the Prado Basin later than vireos and leave earlier. As a result, vireos and flycatchers are only rarely detected in the Basin during October 1 to March 15 (Pike and Hays 1999). The biological opinion for the current water conservation activities anticipated the harm of 90 pairs of vireos or 180 individual vireos over the life of the project due to the periodic, temporary flooding, destruction or degradation of occupied habitat; no harm was anticipated for flycatchers. Since the proposed project's water conservation elevation of 505 feet during summer months is the same as the current water conservation activities, all measures outlined in previous formal consultations for avoidance and minimization to vireo and flycatcher nests and young, including any necessary relocation of nests subject to flooding to a higher elevation, will continue to be implemented by the Corps and/or District for the life of the project. In addition, one conservation measure to be implemented with this proposed project would create at least 37.2 acres of riparian habitat that, over time, would become suitable for occupation by the vireo and, potentially, the flycatcher. This created area would provide nesting area for vireos that may be displaced by the increased water conservation activities between 494 and 498 feet and for the general vireo population, that has grown substantially.

Increased degradation of habitat downstream of the dam due to potentially more frequent, higher rate discharges from the dam: The upsizing of the dam outlet works from Mainstem will increase the capacity for discharges from 5,000 cfs to 8,760 cfs for a 25-year flood, from 5,000 cfs to 18,500 cfs for a 50-year flood, and from 22,200 cfs to 30,000 cfs for a 100-year flood (Corps 2001a, b). Your agency maintains that significant damage to riparian habitat downstream from the dam would occur only rarely because sustained discharges exceeding 10,000 cfs would be rare. However, the draft BA (page 33) states that a release of 7,400 cfs with velocities from 4 to 14 feet per second can cause considerable scouring of the channel. Your agency estimates that 22 acres of downstream habitat will be affected by discharges due to water conservation activities.

Scour of the downstream channel will contribute to the degradation of habitat for vireo. Release at high rates erodes soil, removes vegetation, moves cobble, rock and boulders, and can cause armoring of the channel. High rates of discharge can be a significant factor in causing streambank erosion resulting in loss of riparian vegetation. Water released from Prado Dam, while containing a load of suspended fines, in nearly free of coarser sediments. Thus, the natural dynamics of deposition replacing sediment scoured by large flow rates are highly altered. Vegetation would be unable or take longer to reestablish in areas scoured of soil. The loss of vegetation due to higher velocity flows facilitated by the upsized outlet structures will reduce the extent of suitable overstory and understory riparian downstream of the dam that vireos depend upon for nesting and foraging.

The Habitat Management Plan prepared for these public lands has not been completed or adopted. However, the Corps and District have agreed to finalize the proposed plan or equivalent within one year of the initiation of Mainstem construction in coordination with our agency and, subsequently, obtain approval from our agency and implement the plan immediately thereafter to appropriately conserve listed species within Reach 9 of the River. The local sponsors have indicated that, under any circumstances, the approved Habitat Management Plan will be implemented in full upon the conclusion of construction in the Santa Ana River Canyon (County of Orange 2001). In the interim local sponsors have committed to maintain open space that is under their direct control in a manner that is consistent with the intent of the Habitat Management Plan (County of Orange 2001). We anticipate that the purchase and management of the Santa Ana River flood plain and other habitat restoration measures within the action area will be implemented over time to moderate any damage incurred by higher release flows.

Increased invasion of exotic species due to disturbance of habitats within the expanded reservoir pool area that are favorable to these species: Any project-related creation and maintenance of conditions that favor exotic plants and animals could decrease the status of the vireo and flycatcher. The increase and spread of alien plants such as arundo is continuing in the Santa Ana River watershed, including the Prado Basin. Undisturbed areas vegetated with native species are much more resistant to invasion by this and other alien plants. The alteration of the landscape within the project area and associated establishment and dispersal of select non-native plants likely will impact, and could overwhelm, native habitats in the project area. Invasive exotic plants could be established in riparian habitat impacted by activities associated with the project. Stands of arundo, castor bean (*Ricinus communis*), and other invasive, noxious non-native plants provide little habitat for the vireo and flycatcher. The vast majority of vireo nests within the Prado Basin and elsewhere have been placed in native trees and shrubs (Pike and Hays 2000).

The disturbance or removal of existing riparian can result in the creation of cowbird foraging habitat or increase cowbird parasitism events due to the fragmentation of nesting habitat (Askins 2000). Cowbirds prefer feeding in open areas such as those created by human alterations of the landscape (Garrett and Dunn 1981). There is a relatively high density of cowbirds in the Prado Basin and contiguous reaches of the Santa Ana River, possibly due to the rather close juxtaposition of host-rich riparian habitats and expansive feeding areas in and around nearby dairies, livestock operations, urban, and agricultural fields (Zembal *et al.* 1985, Hays 1987, Lowther 1993, Pike and Hays 1999).

Because the rate of parasitism of vireo nests in the Prado Basin was as high as 100 percent prior to the inception of current management efforts (Zembal *et al.* 1985), any project-related feature that creates conditions favorable to cowbirds in the project area would likely decrease the reproductive success of vireos in the absence of management. However, the cowbird trapping and removal efforts that are part of ongoing efforts by the District should effectively reduce the incidence of parasitism to the vireo or flycatcher in the Prado Basin, based on the results of several recent publications that demonstrated the efficacy of cowbird trapping programs at increasing the reproductive success for the vireo (Kus 1999, Whitfield and Sogge 1999, Whitfield *et al.* 1999, Pike and Hays 2000, Powell and Steidl 2000).

Effects to designated critical habitat for vireo

Within Prado Basin, 15.2 acres of designated vireo critical habitat will be affected by increased inundation. Inundation effects include vegetation mortality that reduces the areal extent of willow riparian habitat and structural changes within the habitat, especially a loss of shrubby understory. These effects to vireo critical habitat will be offset by the creation of 37.2 acres of riparian habitat.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

We are unaware of any future, non-Federal actions that are reasonably certain to occur within the action area that could adversely affect the vireo and its critical habitat, flycatcher, or sucker.

CONCLUSION

Measures to offset effects to vireo and flycatcher from prior water conservation projects include species monitoring and reporting, cowbird trapping, and habitat restoration. Measures to offset effects to sucker from the Mainstem project include habitat restoration and continued development and implementation of a sucker management plan. After reviewing the current status of the vireo and its critical habitat, flycatcher, and sucker, the environmental baseline for the action area, effects of the proposed action including conservation measures, and the cumulative effects, it is our biological opinion that the proposed action is not likely to jeopardize the continued existence of the vireo, flycatcher, or sucker or adversely modify critical habitat for the vireo. Our conclusion is based on the following findings:

1. Adequate conservation measures have been implemented from prior consultations to minimize project-related effects during non-flood season at elevations between 498 and 505 feet, and adequate conservation measures will be implemented for project-related effects during flood season between 494 and 498 feet, thus maintaining the baseline of habitat, abundance, and distribution for the vireo and flycatcher within the project action area;

2. Implementation of the proposed habitat creation efforts, plus remedial measures if necessary, will ensure that habitat function for the vireo and flycatcher is maintained within the action area;

3. Adequate conservation measures will be implemented for project-related effects to the sucker, thus maintaining the baseline of habitat, abundance and distribution of sucker within the project action area; and,

4. Implementation of the proposed exotic predator/competitor eradication plan will ensure that project-related effects to sucker are minimized.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act, and Federal regulations issued pursuant to section 4(d) of the Act, prohibit take of endangered and threatened species without a special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that actually kills or injures a listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an action that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), such incidental taking is not considered to be a prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary and must be implemented by the Corps or the District in order for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity that is covered by this incidental take statement. If the Corps (1) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

AMOUNT OR EXTENT OF TAKE

We anticipate no additional incidental take of vireo from this proposed project over that assessed in Biological Opinion 1-6-99-75 for prior water conservation activities that are still in effect during the life of this project, that is, the harm of 90 pairs of vireos or 180 individual vireos over the life of the project due to the periodic, temporary flooding, destruction or degradation of occupied habitat.

We anticipate no incidental take of flycatchers.

We anticipate incidental take of an unquantifiable number of suckers in the form of harm due to loss of breeding habitat downstream of Prado Dam and inundation effects to 2.2 to 4.8 acres of stream habitat behind the dam in the reservoir pool.

EFFECT OF TAKE

In the accompanying biological opinion, we determined that the level of anticipated take is not likely to result in jeopardy to the vireo, flycatcher and/or sucker, or adverse modification of vireo critical habitat.

REASONABLE AND PRUDENT MEASURES

The Corps shall implement the following reasonable and prudent measure.

1. Your agency or the District will ensure that adverse effects to the vireo, flycatcher and sucker resulting from the implementation of the proposed action are minimized to the maximum extent practicable.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, your agency and/or the project proponents and their agents must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are nondiscretionary.

1.1 The Corps and the District shall implement the project minimization measures for vireo, flycatcher and sucker as described in the section entitled "Description of the Proposed Action."

1.2 The Corps, District, or their agents shall obtain all necessary local, State, and Federal permits to implement the project. In particular, the Corps and District must obtain any necessary permits from California Department of Fish and Game. The incidental take authorization in this biological opinion is not in effect in the absence of any or all such permits.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. If, during the course of the action, the level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. Your agency must immediately provide an explanation of the causes of the taking and review with this office the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. We recommend your agency consider implementing the following recommendations to further the conservation of the vireo, flycatcher, and sucker:

1. A long-term plan for restoring sucker habitat within the Santa Ana River, including Reach 8, should be developed and implemented to address the creation of stream meanders, pool-riffle complexes, upstream and downstream fish passage throughout the reach, reestablishment of riparian vegetation, and other conservation needs. Your agency should regularly participate in the monthly meetings of the Santa Ana Sucker Discussion Team.

2. The installation of low-flow rock passageways, vertical slot structures, fish locks, or other similar methods that provide fish passage through or around drop structures in the Santa Ana River should be developed and implemented. The velocity of flow in which the sucker can maintain direction and movement should be investigated so that appropriate

fish passage systems could be established at each of the drop structures between Prado Dam and Imperial Highway.

3. Conduct an annual assessment of the effects of inundation (e.g., dwell time and elevation) to the vireo, sucker, and their habitats for the life of the dam. This assessment should include baseline information such as the distribution and elevation of all vireo nests during each monitoring season for which data has been collected (i.e., approximately the past 16 years).

4. To the extent practicable, remove all invasive/exotic biota from riparian habitats in the Prado Basin. The existing cowbird management program should be continued and expanded to maximize the reproductive success of the vireo, flycatcher, and other sensitive avian species. Also, the control of invasive, exotic plants such as arundo and castor bean must continue if riparian habitats are to provide the elements necessary to accommodate the vireo, flycatcher, and a large variety of other sensitive animal taxa over time.

5. A sediment transport study should be developed and implemented in cooperation with other local, State, and Federal agencies. The sediment transport study should incorporate historical and current data and evaluate the effectiveness of the Santa Ana River as a sediment transport system. The study should address the excess sedimentation that occurs upstream of Prado Dam and the sediment deficit downstream of Prado Dam. The results of this study would be used to develop measures that would attempt to return the Santa Ana River to a fully functioning sediment transport system.

REINITIATION NOTICE

This concludes formal consultation on the proposed action as specified in your request for formal consultation. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; 3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation. Any questions or comments should be directed to Jill Terp of my staff at (760) 431-9440.

Sincerely,

Karen A. Evans

Karen A. Evans
Assistant Field Supervisor

cc: Orange County Water District, C. Miller and D. Zembal

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G PUBLIC HEARING TRANSCRIPT

PUBLIC REVIEW AND PUBLIC MEETING

Prado Basin Water Conservation Feasibility Study

Draft Feasibility Report
Environmental Impact Statement
Environmental Impact Report

Orange County Water District Boardroom
September 22, 2004 - 7:00 p.m.
10500 Ellis Avenue, Fountain Valley, California

ATTENDANCE

Los Angeles District, U.S. Army Corps of Engineers
Dustin Harris, Captain, Area Commander
Ed Demesa, Chief of the Plan Formulation Branch
Deborah Lamb, Chief of Planning Section A and
Bob Stuart, Study Manager
Dr. Fred-Otto Egler, Chief, Public Affairs Office

Orange County Water District
Virginia Grebbien, General Manager
Craig Miller, Assistant General Manager
Kevin McGillicuddy, Director of Recharge Operations
Judy-Rae Karlsen, Assistant District Secretary

Los Angeles District, U.S. Army Corps of Engineers - Planning Study Team
Kerry Casey, Hydrologist for the Study
Mike Hallisy, Economist for the Study
Alex Watt, Acting Chief Regional Planning Section

Los Angeles District, U.S. Army Corps of Engineers - Programs and Project Management Division
Ken Morris, Project Manager

Speakers
Ati Eskandari, Principal Civil Engineer, Public Works Department - City of Corona
Paul Cook, First Vice President, Board of Directors - Orange County Water District

INTRODUCTION

Captain Dustin Harris, Area Commander, U.S. Army Corps of Engineers

The purpose of this meeting is to give us an opportunity to hear your comments on the Prado Basin Water Conservation Feasibility Study Draft Main Report and Draft Environmental Impact Statement/Environmental Impact Report, and in particular, your comments on the tentatively Recommended Plan. This meeting is part of the public review process that commenced on August 20 and will end on October 4 for the draft Feasibility Study and the Environmental Impact Statement and Environmental Impact Report. The public review process for feasibility studies, such as this one, is a requirement of the National Environmental Policy Act.

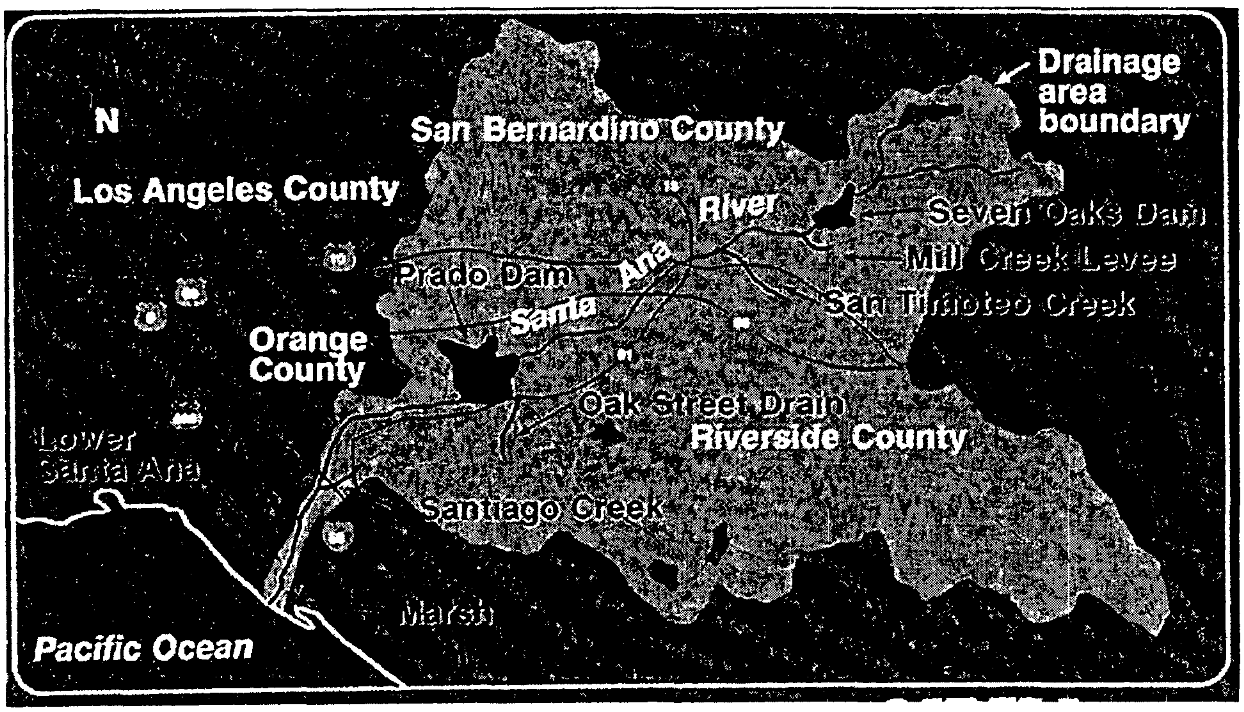
At this time I'd like to thank the Orange County Water District for making the arrangements for tonight's meeting and for their patience and cooperation during the course of this study.

