US Army Corps of Engineers

Los Angeles District

PRADO BASIN ECOSYSTEM RESTORATION AND WATER CONSERVATION STUDY

DRAFT INTEGRATED FEASIBILITY REPORT
Environmental Impact Statement | Environmental Impact Report

Orange, Riverside, and San Bernardino Counties, California

FEBRUARY 2019

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ABSTRACT

Pursuant to the National Environmental Policy Act (NEPA), the U.S. Army Corps of Engineers (Corps) has prepared this Draft Prado Basin Ecosystem Restoration and Water Conservation Integrated Feasibility Report (IFR). The Corps is the Lead Agency for the project under NEPA, and the Orange County Water District (OCWD) is the non-federal sponsor (NFS) and the Lead Agency for the California Environmental Quality Act (CEQA). The proposed project encompasses much of the Prado Basin covering approximately 4,500 acres immediately upstream of Prado Dam and extends along the Santa Ana River for 7 miles downstream of Prado Dam.

This Draft IFR, which also serves as a Draft Environmental Impact Statement and Environmental Impact Report (EIS/EIR) evaluates opportunities for restoring degraded habitats and ecosystem function within the project area. Ecosystem problems include loss and/or degradation of aquatic, riparian woodland and floodplain habitats through alteration of the hydrology of the Santa Ana River and tributaries in the upper and mid Santa Ana River basin. Development, flood damage reduction, agricultural practices and other land use changes have altered water-related environments of the study area to reduce the extent and function of native habitats, and invasive species have displaced and damaged riparian and aquatic habitats.

For Water Conservation, this report also evaluates permanent changes to the Water Control Plan for Prado Dam. Decreasing availability of imported water and increasing cost of municipal and industrial water supply sources to meet demand in the study area have resulted in the need for additional water conservation.

Three Action Alternatives were carried forward for preliminary analysis. The Tentatively Selected Plan (TSP) is Alternative 2 which includes both an Ecosystem Restoration Plan and a Water Conservation Plan. Restoration measures include sediment management to address sediment deposition upstream of Prado Dam and channel incision downstream of the dam which have impacted the hydrologic function, geomorphology and suitability of channel and riparian habitats. The TSP also includes measures to remove invasive plants and animal species that impact habitat functions in the proposed project area, as well as riparian and floodplain restoration and in-stream habitat features to benefit native fish. The proposed Water Conservation Plan includes re-operation of Prado Dam for increased retention and controlled release of water from Prado Dam for diversion and infiltration at OCWD's facilities located downstream of the dam on the Santa Ana River. The TSP (Alternative 2) has been identified as the NEPA Environmentally Preferred Alternative due to the long-term net ecosystem benefits. The official closing date for the receipt of comments is 45 days from the date on which the notice of availability of this IFR/DEIS/EIR appears in the Federal Register. During this 45-day review period, comments should be sent to:

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EXECUTIVE SUMMARY

INTRODUCTION

Pursuant to study resolution dated May 8, 1964 by the Committee on Public Works, U.S. House of Representatives, Section 401(a) of the Water Resources Development Act of 1986, and the National Environmental Policy Act (NEPA), the U.S. Army Corps of Engineers (Corps) prepared the Draft Prado Basin Ecosystem Restoration and Water Conservation Integrated Feasibility Report (IFR), which develops feasible alternatives and also assesses the potential environmental impacts associated with implementation of the proposed project alternatives (in accordance with the requirements of Code of Federal Regulations (CFR) Title 40, Chapter V: Council on Environmental Quality (CEQ), Section 1501.4(b)). The Corps is the Lead Agency for the project in cooperation with the Orange County Water District (OCWD), whom is the non-federal sponsor (NFS) and the Lead Agency for CEQA.

This project is the culmination of coordination and planning that has been ongoing since 2012. The original Feasibility Cost Sharing Agreement (FCSA) between the Corps and the OCWD committed both parties to share costs at a contribution of 50 percent each, with the OCWD's contribution to be provided up to the full amount required as work-in-kind, cash, or any combination. The original FCSA was amended on August 25, 2014 to include a provision for OCWD to contribute funds voluntarily for remaining costs to complete the study.

NEPA regulations allow for the preparation of combined documents that meet the requirements of NEPA, equivalent state requirements such as CEQA, and technical planning and decision-making processes of an agency. The specific requirements of NEPA and CEQA and the sections of this document that address each are provided in Appendix X. No cooperating agencies have been participants in the study as defined under NEPA, beyond the Corps as Lead Agency, and OCWD as the NFS and CEQA Lead Agency. All other coordination and consultation with agencies having jurisdictional interests in the study are identified in Sections 8.1 through 8.3 of the IFR.

The content for this IFR was conducted in compliance with USACE's new SMART Planning (3x3x3 policy) process and was established based on applicable laws, USACE regulations and guidelines, professional judgment regarding the nature of the project, Appendix G of the CEQA Guidelines, and USACE standard NEPA practices. Impacts are described under each of the environmental resource areas in Chapter 5.

BACKGROUND

The Santa Ana River is the largest river entirely within Southern California in the United States. The most upstream tributaries in the watershed originate in the San Bernardino Mountains and the Santa Ana River flows through San Bernardino and Riverside Counties before bisecting the northern Santa Ana Mountains and Chino Hills through Santa Ana Canyon and flows southwest through urban Orange County to discharge into the Pacific Ocean. The Santa Ana River is 96 miles in length, and its drainage basin is 2,650 square miles in area.

The partners in this study, the Corps' Civil Works Program and the Orange County Water District, have responsibilities for management of the Santa Ana River to address a variety of public objectives for water resource management. The Prado Dam and flood control basin were constructed in 1941 to provide flood risk management for developed areas of Orange County. This project addresses ecosystem restoration and water conservation problems within the Prado Basin and the Santa Ana River downstream of Prado Dam.

Problems to ecosystems in the project area include:

- Loss and/or degradation of aquatic, riparian woodland and floodplain habitats through alteration of the hydrology of the Santa Ana River and tributaries in the upper and mid Santa Ana River basin caused by construction of Prado Dam for flood control in the 1940's.
- Development, agricultural practices and other land use changes have altered water-related environments of the study area by increasing the intensity and decreasing the duration of runoff from storm events.
- Invasive species have displaced and damaged edge, riparian and aquatic habitats that have declined in the study area.

Problems to water conservation in the project area include:

- Decreasing availability of imported water and increasing cost of municipal and industrial water supply sources to meet demand in the study area.

Early in the study process, the project delivery team (PDT) along with key stakeholders and the internal USACE reviewers of the Agency Technical Review (ATR) team for the study identified target or focal areas for ecosystem restoration and water conservation measures. These include an area of approximately 200 acres at the north end of the study boundary along Chino Creek; an area of approximately 148 acres along Mill Creek to the west of the creek, adjacent and downstream from a City of Ontario wetlands project; and the entire Santa Ana River Mainstem (SARM) within Prado Basin and Reach 9 from Prado Dam to Weir Canyon Road (Figure ES-1). Due to frequent dry conditions with no stream flow, the reach of Temescal Creek located within Prado Basin is considered a possible location only for measures that include non-native plant removal and associated native plantings.

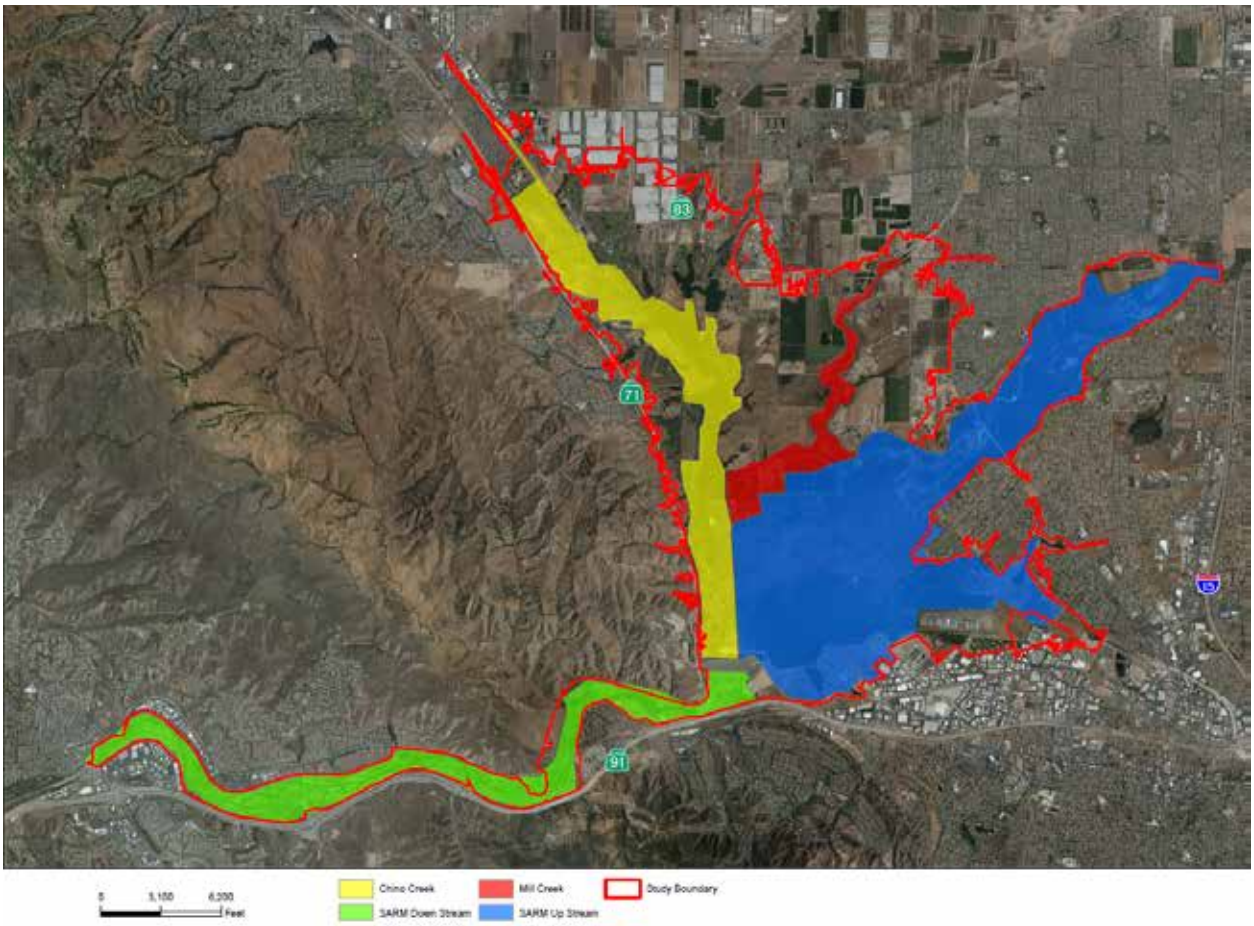

Figure ES-1 Focal Area Map for the Prado Project Area

PROJECT DESCRIPTION AND LOCATION

The project area for the IFR is located within the extent of the Santa Ana River Mainstem Project (SARM) and encompasses most of the Prado Basin covering approximately 4,500 acres of riparian habitat immediately upstream of Prado Dam and extends along Reach 9 of the Santa Ana River for 7 miles downstream of Prado Dam (Figure ES-2). Reach 9 of the Santa Ana River extends from Prado Dam downstream to Weir Canyon Road. All features for the project would be located within this area. The study also addresses any impacts of the project that would occur beyond proposed locations, including the Santa Ana River downstream to the Pacific Ocean.

The Prado Dam and flood control basin can be adapted and supplemented with additional measures to address two water resource management objectives: (1) ecosystem restoration and (2) water conservation. The study objective for ecosystem restoration is to restore aquatic and water-related habitats for native species, including threatened and endangered species with habitat in the study area that make use of the restoration opportunities provided by Prado Basin, the Santa Ana River and its tributaries. The study objective for water conservation is to operate Prado Dam for increased water conservation and cost savings for OCWD as a public water supplier for metropolitan Orange County.