As informational staff reports, we will hear from Craig Miller, Assistant General Manager – Orange County Water District and Bob Stuart, Study Manager - U.S. Army Corps of Engineers. They will present the Recommended Plan, Environmental Impacts of the Plan and Mitigation Measures. Following the presentations we will begin the public comment portion of the meeting. We want to hear your concerns, opinions and suggestions about what we've proposed as a recommended solution. Public comments are the most important item on tonight's agenda.

PROJECT OVERVIEW

Craig Miller, Assistant General Manager - Orange County Water District
Bob Stuart, Study Manager - US Army Corps of Engineers

The study area is located within the Prado Dam and Flood Control Basin located on the Santa Ana River. This map shows the Santa Ana River Watershed Basin, which is the largest river basin in Southern California, with a drainage area of 2,450 square miles. Of that total drainage area, approximately 2,250 square miles are above Prado Dam. Prado Dam is approximately 31 miles upstream from the mouth of the Santa Ana River. Also shown on the map are some of the features of the Santa Ana River Mainstream Project, of which Prado Dam is a component.



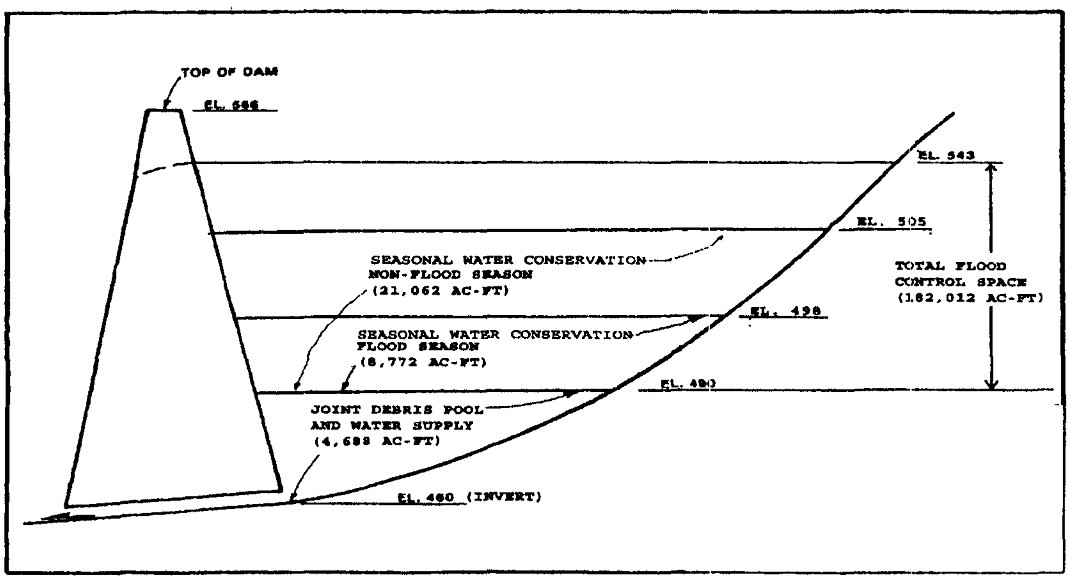
The principal objective of the study was to determine if the operation of Prado Dam could be modified, to maximize water conservation potential, while at the same time being consistent with the flood control purpose and not compromise the flood control capability. In addition, environmental impacts were to be avoided or, if necessary, mitigated.

Re-operation of Prado Dam to increase the amount of impounded floodwaters available for water conservation is an opportunity to help meet future water demands. The re-operation consists of increasing the maximum Prado Basin water surface elevation at which water conservation is permitted during the flood season from 494 feet to 498 feet. The non-flood season maximum Prado Basin water surface elevation at which water conservation is permitted will remain the same as the existing conditions, or 505 feet.

The water conservation operation for both the flood and non-flood seasons will remain the same as the existing operation --- releasing of water from Prado Dam at a rate at which all of the flow will percolate into the Orange County Water District recharge facilities located in Santa Ana Riverbed downstream. This rate is a maximum of 600 cfs.

One of the constraints is that water conservation must not impact the ability of the dam to provide its prescribed flood control function. In order to ensure that prescribed flood control is maintained, the water would be evacuated from the basin down to the debris pool, if necessary, should weather forecasts indicated a significant storm event. This would enable the entire capacity of Prado Reservoir to be used for flood control throughout the storm event. The goal of the operation is that at the tail end of the storm event, the reservoir water surface elevation will be at or very close to 498 feet during the flood season or 505 feet during the non-flood season.

The following diagram illustrates the proposed plan showing the elevations and respective storages for water conservation under the recommended plan.



As shown, the total amount of storage available to water conservation during the flood season is approximately 8,800 acre-feet and for the non-flood season the storage is approximately 21,000 acre-feet. (An acre-foot is the amount of water that would supply two average households for one year.)

Also shown in the diagram is the total storage behind the dam dedicated to flood control, approximately 182,000 acre-feet.

The total amount of storage allocated to water conservation, the 21,000 acre-feet, represents approximately 12% of the total storage up to spillway crest. The spillway crest the maximum elevation in which floods can be completely controlled with prescribed releases downstream, and every effort is made to ensure that, during flood control operations, the water surface does not exceed this elevation.

The Environmental Impact Statement and Report that accompanies the Feasibility Study thoroughly analyzed the potential impacts of the proposed project and alternatives. The EIS/EIR has concluded that there are no permanent environmental impacts. The area is habitat to endangered species such as the Least Bell's Vireo and Southwestern Willow Flkycatcher. However, any impacts to their habitat have been mitigated by dedicating areas within Prado Basin for mitigation activities.

The estimated cost of implementing the plan are as follows:

- Environmental mitigation costs upstream of dam $172,500*
- Environmental mitigation costs downstream of dam $550,000*
- Operation and maintenance cost $213,500
- Cost of storing water* *(currently subject to negotiation)* $ 2,193,000

** One time costs*

The environmental mitigation costs are a one-time cost; the operation and maintenance cost is an annual cost. The cost of storing water in Prado Basin for water conservation purposes is currently the subject of negotiations between the Corps and the Orange County Water District.

Here is the tentative completion schedule. We plan to have responses to your comments provided by early November. Also shown are the next major milestones after responses to your comments culminating in the Assistant Secretary of the Army signing the Report, indicating final approval.

•Prepare responses to public comments	November 1, 2004
•Pricing Policy Approval	November 30, 2004
•Feasibility Review Conference	December 17, 2004
•Final Policy Guidance Memorandum issued	January 7, 2005
•Division Engineer's Final Report and filing	February 2005

•Final Assessment to LA District [end of 30-day Final EIS/R Public Review]	March 2005
•Record of Decision	April 2005
•Memorandum of Agreement	June 2005
•Plan implementation	October 2005

PUBLIC COMMENTS

Captain Dustin Harris, Area Commander, U.S. Army Corps of Engineers

Everyone who is interested in speaking tonight should have filled out one of our comment cards and checked the appropriate box showing your interest. If you did not have the opportunity to fill out a card, please do so now. We will have someone come around and collect those in a few minutes. Speakers will be selected in a random order. When called, please approach the microphone located next to the Assistant District Secretary and state your name clearly before presenting your comments for our record.

We will have a transcript made documenting this workshop. We ask that you please hold all your comments to no more than 3 minutes. We will not be able to provide answers to all comments tonight. A detailed response will be prepared for comments made this evening and for written comments received before the end of the public review timeframe, ending on Monday, October 4. All comments made tonight and submitted in writing during the public review will be documented in the final environmental report. Changes may be made to the tentatively Recommended Plan based on the comments received.

Ati Eskandari, Principal Civil Engineer, Public Works Department - City of Corona

Good evening. I will try to keep my remarks brief. I have had a chance to briefly review the documents in front of us and going back to the records and discussing this with other divisions and management office, we are basically in support of the project. We would like you guys to know that.

However there are a few issues that I would like to take this opportunity to bring up to your attention and perhaps this study can address these concerns or you may have an answer for us tonight.

One of the issues with the project that you mentioned is that you are proceeding with Alternative #2, as shown on the Study which brings up the 505 elevation and the non-storm event. Going with that, and with the nice table presented in the study (Table 2-4) that compares the existing condition and the pool of water at the impass on the days of inundation due to the storage and the proposed project.

When we review this carefully, what we see is that the frequency during the small frequency event, there are some impacts as a result of the increase in storage and elevation up to 540 which is upstream. As you know the City of Corona is located right next to the dam, and the whole project is occurring within the City of

Corona jurisdiction. What we have concerns about are basically related to the following:

- Pool of water pushes the fringes of habitat further up stream as a result we have the following concerns:
- Increased cost of maintenance due to habitat establishment. We don't want the habitats to be established because that is part of our recreational use. As you know the communities as we go through the buildup scenario we get less and less opportunity for recreational lands. In order to preserve those areas we have to keep maintaining those and cutting down the vegetation to basically eliminate the establishment of habitat.
- That cost is not considered here; at the same time the fringes that are now habitats are going to be established at the higher elevation. Which currently they are not.

Other issues, we are willing to start pulling some data and recording- is monitoring the groundwater levels. With the increased pool of water, the groundwater elevation is going to be raised, and I saw your charts that we are going through the drought season...but we are looking at the long term impacts and the groundwater elevation in the future being raised... what type of mitigations or impacts are there going to be on our facilities. As you know our airport is located there within the area at an elevation of 530 to 510 as well as pump stations and other things. The groundwater elevation increase will degrade the subgrade of the airport runways, as well as impact facilities in those locations.

One other thing that was discussed and kind of dismissed is the increased Vector Control. I know the County already has a vector control program but we feel strongly that the agency needs to participate at least on a fair share basis on a routine annual vector control from the time of the project on.

We would like to take advantage of this project as far as we are an upstream agency not receiving the water but perhaps we can receive one great benefit because of the biological treatment towards our NPDES program. We would like to work with OCWD and with the Corps to have the monitoring established for the water quality after the treatment at the outlet and be reported to Riverside County Flood Control as part of our annual report for cleaning the water. However, at the same time we want some assurances that in the future as urban development increases more and more, upstream agencies, including us, are not held responsible to improve any degradation of the water quality just to meet your demand downstream. That needs to be worked out and agreed upon.

At the same time, because of the loss of recreation that we have we would like cooperation with the Corps for the same amount of land more suitable or the same to be given to the City of Corona for future recreational uses.

These are some of the comments and again I am trying to pull all of the comments in and give them to you accordingly... One further comment that our airport manager has made, because of the inundation at the lower frequency storms would trigger loss of revenues because of the hanger locations and forced evacuation. They are going to lose basic abilities for revenues. I know it is uncertain at this point but some agreement needs to be made accordingly so perhaps those events can be compensated accordingly.

With that in mind, I appreciate your time. Do you have any questions for me? Thank you for this opportunity.

Captain Dustin Harris, Area Commander, U.S. Army Corps of Engineers

Thank you very much for your comments. It would be helpful if you could send us a written copy of all your comments and your concerns also.

Our next speaker is Paul Cook.

Paul Cook, First Vice President, Board of Directors - Orange County Water District

Good evening. My name is Paul Cook, First Vice President of the Orange County Water District Board of Directors. I wanted to come and speak before the Corps for a couple of reasons. I do not have a Board resolution, or a grand speech prearranged, but I do have a few years of actions behind us that speak much louder than a speech that I could give tonight. The actions that we and the LA Corps has taken in support of what we are shooting for by amending the operating plan of the dam speak louder than any speech I can deliver.

We appreciate all the efforts that the LA District extended to us regarding this study. You have seen the commitment of OCWD to mitigate the raising level of the water; we have participated in Vector Control issues upstream of the dam. We have participated to an extreme degree with Fish and Game and Fish and Wildlife. I think we are the "poster child" in their eyes as a good water agency dealing with endangered species, Least Bell's Vireo habitat, and things like that.

Again, I think our actions will speak louder than my words tonight.

I want to thank the LA District specifically. I have been to your headquarters and talked with the folks back there about the permit deviation/modification on the plan and I appreciate your efforts and have sympathy because I know what you have to deal with back there. I look forward to our staff dealing with them on the cost issue. That is all I wanted to say tonight. Thank you and have a good night.

CONCLUSION

Captain Dustin Harris, Area Commander, U.S. Army Corps of Engineers

Thank you for your comments. Would anyone else like to speak? Please send any additional written comments to:

U.S. Army Corps of Engineers
915 Wilshire Blvd.
Los Angeles, CA 90017
Attn: Bob Stuart, CESPL-PD-WA

This concludes tonight's meeting. Thank you for your comments this evening.

H

COMMENTS RECEIVED AND RESPONSES TO COMMENTS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

September 29, 2004

Alex Watt
U.S. Army Corps of Engineers
Los Angeles District (CESPL-PD-RQ)
P.O. Box 532711
Los Angeles, California 90053-2325

Subject: Prado Basin Water Supply Study Draft Environmental Impact Statement/Environmental Impact Report (Draft EIS/EIR) and Draft Feasibility Report [CEQ # 040391]

Dear Mr. Watt:

The Environmental Protection Agency (EPA) has reviewed the document referenced above. Our review and comments are pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act. Our detailed comments are enclosed.

We have rated this Draft EIR/EIS as Lack of Objections (LO) (see enclosed "Summary of Rating Definitions"). EPA recognizes the increasing need for water supplies in Riverside County and the multiple studies that have been done to investigate alternatives for providing this water. The Draft EIS estimates that the environmental impacts from the implementation of Alternative 3, 4, or 5 would be substantially greater than those associated with Alternative 2. Alternatives 4 and 5 also have the potential for more significant adverse impacts on least Bell's vireo and willow flycatcher habitat as well as additional species such as the yellow warbler, yellow-breasted chat, and pond turtles. For these reasons, EPA supports the selection of Alternative 2 as the agency's preferred alternative.

There is some information we would like to see included in the Final EIS. In particular, the relationship between this project and the Phase II General Design Memorandum (GDM) for the Santa Ana River Mainstem, as well as other associated Prado Basin projects, should be explained in more detail. Conservation recommendations included in the U.S. Fish and Wildlife Service's (FWS) Biological Opinion, should be incorporated into the project plan to the greatest extent possible to minimize or mitigate impacts to habitat of endangered species.

We appreciate the opportunity to review this Draft EIR/EIS. Please send two copies of the Final EIR/EIS to this office (mailcode: CMD-2) when it is released for public review. If you have any questions, please call Summer Allen, the lead reviewer for this project, at (415) 972-3847.