Water conservation measures formulated for this study all rely on retention of water at Prado Dam for water conservation that is then released at a rate that allows additional volumes of water to be diverted to OCWD's existing recharge facilities located adjacent to the Santa Ana River downstream of Prado Dam. The existing water conservation provisions of the Prado Dam Water Control Plan allows retention of water to 498 feet water surface elevation (WSE) NGVD during flood season (October through February), and to 505 feet WSE NGVD during non-flood season (March through September) for controlled release for diversion and use by OCWD's recharge facilities.

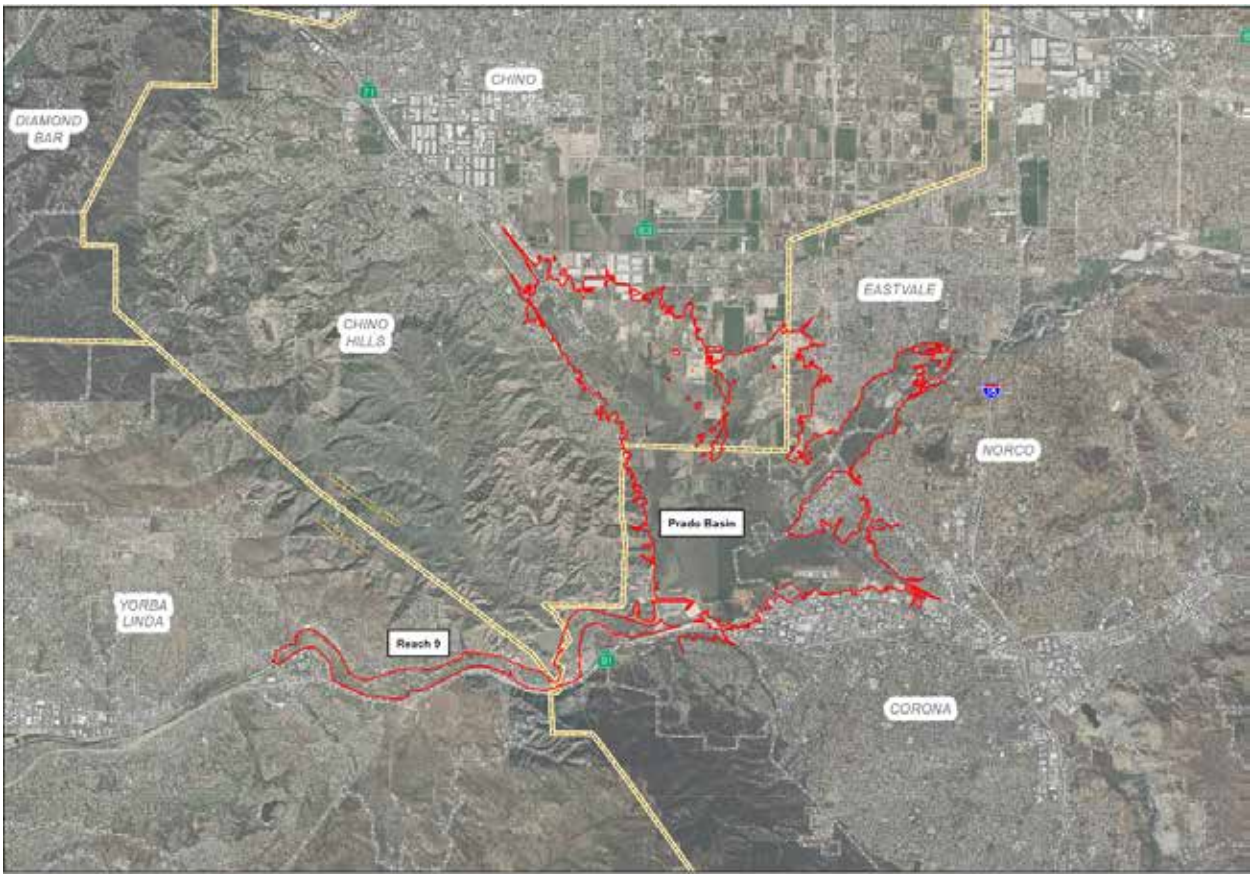

Figure ES-2 Proposed Project Area Map

PROJECT PURPOSE AND NEED

Planning goals for the study include restoration of aquatic and water-related habitats for native species, including threatened and endangered species with habitat in the study area that would make use of the restoration opportunities provided by Prado Basin, the Santa Ana River and its tributaries. There is a need to restore habitats and connectivity for wildlife in the project area. These aquatic and riparian habitats of the Santa Ana River and tributaries support aquatic species that depend on the flow and geomorphology of the largest flowing river in southern California, and thousands of acres of riparian forest that have been impacted by flood risk management activities, propagation of invasive plants and animals, and alteration of watershed hydrology through land development and agricultural practices. In addition, long-term growth and drought have stressed water supplies for the region, increasing demand for imported water has increased

energy use for water transfers, and raises reliability concerns for water supplies from distant sources.

The project purpose is stated in the form of planning objectives. The planning objectives developed for this study state the intended purpose of the planning process, identify what the USACE and OCWD partnership wants to achieve with the alternatives and accomplish with a plan.

The objectives for ecosystem restoration are:

- Improve hydraulic and fluvial geomorphic functions to promote habitat growth and wildlife connectivity to regionally significant core habitats at Prado Basin and associated main watercourses within the project area.
- Restore riparian and riparian associated habitats suitable to native species within the project area
- Reduce presence and effects of non-native wildlife on habitat suitability and function for native wildlife species.

The objective for water conservation is to:
Determine the feasibility of re-operating the Prado reservoir to provide additional water conservation storage. Conserved water would be used by OCWD and its member agencies.

PLAN FORMULATION FOR ECOSYSTEM RESTORATION

Initial plan formulation for Ecosystem Restoration was accomplished through Feasibility Kick-Off Workshops, PDT meetings and follow-on efforts by the Lead Planner in December 2012 and January 2013. Workshops included participation of the USACE PDT, the Agency Technical Review (ATR) Co-Leaders, a Water Resources Planner trained in the SMART planning process, the non-Federal sponsor (OCWD), U.S. Fish and Wildlife Service, California Department of Fish and Wildlife (formerly Fish and Game), the City of Ontario, the Regional Water Quality Control Board, the Santa Ana Watershed Authority and the Riverside-Corona Resource Conservation District.

Design workshops held by the PDT and stakeholders identified an inclusive list of measures to address the study objectives. Based on identified water resource problems and opportunities, many measures were enumerated by the group and have been developed to address the problems. Measures have been combined into alternative plans that could be implemented in the study area. Alternative plans can then be assessed and compared to determine the costs, effectiveness and impacts of the project alternatives.

After the Alternatives milestone, the preliminary array of reduced measures was developed into alternative design features. The design alternatives were developed to a sufficient level of detail to ensure technical feasibility, establish boundary footprints for construction activities, designate riparian habitat planting areas, determine avoidance requirements for existing and proposed infrastructure, and to provide a basis for detailed cost estimates. For the development of the initial array of alternatives, each of the measures developed were evaluated for their applicability

to each focal area and inherent aspects that determined or constrained the applicability and siting of measures.

After the initial set of restoration measures had been identified, a series of thematic plans were formulated for initial evaluation of restoration techniques at increasing scales of investment and intensity of alternation of existing environmental conditions. In increasing order of plan commitment and cost, the preliminary alternatives include:

- Basic Plan: restoration techniques that involve lower intensity alteration and level of investment, with two basic components: Water Conservation at 505' elevation year-round, and Invasive Vegetation Removal at upstream focal areas.
- Medium Chino Plan: added measures to address disrupted channel/aquatic environment geomorphology and hydrology (sediment removal, braided channel at Chino Creek, stabilize streambed of Santa Ana River mainstem)
- Widely Supported Plan: more extensive level of effort for restoration and wider range of habitat types provided (sediment removal for habitat, riparian edge habitats, invasive animal removal, wetlands creation at Mill Creek)
- All Inclusive Plan: a complete suite of available compatible measures for restoration (added floodplain widening and restoration upstream SAR and aquatic habitat features at Chino Creek)

PLAN FORMULATION FOR WATER CONSERVATION

During initial plan formulation, the PDT evaluated potential water conservation measures, including plan formulation efforts conducted for a 2005 draft water conservation feasibility report on Prado Basin. Based on the prior study efforts and the existing water conservation operations at Prado Dam, the PDT identified a range of measures to be considered for there are substantially greater costs and impacts of implementing water conservation to elevations higher than WSE 505 feet, including environmental impacts and flooding impacts within the basin. Water conservation retention at WSE between 498 feet and 505 feet, the project would incur similar operating costs as operating for water conservation at 505 feet but with proportionally lower yields. Based on these considerations, a decision was made at the Alternatives Milestone Conference, through coordination and agreement with the Corps South Pacific Division and Headquarters representatives, to carry forward water conservation at up to 505 feet WSE at any time during the year.

The PDT evaluated the previous operations under the Water Control Plan for Prado Dam and approved deviations and determined that the year round operation at 505 feet WSE maximized yield for the water conservation effort while ensuring that the flood risk management performance of the Santa Ana River Mainstem project, including Prado Dam, was not compromised.

Based on OCWD's experience with ongoing water conservation at Prado Dam, the PDT recognized that sediment removal could be included in the Water Conservation measure to address changes in sediment accumulation that might displace or degrade habitat. This feature would be included in the Water Conservation measure only if it is implemented in conjunction with an Ecosystem Restoration plan that does not include a sediment management measure for

Ecosystem Restoration. For final array plans that combine Water Conservation with a restoration plan that includes Sediment Management for Ecosystem Restoration, the Water Conservation measure would not require sediment removal. This is because the restoration Sediment Management Measure addresses sediment accumulation at much larger scale to address the geomorphologic and hydrologic conditions that provide restoration benefits related to sediment management on the Santa Ana River mainstem. The version of the Water Conservation measure without sediment removal would be compatible with Ecosystem Restoration Best Buy plans 11 and 14 in the final array.

COST EFFECTIVENESS/INCREMENTAL COST ANALYSIS

A Value Engineering workshop was completed in 2014. In addition to identifying some modification of individual measures to improve cost-effectiveness, the workshop recommended completion of a Cost Effectiveness/Incremental Cost Analysis (CEICA) to identify Best Buy Alternatives and ensure combinable measures were used to derive a range of alternatives that could be compared and evaluated for plan selection.

The initial CEICA analysis of refined restoration measures was performed in 2016. Outputs for cost effectiveness calculations are based on the habitat evaluation model identified by USACE as appropriate for this Feasibility Study. The model, Combined Habitat Assessment Protocol or CHAP results of the average annual habitat unites (AAHU) for each measure was included in the analysis. However, when the Abbreviated Cost Risk Analysis (ACRA) was performed for the proposed final array from the initial CEICA, costs for final array plans that included sediment management more than doubled because of the uncertainty associated with transport and placement of excess sediment removed from the basin. Revised contingency costs based on more detailed and updated designs were provided for the individual measures and the CEICA was rerun to ensure that more reliable costs were used as the basis for selecting the final array of alternatives.

To formulate the final array, each measure/focal area combination had been separately assessed for habitat output then assessed for combinability with other features, dependency on other features, and synergy from combining features. When two or more management measures are dependent, that relationship is considered in CEICA and retained in plan formulation. When management measures are not combinable, that relationship is specified in the IWR Plan software, which produces the CEICA. In this manner only mutually exclusive and independent alternatives are formulated, which is a requirement of plan formulation. These criteria were entered to establish all possible combinations of features and associated habitat outputs and costs. These combinations established by the criteria were entered into IWR Plan and became the alternative plans. Dependency, combinability, and synergy have been developed by the PDT based on consideration of function, requirements and location of the individual measures at the relevant focal areas.

The CEICA analysis was performed in a three-step process because the number of features, 20, exceeded the number of the computational capabilities of IWR Plan software. To get around this limitation CEICA analysis was first performed on the features located in SARM upstream and downstream. A CEICA model was then run for features within Chino and Mill Creek.

Chino/Mill Creek did not contain any measures with dependencies. This kept all measures with dependencies and the corresponding dependent measures within the SARM grouping. Non-combinable measure pairings also did not extend beyond either SARM or Chino/Mill Creek ensuring that all non-combinable measures are accounted for.

ALTERNATIVES ARRAY

Four of the Best Buy Plans (including the No Action Plan) were selected to carry forward into the Final Array of Ecosystem Restoration Plans. These plans include Best Buy Plans 1 (No Action), 9, 11, and 14. These Best Buy Plans represent the range of cost-effective combinations of measures that represent the range of possible alternatives that address Ecosystem Restoration objectives at different levels of output that are would provide sustainable benefits for the proposed project area. Table ES-1 below summarizes the features of the Final Array Ecosystem Restoration Plans and Table ES-2 summarizes and compares the outputs and costs of the Final Array Ecosystem Restoration Plans.

Table ES-1: Final Array Plan Features for Ecosystem Restoration

BB Plan	Adds Measure(s)	In Location
1	No Action	
9	Water Conservation at 505’ Elevation Year-Round	All Locations
	Invasive Plant Mgt.	All Locations
	Native Plantings	SARM US, MC, CC
	Raise Invert/Cut New Channel	CC
	Cowbird Trapping*	All Locations
11 (adds to plan 9)	Non-native Aquatics Mgt.	SARM US
	Sediment Mgt. System	SARM US/DS
	Riparian Edge Mgt.	SARM US
	Instream Habitat Feature	SARM DS
14 (adds to Plan 11)	Non-Native Aquatics Mgt.	SARM DS
	Feral Pig Management	All Locations
	Instream Habitat Features	SARM US

Table ES-2: Ecosystem Restoration Array Plan Summary Outputs and Costs

	BB Plan 9	BB Plan 11	BB Plan 14
Construction	$23,709,898	$95,838,470	$101,481,812
PED/S&A	$2,699,920	$10,380,904	$10,925,144
Monitoring & Adaptive Mgt.	$260,000	$310,000	$310,000
LERRD	$0	$3,600,000	$3,600,000
Total First Cost	**$26,670,000**	**$110,129,000**	**$116,317,000**
IDC	$879,300	$6,564,500	$6,801,100
Investment Cost	$27,549,300	$116,693,500	$123,118,100
Annualized Investment Cost	$1,045,400	$4,428,300	$4,672,100
OMRR&R	$864,600	$5,745,000	$6,022,900
Total Annual Cost	**$1,910,000**	**$10,173,300**	**$10,695,000**
AAHU	38,795	60,594	61,246
AAC/AAHU	$49	$168	$175
Incremental AAC	$1,910,000	$8,263,300	$521,700
Incremental AAHU	38,795	21,799	652
Incremental AAC/AAHU	$49	$379	$800

Best Buy Plan 9 - This plan was the plan determined to minimally meet planning objectives. It provides 38,795 AAHUs. The total first cost is approximately $26.7 million, with an average annual cost of about $1.9 million. The incremental AAC/AAHU of Best Buy Plan 9 relative to Best Buy Plan 8 is $206, which represents a substantial increase over some smaller Best Buy Plans, but still low compared to larger scale plans. Relative to the No Action Plan, the incremental AAC/AAHU is about $49. This plan indirectly provides restoration of hydrologic processes by removing Arundo and reducing evapotranspiration, but it does not directly restore hydrologic processes and isolation of habitat caused by channel incision on the Santa Ana River upstream and downstream reaches.

Best Buy Plan 11 - This plan provides a substantial increase in output, generating 60,594 AAHUs. The total first cost is approximately $110.1 million, with an average annual cost of about $10.2 million. The incremental AAC/AAHU of this plan relative to Best Buy Plan 10 is $381, which is a 30% increase, but still low relative to larger scale best buy plans. Relative to Best Buy Plan 9, the incremental AAC/AAHU is about $379. This plan is the first to feature the sediment management system along the SARM, as well as in-stream habitat features in the SARM downstream area and riparian edge management features upstream, which are both dependent upon implementation of the sediment management system. This plan also adds non-native aquatics management in the SARM upstream area. These additional features raise the cost considerably – the first cost is about $83.5 million higher than Best Buy Plan 9, and average annual costs are approximately 5.3 times higher than the annual costs for Best Buy Plan 9. However, the increase in output of 21,799 AAHUs results in a low incremental cost per AAHU. The incremental AAC/AAHU for this best buy plan is substantially lower than larger scale best buy plans.

Best Buy Plan 14 - This is the largest plan carried forward to the Final Array, and is projected to generate 61,246 AAHUs. This represents an increase of 652 AAHUs relative to Best Buy Plan 11. The total first cost of Best Buy Plan 14 is approximately $116.3 million, with an average annual cost of about $10.7 million. The incremental first cost and annual cost of Best Buy Plan 14 relative to Best Buy Plan 11 are about $6.2 million and $522,000, respectively. This plan adds

non-native aquatics management in the SARM downstream area, in-stream habitat features in the SARM upstream area, and feral pig management throughout all focal areas. While the incremental AAC/AAHU for this final array plan is larger than smaller scale plans, it is still less than $900, which is substantially lower than larger scale best buy plans.

FINAL ARRAY OF COMBINED PLANS

The measures and plans formulated for each project purpose were formulated independently. The evaluation of conflicts and dependencies between plans for the different study purposes determined that the Water Conservation plan requires a component for additional sediment removal in combined plans only for alternatives where the Ecosystem Restoration Plan does not include the Sediment Management System Measure. The final array of combined plans is provided in Table ES-3.

Table ES-3: Final Array Combined Plans for Ecosystem Restoration and Water Conservation

Final Array Plan Number	1 (No Action)	2	3	4
Ecosystem Restoration Plan Component	None	Best Buy Plan 11	Best Buy Plan 9	Best Buy Plan 14
Water Conservation Plan Component	None	Water Conservation at WSE 505 (No Sediment Removal)	Water Conservation at WSE 505 With Sediment Removal	Water Conservation at WSE 505 (No Sediment Removal)

The environmental impacts of the alternatives are presented in Chapter 5, the comparison of plans by their outputs, impacts and costs is provided in Chapter 6, and the Tentatively Selected Plan (TSP) is identified in Chapter 7. USACE recommends implementation of Alternative 2, which combined Ecosystem Restoration Plan Best Buy 11 with Water Conservation at 505 feet WSE. Table ES-4 displays the comparison of impacts for the 4 final Alternatives and identifies unavoidable significant impacts in regards to air quality with respect to CEQA standards. The TSP is the combined plan for Ecosystem Restoration and Water Conservation purposes that meets the study objectives for each purpose while maximizing net economic benefits as the National Economic Development Plan for Water Conservation and also provides the most non-monetary benefits for Ecosystem Restoration relative to the monetary costs of the proposed plan to meet the national objective of National Ecosystem Restoration.

AREAS OF CONTROVERSY AND ISSUES TO BE RESOLVED

At present there are no areas of major controversy that have been identified by the public. The Corps and OCWD have worked closely together and with the public and stakeholders to develop alternatives and a TSP that is responsive to potential concerns. The Corps and OCWD will continue to work together as public and agency comments are submitted on this Draft IFR. The key issue to be resolved is the final selection and any refinement to the choice among the

alternatives. While a TSP has been identified, the final selection remains an issue to be resolved, including potential refinements and the sequencing of the actions under the plan.

Table ES-4: Comparison of Potential Impacts

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
GEOLOGY, SEISMOLOGY, SOILS, AND MINERALS	***Construction Impacts*** None. ***Operation Impacts*** None.	***Construction Impacts*** Construction activities would not increase the risk or exposure of people or structures to significant adverse seismic ground rupture, seismic shaking impacts, or liquefaction impacts over the current condition. Soil, water and wind erosion resulting from construction would be controlled through BMPs and would be temporary. Impacts would be **less than significant**. ***Operation Impacts*** Impacts would not involve any activities that would increase the risks of ground rupture impacts, seismic ground shaking impacts, liquefaction or landslide impacts over the current condition. Adaptive management may include adjustments to cowbird control and fish removal methods, level of effort, and/or trap locations. As with other maintenance activities, potential impact would be **less than significant**.	***Construction Impacts*** Construction and long-term operation and maintenance activities would not increase the risk or exposure of people to significant adverse seismic ground rupture, seismic shaking impacts, or liquefaction impacts over the current condition. Potential impacted area decreases from Alternative 2 with less temporary and permanent grading impacts. Soil, water and wind erosion resulting from construction would be controlled through BMPs, and would be temporary resulting in **less than significant impacts.** ***Operation Impacts*** Same as Alternative 2 (Less than significant impact).	***Construction Impacts*** Potential impacted area is the same as Alternative 2. Soil, water, and wind erosion resulting from construction would be controlled through BMPs and would be temporary Impacts would **be less than significant.** ***Operation Impacts*** Same as Alternative 2 (Less than significant impact).
AIR QUALITY AND GREENHOUSE GASES	***Construction Impacts*** No adverse impacts There would be no construction air emissions that could	***Construction Impacts*** The construction and operational phases are expected to exceed the NOx threshold under CEQA resulting in **unavoidable impacts**. In regards to	***Construction Impacts*** Same as Alternative 2 (Less than significant).	***Construction Impacts*** Same as Alternative 2 (Less than significant impact).

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	have the potential to exceed the Federal General Conformity Rule. ***Operation Impacts*** Emissions associated with existing operational practices and daily visitations to the project area would remain.	NEPA, construction activities would not result in Project-related emissions exceeding General Conformity de minimis levels as established in 40 CFR 93.153(b.), resulting in **less than significant impacts**. ***Operation Impacts*** Worse-case summer or winter daily regional annual criteria pollutants for operation/maintenance results show that combined direct and indirect emissions would be within the General Conformity de minimis levels. Therefore, preparation of a General Conformity Determination would not be required for the implementation of the Proposed Action. **Less than significant** impacts would occur.	***Operation Impacts*** Same as Alternative 2 (Less than significant impact).	***Operation Impacts*** Same as Alternative 2 (Less than significant impact).
LAND USE	***Construction Impacts*** None. ***Operation Impacts*** Water would continue to be stored at elevation 498 ft. during the flood season and at	***Construction Impacts*** With implementation of Environmental Commitments detailed in Chapter 5, construction activities would not result in adverse land use impacts or physically divide an established community resulting in **less than significant** impacts. Alternative 2 would not conflict with any	***Construction Impacts*** Compared to Alternative 2, sediment removal activities would be confined to a smaller area within the Prado Basin and would not impact any existing land uses With implementation of Environmental Commitments	***Construction Impacts*** Same as Alternative 2. (Less than significant impacts). ***Operation Impacts*** Same as Alternative 2. (Less than significant impacts).

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	elevation 505 ft. during the non-flood season in accordance with the Water Control Plan for Prado Dam.	applicable land use plan, policies or regulations of an agency with jurisdiction over the project adopted for avoiding or mitigating an environmental effect. ***Operation Impacts*** Operation activities would be confined to specific areas for a short period of time. Potential operation, maintenance, and adaptive management impacts would not result in adverse land use impacts or physically divide an established community. Any land use **impacts would be less than significant.**	detailed in Chapter 5, the level of potential impacts to existing land uses and established community would be the same, resulting in impacts being **less than significant**. ***Operation Impacts*** Compared to Alternative 2, future operation and maintenance impacts would be the same and adverse impacts would **be less than significant.**	
WATER RESOURCES	***Construction Impacts*** No adverse impacts. There would be no construction or ecosystem restoration activities occurring in the study area and there would be no potential that water quality standards in the Basin Plan could be violated ***Operation Impacts*** The study area would continue to be subject to the water quality	***Construction Impacts*** With implementation of Environmental Commitments detailed in Chapter 5, construction activities would not violate any water quality standards or waste discharge standards, or otherwise degrade water quality making the impacts **less than significant**. Construction activities would not place structures within a 100-year floodplain which would impede or redirect flood flows or expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a	***Construction Impacts*** Same as Alternative 2, with less sediment excavation activities. While sediment management and related ecosystem restoration measures would not be implemented, the habitat benefits associated with Chino Creek restoration, invasive removal and native plantings would be consistent with Basin Plan objectives. None of the other restoration measures or the Water Conservation Plan would	***Construction Impacts*** Same as Alternative 2. (Less than significant impacts) and (Beneficial Impact). ***Operation Impacts*** (Less than significant impact) and (Beneficial Impact).