Sincerely,

Lisa B. Hanf

Lisa B. Hanf, Manager
Federal Activities Office

MI# 004439
Enclosures:
EPA's Detailed Comments
Summary of Rating Definitions

cc: Jill Terp, U.S. Fish and Wildlife Service

EPA DETAILED COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR PRADO BASIN WATER SUPPLY STUDY AND FEASIBILITY REPORT, SEPTEMBER 29, 2004

Related Projects

The current proposal was established based on previous environmental reviews such as the Phase II GDM for the Santa Ana River Mainstream Project (SARMP), prepared in 1988. EPA provided comments on the Prado Basin and Vicinity Draft and Final EIS in 2000 and 2002, respectively. At that time, we expressed concern with impacts to air quality and the project's consistency with Clean Water Act Section 404(b)(1). The relationship between the 2002 flood control project and this water conservation project is not discussed in the document. In addition, it is not clear how this project proposal is related to the Prado Dam modifications described in the GDM for the SARMP.

Recommendations:

> The Final EIR/EIS should include information regarding previous environmental reviews involved in the establishment of the current proposal, such as the Prado Basin flood protection Draft and Final EIS and the GDM for the SARMP. Conservation efforts that have been undertaken by Orange County Water District as a result of these plan formulations, should be included. The Final EIS should address how this project relates to the GDM for the SARMP and what other alternatives and associated projects were included in that Memorandum.

Habitat and Wildlife Consideration

All action alternatives have direct and adverse impacts to wildlife movement corridors, protected species, non-sensitive vegetation, and nonsensitive wildlife. Endangered Species Act, Section 7 consultation with the U.S. Fish and Wildlife Service has been completed. Based on this consultation, the project may result in degradation of least Bell's vireo, Southwestern Willow Flycatcher, and the Santa Ana sucker. It may also contribute to the invasion of exotics due to habitat disturbance and direct impacts to the sucker due to conservation structures and diversions. The most significant impacts to least Bell's vireo habitat will occur if there is a major storm event.

Recommendations:

> The Final EIR/EIS should discuss additional conservation measures that will be undertaken and should evaluate the ability of the project to incorporate the conservation recommendations that were suggested by the U.S. Fish and Wildlife Service in the Biological Opinion. USFWS-approved mitigation plans should be incorporated into the project and addressed in the Final EIS/EIR. The Final EIS/EIR should also identify additional mitigation efforts that will be undertaken in the event of a major storm event.

SUMMARY OF EPA RATING DEFINITIONS

This rating system was developed as a means to summarize EPA's level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the EIS.

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 public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the 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 analysed 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 analysed in the draft EIS, which should be analysed 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."

Responses to EPA

Related Projects
The proposed project, although it is occurring within Prado Basin, is not dependent upon the completion of the Santa Ana River Mainstem Project, as the proposed alternative could result in releases that are consistent with the current releases from Prado Basin. Alternative 2, which is the proposed action could result in releases of up to 4700 cfs, which is less than the current maximum non-damaging releases of 5,000cfs, which could occur as a result of flood control.

The proposed action, which will allow holding of water at an elevation 4 feet higher than the current buffer pool, also requires that in the event of a storm being forecast, the pool will be lowered to elevation 494, which is the current buffer pool elevation within 24 hours. This is to remove any potential impact to the flood control function and capacity of Prado Basin. The proposed action will not impact the flood control protection provided by Prado Basin.

Habitat and Wildlife Consideration.
The mitigation proposed for the project is the result of several years' negotiation and numerous meetings between USFWS, OCWD and the Corps. The increased pool will occur in the lower reaches of the basin, during the time of year when the plants are dormant, and the avian species of concern are not present. The proposed action is to hold water up to elevation 498 between October and the end of February. The least Bell's vireo do not return to Prado basin and start establishing territories until the end of March. If a storm occurs which results in the pool elevation exceeding 498, the basin will revert to its use for Flood Control, which is the prime function of the basin. The mitigation proposed for the project is either already in place, or is being undertaken ahead of the proposed action.

OCWD has been instrumental in setting up the Santa Ana Sucker Working group, and it is this group that will determine what conservation measures are needed to ensure the survival of the Sucker. Prior to the group being established there was virtually no knowledge of the needs and requirements of the sucker, and therefore any mitigation proposed would have been scientifically unfounded.

COUNTY OF ORANGE

RESOURCES & DEVELOPMENT MANAGEMENT DEPARTMENT

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September 30, 2004

Mr. Alex Watt
U.S. Army Corps of Engineers
P.O. Box 532711
Los Angeles, CA 90053-2325

Subject: Prado Basin Water Conservation Feasibility Study

Dear Mr. Watt:

The Trail Planning & Implementation section of RDMD/Harbors, Beaches and Parks (HBP) has reviewed the subject document and offers the following comments:

The Recreation section (4.5.13) on page 4-28 should also address the proposed Santa Ana River Trail and separate Santa Ana River Bikeway.

Regional Trail: The Santa Ana River Trail is a regional riding and hiking trail, proposed to follow the Santa Ana River from the San Bernardino Mountains to Pacific Coast Highway in Orange County. The existing portion of the trail in Orange County is surfaced with decomposed granite (DG) and is used by pedestrians, equestrians, and mountain bicyclists.

Regional Bikeway: The Santa Ana River Bikeway is a regional Class I (paved off-road) bikeway, proposed to follow the Santa Ana River from the foothills of the San Bernardino Mountains downstream to Huntington State Beach. The bikeway is existing in Orange County. It is used by both bicyclists and pedestrians, and is the most popular cycle-commuter and recreational route in Orange County. It is used by about 500,000 people per year.

HBP/Trail Planning has been working closely with the Counties of San Bernardino and Riverside, and the Army Corps of Engineers, to ensure that the trail and bikeway will continue upstream from Orange County, past the Prado Dam and Prado Basin. When completed in that area, both the trail and bikeway should be kept open for public use at all times, and therefore should be located outside the inundation areas of the Santa Ana River and the Prado Basin. The subject document should address this.

Thank you for the opportunity to respond. If you have any questions, please feel free to call me at (714) 834-5372.

Sincerely,

Jeff Dickman
Chief, HBP/Trail Planning

JD/SM:sm

Responses to County of Orange, Resources & Development Management Department

The Santa Ana River Regional Trail will not be affected by the proposed action as the existing portion is out of the flood control channel, which has a capacity of 30,000 cfs, between Weir Canyon and the Ocean. Upstream of Weir canyon, the river has been left natural except for the stretch through Green River Golf Course, where the low flow channel has a capacity of 5,000 cfs. The trail is located along the bank outside of the flood control channel. The portion of the trail that is proposed to pass through Prado basin has not be delineated at this time, and the trail will be situated in the higher reached of Prado basin, outside of the areas that have a higher potential of being inundated by flood waters. The proposed water conservation pool will not impact the proposed trail. As there has been no established alignment for the trail, it is not addressed in this document, but will be addressed in the Prado Basin Master Plan that is currently being prepared by the Corps.

OFFICE OF CITY MANAGER

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CORONA CITY HALL - ONLINE, ALL THE TIME (http://www.discovercorona.com)

October 1, 2004

Via Fax (213-452-4204) and Mail

Mr. Alex Watt (CESPL-PD-RQ)
U.S. Army Corps of Engineers
Los Angeles District
Post Office Box 532711
Los Angeles, CA 90053-2325

RE: COMMENTS REGARDING THE PRADO BASIN WATER CONSERVATION DRAFT FEASIBILITY REPORT (JULY 2004 DRAFT F5 DOCUMENT – REVISED)

Dear Mr. Watt:

The City of Corona ("City") has reviewed the Prado Basin Water Conservation Feasibility Study – Draft Feasibility Report (July 2004 Draft F5 Document – Revised) ("Report") for the proposed project to increase the water supply pool behind the dam. The City is generally in support of Alternative 2 as presented in the Report. We have determined, however, that the document is deficient because of several issues affecting the City of Corona that are ignored or insufficiently analyzed in the Report. The City therefore requests that the Army Corps of Engineers address the following issues.

Water Quality Treatment – Watershed Management

The Report does not recognize the benefits to water quality and the general improvement to management of the watershed that would result from the project. The Benefits section of the document (section 4.6.2) notes that the project would lead to water supply savings for Orange County Water District ("OCWD"). The document should make clear the positive effect that the biological treatment of the stored water would have upon entities upstream of Prado Dam, including the City of Corona. Specifically, the increased storage of water will result in the creation of new wetlands that will assist in nutrient removal, increase water quality, and lead to better watershed management. The agencies upstream from Prado Dam are developing Total Maximum Daily Load ("TMDL") standards related to urban run-off. The Report should recognize the benefits of the improved biological treatment of water that would result from increased water storage behind Prado Dam as part of the project so that the upstream agencies may utilize these benefits as part of their water management plans.

Moreover, to facilitate the enjoyment of this benefit of the project, data regarding water quality improvement must be shared by way of a monitoring and reporting program that would report the results of the water treatment to the Riverside County Flood Control

District as part of the Santa Ana Watershed Management and NPDES Permit requirements.

The Report should also recognize, as part of the project description, the current Water Quality Standards as set forth in the Santa Ana River basin plan and its permitted dischargers. Also, acknowledging the current standard is set for beneficial users, for recreational purposes, not water supply reservoir purposes. It should be recognized that the Prado Basin will not be permanently designated as a water supply source. If the reservoir becomes a permanent water source then higher water quality standards for the benefit of downstream users would likely be put into place. However, the City could not afford to meet any more stringent standards. Moreover, such issues are not analyzed in the Report.

Additional Water Storage/Average Water Levels Will Cause Adverse Impacts in the City of Corona

As is made clear throughout the Report, Alternative 2 would result in increased inundation from storm events and facilitate increased water storage. (See, e.g., Report, pp. 4-4, 4-8, and 4-16.) Those increased water levels would result in the following adverse impacts that are insufficiently analyzed in the Report:

- Sediment and debris that is now flushed through the reservoir would accumulate at an increased rate as a result of the project because of additional water storage and the fact that the reservoir would not be drained as often to allow for debris and sediment removal. As a result, average surface water levels will be higher even when similar storage volumes for the reservoir are maintained. Increased maintenance costs will be incurred by the City and its landowners as areas that are higher in elevation and further back from Prado Dam will be regularly inundated and subject to sediment and debris accumulation. Additional costs may include the need to prevent currently useable lands from reverting to wetlands at higher elevations. The Report does not make sufficiently clear how many days or to what level the increased inundation will cause these effects. The Report also makes certain assumptions regarding sediment and debris accumulation without addressing the potential impact for additional sedimentation and debris deposits.

- Increased average inundation, including the inundation of existing sensitive habitat in the basin, would force valuable habitats and sensitive species that are now at the edge of the reservoir or elsewhere in the basin to be relocated to higher areas further back from the dam at higher elevations, leading to harm to the species. Orange County Water District ("OCWD") has stated that mitigation lands have been purchased. However, the location and features of that land is insufficiently identified. The failure to specifically identify mitigation land has also resulted in an insufficient analysis of related impacts to the City of Corona.

- The project could result in sensitive species and habitat, including Least Bell's Vireo or Southwestern Willow Flycatcher nests, being relocated closer to developed areas, including the Corona airport, flood control channels, and residential and commercial properties such that the use of those properties could be impeded on a regular basis. The City is concerned that as a result of the increased inundation, the use and maintenance of those properties, including brush clearance/fuel modification and the clearance of drainage facilities in the basin, could become problematic if the project causes the movement of sensitive species or habitats in the area. The Report fails to recognize that some of these concerns could potentially be minimized if the City was included in the negotiation and site selection regarding habitat lands undertaken by the United State Fish and Wildlife Service ("FWS") and OCWD. It also should be recognized that the sites selected for sensitive species use should be fenced and permanently delineated to limit wildlife encroachment into adjoining developed areas. Moreover, it is imperative that an agreement be reached whereby the City can maintain its properties, including the airport and flood control channels, without undue restriction by the FWS.

- Even with implementation of the ideas set forth above to minimize concerns caused by the project, the additional inundation will cause additional costs to be incurred by the City associated with threats to the structural integrity of the City's facilities, including Corona Municipal Airport, wastewater facilities, pipelines, roadways, and bridges. Raised water levels will also potentially cause the City to incur increased costs caused by loss of use and the evacuation of the airport and loss of revenue from cancellations of recreational events. It must be recognized that the increased water levels, and resulting impacts, would be caused not by a flood event but rather for water storage that would benefit only downstream interests. Therefore, an agreement, including compensation provisions, should be put into place to address this concern.

- The possible effects of a major storm are inadequately addressed in the Report. The Report assumes a planning period of only 50 years. (See, e.g., Report, p. 4-9.) Apparently this planning period was selected on the basis of the lead agency's planning cycle, when in fact the nature of the project makes it clear that the operation of the project would last much longer than 50 years. The artificially shortened planning period analysis fails to address the potential impacts that would be caused by a major storm, longer-term sediment and debris accumulation, and the need for long-term protection of the City of Corona from such events. The whole project and its impacts must be analyzed.

- Improper baselines are used in the Report. The study establishes drought conditions as the baseline for the project when water level comparisons should be made not only to drought conditions but also to average current water levels in the reservoir. The report also indicates an increase in the Liquefaction Level due to potential seismic activities, a long the outer areas of the project possibly under exiting homes and businesses, without identifying any mitigation measures.

Vector Control
The Army Corps of Engineers is currently responsible of the cost of vector control within the Prado Basin. The Report does not include any historical data set forth in the Report regarding the costs of the vector control in the past, or any quantification of the increases in vector control costs that would be required by implementation of the project. While the Report states that OCWD and others could share in the increased costs of the vector control, there is no statement of how OCWD could share in the cost of mosquito abatement in Riverside County or how the mitigation program as a whole would be implemented on an annual basis, including the ongoing sharing of abatement costs. As such, the mitigation measure as stated is insufficient to explain how the stated risk for an increase in the mosquito population has been mitigated to a less than significant impact.

Recreation
The Report does not address significant impacts to recreation that would be caused by the increased inundation of the Prado Basin. If recreation lands are to be removed from use in the Prado Basin, as is conceded in Section 4.5.13 of the Report, equal opportunities to use other lands in the basin should be provided to offset the loss of currently-used lands. While the Report cites the modified recreational plan being negotiated by OCWD and the Army Corps of Engineers, there is no explanation of how the proposed Project would coexist and/or conflict with the modified recreational plan. Without an explanation and analysis of the similarities and differences of the two planned uses of basin land, an adequate analysis of the potential impacts to recreation have not been provided by the Report.

Conclusion
The City of Corona appreciates the opportunity to comment upon the Report and requests that the United States Army Corps of Engineers address the issues raised in this letter.

Sincerely,

Bradly L. Robbins
Assistant City Manager
DWP General Manager

C: Beth Groves, City Manager
Amad Qattan, Public Works Director
Don Williams, Assistant G

Responses to City of Corona

The proposed action will not result in any increases to the biological treatment of stored water as water will only be held behind Prado Basin at elevation 498 for an average increase of 4 days per year. The pool will not be permanent, but will allow for the holding of water up to elevation 498 only when there is sufficient flow in the river. There will be no new wetlands created as part of the proposed action, however, OCWD is proposing to create addition wetlands within Prado Basin, but these will be similar to the ponds that are already existing, and will not contribute to this proposal for water conservation.

Prado Basin will not be permanently designated as a water supply source, as it's prime function is flood control, and any water conservation that occurs within the basin will not impact the flood control capacity.