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	standards established in the Basin Plan.	levee or dam. **Impacts would be less than significant**. ***Operation Impacts*** Water Conservation Measure would increase the level of pooling and days of inundation within the Prado Basin. Incoming waters into the Prado Basin that comply with the Basin Plan water quality objectives and beneficial uses would ensure that the additional stored water in the basin would not introduce new sources of pollution that would exceed water quality standards in the Basin Plan. Turbidity caused by high flow conditions during dam releases **is significant.** Although the sediment re-entrainment to the area downstream of the dam would not substantially increase the levels of turbidity, it is still significant and unavoidable. Moreover, water conservation would result in a **beneficial impact** by increasing the amount of water that is available for groundwater recharge.	worsen water quality or exceed thresholds identified in the Basin Plan. **Less than significant** impacts. ***Operation Impacts*** Same as Alternative 2 except there would not be unavoidable turbidity caused by high flow conditions during dam releases as described in Alternative 2. Thus, this Alternative would have less impacts compared to Alternative 2 in regard to turbidity.	
BIOLOGICAL RESOURCES	***Construction Impacts*** None. ***Operation Impacts*** None.	***Construction Impacts*** With implementation of Environmental Commitments detailed in Chapter 5, construction activities would not	***Construction Impacts*** With implementation of Environmental Commitments detailed in Chapter 5	***Construction Impacts*** Same as Alternative 2 (Less than Significant Impact).

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		result in substantial adverse effects, either directly or through habitat modifications, on any species identified as candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service. Indirect impacts were evaluated and are also not substantial, and therefore impacts would be **less than significant**. ***Operation Impacts*** Since the same actions would occur under long-term operation and maintenance as those that occurred under initial implementation, **impacts would be less than significant.**	Construction activities would not result in substantial adverse effects, either directly or through habitat modifications, on any species identified as candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service. Indirect impacts were evaluated and are also not substantial, and therefore **less than significant**. ***Operation Impacts*** Since any long-term operation and maintenance efforts would utilized the same methods as the original implementation, the associated impacts would be the same as well. Therefore, impacts associated with long-term operation and maintenance would not result in substantial adverse effects to any sensitive or special status	***Operation Impacts*** Since any long-term operation and maintenance efforts would utilized the same methods as the original implementation, the associated impacts would be the same as well. Therefore, impacts associated with long-term operation and maintenance would not result in substantial adverse effects to any sensitive or special status plant of wildlife species and are therefore **less than significant.**

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
			plant of wildlife species and are therefore **le**ss **than significant.**	
CULTURAL RESOURCES	***Construction Impacts*** No adverse impacts. There would be no ground disturbances and no potential that buried pre-historic and/or historical cultural resources within the study area would be adversely affected. ***Operation Impacts*** None.	***Construction Impacts*** Alternative 2 would result in an adverse effect/substantial adverse change to at least one historic property/historic resource related to the construction of the sediment storage area. The impacts to the historic property/historic resource would not be substantial enough to exceed the significance criteria. Additional adverse effects/substantial adverse changes could occur if a historic property/historic resource is located within the footprint of the Chino Creek channel restoration measure or any of the features associated with the sediment trap and cannot be avoided. Due to the location and type of impacts associated with the Chino Creek channel or the sediment trap if there is an adverse effects/substantial adverse change the impact would likely be major enough to exceed the significance criteria. Alternative 2 would result in a known adverse effect/substantial adverse change that is **less than significant** under NEPA and CEQA;	***Construction Impacts*** Compared to the Alternative 2, Alternative 3 would have substantially less excavation activities, a smaller construction footprint and less likelihood to encounter unknown pre-historic and historic cultural resources. **Less than significant impacts** would occur. ***Operation Impacts*** Compared to the Alternative 2, Alternative 3 would have substantially less excavation activities, a smaller construction footprint and less likelihood to encounter unknown pre-historic and historic cultural resources. **Less than significant impacts** would occur.	***Construction Impacts*** Same as Alternative 2 (Less than significant impacts). ***Operation Impacts*** Same as Alternative 2 (Less than significant impacts).

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		however, additional significant impacts could occur to as of unidentified cultural resources, but these impacts are unlikely. ***Operation Impacts*** The long-term operation and maintenance and adaptive management activities would involve regular inspection of the focal areas and the removal of non-native wildlife. Any future removal activities would be conducted in natural open space areas using existing maintenance roads and staging areas. Operation and maintenance would result in **less than significant** impacts under NEPA and CEQA.		
TRAFFIC AND CIRCULATION	***Construction Impacts*** None. ***Operation Impacts*** None.	***Construction Impacts*** Construction activities would occur over a period of 5 years. **Less than Significant impact** would occur. Construction activities would not conflict with an applicable plan, ordinance or policy establishing measures of effectiveness (Level of Service) for the performance of the circulation system, considering all modes of transportation including mass transit, and non-motorized travel and	***Construction Impacts*** Compared to the Alternative 2, Alternative 3 would have substantially less excavation activities, a smaller construction footprint and less traffic and circulation impacts. Daily construction is expected to be less than Alternative 2 after each of the following 3 years of construction.	***Construction Impacts*** Same as Alternative 2 (Less than significant impacts). ***Operation Impacts*** Same as Alternative 2 (Less than significant impacts).

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		relevant components of the circulation system. Operation Impacts Daily trip contribution would be 0.30% to 0.60%. **Less than significant impact** would occur. Operation and maintenance activities would not conflict with an applicable plan, ordinance or policy establishing measures of effectiveness (Level of Service) for the performance of the circulation system, considering all modes of transportation including mass transit, and non-motorized travel and relevant components of the circulation system.	(2021,2022,2023). **Impacts will be less than significant.** Operation Impacts Daily trip contribution would be 0.20% to 0.30%, resulting in **less than significant** impacts.	
NOISE	***Construction Impacts*** None. ***Operation Impacts*** None.	***Construction Impacts*** All of the construction activity would occur during the hours of the day when construction noise would be exempt under the City of Norco Noise Ordinance, City of Eastvale Noise Ordinance and the County of Riverside Noise Ordinance. Construction activities associated with the non-native wildlife management would not result in an exposure of persons to or generation of noise levels in excess standards established in the local general plan	***Construction Impacts*** Compared to the Proposed Action, Alternative 3 would have substantially less excavation activities, a smaller construction footprint and, thus, less noise impacts resulting in impacts being **less than significant**. ***Operation Impacts*** Compared to the Proposed Action, Alternative 3 would have substantially less	***Construction Impacts*** Same as Alternative 2 (Less than significant impacts). ***Operation Impacts*** Same as Alternative 2 (Less than significant impacts).

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		or noise ordinance, or applicable standards of other agencies. **Less than significant** impacts would occur. ***Operation Impacts*** No potential conflicts with local noise ordinances would occur during operations. **Less than significant** impacts would occur.	excavation activities, a smaller construction footprint and, thus, less noise impacts. **Less than significant** impacts would occur.	
AESTHETICS	***Construction Impacts*** No adverse impacts to existing scenic vistas would occur. Existing views surrounding the study area would not change. ***Operation Impacts*** None.	***Construction Impacts*** Construction activities would not have a substantial adverse effect on existing scenic vistas, site quality, or visual character of the Santa Ana River and the surrounding areas would return to their pre-construction condition and **would be less than significant.** ***Operation Impacts*** Same as above. Same as above.	***Construction Impacts*** Compared to the Alternative 2, no light and glare impacts would occur resulting in **less than significant impacts.** ***Operation Impacts*** Same as Alternative 2, but less construction and operation impact from sediment management. **Less than significant** impacts would occur.	***Construction Impacts*** Same as Alternative 2 (Less than significant impacts). ***Operation Impacts*** Same as Alternative 2 (Less than significant impacts).
PUBLIC HEALTH AND SAFETY, HAZARDOUS, TOXIC, RADIOACTIVE WASTE	***Construction Impacts*** Water would continue to be stored at elevation 498 feet during flood season and up to elevation	***Construction Impacts*** Implementation of the Non-Native Wildlife Management Measures would not involve the handling of any hazardous substances that could inadvertently be released into the	***Construction Impacts*** Same as Alternative 2, but less construction and operation impacts from sediment management. Less than	***Construction Impacts*** Same as Alternative 2 (Less than significant impacts).

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	505 feet during the non-flood season in accordance with the Prado Dam Water Control Plan. In addition, no construction activity would occur as the Ecosystem Restoration Plan would not be implemented. Therefore, there would be no adverse impacts in creating a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. ***Operation Impacts*** Same as construction for Alternative 1.	environment. Therefore, **less than significant** impacts would occur that would create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. ***Operation Impacts*** Long-term operation and maintenance activities would involve regular inspection of the focal areas and the removal of non-native wildlife. These activities would be confined to specific areas for a short period of time. Additional adaptive management may include adjustments to cowbird control and fish and removal methods, level of effort, and/or trap locations. Therefore, long-term operation, maintenance, and adaptive management activities would not result in impacts that would create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.**(Less than significant).**	significant impacts would occur. ***Operation Impacts*** Same as Alternative 2, but less construction and operation impact from sediment management.	***Operation Impacts*** Same as Alternative 2 (Less than significant impacts).

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE	***Construction Impacts*** No Adverse Impacts. Neither the Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. ***Operation Impacts*** None.	***Construction Impacts*** Implementation of the ecosystem restoration measures would generate a limited amount of new employment opportunities within the study area. The majority of these employment opportunities would be expected to be filled by currently employed and unemployed labor force participants from the local and surrounding area and would not generate significant new increases in population levels or significantly increase housing demand within the study area. The proposed ecosystem restoration activities would be implemented within Riverside County, San Bernardino County and Orange County. This Alternative would not cause disproportionately adverse impacts to minority populations nor to low income households in these counties. Impacts would **be less than significant.** ***Operation Impacts*** Same impacts as that described in Construction Impacts **(less than significant)**	***Construction Impacts*** Compared to Alternative 2, there could be potentially fewer new employment opportunities and would not induce substantial population growth in an area within the study area resulting in **less than significant impacts**. ***Operation Impacts*** Compared to Alternative 2, there could be potentially fewer new employment opportunities and would not induce substantial population growth in an area within the study area resulting in **less than significant impacts**.	***Construction Impacts*** Same as Alternative 2 (Less than significant). ***Operation Impacts*** Same as Alternative 2 (Less than significant impacts).
CUMULATIVE IMPACTS	***Construction Impacts*** No Adverse Impacts.	Significant adverse long-term cumulative impacts have been	No significant adverse long-term cumulative impacts.	Same as Alternative 2 (Less than significant impacts).

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Neither the Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. **Operation Impacts** None.	identified for Water Resources and Water Quality. Significant adverse short-term and long-term cumulative impacts under CEQA have been identified for Air Quality.		

1.0 INTRODUCTION

1.1 OVERVIEW OF THE INTEGRATED FEASIBILITY REPORT/ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT (IFR/EIS/EIR)

This section describes the organization of the Integrated Feasibility Report (IFR) for Ecosystem Restoration and Water Conservation, Prado Basin, Orange County, California. The following sections describe the contents of the report and address how the report documents the results of the U.S. Army Corps of Engineers (Corps) planning process, in and the requirements of the National Environmental Policy Act (NEPA) for an Environmental Impact Statement (EIS) and the California Environmental Quality Act (CEQA) for an Environmental Impact Report (EIR). The IFR is a combination of the Feasibility Report, EIS, and EIR.