Sediment will continue to build up within the basin, and this will result in less water being held for water conservation over time, as the proposed action is to allow water conservation up to a specific elevation. The incremental increase in sediment as a result of water conservation is considered minimal, however the Corps and OCRFCD are aware of the sedimentation, and this was taken into account with the raising of Prado Dam and the new outlet works. Currently there is only a minimal amount of sediment being passed through the dam, and there has been several discussions on methods that could be implemented to increase the amount of sediment reaching the lower river. The proposed action will result in water being held at elevation 498 for an average of 4 additional days per year with present conditions and for 13 additional days at the end of the project life, and at elevations 505 for less than one additional day per year under present conditions and for 2 additional days at the end of the project life. Above this elevation there is no increase in number of days of inundation.

The increases for water conservation within the basin will occur when the plants are dormant and the avian species of concern are not present. The proposed action will not result in the sensitive species being forced to relocate to higher elevations. The water conservation that has occurred within Prado basin has been responsible for the vireo increasing in number from 19 pairs in 1986 to over 700 pairs in 2004. Any birds that move to higher elevations are doing so, not because of the increased water level, but because of the increased numbers of territories within the basin. The lands that OCWD has set aside for mitigation are along the Santa Ana River at elevations above 512 within the basin. These lands are owned by OCWD, and are at lower elevations that any of the Corps lands leased to the City of Corona.

The proposed action will not affect the City of Corona from performing the required maintenance that is permitted by the Corps of Engineers Regulatory Branch, provided the City continues to operated within the requirements of the permits. The areas set aside for mitigation are within the lower elevations of the basin, and are susceptible to flooding during winter storms. Any fencing would act as a trap for debris, and would become a major maintenance problem.

The Corona Airport is within a flood control facility, is leased from the Corps, and has been susceptible to flooding. The lease that the City has for the airport spells out the requirements that must be met, including the evacuation of all aircraft, if the airport is being flooded, and that all buildings on the property must be floodable, which restricts the materials being stored on the site, and within the buildings. Any flooding of the leased facilities will be as a result of a flood event, as the pool will be lowered, through increased released from the Basin prior to the flood waters reaching Prado.

The effect of a major storm are considered Flood Control, not water conservation, and the life of the project is based on the life of the Prado Dam, as described in the GDM, not as part of the water conservation project.

The project baseline conditions are not just the drought conditions of the past few years, but include records for dry and wet years and is and is what is expected to occur over the next 50 years. Liquefaction is not considered to be a significant issue due to the temporary holding of water at elevation 498 feet.

Vector control is currently funded by the Corps and by OCWD. The local vector control agencies bills OCWD annually for any vector control.

Recreation lands will not be affected by the proposed action,. The Corps is preparing a Master Plan for recreation within Prado Basin, however, all recreation lands are at higher elevations within the basin, and are located outside of sensitive habitat.

COUNTY OF ORANGE

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October 4, 2004

Alex Watt, Regional Planning Division
U. S. Army Corps of Engineers
USACE Los Angeles District
P.O. Box 532711
Los Angeles, CA 90053-2325

Subject: Comments on Draft Feasibility Report for the Prado Basin Water Supply Study and Draft EIS/EIR

Dear Mr. Watt:

Thank you for the opportunity to respond to the subject draft EIS/EIR and Feasibility Report/Study (Report). The Orange County Flood Control District (OCFCD) has previously provided general comments to the U.S. Army Corps of Engineers, Los Angeles District (Corps), on the Report. We wish to take this opportunity to provide the following comments.

We request that the Corps require the Orange County Water District (OCWD) to enter into an agreement with the OCFCD to address the relationship and impact of proposed implementation of the 'Water Conservation/NED Plan' (Plan) described in the Report to the OCFCD's responsibilities for the Santa Ana River Mainstem (SAR)/Prado Dam Projects (Projects). We believe that the OCFCD's costs and responsibilities for the Projects warrant the Corps requiring such agreement. We further request that this requirement is included in Section 6.3 of the Report.

The comments provided below are issues proposed to be addressed in the proposed agreement and/or in the final Report by the Corps.

1. Timing of Plan Implementation: In Section 6.2 of the Report, the Corps states that the Plan is expected to be implemented prior to completion of SAR Project/Reach 9 and Dam Embankment/Outlet Works construction, (potentially also including completion of the protection/relocation of the Santa Ana River Interceptor or SARI Line). This creates an interim period prior to completion of these projects, wherein on-going projects construction and related efforts - such as biological mitigation, Reach 9 phased construction, and SARI line protection - could be affected. In addition, the SARI line (already in peril due to Santa Ana River erosion) may be impacted prior to completion of protection as well. We request that the Corps further clarify how implementation of the

Plan impacts the planned construction projects and existing infrastructure and how the timing of Plan implementation affects (or does not affect) analysis on 'cumulative effects'; and where applicable, how potential damages resulting from implementation are considered in addition to potential damages from the Projects (e.g. see Table 5.9 of the Economic Appendix). We also request that the Corps/OCWD specifically state in the Report that the SAR Sponsors have no responsibilities for, and are held harmless from impacts of Plan implementation.

2. Real Estate Requirements and Estimated Damages: Report Section 6.2.1 indicates that two leases (involving property behind the Dam) are impacted, and that either the Federal Government or the OCWD own real property rights required for Plan implementation. The Economic Appendix (for example, see Section 5.5) and Sections 4.5.13.2 and 4.6.3 of the Report provide comparisons of water conservation alternatives and related impacts on recreational land uses downstream of the Dam.

   The Green River Golf Course, Riverview Golf Course, Featherly Park and the SARI line reside within the floodway of the Santa Ana River. Further explanation is requested on the analysis of Corps/OCWD rights to impact utilities, publicly owned facilities, property owners and leaseholders downstream of the Dam for increased water conservation purposes per the Plan (as compared to existing or proposed flood control, and existing water conservation purposes). If applicable, we suggest that damage assessments and related cost estimates/benefits analyses are updated in the Economics Appendix and Section 4 of the Report (see also #3, below).

3. Sedimentation, OMRR&R Responsibilities, and Level of Flood Protection:

   a. Among other items, the Hydrology and Hydraulics Appendices of the Report provide information regarding impacts of increased sedimentation, frequency of inundation and erosion (for example, see Tables 46-48 in the Hydrology Appendix). Further explanation is requested as to potential impacts downstream of the Dam, in relation to the OCFCD's operation, maintenance, repair, etc. (OMRR&R) responsibilities along the SAR within Orange County – such as environmental mitigation, and other responsibilities associated with flood control operation.

   b. Section 7.2.2. of the Hydrology Appendix identifies the need for an agreement between the OCWD and the Federal Government/Corps for removing sediment in order to not impact flood 'level-of-protection'. Sections 6.3 and 6.4.2 of the Report also specify an agreement between the Corps and OCWD – to address flood protection, and other issues such as cost and liability responsibility. However, the OCFCD and other SAR Sponsors are not mentioned as potential parties to such agreement. Further discussion is warranted as to how the OCFCD (and other SAR Sponsors as may be applicable) interests are to be addressed, including potential effects on OCFCD costs for flood control OMRR&R and liability.

4. Consultation with the OCFCD on Water Conservation Operation: Section 6.2.3 of the Report states that the Corps will operate the Dam, and consult/coordinate with the OCWD on operation, based on an agreement to be developed after the Report is completed (see

also Hydrology Appendix p.39). We concur that close coordination with the OCWD is necessary; however, we believe that additional information should be provided on the relationship and cost sharing between the Corps and the OCFCD on Dam/downstream OMRR&R and overall flood control management. Accordingly, we also suggest that the Report clarifies that, because flood control is the pre-eminent purpose of the Dam, the Corps intends to consult with the OCFCD on operations matters including decisions on water conservation operation.

5. Water Rights (Sections 4.4.16 and 6.2.3): The OCWD has applied to the State of California Water Resources Control Board (SWRCB) for a revision to the Fully Appropriated/Santa Ana River Stream (Application). Given the role of the SWRCB, we are not in a position to determine how, or if, the Application/ruling by the SWRCB applies to Plan implementation. As you are aware, however, the OCFCD previously filed a protest to the Application with the SWRCB, advising that it is necessary for the OCWD to enter into an 'access' agreement with the OCFCD. As intended by the OCFCD, such 'access' agreement is the same as mentioned in the second paragraph of this letter.

6. Reallocated Project Cost Relationship to SAR Project Sponsor Costs: Section 6.3(1) of the Report identifies a 'reallocated project cost' of $2,193,000, and that the OCWD is to make payments to the Federal Government. We request further explanation regarding computation of costs/payments, and relationship to the SAR Sponsors' costs for the Projects.

7. Water Conservation Pricing: At the end of Section 6.3 of the Report, the Corps advises that an alternative formula is being developed for 'water conservation pricing'. We request further information on this matter, similar to the request for explanation on the issues noted in #6, above.

Thank you again, for the opportunity to provide comments and requests for your consideration. We look forward to a cooperative effort among the Corps, the OCWD, and the SAR Sponsors toward implementing the Plan in a prompt and equitable manner. Please call me (714-834-2398) if you or your staff have questions regarding this letter.

Sincerely,

Lance Natsuhara, P.E., Manager
Santa Ana River Project

S:\SARP\Elayne Rail\Draft EIS EIR Comments Prado Basin Water Conservation Feasibility Study 4

Responses to County of Orange, Flood Control Division

The proposed water conservation will occur during the flood season, when the work is not expected to be occurring as part of the SARP The proposed alternative may result in releases of up to 5,000 cfs, which is below the current maximum flood control releases from Prado Basin. The Corps is requesting that OCWD sign an amendment to the existing water conservation MOA, holding the Corps and OCFCD harmless from damages occurring as a result of water conservation releases.

The releases resulting from the water conservation will be up to a maximum of 5,000cfs, and these rates will only occur for a short duration as any releases being made prior to the arrival of flood waters requires that the releases be increased and then reduced to allow the water conservation pool to be released in less than 24 hours. The maximum releases will only occur for a few hours. The channel downstream of the basin will be capable of handling 30,000 cfs since all the bank stabilization measures are in place. The reach from Prado to Weir Canyon may have some inundation occurring from the proposed action as flows may exceed the current low flow channel at the upstream area of Green River Golfcourse. This is not expected to result in erosion, mainly in water flowing over the lower portions of the golf course causing areas of flooding.

Increased sediment in the basin will occur over the life of the project, and there is a small increment that will result for the proposed water conservation. The MOA for the water conservation will address this issue and further discussion will take place.

The prime purpose of Prado Basin is flood control, and any water conservation is a secondary use of the facility. The Corps will coordinate with OCFCD and OCWD in the preparation of the new Water Control manual for the basin.

OCWD's application to the State Water Resources Control Board is a separate issue form this proposed action, and the water being conserved is water that has been determined to belong to OCWD, as they currently have the right to all water reaching Prado Basin. This action does not increase the amount of water reaching the basin.

The Corps is currently working on the reallocated project costs, and the final determination will be included in the final decision for the proposed action.

CENTER FOR BIOLOGICAL DIVERSITY
CALIFORNIA AND PACIFIC OFFICE
protecting and restoring natural ecosystems and imperiled species through science, education, policy, and environmental law

VIA U.S. MAIL

October 12, 2004

Mr. Alex Watt, Environmental Coordinator
U.S. Army Corps of Engineers, Los Angeles District
P.O. Box 532711
Los Angeles, CA 90053-2325

Mr. Bill Everest
Orange County Water District
10500 Ellis Avenue
Fountain Valley, CA 92708

Re: Draft EIS/EIR for the Prado Basin Water Supply Feasibility Study

Dear Mr. Watt and Mr. Everest:

These comments are submitted on behalf of the Center for Biological Diversity ("Center") on the Draft Environmental Impact Report and Environmental Impact Statement ("Draft EIS/EIR") for the Prado Basin Water Supply Feasibility Study ("the project"). The Center is a non-profit environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center has over 10,000 members throughout California and the western United States, including in the area where the project is located. As described below, the Center objects to approval of the project based on the inadequacy of the current environmental documents.

I. THE DRAFT EIS/EIR'S ANALYSIS OF IMPACTS TO BIOLOGICAL RESOURCES IS INADEQUATE

The Biological Resources section of the Draft EIS/EIR fails to adequately disclose, analyze, minimize, and mitigate impacts to the biological resources of the project site. While the Draft EIS/EIR discloses that the endangered least Bell's vireo (*Vireo bellii pusillus*, "vireo,"), endangered southwestern willow flycatcher (*Empidonax traillii extimus*, "flycatcher"), and threatened Santa Ana sucker (*Catostomus santaanae*, "sucker"), as well as a host of other state-listed and sensitive species, including the western yellow-billed cuckoo, occupy the project site, the Draft EIS/EIR fails to adequately analyze the significance of the project to these species.

Kassie Siegel, Staff Attorney
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An EIS/EIR must describe the "environment in the vicinity of the project," as it exists before commencement of the project, from both a local and a regional perspective. 14 Cal Code Regs § 15125. The description should place special emphasis on environmental resources that are rare or unique to the region and that would be affected by the project. Id. Where basic information is missing from the EIS/EIR, the document is deficient as a matter of law. *San Joaquin Raptor/Wildlife Rescue Ctr. v. County of Stanislaus* (1994) 27 Cal. 4th 713, 722-729. The Draft EIS/EIR is out of date, and lacks information critical to a valid environmental analysis. For example, the Biological Resources section states that the sucker is "currently proposed as a federal Threatened Species...." Draft EIS/EIR at 4-18. The Draft EIS/EIR also contains inaccurate information which appears designed to minimize the environmental impacts of the project. For example, the Biological Resources section states that the sucker does not spawn within the Prado Basin. Draft EIS/EIR at 4-19. This statement is contradicted by the U.S. Fish and Wildlife Service's 2002 biological opinion for the project ("biological opinion"), which states that it is unknown whether suckers spawn in this area. Moreover, to the degree the habitat is not used for spawning, it is likely due to impacts from the existing dam to sucker habitat, impacts that will be compounded by the proposed project.

In general, the Draft EIS/EIR minimizes the impacts to the endangered, threatened, and sensitive species that will be impacted by the project. Having done so, the Draft EIS/EIR then fails to propose adequate avoidance or mitigation measures. While this is true for all species, the treatment of the sucker is particularly egregious. The biological opinion analyzes impacts to the sucker in some detail and proposes a list of possible mitigation measures. The Draft EIS/EIR fails to discuss these measures, as required under CEQA. Moreover, the mitigation the Draft EIS/EIR does propose (preparation of a management plan) itself violates CEQA because it constitutes post-approval study. Post-approval study violates the law because it inevitably results in less informational disclosure to the public and less protection for the environment. The time to study, propose and adopt mitigation for the sucker is before this project is approved. It cannot be delayed until after project approval.

II. THE DRAFT EIS/EIR'S ANALYSIS OF GROWTH INDUCING AND CUMULATIVE IMPACTS IS INADEQUATE

CEQA requires complete analysis of a project's growth inducing and cumulative impacts. The Draft EIS/EIR's treatment of these vitally important topics is cursory and entirely inadequate. The Draft EIS/EIR simply states, in a single short paragraph, without explanation, that the project is not growth inducing. This conclusion is illogical and untrue. The Orange County Water District wishes to obtain and store more water to serve its customers. This availability of additional water will inevitably facilitate and fuel further sprawl style development with all of its attendant environmental impacts. These impacts must be disclosed, quantified, avoided where possible, and mitigated.