1.1.1 Report and Appendices

The content for this IFR was established based on applicable laws, Corps regulations and guidelines, professional judgment regarding the nature of the project, Appendix G of the CEQA Guidelines. Impacts of the alternatives are described under each of the environmental resource areas in Chapter 5. Detailed technical and additional background information are provided in the appendices.

To help the reader navigate this IFR, an overview of the contents of each chapter is provided below.

- Chapter 1 - Introduction: identifies the Project Purpose and Need, Study Authority legislation, and Authorities for Study Participants; provides an overview of the Watershed and Study Area; and summarizes Related Studies and Reports.
- Chapter 2 - Study Objectives and Planning Considerations: Problems and Opportunities, Planning Objectives, Constraints, and Basis of Resources Significance Criteria.
- Chapter 3 - Plan Formulation: identifies management measures developed to address study objectives and their screening for incorporation into initial alternatives, alternatives subject to preliminary screening, alternatives eliminated from further consideration, the final array of alternatives carried forward, and design features incorporated into those alternatives. The final array of feasible alternatives fully evaluated in the EIS/EIR is described in more detail via text, tables, and figures.
- Chapter 4 - Affected Environment/Existing Environmental Setting: describes the existing, potentially affected environment in the study area. These environmental topics include water and sediment quality, aesthetics, recreation, air quality, noise, biological and cultural resources, etc. This section corresponds to the description of Existing Conditions under NEPA and CEQA.
- Chapter 5 - Evaluation of Alternatives and Environmental Consequences: discloses the potential consequences of implementing each of the alternatives in the focused array. Significance criteria are identified, and a determination is made of whether any of the alternatives would result in significant adverse impacts to environmental resources. Mitigation measures or environmental commitments, including best management practices and other measures to avoid or minimize adverse impacts, are identified where applicable. Cumulative impacts of this and other past, present and reasonably foreseeable

future actions in the project area are also evaluated. The relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity, irreversible of irretrievable commitments of resources involved, and growth inducement are also analyzed in this section. This section corresponds to Impact Analysis under NEPA and CEQA.

- Chapter 6 - Comparison of Alternatives: the final array of alternatives is compared to project objectives, policy issues, risks and constraints. A comparison of the alternative plans contribution to national objectives and social and economic effects are compared. A cost comparison of alternatives is provided, and the plans are compared to identify selection of the National Ecosystem Restoration (NER) and National Economic Development (NED) plans.
- Chapter 7 - The Tentatively Selected Plan (TSP): The TSP is identified based on the comparison of alternatives conducted in this study for proposed authorization and implementation.
- Chapter 8 - Public Involvement and Collaboration: provides the input from the public on the scoping of the project and results of collaboration with project stakeholders and agencies that have jurisdiction over resources in the project area.
- Chapter 9 - Remaining Reviews, Approvals, Implementation and Schedule: describes the Federal and non-Federal authorities for reviews, approvals and implementation of the recommended plan.
- Chapter 10 - Environmental Compliance: presents the status of compliance with applicable Federal, state and local laws, regulations and policies
- Chapter 11 - Recommendations: This section provides the Los Angeles District's recommendation for the proposed plan and its implementation.
- Chapter 12 - List of Preparers: This section lists Corps and OCWD (OCWD) participants in this study.
- Chapter 13 - List of Acronyms and Abbreviations: This section lists and defines acronyms and abbreviations in this study.
- Chapter 14 - References: reports and supporting documents used in preparation of the study.
- Chapter 15 – Index: provides key words and page numbers for each occurrence.
- Appendices: There are a total of 17 appendices with more detailed technical information.

1.1.2 Corps Planning and NEPA/CEQA Integration

This IFR is intended to carry out requirements of the Corps of Engineers Civil Works planning process, as documented in the Planning Guidance Notebook (Engineer Regulation (ER) 1105-2-100 (Mon YR)), and the National Environmental Policy Act (NEPA) requirements for an EIS. In addition, the IFR fulfills the OCWD's obligations as non-Federal sponsor to comply with the California Environmental Quality Act (CEQA) requirements for an EIR. Each of these sets of planning regulations require public agencies to provide the public with documentation of the purpose of a proposed project, the process used to develop and compare alternatives to fulfill the project purpose, the environmental and socioeconomic impacts of the alternatives, and the basis for the agency decision.

NEPA regulations encourage the preparation of combined documents that meet the requirements of NEPA, equivalent state requirements such as CEQA, and technical planning and decision-

making processes of an agency such as the Corps Planning process, as specified in 40 CFR 1506.2(c). The sections of this document that address are marked with an asterisk in section headings.

1.2 STUDY AUTHORITY AND RESPONSIBILITIES

1.2.1 Study Authority

The Prado Basin, California study was authorized by study resolution dated May 8, 1964 by the Committee on Public Works, U.S. House of Representatives as follows:

> "Resolved by the Committee on Public Works of the House of Representatives, United States, that the Board of Engineers for Rivers and Harbors is hereby requested to review the reports on (a) San Gabriel River and Tributaries, published as House Document No. 838, 76th Congress, 3d Session; and (b) Santa Ana River and Tributaries, published as House Document No. 135, 81st Congress, 1st Session; and (c) the project authorized by the Flood Control Act of 1936 for the protection of the metropolitan area of Orange County, with a view to determining the advisability of modification of the authorized projects in the interest of flood control and related purposes."

In addition, Section 401(a) of the Water Resources Development Act of 1986, which authorized the Santa Ana River Mainstem project for flood control, provides authority for inclusion of water conservation in this study:

> "If a non-Federal sponsor agrees to pay at least 50 percent of the cost of such investigation, the Secretary is authorized to investigate the feasibility of including water supply and conservation storage at Prado Dam."

The Corps previously conducted a Reconnaissance Study of the Santa Ana River Basin and Orange County Streams, California. Ecosystem restoration and water conservation for the Santa Ana River and Prado Basin were identified as Federal interests to be addressed under the authorities described above. The Corps has determined that the primary Federal interest for this project is to contribute to National Ecosystem Restoration (NER) through restoration of degraded ecosystem structure, function, and dynamic processes to a less degraded, more natural condition in Prado Basin and the Santa Ana River downstream of the dam. Federal interest in ecosystem restoration is based on resource significance as identified through technical, institutional, and public recognition. Federal interest in water conservation is based upon contributions to National Economic Development (NED), which are increases in the net value of the national output of goods and services, expressed in monetary units, and are the direct net benefits that accrue in the planning area and the rest of the Nation.

1.2.2 Lead Federal Agency and Non-Federal Sponsor *

The Corps is the federal Lead Agency for the project and NEPA and OCWD is the Lead Agency for CEQA. The Prado Basin Ecosystem Restoration and Water Conservation Integrated Feasibility Report presents the plan formulation undertaken to develop feasible alternatives and also assesses the potential environmental impacts associated with implementation of the proposed project alternatives (in accordance with the requirements of Code of Federal

Regulations (CFR) Title 40, part 1500 et seq. The IFR/EIS/EIR complies with the California Environmental Quality Act (CEQA, Public Resources Code 21000-21189) and the CEQA Guidelines (California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387) as administered by the Governor's Office of Planning and Research (OPR). For the Proposed Projects/Covered Activities the Conservation District is the Lead Agency for the preparation of this DEIS/SEIR in compliance with the requirements of CEQA.

The project would be implemented in cooperation with the OCWD, the non-federal sponsor (NFS). The original Feasibility Cost Sharing Agreement (FCSA) between the Government and the NFS was executed on March 26, 2012. The FCSA was amended on August 25, 2014 to include a provision for the NFS to contribute funds voluntarily for remaining costs to complete the study.

1.2.3 Cooperating Agencies and Jurisdictional Interest

No agencies accepted cooperating agency status under NEPA.. Other coordination and consultation with agencies that have jurisdictional interests in the study are identified in Sections 8.1 through 8.3 of the IFR. Environmental compliance considerations related to coordination and consultation are provided in Section 10 of the IFR. The Draft Coordination Act Report pursuant to the Fish and Wildlife Coordination Act will be provided as an appendix to the final report. The U.S. Fish and Wildlife Service has provided a planning assistance letter for coordination on the draft study report, included as Appendix C to this IFR. USFWS has responsibility over threatened and endangered species in the study area under the authority of Section 7 of the Endangered Species Act. The Regional Water Quality Control Board is a Federally sanctioned State Water Resources permitting agency under the authority of Section 401 of the Clean Water Act. Coordination with the State Historic Preservation Office (SHPO) is being conducted to comply with Section 106 of the National Historic Preservation Act.

1.3 WATERSHED AND STUDY AREA

1.3.1 Study Area

The Santa Ana River is the largest river watershed located entirely within Southern California. The most upstream tributaries in the watershed originate in the San Bernardino Mountains. The Santa Ana River flows through San Bernardino and Riverside Counties before bisecting the northern Santa Ana Mountains and Chino Hills through Santa Ana Canyon. It then flows southwest through urban Orange County to discharge into the Pacific Ocean. The Santa Ana River is 96 miles in length, and its drainage basin is 2,650 square miles in area.

The Santa Ana drainage basin has a diversity of terrain, ranging from high peaks of inland mountains in the north and east, to interior and semi-desert basins of the Inland Empire, to the low relief coastal plain of Orange County. Although it includes areas of alpine and highland forest, the majority of the watershed consists of arid desert and chaparral environments. A wide variety of animal and plant communities depend on the riparian zones and remnant wetlands along the Santa Ana River. Figure 1-1 illustrates the extent of the watershed, sub watersheds and major project locations.

1.3.2 Proposed Project Area

The proposed project area is located primarily within the extent of the Santa Ana River Mainstem Project (SARM), a regional flood risk reduction project that is currently being constructed by the Corps and the non-federal sponsors for that project (San Bernardino County Flood Control District, Riverside County Water Conservation and Flood Control District, and Orange County Flood Control District). It encompasses the Prado Basin (upstream of the dam to elevation 566 feet NGVD29) covering approximately 4500 acres of riparian habitat, and also extends throughout Reach 9 of the Santa Ana River for 7 miles downstream of Prado Dam (see Figure 1-2).

While this study considers impacts of potential project features within the entire study area, the proposed project area is a subset of the study area, as potential features and active management activities for the project would not extend beyond Reach 9 of the Santa Ana River in the downstream direction and would not extent above the 566 feet elevation contour in the upstream direction. The proposed project area within the overall study area was selected as the geographic extent of potential project features based on the following considerations:

- Technical uncertainties with respect to the long-term sediment transport processes that would have to be considered to quantify potential restoration and water conservation benefits downstream of Reach 9 of the Santa Ana River.
- Practicability and high costs of active sediment management and transportation of material further downstream of Reach 9.
- Potential conflicts with flood risk management operations in the lower part of the Santa Ana River watershed.
- Overlap and duplication of effort with existing commitments by other entities to restore habitats along the mainstem of the Santa Ana River upstream of the Prado Basin as part of agreements to provide mitigation for impacts of their projects in the Santa Ana River watershed. The 566 foot elevation contour was selected as the effective boundary between restoration efforts under this study and existing commitments for mitigation for other projects further upstream from Prado Basin

1.3.3 Description of Study Focal Areas

As a result of the plan formulation workshops held in December 2012, the project delivery team (PDT) along with key stakeholders and the Corps personnel identified target areas for restoration based on vegetation communities, physical and hydrologic conditions that could sustain restored habitats within the proposed project area. These include an area of approximately 200 acres at the north end of the study boundary along Chino Creek; an area of approximately 148 acres along Mill Creek to the west of the creek, adjacent and downstream from a City of Ontario wetlands project; and the entire Santa Ana River Mainstem (SARM) extending from approximately Hamner Road downstream through Reach 9. Due to the lack of a dependable water supply, Temescal Creek has been ruled out as a candidate project area for anything beyond non-native plant removal and associated native plantings. Focal areas are shown on Figure 1-3 Santa Ana River Downstream.