The Draft EIS/EIR's treatment of growth inducing projects is also cursory and inadequate. The Draft EIS/EIR does not even contain a valid list of cumulative projects, as required by CEQA. All reasonably foreseeable projects with similar impacts must be listed, their impacts briefly summarized, and the cumulative impacts analyzed, avoided, and mitigated. The cumulative impacts section of the Draft EIS/EIR does not even approach this standard. As a starting point, all Santa Ana river-related projects by the Orange County Water District, all other water agencies in the region, and all other agencies (including, but not limited to flood control districts) that undertake projects that impact the Santa Ana River and its watershed must be compiled in a list of cumulative projects and addressed. The Santa Ana River is dying from a host of projects and impacts, many of which might be considered individually insignificant but which cumulatively are destroying the river environment. CEQA explicitly requires that a Draft EIR vigorously explore these issues. The Draft EIS/EIR fails to do so.

III. THE DRAFT EIS/EIR SHOULD BE RECIRCULATED FOR PUBLIC REVIEW AND COMMENT

A lead agency must recirculate an EIS/EIR for further public comment under any of four circumstances:

(1) When the new information shows a new, substantial environmental impact resulting either from the project or from a mitigation measure;
(2) When the new information shows a substantial increase in the severity of an environmental impact, except that recirculation would not be required if mitigation that reduces the impact to insignificance is adopted;
(3) When the new information shows a feasible alternative or mitigation measure that clearly would lessen the environmental impacts of a project and the project proponent declines to adopt the mitigation measure; or
(4) When the draft EIR was "so fundamentally and basically inadequate and conclusory in nature" that public comment on the draft EIR was essentially meaningless.

CEQA Guidelines §15088.5.

Based on the comments above, it is clear that the EIS/EIR must be re-drafted and recirculated. Conditions (1), (2), and (3) above will be met by meaningful and adequate discussion of the project's impacts to biological resources, as well as a discussion of growth inducing and cumulative impacts. The combined effect of these omissions makes it clear that the fourth condition has also been met.

VI. CONCLUSION

In summary, the current Draft EIS/EIR has not adequately disclosed, analyzed, minimized, and mitigated the environmental impacts of the proposed project. Because of the document's shortcomings, the public and decision makers cannot make informed decisions about the proposed project's costs in areas including biological diversity, growth inducement and cumulative impacts.

Should your agencies wish to move forward with the proposed project, the Center hopes to receive a revised Draft EIS/EIR. Please add the Center for Biological Diversity, P.O. Box 493, Idyllwild, CA 92549, Attn: Kassie Siegel, to all mailing lists for all information about this project. Thank you very much for your consideration of these comments.

Sincerely,

Kassie Siegel
Center for Biological Diversity

CC:

USFWS- Ecological Services
Carlsbad Field Office
2730 Loker Avenue West
Carlsbad, CA 92008
Attn: Karen A. Evans, Assistant Field Supervisor

Responses to Center for Biological Diversity

The DEIS/EIR does fully address the species of concern within the project area. The statement that the document is out-of-date is inaccurate. When the document was being prepared the sucker was proposed for listing, but was listed on April 2000, and the EIS/EIR was updated accordingly. The statement on page 4-18 has been updated. The Services BO statement that it is unknown whether the sucker spawns within Prado Basin was prepared prior to the Santa Ana Sucker Working Group determining that the sucker does not spawn within the basin. The sucker requires a gravel river botton for spawning, which is not found within the lower elevations of Prado Basin, but may occur several miles upstream on the Santa Ana River and tributaries. The mitigation proposed for the project has been agreed to be the USFWS, and expands the mitigation already in place for the vireo and the flycatcher. The mitigation for the sucker is being developed by the Santa Ana Sucker Working Group, members of the group include USFWS, OCWD, CDFG and OCFCD.

The EIS /EIR has been revised to include a more detailed section on growth inducing impacts, although the proposed action is not considered to be growth inducing as the area supplied with water from OCWD is northern and central Orange County which is already full developed, with the only growth being minimal infilling on vacant lots.

The cumulative impacts section of the EIS is Chapter 6.2

The Corps and OCWD do not believe that the document is inadequate under any of the four circumstances stated, and the document does not require recirculation.

CITY OF FOUNTAIN VALLEY

10200 SLATER AVENUE • FOUNTAIN VALLEY, CA 92708-4736 • (714) 593-4400, FAX: (714) 593-4498

October 5, 2004

U.S. Army Corps of Engineers
Los Angeles District
Attn: CESPL-PD-WA (Mr. Bob Stuart)
915 Wilshire Boulevard
Los Angeles, CA 90017-3401

Subject: Letter Supporting Orange County Water District Water Conservation At Prado Dam

Dear Mr. Stuart:

In response to the recently published "Prado Basin Water Conservation Feasibility Study Draft Report and Draft Environmental Impact Statement/Environmental Impact Report" for Orange County Water District's (OCWD) effort to conserve water at Prado Dam, the local Groundwater Producers Group would like to go on record in support of the project.

The Groundwater Producers Group is comprised of the following cities and water districts that rely on the local groundwater basin as a significant source of water within the boundaries of OCWD:

City of Anaheim	City of Newport Beach	Irvine Ranch Water District
City of Buena Park	City of Orange	Mesa Consolidated Water District
City of Fountain Valley	City of Santa Ana	Municipal Water District of OC
City of Fullerton	City of Seal Beach	Santiago County Water District
City of Garden Grove	City of Tustin	Serrano Water District
City of Huntington Beach	City of Westminster	Southern California Water Co.
City of La Palma	East OC Water District	Yorba Linda Water District

Prado Dam, a federal facility, provides great benefits to the Southern California region. In particular, OCWD's conservation efforts provide a unique opportunity for the County of Orange and the Santa Ana Watershed by storing valuable native water at the Dam while preserving the primary flood control mission of the Army Corps of Engineers. If OCWD were unable to conserve water behind Prado Dam, released water would eventually flow into the ocean instead of being diverted to replenish the local groundwater basin. Because of the extreme drought conditions in the Western United

States, the importance of using our water supplies for conservation and replenishment has become more imperative than ever.

As Chairman of the Groundwater Producers Group, I strongly urge you to move forward with OCWD's request for increased water conservation at Prado Dam.

Sincerely,

Robert Kellison
Groundwater Producers Group Chairman

RK:ke

c. Virginia Grebbien, OCWD

Response to City of Fountain Valley

Thank you for your comments on the proposed project. Your support of the proposed action is noted.

COUNTY OF RIVERSIDE

TRANSPORTATION AND
LAND MANAGEMENT AGENCY

Transportation Department

George A. Johnson, P.E.
Director of Transportation

September 30, 2004

U.S. Army Corps of Engineers
Los Angeles District
Attention: Mr. Alex Watt (CESPL-PD-RQ)
P.O. Box 532711
Los Angeles, CA 90053-2325

Re: **Prado Basin Water Conservation Feasibility Study**
Main Report and Draft Environmental Impact Statement / Environmental Impact Report (Draft EIS/EIR), July 2004

Dear Mr. Watt:

The Riverside County Transportation Department (RCTD) has reviewed the above-referenced document. We appreciate the opportunity to review this Draft Feasibility Report and Draft EIS/EIR. Our detailed comments are provided below.

Prado Dam is currently being modified to increase its capacity for flood control. We understand that the increased flood control storage space behind the dam presents an opportunity to modify the existing operating plan to capture additional runoff for water conservation. The proposed project will allow storage of water, between elevations 494 and 498 feet, between the months of October and March. Current water conservation within Prado Basin allows for storage of water at elevation 494 feet during the winter months, and up to an elevation of 505 feet between March and October. The proposed project will allow storage of water at a higher elevation during the winter season, with the pool being evacuated before any storm flows enter the basin, thus with no impact to the flood control capacity of the Prado Dam. The document concludes that the project is not expected to have any significant environmental effects.

River Road Bridge Replacement Project

The RCTD is preparing the Final Environmental Assessment and Environmental Impact Report (Final EA/EIR) to replace the existing River Road Bridge, which is located in the flood plain of the Santa Ana River (SAR) as it enters the Prado Basin. The bridge site is subject to significant sediment deposition especially during large storm events. As a result, the waterway under the bridge is severely constrained, and tends to plug with debris and sediment during moderate storms. The bridge is considered structurally deficient and functionally obsolete mainly because of its deficient waterway conditions. The RCTD, in cooperation with the Orange County Water District (OCWD), retains a contractor to remove the sediment and debris up and downstream of the bridge in order to keep the existing route operational until replacement.

Riverside County initiated the environmental clearance process for replacing the River Road Bridge in March of 1998. The alternatives analysis for the replacement of the bridge, the risks and the impacts associated with the encroachment of the new construction on the 100-year base flood plain were all based on a vast array of parameters briefly described below. One of

the primary goals of the bridge replacement project is to eliminate the need for sand mining over the service life of the new bridge while providing a safe and sound structure, which complies with all current design standards.
Considering the estimated $23 million total cost of the project, any development in the flood plain, which was not accounted for in the hydraulic models and which might adversely impact the conveyance and the structural integrity of the new bridge is a significant source of concern for the Riverside County. ***Particularly, the potential for increased amounts of sediment deposition and the increased duration of inundation due to the proposed Water Conservation Project which may adversely affect the new River Road Bridge.***

The New River Road Bridge Hydraulic Design Criteria

The hydraulic design of the new bridge follows the design criteria summarized in Caltrans Local Assistance Procedures Manual, "Chapter 11 – Design Standards," and as detailed in the State's Bridge Design Manuals and Guidelines. In brief, the new bridge shall be designed to pass the two percent (2%) probability local flood (Q_{50}) or the flood-of-record with adequate freeboard between the soffit and the water surface. The bridge will also convey the one percent (1%) probability local base flood (Q_{100}) with no freeboard. The minimum design flood for the scour analysis and the foundation design of the new bridge is the local base flood (Q_{100}). The term "local" used in defining the design floods refers to the (Q_{50}) and (Q_{100}) occurring on the SAR main stem at the bridge location. The "regional" base flood (Q_{100}), which is based on the confluence of all the contributing watersheds downstream the bridge in the Prado Basin, would form a lake due to backwater effects of the Prado Dam and might inundate the River Road Bridge. The new bridge design will tolerate submersion without damage to the structure. The design will also aim to maintain the integrity of the approach roadway embankments to the maximum possible extent in case of such an extreme event.

Build Alternatives and Modeling Assumptions

The profile for each one of the four build alternatives, which are being studied in the environmental document for the new River Road Bridge, was set to satisfy the design criteria described above while eliminating the need for sand mining over the 50-year service life of the bridge. The design flows were obtained from ***Main Stem Discharge Values (Future Conditions)*** of the U.S. Army Corps of Engineers' General Design Memorandum for the SAR. The flood plain and riverbed cross-sections used in the water surface and scour analysis reflect the existing conditions as impacted by sedimentation projected over the bridge service life. The planned improvements for each build alternative/bridge configuration and the projected land uses that were known to the design team at the time of analysis were built into the hydraulic models.

Compatibility With Proposed Water Conservation Project

As previously noted, ***Riverside County has two primary concerns regarding the proposed Water Conservation Project. These are:***

- ***Increased sediment deposition rates***
- ***Increased duration of inundation***

Increased Sediment Deposition Rates – In Chapter 4 of the subject document, Articles 4.5.1 and 4.5.2, covering Hydrology and Hydraulics respectively, indicate "the sediment trap efficiency of the Prado Dam will increase slightly as a result of the increase in water conservation pool elevation. It occurs due to the increased detention time and the reduction of the flow velocity associated with the increase in the mean operating level." While this increase might be insignificant considering the entire scale of the Prado Basin, a significant part of this sedimentation will occur in the area of sediment delta formation and propagation where Santa Ana River enters the Prado Basin and where the River Road Bridge is located. It is triggered by the sudden reduction in flow velocity due to increased cross-section of the flow area. The additional sedimentation may be insignificant in comparison to the reservoir capacity, but its local impact, which is not accounted in our estimates of the long-term variation of the streambed elevation, may adversely affect the conveyance of the new bridge before its service life is realized.

Increased Duration of Inundation – It is the County's understanding that the current modifications to the Prado Dam include outlet works, which would result in significantly reduced inundation periods due to increased capacity of the existing outlet works (a reduction from 18 days down to 6 days for the 100 year storm to drain to elevation 505 feet). The Chapter 4, Article 4.5.1.2 Duration and Frequency of Inundation, of the Water Conservation document indicates, "each water conservation alternative will increase the duration of inundation ***at any given elevation***." Table 4-2 of the same document shows ***a minimum 30 days increase in number of days of inundation*** from without project alternative at elevation 494 ft.

While the increase in duration of inundation at the bridge site is unclear to the County, it is a serious concern on two accounts. First, although the County recognizes that the 100-Year Regional Flood would inundate the bridge and the approach roadways, thus requiring protective measures to maintain the integrity of the bridge and the approach roads, inundation over a prolonged period of time might lead to faster deterioration of the approach roads and some components of the bridge such as joints. This would require costly repairs over long periods of time. Second, the economic impacts of longer closures of the roadway due to inundation and the following maintenance work would be significant for the immediate community utilizing the bridge.

We look forward to a response to our concerns that adequately addresses the potential impacts and possible mitigation measures. The Chapter 4, Article 4.5.1.6 Operation and Maintenance, of the referenced document suggests, "the new operation plans must include a formal written agreement for removing sediment and debris from the reservoir that is directly attributable to water conservation operations." We are proposing that the mitigation measures will require the appropriate agencies to work with the Riverside County Transportation Department to address:

1. Mitigating the costs associated with raising the bridge and roadway profile, or sediment removal at the bridge site during the 50-Year service life of the new River Road Bridge, should it be determined necessary as a result of the proposed water conservation operations.
2. Proportionate cost sharing for the repair and maintenance of the new bridge and the approach roads due to damages sustained from increased duration of inundation.

We truly appreciate the challenges involved in clearing a project in this environmentally complex setting. We are prepared to cooperate and coordinate for the success of all proposed projects in the Prado Basin. If you have any questions or comments, please contact Tayfun Saglam, the Project Manager, at (909) 955-2871 or Mary Zambon, the environmental planner for the River Road Bridge Replacement Project, at (909) 955-6759.

Sincerely,

George A. Johnson

George A. Johnson, P.E.
Director of Transportation

Cc: Tony Carstens, TLMA
Juan Perez, RCTD
Scott Staley, RCTD
Ed Studor, RCTD
Tayfun Saglam, RCTD
Mary Zambon, RCTD

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Responses to County of Riverside Transportation

The River Road Bridge replacement is located upstream of the water conservation pool, at approximately elevation 530, and will not be affected by the increase in water conservation during the winter season.

The sedimentation within Prado basin will increase in volume over time, however the water conservation pool will not increase in response as the pool will be held to the elevation determined by whichever alternative is selected.

The increase in annual average duration of inundation at the elevation of the new River Bridge is less than one day per year as a result of a 50 year flood. Without the proposed project, the expected duration of inundation is 2 days as a result of a 50 year flood, which is entirely due to flood control, and has been addressed in the EIS that was prepared for the Santa Ana River Mainstem Project.

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
1111 Jackson Street, Suite 520
Oakland, CA 94607

September 24, 2004

ER: # 04/644

Mr. Alex Watt
U.S. Army Corps of Engineers
Los Angeles District
P.O. Box 532711,
Los Angeles, CA 90053

Subject: Review of Draft Environmental Impact Statement/Environmental Impact Report and Draft Feasibility Study (DFS) for the Prado Basin Water Supply Study, Riverside and San Bernardino Counties, California

Dear Mr. Watt,

The U.S. Department of the Interior has received and reviewed the subject document and has the following comments to offer.

GENERAL COMMENTS:

The Draft Feasibility Study and Draft Environmental Impact Statement/Environmental Impact Report do not adequately address geohazards associated with Prado Dam project alternatives. Geohazards described in the DFS, DEIS/EIR, and Geotechnical Appendix include seismic hazards, liquefaction, and slope stability.

No mitigation plan is presented that addresses any of these hazards.

In addition, cost of mitigation measures needed to reduce these geohazards to less-than-significant status is not included in any benefit-cost analysis. Cost of mitigation for geohazards could be a factor in deciding between alternatives including the No Action Alternative, and thus should be described in the benefit-cost analysis.

Supporting information describing biological populations in the project area were written several years prior to the February 26, 2004, Final Rule to designate critical habitat for the Santa Ana Sucker (*Catostomus santaanae*) (Final Rule (FR 69(38):8839-8861), which cites the project location. Report information, and the included US Fish and Wildlife Service Biological Assessment and Biological Opinion, should be reconsidered and perhaps revised to reflect known habitat requirements of the Federally listed threatened Santa Ana sucker per the Final Rule of February 26, 2004.

SPECIFIC COMMENTS:

MAIN REPORT AND DRAFT ENVIRONMENTAL IMPACT STATEMENT/ ENVIRONMENTAL IMPACT REPORT (DEIS/EIR) FOR PRADO BASIN WATER CONSERVATION FEASIBILITY STUDY:

Page S-5, Syllabus, Table S-3 Prado Dam Water Conservation Mitigation Costs, Prado Water Conservation Biological Mitigation Costs, Alternative 2*:
The asterisk states that the annual cost of $58,000 for Alternative 2* includes "$14,700 in annual costs for Santa Ana Sucker." USGS suggests that the text identify and describe, somewhere in the reports, proposed mitigation technologies for the Santa Ana sucker, and provide an explanation of how the $14,700 amount was derived.

Page 4-14, Section 4 Plan Formation, Subsection 4.5.3 Civil Design, first paragraph:
There is no Appendix D: "Civil Design" associated with the Feasibility Study or DEIS/EIR. The un-lettered Appendix at the back of the document, which is not referenced or included in any Tables of Content, is called the Prado Basin Water Supply Feasibility Study AFB Package Civil Design Appendix, August, 1999. The appendix is not detailed as promised in this paragraph, and the data and analysis are quite old.

The exact nature of the structural changes to existing Prado Dam should be included in "Section 4 of the Feasibility Study (PLAN FORMULATION) and Section 2: DESCRIPTION OF PROJECT ALTERNATIVES" in the DEIS/EIR.

Page 4-15, Section 4 Plan Formation, Subsection 4.5.3 Civil Design, third paragraph:
There is no Section 4.8.6, and thus no description of the 1996 "reevaluation of the seismic design parameters for Prado Dam..." and "...earthquake liquefaction potential." This section should be included in the Feasibility Study and summarized in the DEIS/EIR.

PRADO BASIN WATER SUPPLY FEASIBILITY STUDY:

Page 3-1, Section 3 Affected Environment, Subsection 3.1 Earth Resources, Subsection 3.1.1 Geology and Soils:
A description of the liquefaction hazard at the site needs to be included in this section.

Page 3-3, Section 3 Affected Environment, Subsection 3.2 Water Resources, Subsection 3.2.1 Hydrology/Surface Drainage, third paragraph:

It is not immediately apparent why the period 1950-88 was used for the hydrologic analysis, with streamflow data then "adjusted" to account for changes in watershed characteristics through 2001. The USGS recommends that the Appendix, Hydrology, Final, p. 19, be referenced as the source of information given in the paragraph.

Page 3-3, Section 3 Affected Environment, Subsection 3.2 Water Resources, Subsection 3.2.4 Flood Control/Water Storage Operations, second paragraph:
The USGS recommends that a more complete discussion of water-quality impacts of increased retention time be provided. The paragraph states that an effect of detention is to reduce TDS (total dissolved solids) through settling, thereby enhancing water quality.

This is inaccurate, as only sediments or suspended solids will settle during detention. Any constituents that are dissolved will remain dissolved regardless of how long the water is held. The USGS suggests that the paragraph be revised to eliminate this inaccuracy. Perhaps, the author(s) of this paragraph intended to use the term "TSS, total suspended solids."

In addition, the paragraph omits or only partly describes some other effects of long-term storage. If there is significant evaporation during the holding period, concentrations of dissolved constituents may increase; temperature may increase as well. These possibilities are not addressed in the document.

Finally, the paragraph states that organisms may utilize nitrates, but fails to point out that when those organisms die and decay, the processes use up dissolved oxygen necessary for ecosystem health, and may release some of the nitrogen back into the water system.

Most of these issues were identified back in 1997 and documented in Appendix B., "Summary Responses, pages 5 and 6, items 18-20 but were not adequately addressed in this DFS and DEIS/EIR. The USGS suggests that items 18-20 on pages 5 and 6 of Appendix B be revisited for adequate response of water-quality issues raised.

The USGS further suggests that nutrients, such as nitrates, ammonia, and phosphates, and the trophic conditions of the reservoir be discussed in more detail, particularly in light of wastewater treatment plant effluents being released into the Santa Ana River upstream from Prado Dam.

Page 4-1 – 4-3, Section 4 Environmental Consequences and Mitigation Measures, Subsection 4.1 Earth Resources:
A description of the environmental consequences (impacts) and mitigation measures for seismicity, liquefaction, and slope instability needs to be included in this section.

Page 4-3, Section 4 Environmental Consequences and Mitigation Measures, Subsection 4.1 Earth Resources, Subsection 4.1.1.4 Seismicity:
Documentation and/or a reference is needed for the statement, "...increased water level from each of these alternatives is well within the safe capacity of Prado Dam." In

addition, clarification is needed as to whether this conclusion is based on the existing Prado Dam or the newly renovated Prado Dam.

Page 4-47, Section 4 Environmental Consequences and Mitigation Measures, Subsection 4.3.3.2, Santa Ana Sucker, first paragraph:
The report states that "Direct impacts on Santa Ana Suckers and their potential spawning habitat downstream of Prado Dam are considered to be adverse and significant regardless of project alternative." The report further states that an outline of a management report is provided in Appendix E, Management of the Santa Ana Sucker and Exotic Aquatic Species in the Prado Basin and Environs. The USGS suggests that the management report, which will be prepared by the Orange County Water District to address the impacts in this reach of the Santa Ana River below Prado Dam, be incorporated as an appendix into the final FS report and EIS, and cited where appropriate.

The outline includes **Section IV, Management of Suitable Fish Passage Through Prado Basin Both Above and Below the Dam.** Fish passageway, however, is not described in other sections of the DFS and DEIS/EIR reports, but should be. Also, **Section IX, Summary of Control Techniques** includes, without further description, **Parts d. Electroshocking** and **e. Chemical Control**. It should be noted that both these techniques could have adverse effects on the already threatened sucker and should be explained in the management report.

PRADO DAM WATER CONSERVATION STUDY, GEOTECHNICAL APPENDIX FOR AFB DOCUMENTATION:

Page 5, Design Earthquake Events, second paragraph:
Horizontal-acceleration calculations are based on bedrock conditions: the saturated sands beneath the Prado Dam amplify acceleration. In addition, the Prado Dam is located at the juncture of three faults: Whittier, Elsinore, and Chino [Page 4-15, FEASIBILITY STUDY, **Section 4 Plan Formulation, Subsection 4.5.6 Geotechnical (Geology and Soils)**]. Therefore, the value of 0.45 g for the maximum horizontal acceleration seems low. For the city of Corona, which is just south of the dam site, the peak ground acceleration with 2% probability of exceedance in 50 years is 0.66 g (see REFERENCE Section). This value would be more appropriate for the seismic hazard at the dam site.

APPENDIX B: SCOPING ANNOUNCEMENT, SCOPING REPORT, AND DISTRIBUTION LIST:

Page 9, ISSUES RAISED BY THE CITY OF CORONA, Item 35 "The Prado Basin area is prone to seismic liquefaction. Increasing the water table in the basin may expand the liquefaction factor to basin fringes and, possibly, beyond."
Liquefaction hazard potential has not been addressed in the DEIS/EIR as promised.

Thank you for our opportunity to review this project.

Sincerely,

Patricia S. Port

Patricia Sanderson Port
Regional Environmental Officer

cc: Director, OEPC, HQ,
FWS, Portland, OR,
USGS, Reston, VA

Responses to DOI

The geohazards mentioned have been fully addressed in the document prepared for the Santa Ana River Mainstem Project, and in the Geotechnical Appendix. None of the geohazards are considered to be significant, and no mitigation is required.

The Final Rule of February 26, 2004 was primarily the result of information obtained by the Santa Ana Sucker Working Group, and information obtained since the Final Ruling is being utilized in the management of the Santa Ana Sucker. The management plan for the Santa Ana Sucker is adaptive and will be adapted to ensure the protection and success of the species.

The annual mitigation for the sucker is based on an agreement between the USFWS, OCWD, and the Corps. It recognizes the commitments already made by OCWD to provide a total of $40,000 per year to pay for biologists to participate in developing a Santa Ana Sucker recovery Plan, a $50,000 cash contribution to existing Santa Ana Sucker Studies in Prado Basin, and $15,00 for water quality analysis equipment and laboratory. In addition OCWD will provide $25,000 annually for 5 years and then $10,000 annually for 45 years towards implementation of the sucker management plan. This is detailed is Section 4.3.3.2 of the EIS. Table S-3 has been corrected.

There are no structural changes to Prado Basin or Prado Dam as a result of the proposed project. The structural changes that are being made are all part of the Santa Ana River Mainstem Project, and were fully addressed in the 1988 Main Report and Supplemental EIS, and in the 2002 SEIS for the Santa Ana River Mainstem.

The seismic design parameters were address in the 1988 documents listed above.

Page 3-1 – Liquifaction is not considered to be a concern and has been fully addressed in the documents prepared for the Santa Ana River Mainstem Project, and in the Geotechnical Appendix. The proposed project will not change the level of hazard for the existing conditions.

Page 3-3 – The document has been revised as recommended to change TDS to TSS. The additional retention time for the water conservation pool is minimal, with the water taking an additional average of 5 days to pass through the basin. The pool at elevation 494 contains 8915 acre-feet, which would take approximately 9 days to pass through the basin based on a release rate of 500cfs, whereas the pool at elevation contains 14857 acre-feet which would take approximately 15 days to pass based on the same release rate. This is not considered to have a significant impact on water quality.

Page 4-1 - 4-3 The Geohazards are not considered significant and no mitigation is required.

Page 4-3 The increased water levels are well within the safety capacity of both the existing and the new Prado Dams.

Page 4-47 - The Santa Ana Sucker Management Plan is a living document and the current version has been included in Appendix E. The outline listed fish passages through Prado, however these are not considered feasible as flows from Prado exceed the swimming and darting speed of the sucker. The Conservation Recommendations provided by the Service in the Biological Opinion have all been reviewed and are being incorporated as deemed appropriate into the Prado Mainstem Project which is in the process of reconstructing Prado Dam and the outlet works. As no construction will occur as part of the water conservation project, the construction of fish passages is not considered appropriate, however, any provisions are being formulated with the Santa Ana Sucker Management Plan to relocate suckers that pass through the dam, to upstream habitat areas.

GEOTECH APPENDIX - Page 5 - Geohazards have been fully addressed in the document prepared for the Santa Ana River Mainstem Project, and in the Geotechnical Appendix. None of the geohazards are considered to be significant.

APP B – Issue 35 raised by the City of Corona. The Corps stated that liquefaction would be addressed if it was considered to be a significant issue as a result of the proposed action. It was fully addressed in the document prepared for the Santa Ana River Mainstem Project, and in the Geotechnical Appendix, and is not considered a significant change from existing conditions as a result of holding water below elevation 505.

LAW OFFICES OF ROBERT C. HAWKINS

October 18, 2004

Via Facsimile and U.S. Mail

Alex Watt
United States Army Corps of Engineers
Los Angeles District
P. O. Box 532711
Los Angeles, California 90053-2325

Re: **The U.S. Army Corps of Engineers' (the "Corps") and the Orange County Water District's (the "District") Draft Environmental Impact Statement/Environmental Impact Report ("DEIS/DEIR") for the Prado Basin Water Supply Project (the "Project") (SCH No. 2004051004)**

Dear Mr. Watt:

Thank you for the opportunity to comment on the DEIS/DEIR for the Project. This Firm represents landowners within the Prado Basin watershed, landowners located upstream and downstream of the Prado Dam, and various individuals and entities with an interest in the captioned Project. We understand that the Corps and the District released the DEIS/DEIR for comment on or about August 16, 2004 with the comment period set to close on October 4, 2004. We understand that the Corps and the District decided to extend the comment period through October 18, 2004.

On behalf of these clients, and in the hopes of improving the EIR, we offer the following comments on the DEIS/DEIR.

I. A Brief Summary of Our Concerns.

We recommend that the Corps and the District reconsider, revise and recirculate the DEIS/DEIR in order to respond to the concerns set forth here as well as other comments received in the environmental review process. We make these recommendations for several reasons:

(1) The DEIS/DEIR fails to describe and discuss the Project description and the Project's environmental setting;

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(949) 650-5550
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(2) The Project has significant impacts on land use, water quality and water resources which are neither analyzed or mitigated in the DEIR; and

(3) The DEIS/DEIR's analysis of growth inducing impacts is problematic since the DEIS/DEIR recognizes that the Project will be growth inducing.

II. Introduction: EIR Standards.

An EIR constitutes the heart of CEQA: An EIR is the primary environmental document which:

> ". . serves as a public disclosure document explaining the effects of the proposed project on the environment, alternatives to the project, and ways to minimize adverse effects and to increase beneficial effects."

CEQA Guidelines section 15149(b). See California Public Resources Code section 21003(b) (requiring that the document must disclose impacts and mitigation so that the document will be meaningful and useful to the public and decision makers.)

Further, CEQA Guidelines section 15151 sets forth the adequacy standards for an EIR:

> "An EIR should be prepared with a sufficient degree of analysis to provide decision-makers with information which enables them to make a decision which takes account of the environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible. Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts. The courts have looked not for perfection but for adequacy, completeness, and a good faith attempt at full disclosure."

Further, "the EIR must contain **facts and analysis**, not just the agency's bare conclusions or opinions." Concerned Citizens of Costa Mesa, Inc. v. 32nd District Agricultural Association. (1986) 42 Cal. 3d 929 (Emphasis supplied.).

An EIR must describe the physical conditions and environmental resources within the project site and in the project vicinity, and evaluate all potential effects on those physical conditions and resources. CEQA Guidelines sections 15125, 15126.2 (a) n11. See County of Amador v. El Dorado County Water Agency (1999) 76 Cal. App. 4th 931, 952. The EIR must describe environmental conditions in the vicinity of the project, "as they exist at the time the notice of preparation is published, or if no notice of preparation is published . . . from both a local and regional perspective. This environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant. The description of the environmental setting shall be no longer than is necessary to an understanding of the significant effects of the proposed project and its alternatives." CEQA Guidelines section 15125(a). Further, CEQA Guidelines section 15125(c) provides that:

> "Knowledge of the regional setting is critical to the assessment of environmental impacts. . . . The EIR must demonstrate that the significant environmental impacts of the proposed project were adequately investigated and discussed and it must permit the significant effects of the project to be considered in the full environmental context."