The Santa Ana River Downstream focal area includes the existing channel of the Santa Ana River from the Prado Dam downstream to the upstream limit of the engineered flood control channel of the Santa Ana River near the crossing of Yorba Linda Boulevard. Reach 9 of the Santa Ana River Mainstem Project (SARM) is the segment of the river immediately downstream of Prado Dam managed for flood damage reduction. The focal area includes the mainstem of the Santa Ana River through Reach 9, along with the associated floodplains within the boundaries of the bank stabilization features of SARM. The boundaries of this focal area were selected based on the presence of planning constraints posed by the downstream engineered flood control channel and the bank protection features of the SARM project.

1.3.3.1 Santa Ana River Upstream

The Santa Ana River Upstream focal area includes the existing channel of the Santa Ana River from the Hamner Avenue crossing. This represents the river reach upstream of Prado Dam where there are no physical barriers to ecological restoration or connectivity of the active river channel and the adjacent floodplain that provides riparian forest and associated habitats. These habitats rely on the river and floodplain for their character and ecological functions, primarily because of overbank flows in the floodplain and the river's contribution to the shallow water table in the alluvial aquifer. The portion of the Prado Basin that is within the drainage area of the Temescal Creek tributary to the southwest was included in this focal area, as it was determined that the infrequent ephemeral flows and highly drained soils of Temescal Creek provide more limited opportunities for restoration, other than through control of invasive species.

1.3.3.2 Chino Creek

The Chino Creek focal area was defined based on the restoration opportunities presented by the active channel of Chino Creek, which is perennial due to the upstream flow contributions that include discharge of treated wastewater from active municipal treatment plants. Open areas along Chino Creek provide restoration opportunities for the creek channel and adjacent riparian habitats from Pine Avenue downstream to Euclid Avenue. Restoration in this focal area would improve hydrologic and wildlife connectivity from Prado Regional Park to the downstream reach of Chino Creek that is influenced by operation of Prado Dam.

1.3.3.3 Mill Creek

The Mill Creek focal area extends along the minor valley of the Mill Creek tributary of Prado Basin from an area due west of the OCWD constructed wetlands to Chino Corona Road to the north. While Mill Creek is an ephemeral stream, the focal area provides opportunities for restoration of riparian habitat and provides connectivity to the existing habitat in the lower part of the basin south of this focal area.

1.3.4 Historic Conditions

The project is located in the southwestern Chino Valley, which is bounded on the west by the Puente Hills, on the south by the Chino Hills, on the north by the foothills of the San Gabriel Mountains (USGS 1981), and on the east by La Sierra and the Jurupa Mountains. Previous

geologic mapping indicates that the proposed project site is situated entirely upon late Holocene fan deposits (Scott 2014). These locally consist of poorly sorted sandy silt containing scattered pebbles and cobbles. The native biology of the region is difficult to reconstruct due to recent and historical agricultural, municipal, and industrial impacts. The project site is situated in the Upper Sonoran Life Zone. This zone typically comprises cismontane valleys and low mountain slopes dominated by mixed coastal sage scrub and chaparral vegetation communities (Williams 2008).

Historic-era California is generally divided into three periods: the Spanish or Mission Period (1769 to 1821), the Mexican or Rancho Period (1821 to 1848), and the American Period (1848 to present). The first European to pass through the area is thought to be a Spaniard called Father Francisco Garces Having become familiar with the area, Garces acted as a guide to Juan Bautista de Anza, who had been commissioned to lead a group across the desert from a Spanish outpost in Arizona to set up quarters at the Mission San Gabriel in 1771 near what today is Pasadena. In 1821, Mexico overthrew Spanish rule and the missions began to decline By 1833, the Mexican government passed the Secularization Act, and the missions, reorganized as parish churches, lost their vast land holdings, and released their neophytes. The American Period, 1848–Present, began with the Treaty of Guadalupe Hidalgo. In 1850, California was accepted into the Union of the United States primarily due to the population increase created by the Gold Rush of 1849. The cattle industry reached its greatest prosperity during the first years of the American Period. Mexican Period land grants had created large pastoral estates in California, and demand for beef during the Gold Rush led to a cattle boom that lasted from 1849–1855. However, beginning about 1855, the demand for beef began to decline due to imports of sheep from New Mexico and cattle from the Mississippi and Missouri Valleys. When the beef market collapsed, many California ranchers lost their ranchos through foreclosure. A series of disastrous floods in 1861–1862, followed by a significant drought diminished the economic impact of local ranching. This decline combined with ubiquitous agricultural and real estate developments of the late 19th century, set the stage for diversified economic pursuits that have continued to proliferate to this day.

Although historical reference to water resources issues in region date back to about 1769, little information is available regarding the magnitude of floods occurring prior to 1850. Historical references indicate that from 1769 to 1850 medium-to-large floods occurred in 1825, 1833, 1840, and 1850. Some available quantitative data indicates that, from 1850 to 1897, eight medium-to-large winter floods occurred. Recorded data from 1897 to the present indicate that fifteen medium-to-large winter floods occurred during this period. The latest medium to large flood events to impact the region occurred in 1980 and 1983. Large flood events in southern California have been caused by the global climate patterns associated with El Nino events and weather conditions that result in large scale streaming of atmospheric moisture from the Pacific Ocean north and eastward into Southern California known as “atmospheric rivers.”

In the largest known flood event to affect central and southern California, widespread rainfall persisted for several weeks in January 1862, and was preceded by weeks of heavy mountain snowfalls that began in November 1861. The relatively warm storm event and intense rainfall produced extensive flooding from Washington to southern California, with much of the Central Valley being inundated. Little information is available pertaining to the storms which led to the great flood of 1862. No rainfall amounts are available for the area in or near the Santa Ana River

Basin. Accounts of the time, however, tell of 18 straight days of rain, and a flood that brought great destruction and desolation, as described by settlers in the area.

The storm of February 27 - March 3, 1938, was one of the most severe general storms of record for southern California. The storm produced more runoff because of saturated soil conditions from rainfall over the month preceding the event. High precipitation rates over March 1 and 2 resulted in numerous peak discharges on the Santa Ana River. The storm of January 21-24, 1943, was the most severe rainfall event in southern California with measured precipitation totals. However, lower soil moisture preceding the January 1943 storm resulted in lower discharges and less extensive flooding than that produced by the storm of 1938.

With the increased flood protection afforded by the completion of Prado Dam in 1941, major industrial development expanded south from the Los Angeles Basin beginning in the 1940s. Extensive growth in housing development in the coastal plain area of Orange County began the 1950s and 1960s. Extensive areas of the coastal portion of the county changed land use from agricultural to urban. The population of the Santa Ana River basin increased dramatically. The construction of roads and buildings lead to an increase in urban runoff.

Large storms occurred in Orange County in January and February of 1969, and February and March of 1978. The storms and floods of February-March 1983 were the climax of a season of repeated moderate-to-heavy storms across southern California, resulting from the strongest El Nino phenomenon in many decades. Very heavy rains fell from Ventura County to San Bernardino and Riverside Counties and southward through Orange County.

Seven Oaks Dam, the upstream-most feature of SARM, was completed in 1999. This dam captures flood runoff from Santa Ana Canyon before it can enter the Inland Empire portion of the Santa Ana watershed. The dam was designed to withstand a 350-year flood. Currently, concrete or otherwise modified channels and levees provide flood risk management throughout much of the river's course below Seven Oaks Dam.

The El-Nino event of 2005 produced heavy storms and corresponding discharge that flooded the Corona Airport located within Prado Basin and led to airplanes being parked on nearby city streets. When large storms have been preceded by wet weather with insufficient time for soil moisture to decrease from saturated conditions, the events have produced proportionally larger stream discharges and extent of flooding in comparison to storms that were preceded by lower soil moisture content in the region.

In addition to the construction of Prado Dam and Seven Oaks Dam, additional measures have been implemented to address flood risks associated with the Santa Ana River. In the most downstream segment of the Santa Ana River, 20% of the SAR is a concrete channel, the majority being near the mouth of the river. Discharge from publicly owned treatment works (POTWs) have altered natural flow patterns, and now provides base flow in many parts of the Santa Ana River's drainage network that used to have base flow only on a seasonal basis in late fall, winter and early spring. This treated wastewater has altered the natural system by providing year-round river flow. As populations have increased and more impervious surfaces are present in the watershed, both urban runoff and wastewater flows have increased. Between 1970 and 2000, the

total average inflow at Prado Dam rose from less than 50,000 to over 146,000 acre-feet per year (AFY). Base flow is expected to rise to 370,000 AFY by 2025, a projected increase of 153 percent since 1990 (SAWPA, 2013).

Increasing development over the last half of the 20th century have also greatly reduced the presence of natural habitats associated with the Santa Ana River and its associated floodplains, including riparian forest, floodplain marsh and wetlands, and undisturbed channel habitats. Development activities have directly displaced some habitats, while altered flow conditions caused by the presence of dams, bank protection structures, and changes in flow conditions based on increased wastewater discharges and increased in impervious surfaces have all contributed to loss of habitat and degraded habitat functions in the project area.

1.4 RELATED STUDIES AND REPORTS

1.4.1 U.S. Army Corps of Engineers Reports

The Project Area has been studied for years by several entities, including the Corps and OCWD. The Santa Ana Watershed Association (SAWA) and OCWD conduct annual biological surveys throughout much of Prado Basin and the larger watershed, partially funded by the Corps. These survey reports are not listed here but were used to help define existing conditions and potential effects of the proposed action. Other relevant past studies conducted by the Corps are listed below. This list is not comprehensive.

- Phase II General Design Memorandum on the Santa Ana River Mainstem including Santiago Creek. Main Report, Supplemental Environmental Impact Statement, and Appendices. August 1988.
- Prado Basin and Vicinity, Including Reach 9 and Stabilization of the Bluff Toe at Norco Bluffs, Supplemental Environmental Impact Statement/Environmental Impact Report, and Appendices. November 2001.
- Santa Ana River: Reach 9 Phase II Green River Golf Club Embankment Project, Riverside and Orange Counties. Final Supplemental Environmental Assessment and Addendum to EIR 583. September 2009.
- Santa Ana River Flood Control Project, Reach 9, Phase 2A Embankment. Final Supplemental Environmental Assessment and Addendum to Environmental Impact Report 583. March 2011.
- Final Environmental Impact Report/Assessment Five Year (2019 to 2023) Deviation to the Prado Dam Water Control Plan and Sediment Management Demonstration Project. August 2018.

1.4.2 Individual, Local, and Agency Reports

To provide water supply to constituent distribution systems in Orange County, OCWD has conducted a number of studies and project evaluations to make use of water conservation opportunities in the study area. The reports are listed below.

- Prado Basin Sediment Management Demonstration Project Biological Resources Technical Report. December 2010.

- Prado Basin Sediment Management Demonstration Project 60% Engineering Analysis Draft. January 2013.
- Deviation from The Prado Dam Water Control Plan Through March 10, 2016 Prado Dam & Reservoir, Riverside County, CA January 2016
- Minor and Major Deviations from The Water Control Plan Through March 10, 2017 for Prado Dam & Reservoir, Riverside County, December 2016
- Interim Minor Deviation from the Water Control Plant for the Period December 2015 – February 2016 for Prado Dam & Reservoir, Riverside County, December 2015
- Water Conservation Environmental Impact Report/Environmental Assessment. Planned Deviation 2003 from Prado Dam Interim Water Control Plan

1.4.3 Concurrent Studies and Ongoing Data Collection

Concurrent with this study, ongoing related study efforts will provide information relevant to this project. Data from these efforts is intended to be available to support refinement of engineering designs, operating and maintenance requirements, and adaptive management strategies for implementing the project and ensuring effective outcomes include:

- Prado Basin Sediment Management Demonstration Project Study, OCWD. This study is an ongoing effort to collect data on performance of smaller scale sediment management measures. This study will be completed when sufficient wet weather events have been observed to meet study objectives
- Sediment Transport, Stream Geomorphology and Habitat Suitability Study for Santa Ana River Mainstem between Seven Oaks Dam and Prado Dam, U.S. Army Corps of Engineers. This is an ongoing study to evaluate existing conditions for sediment accumulation that may impact Santa Ana Sucker habitat.
- Prado Basin Water Control Plan Major Deviation Monitoring. As part of the major deviation from the existing water control plan for water conservation, OCWD will monitor sediment accumulation changes within Prado Basin to ensure there are not unacceptable impacts to riparian habitat, and to provide a basis for any mitigation that would be required.