In addition, an EIR must specifically address the environmental effects and mitigation of the Project. But "[t]he degree of specificity required in an EIR will correspond to the degree of specificity involved in the underlying activity which is described in the EIR." CEQA Guidelines section 15146. The analysis in an EIR must be specific enough to further inform decision making and public participation. The EIR must produce sufficient information and analysis to understand the environmental impacts of the proposed project and to permit a reasonable choice of alternatives so far as environmental aspects are concerned. See Laurel Heights Improvement Association v. Regents of the University of California (1988) 47 Cal. 3d 376.

Also, to the extent that an EIR proposes mitigation measures, it must provide specific measures. It cannot defer such measures until some future date or event. "By deferring environmental assessment to a future date, the conditions run counter to that policy of CEQA which requires environmental review at the earliest feasible stage in the planning process." Sundstrom v. County of Mendocino (1988) 202 Cal. App. 3d 296, 308. See Bozung v. Local Agency Formation Comi.(1975) 13 Cal.3d 263, 282 (holding that "the principle that the environmental impact should be assessed as early as possible in government planning."); Mount Sutro Defense Committee v. Regents of University of California (1978) 77 Cal. App. 3d 20, 34 (noting that environmental problems should be considered at a point in the planning process "where genuine flexibility remains"). CEQA requires more than a promise of mitigation of significant impacts: mitigation measures must really minimize an identified impact.

"Deferral of the specifics of mitigation is permissible where the local entity commits itself to mitigation and lists the alternatives to be considered, analyzed and possibly incorporated in the mitigation plan. (Citation omitted.) On the other hand, an agency goes too far when it simply requires a project applicant to obtain a biological report and then comply with any recommendations that may be made in the report. (Citation omitted.) Defend the Bay v. City of Irvine, 2004 Cal. App. LEXIS 1031at 25 (Cal. Ct. App., 2004).

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An EIS performs a similar function with somewhat similar standards under the National Environmental Policy Act, 42 U.S.C. section 4321 et seq. ("NEPA"). However, the federal standards established for evaluating an EIS may be more relaxed than the California standards for evaluating an EIR. Nonetheless, an EIS should be a self contained document which informs the decisionmakers and the public "without the need for undue cross-reference." Baltimore Gas and Electric Co. v. Natural Resources Defense Council (1983) 462 U.S. 87, 99-101, n. 12 and 13.

III. Chapter 1: Introduction.

Chapter 1 discusses the purpose of the DEIS/DEIR:

> "The purpose of the proposed action is to increase conservation of surplus water at Prado Dam. . . .. **The County of Orange is planning for growth and the inevitable population increase will demand more water.** To reduce the need for expensive imported water supplies, OCWD has initiated several water management projects to enhance groundwater supplies, including water conservation at Prado Dam. Although **the Dam's primary operation function is for flood control,** changes have occurred in the operation to allow water from the Santa Ana River to be held back during the flood and non-flood seasons."

DEIS/DEIR, 1-1 (Emphasis added.) Indeed, under its current operations plan, the Corps operates the Dam as follows: If the water surface in the reservoir exceeds the top of the buffer pool, flood control releases commence. The objective of the flood control operation is to drain the reservoir back to the top of the buffer pool as quickly as possible without exceeding the capacity of the channel downstream. In current practice, when the water surface in the reservoir exceeds the top of the buffer pool, releases are increased to match inflow up to 5000 cfs (142 cms). When inflows exceed 5000 cfs, the excess water is stored in the reservoir.

The Project proposes to increase the amount of water held behind the Dam in order to further groundwater recharge and replenishment. However, as discussed below, this sacrifices the main mission of the Dam– flood control– for a secondary goal– water conservation. Moreover, as indicated in the passage quoted, this reoperation plan will increase water available for growth and thus create long term Project and cumulative impacts relating to population growth.

Section 1.5 of the DEIS/DEIR addresses consideration of related state and federal statutes. This include NEPA, CEQA, the Clean Water Act, the federal and state endangered species acts and other statutes.

Section 1 does not include or refer to other environmental documents or studies. However, the Feasibility Study which is part of the EIS/EIR refers to other prior studies and reports at Section 1.5 including the 1936 report on the Prado Dam as well as subsequent reports. However, this Section 1.5 fails to address or consider studies upstream of the Dam including the August 1998 Feasibility Study for the reoperation of the San Antonio and Chino Creeks Channel. This study proposed among other things to hold water behind the San Antonio Dam for longer periods of time in order to free up capacity in the San Antonio Channel so that developments downstream could use the freed up capacity. The net effect of this study would be increase flows into Prado Dam. The DEIS/DEIR should be revised to consider and address these proposals as well as the impacts of increased flows down San Antonio Creek into the Prado Dam area.

IV. Chapter 2: Description of Project Alternatives and the Project Description.

Section 2.1 addresses the Project location and site characteristics. However, this section fails to discuss the primary flood control purposes of the Dam. This Section notes that the Corps "administers approximately 2,950[hectacres] (7,300 acres) of federally owned lands in the [Prado] basin, most of which is leased for recreational purposes." DEIS/DEIR 2-1.

As indicated above, the purpose of the Project is water conservation. Section 2.2 further refines the Project Objectives:

> "Prado Reservoir is proposed to allow for a greater amount of water conservation in response to local concerns regarding future water supply sources, continued regional population growth, dwindling imported water supplies, and continued increases in the cost of water. More specifically, the objective of the currently proposed water conservation and supply study is to increase maximum pool elevation for water conservation behind the dam between storms and after the flood season."

DEIS/DEIR, 2-1. The Project proposes to increase the pool elevations during the flood season but "when unfavorable weather is forecast, the water level behind the dam would be drawn down, if necessary, to accommodate anticipated flood flows." DEIS/DEIR, 2-2. However, this optimistic view of the Corps' weather forecasting ability runs counter to its experience elsewhere in the watershed. For instance, "[h]istorically, San Antonio Creek has been noted for its flash floods that transport large quantities of debris." San Antonio and Chino Creeks Channel, Main Report and Technical Appendices, Feasibility Study, August 1998, p. 27. See also id. at 9-10 (discussing the climate in the Prado Watershed and noting the potential for flash flooding and substantial runoff.)

Section 2.3 discusses the existing Dam features and operational protocols. However, this section ignores the flood control features and operational considerations of the Dam. As indicated above and in the DEIS/DEIR, the primary purpose of the Dam is for flood control. To the extent that Project affects or alters this purpose, the DEIS/DEIR must provide the basis for the change and the ability of the Dam under the Project configuration to handle historic flows including flows such as occurred in 1938.

Section 2.3 attempts to discuss the current operational levels for the Dam: during flood season, water levels below 494 feet are the target levels; during non-flood season, water levels below 505 feet are the target levels.

Section 2.6 discusses the Project alternatives which the DEIS/DEIR analyze:

- Alternative 1 is the no Project Alternative;
- Alternative 2 which is the National Economic Development ("NED") Plan Alternative which provides for flood season water conservation to elevation 498 feet with non-flood levels to 505 feet;
- Alternative 3 which is the locally preferred alternative which establishes the flood season levels to 500 feet and non-flood season levels to 505 feet;
- Alternative 4 which provides for flood season levels and non-flood season levels to 505 feet; and
- Alternative 5 which establishes flood season levels and non-flood season levels to 508 feet.

Interestingly, nowhere in the DEIS/DEIR is the flood season characterization discussed. Section S, the Summary, notes that the DEIS/DEIR considers the flood season to run from October to the end of February; and the non-flood season runs from March to September. However, as indicated in the San Antonio Creek study, substantial flows occur as late as March or April. Indeed, as recently as the late 1990's, maximum rainfall in the years occurred during the month of March. The DEIS/DEIR should be revised to address and discuss the appropriate length of the flood season, explain how the Project may affect a shorter or longer flood season, and when such seasons should begin or end. Given that the Project will attempt to operate the Dam for water conservation, the DEIS/DEIR should discuss, analyze and consider the most conservative flood season so that the Corps is not surprised by substantial rainfall events after the close of the "flood season."

Section 2.6.1 addresses Project Assumptions. Among other things, this section notes that Project Assumptions include growth projections to 2052. However, the DEIS/DEIR is unclear as to the source of those projections: is this projection based upon full buildout within the watershed as indicated by municipal and county general plans? The DEI/DEIR should be revised to discuss this assumption and provide substantial analysis based upon this full build out assumption. Also, as indicated in the San Antonio Creek study, the inflow channels to Prado Dam may be operated at various levels. The DEIS/DEIR should be revised to discuss the operational levels of all channel inflows as well as proposed changes in order to ensure that the operational levels of the Dam will accommodate such changed operational levels.

V. Chapter 3: "Affected Environment"

A. Section 3.2: Water Resources.

Section 3.2.1 discusses "Hydrology/Surface Drainage." Among other things, this section discusses inflows to the Prado Dam area. However, this section fails to consider the San Antonio Creek Channel inflow. The DEIS/DEIR should be revised to consider this inflow source and revise to the document to the extent that such inflow is substantial. This section also discusses the mean annual inflow both for 2001 as well as for future conditions. For 2001, mean annual inflow is approximately 278,000 acre feet of water; for some unidentified future condition, mean annual inflows will be approximately 374,000 acre feet.

Without more, these figures are not useful. First, the DEIS/DEIR should be revised to discuss and explain the future conditions which result in the 374,000 acre feet inflow estimate. What is the source for the population and development figures for this projection? The DEIS/DEIR should explain and analyze this future condition inflow estimate because the Project's propose operational plan may be inadequate to handle the additional future project flows. Second, the DEIS/DEIR should be revised to include a discussion and table for monthly inflows for the period from 1950 through 1988. Such a table and discussion would assist in the development of the appropriate period for the "flood season."

Section 3.2.2 discusses Groundwater. Section S.1 notes that the Project is located in the Prado Basin and that the Corps administers over 7,000 acres of land in the Basin. Although the Basin is approximately 9,700 acres, its drainage area encompasses 2,255 square miles. Although Section S.1 discusses the Prado Basin, Section 3.2.2 which discusses Groundwater omits mention of recharge behind the Dam. The DEIS/DEIR should be revised to include a full discussion of such recharge and its drainage area or watershed.

In addition, Section 3.2.2 discusses high groundwater in Corona and areas upstream of the Dam. It fails to discuss the potential for any high groundwater levels in areas downstream. The DEIS/DEIR should be revised to include such a discussion of the existing and projected conditions relating to high groundwater in areas downstream of the Dam.

Section 3.2.4 discusses Flood Control/Water Storage Operations. This section recognizes that the current function of the Dam is flood control. "During rainy winter months, impoundment of water in the Reservoir minimizes flooding potential which facilitating groundwater recharge downstream." This sentence is problematic for several reasons. First, impoundment of water behind the Dam may minimize flooding downstream but it may flood upstream properties. In addition, it is unclear how impoundment may affect groundwater recharge downstream. It may be that the impoundment actually accomplishes recharge which flows downsteam in the groundwater basins/system. The DEIS/DEIR should be revised to discuss the impacts of impoundment on recharge and upon both upsteam and downstream properties.

As for the effect of impoundment on water quality, the DEIS/DEIR notes that such impoundment has little effect on water quality because either flows are quickly released along with any contaminates or with longer impoundments contaminants settle out. Section 3.2.4 concludes:

> "[I]n either case (short or long periods of impoundment time), the affect of detention within the Reservoir tends to reduce nitrates and TDS concentrations and, therefore, enhance overall water quality."

DEIS/DEIR, p. 3-5. The Project proposes increasing the impoundment intervals. According to Section 3.2.4, this will increase contaminate settling in the Reservoir. If such contaminates are soluble, these will infiltrate into the groundwater basin. If not, then the contaminates will block recharge, undercut the purposes of the Project and increase maintenance demands for the reservoir. The DEIS/DEIR should be revised to address these issues and, if necessary, propose adequate mitigation.

B. Section 3.6: Land Use and Recreation.

Section 3.6 discusses the environmental setting for land use and recreational uses for areas both upstream and downstream of the Dam. For areas downstream of the Dam, during significant releases from the Dam, many areas will be inundated. For areas upstream of the Dam, during periods of significant impoundment, many areas will be inundated. The Project may exacerbate both conditions.

Also, for each land use/landowner, the DEIS/DEIR discusses inundation potentials for "present conditions" and "future conditions." However, "future conditions" are not defined or specified. The DEIS/DEIR should be revised to specify what these "future conditions" are including full buildout under all applicable general plans, maximum runoff from all sources and so on.

VI. Chapter 4: Environmental Consequences and Mitigation Measures.

A. Section 4.2: Water Resources.

This Section discusses Project impacts on water resources and mitigation measures for any such impacts. However, as discussed below, the analysis is truncated and incomplete.

For each alternative, Section 4.2 analyzes Project impacts on hydrology and water quality. On hydrology, for each Project Alternative (not the No-Project Alternative), the analysis is pretty much the same: the alternatives will increase sediment and debris within the reservoir, improve sediment flows during releases, increase groundwater recharge, but increase sediment erosion downstream at River View Golf Course. The impacts vary depending upon the Alternative; Alternatives with higher water levels generally result in worsening bad impacts, e.g. sediment buildup in the Reservoir or erosion downstream and in improving good conditions, e.g. increasing groundwater recharge.

On water quality, results are uniformly positive: each alternative will improve surface water quality both within the Reservoir as well as downstream of the Dam.

As indicated above, Section 4.2 is inadequate. First, although the DEIS/DEIR recognizes that flood control features are part of the Project's environmental setting, the DEIS/DEIR contains no analysis of the Project's and the Alternatives' impacts on the flood control aspect of the Dam. As indicated above and in the DEIS/DEIR, the primary function of the Dam is flood control. The Project and its Alternatives will affect the flood control operations of the Dam and should be analyzed. The DEIS/DEIR should be revised to include such an analysis and, if necessary, propose adequate mitigation.

Second, Section 4.2 forgets Section 3.2.4's point that impoundment will cause contaminants to settle. Nothing in Section 4.2 addresses increased accumulation of contaminants and any necessary mitigation measures. DEIS/DEIR should be revised to address both the impacts and mitigation.

Third, Section 3.2 discusses among other things groundwater in and around the Project. It notes that high groundwater may occur upstream of the Dam but fails to include a discussion of areas of high groundwater downstream of the Dam. Given that all Alternatives will increase the amount of groundwater recharge downstream, the DEIS/DEIR should include a discussion of the potential for the Project and all Alternatives to exacerbate any areas with potentially high groundwater conditions downstream of the Dam.

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Fourth, the Project and each Alternative may create a significant impact on water quality. As indicated in Section 3.2, increased impoundment of water will increase contaminant settling. Without mitigation, such contaminants may build up and be released during periods of flooding. Further, such contaminants may affect groundwater quality in areas behind the Dam.

Fifth, the Project and each Alternative will inundate and increase erosion in areas downstream of the Dam. The DEIS/DEIR should be revised to include discussion of all feasible mitigation measures including improving the channel or river to avoid erosion and innundation in affected areas.

For all of these reasons, the DEIS/DEIR should be revised to include discussion and analysis of all of these issues. Because of the inadequacy of the DEIS/DEIR, the Corps should recirculate the revised document for further public review and comment.

B. Section 4.6: Land Use and Recreation.

Section 4.6 addresses Project impacts on land use and recreation in areas both upstream and downstream of the Dam. Although Section 4.6 recognizes that the Project and its Alternatives will have some impacts on both upstream and downstream areas, it concludes that such impacts are not significant. Given Section 4.2's conclusion regarding erosion and innundation of areas downstream of the Dam, this conclusion is surprising. Section 4.2 states that Green River Golf Course will suffer significant impacts due to erosion and inundation under all Alternatives. If so, then all alternatives will interfere with an existing land use.