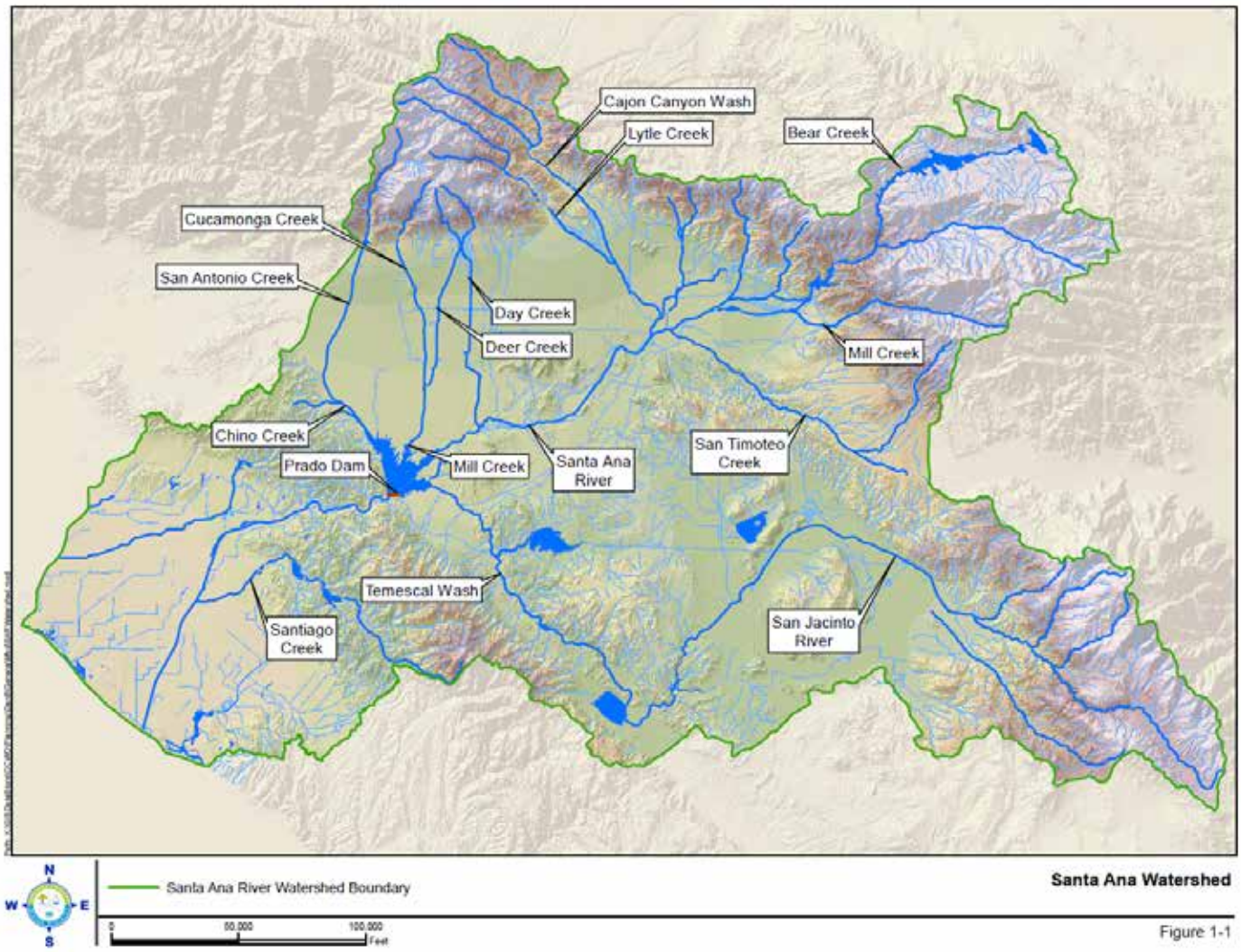

Figure 1-1: Santa Ana Watershed

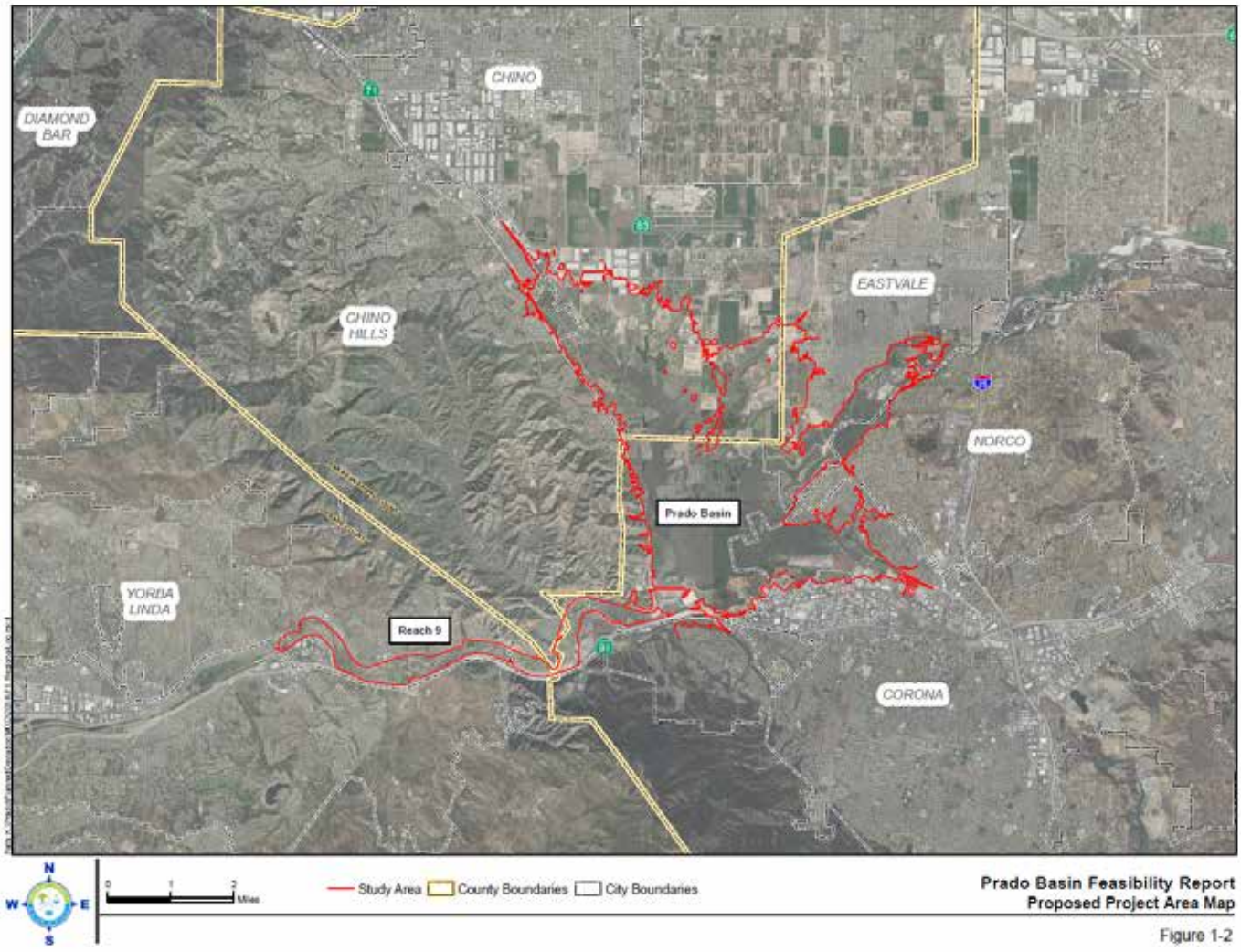

Figure 1-2: Proposed Project Area Map

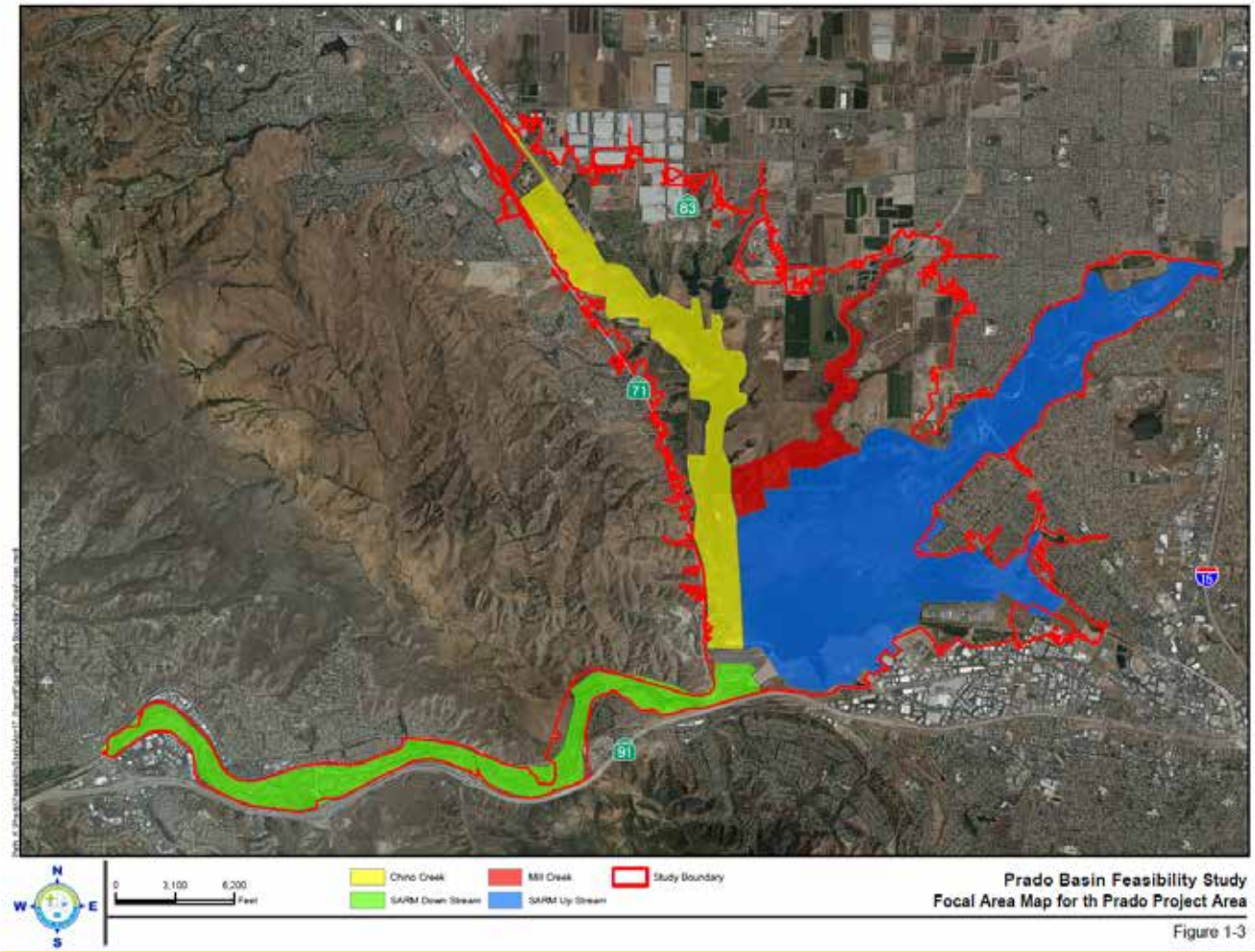

Figure 1-3: Focal Area Map for the Prado Project Area

2.0 STUDY OBJECTIVES AND PLANNING CONSIDERATIONS

2.1 PROBLEMS AND OPPORTUNITIES

This study addresses ecosystem restoration and water conservation in/around the Prado Basin and the Santa Ana River downstream of Prado Dam. For a multi-purpose study, problems and opportunities are identified for each of the major purposes, informing the development of study objectives. Problems and opportunities related to ecosystem restoration and water conservation for the study are presented in the following sections. For each problem, there is a corresponding opportunity.