As indicated above, the DEIS/DEIR should be revised to recognize this significant impact on land use and propose adequate and feasible mitigation measures. As before, the revised document should be recirculated for public comment.

VII. Chapter 5: Growth Inducing and Cumulative Impacts.

Section 6.1 is one paragraph which concludes that the Project and its Alternatives are "not considered growth inducing." The basis for this surprising conclusion is that the Project will "maintain the amount of water being held in the aquifier." That is, under current use and projected future use, the Project will prevent significant drawdown of the aquifier. That is growth inducing.

As quoted above, the DEIS/DEIR starts out by recognizing that:

"The purpose of the proposed project is to increase conservation of surplus water at Prado Dam. **Water demands within the OCWD service area have result in relatively constant drawdown of the local acquifier . . .. The County of**

Orange is planning for growth and the inevitable population increase will demand more water."

That is, the DEIS/DEIR recognizes that the Project will be growth inducing by satisfying the thirst of the planned growth.

The DEIS/DEIR should be revised to address the growth inducing impacts of the Project. The Project will free up more water and will induce growth. The DEIS/DEIR should recognize this impact and provide adequate mitigation.

VIII. Conclusion.

Thank you for the opportunity to comment on the captioned document. For the foregoing reasons, we recommend that the DEIS/DEIR be revised and recirculated to address the issues raised above.

Should you have any questions, please do not hesitate to contact me.

Sincerely,

LAW OFFICES OF ROBERT C. HAWKINS

Robt C. Hc

By: Robert C. Hawkins

RCH/kw

Responses to Robert C. Hawkins

The DEIS/EIR fully describes the project and the environmental setting in Chapters 2 and 3.

The project does not have significant impacts on land use, water quality, and water resources.

The Section on Growth Inducing Impacts has been expanded, however the proposed action is not considered to be growth inducing,

The DEIS/EIR is fully consistent with the standards set by both NEPA and CEQA.

The portion of Orange County that is planning for growth is not the area that is serviced by OCWD. The water that will be held within Prado Basin as a result of the proposed action will not be allowed to exceed elevation 498, and releases will be increased to ensure that the pool elevation is not exceeded for water conservation.

The forecasting has improved over time, and OCWD is aware that the Corps will operate the dam in a conservative manner, and releases may occur when an expected storm fails to materialize. This is not just storms at Prado Basin, but over the Santa Ana Watershed.

The Corps is aware of the potential for storms to occur outside of the October to March time frame. Water conservation at elevation 505 has been occurring for the past several years, and the proposed action will not change the current seasonal water conservation occurring at Prado, but will augment it with additional conservation during the October to march time frame.

The document considers all flows into Prado Basin, and a full documentation of the Hydrology is located in the Hydrology Appendix to the Main Report.

There is no recharge by a water District within the boundaries of Prado Basin. Downstream of Prado Basin, high groundwater is not considered to be a concern as the only stretch of river that is not hardened is between the dam and Weir Canyon. This area has been left natural for wildlife and high groundwater is considered beneficial to the habitat.

High flows in the river, downstream of Prado, result in the temporary berms constructed by OCWD in the river bottom to be washed out, resulting in a reduction in the amount of water captured by the recharge facilities. Holding the water behind Prado Dam and releasing at a slower rate allows OCWD to capture the flows and get maximum recharge. There is no connection between aquifers upstream and downstream of Prado Basin.

Section 3.2.4 describes existing and future flood control operation of Prado Basin, which was fully addressed in the 2002 Supplemental EIS for SAR.

Land Use and recreation facilities and the potential impacts occurring to these uses are fully addressed in Section 4.6 of the DEIS/EIR.

Future conditions are described as the project life of the project, which is considered to be 2052.

Section 4.2 is not considered to be inadequate. The flood control aspect of the dam was fully addressed in the EIS, and has been summarized in this document. The References have been revised to include the 2002 EIS/EIR for the Mainstem Project.

The proposed action will have no impact on the flood control function of the dam as the pool will be discharged prior to any storm waters arriving at the basin.

Groundwater will not affected downstream of the basin, as there will be no change in the overall volume of water being released from Prado Basin.

Any contaminants that are carried out of Prado Basin by flood flows will continue downstream past the OCWD recharge facilities.

The proposed action is not expected to result in any increase in erosion as the maximum release will be less than the current maximum flood control release from Prado Basin. The other alternatives could have resulted in erosion, prior to the completion of the flood control protection work currently being constructed, or planned for construction downstream of Prado basin as a result of the Santa Ana River Mainstem Project.

The Green River Golf Course may suffer from minor inundation as a result of the proposed action if the pool has to be dropped due to an potential storm. However, this inundation will be for a short duration as the pool is required to be discharged within 24 hours.

The Section on Growth Inducing Impacts has been revised.

'ARREN D. WILLIAMS
ıeral Manager-Chief Engineer

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RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

October 15, 2004

Mr. Robert Stuart
Study Manager
Plan Formulation Branch
U.S. Army Corps of Engineers
P.O. Box 532711
Los Angeles, CA 90053-2325

Dear Mr. Stuart:

Re: Notice for Public Review of the Draft Feasibility Report and Environmental Impact Report for the Prado Basin Water Conservation Feasibility Study

This letter is written in response to the Notice for Public Review of the Draft Feasibility Report and Environmental Impact Report (EIR) for the Prado Basin Water Conservation Feasibility Study (Study). The Study evaluates a plan to allow increased storage of floodwaters in Prado Reservoir up to an elevation of 498 feet from October through February and up to an elevation of 505 feet from March through September. The proposed project site is located on the Santa Ana River within Riverside and San Bernardino counties, at the head of Santa Ana Canyon, three miles upstream from Orange County.

The Riverside County Flood Control and Water Conservation District has no comments at this time.

Thank you for the opportunity to comment on the Draft Feasibility Report and EIR. Please forward any subsequent environmental documents regarding the project to my attention at this office. Any further questions concerning this letter may be referred to me at 951.955.1233 or Marc Mintz at 951.955.4643.

Very truly yours,

Teresa Tung

TERESA TUNG
Senior Civil Engineer

c: TLMA
Attn: Greg Neal

MAM:erf
PC\90898

Response to Riverside County Flood Control and Water Conservation District

Thank you for your comment letter on the proposed project.

STATE OF CALIFORNIA

Governor's Office of Planning and Research

State Clearinghouse and Planning Unit

Arnold Schwarzenegger
Governor

Jan Boel
Acting Director

October 25, 2004

Alex Watt
U.S. Army Corps of Engineers
915 Wilshire Boulevard
Los Angeles, CA 90017

Subject: Proposed Prado Basin Water Supply, Riverside and San Bernardino Counties Draft EIR
SCH#: 2004094001

Dear Alex Watt:

The State Clearinghouse submitted the above named Draft EIR to selected state agencies for review. The review period closed on October 22, 2004, and no state agencies submitted comments by that date. This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act.

Please call the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process. If you have a question about the above-named project, please refer to the ten-digit State Clearinghouse number when contacting this office.

Sincerely,

Terry Roberts

Terry Roberts
Director, State Clearinghouse

Document Details Report
State Clearinghouse Data Base

SCH#	2004094001
Project Title	Proposed Prado Basin Water Supply, Riverside and San Bernardino Counties Draft EIR
Lead Agency	U.S. Army Corps of Engineers

Type EIR Draft EIR

Description The proposed project will allow storage of water between elevations 494 and 498 feet between the months of October and March. Current water conservations within Prado Basin allows for storage of water at elevation 494 feet during the winter months, and up to elevation 505 feet between March and October. The proposed project will allow storage of water at a higher elevation during the winter season, with the pool being evacuated before any storm flows enter the basin. This will ensure that there is no impact to the flood control capacity of the Prado Dam. The Draft EIS/EIR evaluates alternatives carried forward for detailed environmental analysis. The environmental impacts related to the proposed action and other alternatives are addressed in the Draft EIS/EIR.

Lead Agency Contact

Name Alex Watt
Agency U.S. Army Corps of Engineers
Phone (213) 452-3860 ***Fax***
email
Address 915 Wilshire Boulevard
City Los Angeles ***State*** CA ***Zip*** 90017

Project Location

County Riverside, San Bernardino
City Corona
Region
Cross Streets Riverside Freeway (91) / Corona Expressway (71)
Parcel No. N/A
Township 3S ***Range*** 7W ***Section*** 20 ***Base*** SBM

Proximity to:

Highways 91, 71, 83
Airports Corona Municipal Airport
Railways BN&SF
Waterways Santa Ana River
Schools
Land Use Flood control is primary land use. Secondary uses include recreation, water conservation, agricultural leases, and open space.

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Cumulative Effects; Drainage/Absorption; Economics/Jobs; Fiscal Impacts; Flood Plain/Flooding; Geologic/Seismic; Growth Inducing; Landuse; Minerals; Noise; Population/Housing Balance; Public Services; Recreation/Parks; Septic System; Sewer Capacity; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Wildlife

Reviewing Agencies Resources Agency; Regional Water Quality Control Board, Region 8; Department of Parks and Recreation; Native American Heritage Commission; Department of Health Services; Reclamation Board; Department of Fish and Game, Region 6; Department of Water Resources; Colorado River Board; Caltrans, District 8; State Water Resources Control Board, Division of Water Rights; State Water Resources Control Board, Division of Water Quality; State Water Resources Control Board, Clean Water Program; State Lands Commission

Date Received 09/08/2004 ***Start of Review*** 09/08/2004 ***End of Review*** 10/22/2004

Note: Blanks in data fields result from insufficient information provided by lead agency.

Response to State of California, State Clearing House

Thank you for your notification of no comments being submitted by State Agencies, and acknowledgement of compliance with the State Clearinghouse review requirements under the California Environmental Quality Act.

STATE OF CALIFORNIA — Arnold Schwarzenegger, Governor

NATIVE AMERICAN HERITAGE COMMISSION
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May 20, 2004

Mr. Alex Watt
U.S. Army Corps of Engineers
P.O. Box 532711
Los Angeles, CA 90053-2325

Re: Notice of Preparation of a Prado Basin Water Feasiblity Study EIR
SCH # 2004051004

Dear Mr. Watt:

Thank you for the opportunity to comment on the above-referenced Notice of Preparation. To adequately assess the specific related project impacts on cultural resources, the Commission recommends the following actions be taken:

- Contact the appropriate California Historic Resources Information Center for a record search. The record search will determine:
  - If a part or all of the area of project effect (APE) has been previously surveyed for cultural resources.
  - If any known cultural resources have already been recorded on or adjacent to the APE.
  - If the probability is low, moderate, or high that cultural resources are located in the APE.
  - If a survey is required to determine whether previously unrecorded cultural resources are present.
- If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
  - The final report containing site forms, site significance, and mitigation measurers should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for pubic disclosure.
  - The final written report should be submitted within 3 months after work has been completed to the appropriate regional archaeological Information Center.
- Contact the Native American Heritage Commission for a Sacred Lands File search of the project area and information on tribal contacts in the project vicinity who may have additional cultural resource information.
  - Please provide U.S.G.S. location information for the project site, including Quadrangle, Township, Section, and Range.
  - We recommend that you contact all tribes listed on the contact list to avoid the unanticipated discovery of sensitive Native American resources after the project has begun.
- Lack of surface evidence of archeological resources does not preclude their subsurface existence.
  - Lead agencies should include in their mitigation plan provisions for the identification and evaluation of accidentally discovered archeological resources, per California Environmental Quality Act (CEQA) §15064.5 (f). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American, with knowledge in cultural resources, should monitor all ground-disturbing activities.
  - Lead agencies should include in their mitigation plan provisions for the disposition of recovered artifacts, in consultation with culturally affiliated Native Americans.
  - Lead agencies should include provisions for discovery of Native American human remains in their mitigation plan. Health and Safety Code §7050.5, CEQA §15064.5 (e), and Public Resources Code §5097.98 mandates the process to be followed in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery.

Sincerely,

Carol Gaubatz

Carol Gaubatz
Program Analyst
(916) 653-6251

CC: State Clearinghouse

Responses to Native American Heritage Commission

The Corps is in compliance with Section 106 of the National Historic preservation Act (36 CFR 300). A memorandum of agreement was developed and executed for all water conservation activities associated with water conservation up to elevation 505 in Prado Basin.

State Water Resources Control Board

Division of Water Rights
1001 I Street, 14th Floor, Sacramento, California 95814
P.O. Box 2000, Sacramento, California 95812-2000
(916) 341-5300 ♦ FAX (916) 341-5400 ♦ www.swrcb.ca.gov

Terry Tamminen
Secretary for Environmental Protection

Arnold Schwarzenegger
Governor

OCT 2 5 2004

In Reply Refer to:JF:File A031174

Mr. Alex Watt
U. S. Army Corps of Engineers
915 Wilshire Blvd.
Los Angeles, CA 90017

DRAFT ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT FOR THE PROPOSED PRADO BASIN WATER SUPPLY, RIVERSIDE AND SAN BERNARDINO COUNTIES, CA

Dear Mr. Watt,

On August 16, 2004, the Army Corps of Engineers (ACOE) issued the Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Proposed Prado Basin Water Supply. ACOE allowed two additional weeks for the State Water Resources Control Board (SWRCB), Division of Water Rights (Division) to submit its comments on the above-referenced project. The major question raised by the Division's review of this document is the authority by which ACOE has operated Prado Dam for conservation storage since 1992, and its authority to increase storage at this time. The Division has no water right on file authorizing storage at Prado Dam.

The Prado Basin Water Conservation Feasibility Study (Study) states that Orange County Water District (OCWD) owns all rights, title and interest in any waters flowing in the Santa Ana River into Prado Basin. In addition, the document states that OCWD has an annual right to receive a minimum of 42,000 afa (acre feet annually) waters at Prado Dam together with the right to all storm flows reaching Prado Dam by virtue of the judgment *OCWD v. City of Chino, et al.*, Riverside County Superior Court No. 117628, dated 17 April 1969 (Study at p. 4-31). While the SWRCB will afford great weight to court judgments in determining the proper allocation of water among parties, the 1969 Stipulated Judgment providing OCWD a guaranteed base flow of 42,000 afa as against the upstream users does not authorize any water rights. On April 20, 2001, OCWD filed water right application A031174 with the SWRCB to appropriate 507,800 afa from the Santa Ana River. That application, plus five others on the Santa Ana River, are pending before the SWRCB. The final allocation of Santa Ana River water will be the result of compliance with California Environmental Quality Act, protest resolution and possibly a hearing before the SWRCB.

The Division would appreciate ACOE's accounting for authorization to store water for consumptive use at Prado Dam.

OCT 2 5 2004

If you have any questions, please contact me at (916) 341-5349.

Sincerely,

Jane Farwell

Jane Farwell
Environmental Scientist

cc: Mr. Craig Miller
Orange County Water District
10500 Ellis Avenue
Fountain Valley, CA 92708

Responses to State Water Resources Control Board

The proposed project will allow temporary storage of water between elevations 494 and 498 during the period between October and March. Currently the Corps allows seasonal water conservation in Prado Basin up to elevation 505. This is authourized by the Flood Control Act of June 22 1936, Public Law 74-738, as amended, and by HR 101-96, June 20, 1989. The water that will be conserved is comprised of flows that have reached Prado Basin, and which if allowed to immediately pass through the facility, will flow directly to the Pacific Ocean, as there is no capability to capture and use this water other than the Orange County Water District recharge facilities. This conservation proposal is not intended guarantee the delivery of water, only to allow the opportunity to capture flows that currently are flowing directly to the ocean.