Ecosystem Problems:

- Loss and/or degradation of aquatic, riparian woodland and floodplain habitats through alteration of the hydrology of the Santa Ana River and tributaries in the upper and mid Santa Ana River basin caused by construction of Prado Dam for flood control in the 1940s. Prado Dam has changed the hydrology of the Santa Ana River by decreasing peak flows associated with storm events and disrupting the hydraulic gradient of the drainage system. As a result, the river does not maintain geomorphologic equilibrium between the river channel and floodplain. The ecological effects caused by the dam and related flood control operations include:
  a. Sediment accumulation where streams flow into the basin, resulting in localized sediment deposition that covers existing habitat features.
  b. Decreased the transport of coarse grained sediments needed to maintain habitat features such as runs, riffles, pools, gravel bars, vegetated banks and sand bars.
  c. Deposition of sediment in the Prado Basin results in discharge from the dam with available capacity to transport sediment, resulting in erosion downstream of the dam. This causes down-cutting of the channel into the floodplain, which leads to hydraulic and physical separation of the channel from the adjacent riparian zone and floodplain wetlands. The incised channel decreases inundation of floodplain and lowers the water table in the alluvial aquifer. These processes decrease available water for wetlands and riparian habitats.
- Development, agricultural practices and other land use changes have altered water-related environments of the study area by increasing the intensity and decreasing the duration of runoff from storm events. Soil disturbance related to these practices also has increased the concentration of fine-grained, suspended sediment and nutrients in runoff that affect aquatic habitats of the Santa Ana River and tributaries. Development and associated flood control and infrastructure have also narrowed the floodplain and blocked historic wildlife movement corridors.
- Invasive species have displaced and damaged edge, riparian and aquatic habitats that have declined in the study area. Rooting and trampling by feral pigs degrades streambanks and riparian vegetation within the Prado Basin and Santa Ana River upstream of the Prado Dam. The reduction in streamside vegetation impacts the local quality and quantity of riparian vegetation available for riparian obligate species, including the least Bell's vireo, southwestern willow flycatcher, and western yellow-billed cuckoo. Cowbirds have parasitically nested in least Bell's vireo nests of migratory and resident native songbirds, eliminating the habitat function to provide nesting that

supports native species' reproduction and causes population declines. Arundo donax and other invasive plant species have displaced native riparian vegetation that provides habitat for riparian dependent wildlife, acts as a physical barrier to wildlife in the riparian zone due to its dense growth patterns, and alters hydrology of the floodplain by excessive water consumption through root uptake and transpiration. Invasive aquatic species such as crawdads and smallmouth bass displace and predate on Santa Ana sucker (SAS) in its existing habitat in river pools and runs.

Ecosystem Opportunities:

- Address degraded habitat to provide shelter, feeding and procreation of threatened and endangered species, including the least Bell's vireo, southwestern willow flycatcher, western yellow-billed cuckoo and coastal California gnatcatcher.
  a. Restore and manage edge/early successional habitat and other native riparian/floodplain habitat types.
- Restore hydrologic and hydraulic character of the Santa Ana River within Prado Basin and downstream of the dam through:
  a. Restoration of the river gradient;
  b. Improvement of sediment transport and management of sediment;
  c. Restoration of the character and extent of Santa Ana sucker (SAS) habitats that have been isolated by altered stream conditions; and
  d. Widening/restoration of floodplains to improve connection with channels and support for riparian vegetation and floodplain habitats;
- Restore conditions to support native aquatic and terrestrial species and wildlife movement.
- Restore stream banks to remove physical separation between channels, banks and riparian zones
- Reduce unauthorized dumping and associated impacts on habitats
- Reduce illegal off-road vehicle use that causes soil erosion and contributes fine-grained sediment to the stream channels

Water Conservation Problems:

- Decreasing availability of imported water and increasing cost of municipal and industrial water supply sources to meet demand in the study area.
  a. Sediment deposition in Prado Basin decreases water conservation storage capacity.
  b. Long-term drought and climate patterns are reducing the availability of water from imported sources, such as the California State Water Project and the Colorado River Aqueduct. Imported water sources are also at risk of being interrupted by catastrophic events such as earthquakes and or failure of long-distance conveyances such as canals or aqueducts.
  c. Imported water is expensive and may not be sustainable in the long-term, and is relied on only the extent necessary to meet demand that exceeds lower cost sources, including groundwater.

Water Conservation Opportunities:

- Increase water conservation in the project area
  a. Increase recharge of the alluvial aquifer of Santa Ana River downstream of the basin

b. Restore percolation rate through stream bed(s), reducing infiltration of fine-grained silt and clay into the stream bed
c. Increase overall cost-effectiveness of water supplies for the region as measured by costs of water supplied to the OCWD
d. Reduce demand for imported water sources by increasing local, sustainable supplies
    1. Reduce risk to water availability associated with catastrophic events such as earthquakes and/or levee failures that disrupt water supplies from other regions
    2. Reduce energy required for long-distance transport of water from imported sources
    3. Reduce impacts of regional water transfers from other river systems for use in distribution systems in the study area

2.2 PURPOSE AND NEED

As described in the problem statements above and the discussion of significance for the project in Section 2.4, the project area contains the largest riparian forest in southern California, and it contains critical habitats for threatened and endangered species. The project area is also contiguous with public lands of Chino Hills State Park and the Cleveland National Forest that extend the range of natural areas and provide wildlife connectivity to the project area. Planning goals for the study include restoration of aquatic and water-related habitats for native species, including threatened and endangered species with habitat in the study area that would make use of the restoration opportunities provided by Prado Basin, the Santa Ana River and its tributaries. There is a need to restore habitats and connectivity for wildlife in the project area. These aquatic and riparian habitats of the Santa Ana River and tributaries support aquatic species that depend on the flow and geomorphology of the largest flowing river in southern California, and thousands of acres of riparian forest that have been impacted by flood risk management activities, propagation of invasive plants and animals, and alteration of watershed hydrology through land development and agricultural practices. In addition, long-term growth and drought have stressed water supplies for the region, increasing demand for imported water has increased energy use for water transfers, and raises reliability concerns for water supplies from distant sources.

The project purpose is stated in the form of planning objectives. The planning objectives developed for this study state the intended purpose of the planning process, identify what the USACE and OCWD partnership wants to achieve with the alternatives and accomplish with a plan, while avoiding violating the constraints stated below.

The planning objectives for ecosystem restoration are:

- Improve hydraulic and fluvial geomorphic functions to promote habitat growth and wildlife connectivity to regionally significant core habitats at Prado Basin and associated main watercourses within the project area.
- Restore riparian and riparian associated habitats suitable to native species within the project area
- Reduce presence and effects of non-native wildlife on habitat suitability and function for native wildlife species.

The planning objective for water conservation is to:

- Determine the feasibility of re-operating the Prado Reservoir to provide additional water conservation storage. Conserved water would be used by OCWD and its member agencies.

2.3 CONSTRAINTS

During the plan formulation workshops and value engineering exercises conducted between 2012 and 2014, planning constraints were identified for the water conservation and ecosystem restoration purposes of the project. Planning constraints are potential changes in conditions of the study area or potential outcomes of the project that must be avoided. Constraints are outcomes or conditions that are unacceptable for any reason, practical, legal, policy or acceptability to the public. Measures or plans that violate constraints are either modified to avoid the constraint or eliminated from further consideration. The planning constraints for the Prado Basin study include:

- Measures cannot increase flood risk. Requirements for flood operations at Prado and Seven Oaks Dams are also planning constraints that cannot be violated. The recommended plan cannot increase the risk of failure or inadequate operation of the dam or increase flood risks downstream of the dam.
- Sediment in Prado Basin cannot be excavated below an elevation of 470', which is the elevation of the outlet invert. Excavation below that depth would result in unacceptable impacts to stability and safe operation of the dam and use of the basin for impoundment of water for flood risk management.
- The current Dam Safety Action Class (DSAC) rating of 3 does not allow for permanent changes in operation of Prado Dam until the DSAC is raised to a minimum of 4. Permanent changes in dam operations could only be implemented after the DSAC rating has been increased or if a waiver of this requirement is granted by the Corps Risk Management Center.
- Removal or relocation of existing major transportation and utility infrastructure (including bank protection features, Burlington, Northern and Santa Fe (BNSF) railroad, State Route (SR) -91, SR-71 and a regional brine transfer pipeline) must be avoided.
- Existing mitigation features cannot be disrupted or displaced by project features without replacing or providing alternate suitable mitigation benefits.

2.4 BASIS OF RESOURCES SIGNIFICANCE CRITERIA

2.4.1 Technical Recognition

Several criteria for evaluating technical significance are reviewed in this section including: habitat scarcity, biodiversity, status and trends, special status species, hydrologic and geomorphic character, connectivity, and limiting habitat.

Habitat Scarcity – The Prado Basin is home to the largest riparian forest in southern California. The portion of the project area location downstream of Prado Dam in the Santa Ana Canyon, referred to by the USACE as Reach 9, has approximately 8 linear miles of western cottonwood-willow forest within its floodplain. However, while a significant amount of riparian habitat

remains, much more has been lost over the last century where Prado Basin and Reach 9 are mostly isolated islands of habitat in the midst of heavily developed areas. Also, what remains has been substantially degraded due to invasive species and interruption of a natural sediment transport regime. This habitat type has been identified as one of the rarest forest types in North America (Krueper 1995), and one of the most endangered ecosystems in the United States (Noss and Peters 1995).

Biodiversity – The project area is situated within the California Floristic Province which is considered a biodiversity hotspot (Stein et al 2000) or one of the world's 25 most biologically rich and threatened terrestrial ecoregions (Myers et al. 1999). The 25 hotspots only account for approximately 1.5 percent of the earth's land surface, but they account for on the order of 60 percent or more of the remaining diversity of life on the planet (Myers et al 1999). The scarce riparian habitats of the arid southwestern United States are crucial for species persistence due to the high temperatures and dry conditions that occur beyond the riparian ecosystem (Levick 2008). Approximately 80 percent of all wildlife utilize the riparian ecosystem at some life stage, with more than 50 percent of bird species nesting primarily in riparian habitats (Krueper 1993). The riparian corridors and core habitats are an essential component of ensuring the aquatic and riparian-upland transitional habitats function as a holistic ecosystem. Over 393 species of vascular plants, 7 species of amphibians, 13 species of reptiles, 23 mammalian species and over 308 bird species have been identified within the Prado Basin and Reach 9. Over 126 of these avian species breed in the project area. The Prado Basin is also home to one of the top two populations of the endangered least Bell's vireo anywhere.

Status and Trends – Less than 10 percent of the surface area that was once wetlands remains in California. The rest of the country has experienced loss of approximately 50 percent of wetland acreage (Dahl 1990). This severe loss of up to 90 percent of the wetlands acreage is coupled with the loss of over 90 percent of riparian habitat in the region (Faber et al 1989) (Dahl 1990). The current extent of riparian communities in the coastal plain of southern California are a remnant of what was once a vast, interconnected system of rivers, streams, marshes, and vegetated washes (Krueper 1995). This trend is apparent within the project area. These factors have and continue to limit the amount, type, and quality of habitat that remain. The area occupied by riparian communities downstream of Prado Dam is expected to decrease as the river incises, which drives the groundwater table deeper, leaving roots perched and decreases the permeability in the landscape for wildlife to move across the floodplain. Aggradation upstream has flattened the river gradient which has led to the simplification of the aquatic habitat and the covering of cobbles and other larger sediment grain sizes by a lens of sands and other finer sediment grain sizes. This homogenization of aquatic habitat has led to a homogenization of freshwater biota, which is a threat to overall biodiversity in altered systems like the Santa Ana River (Ball et al. 2013).

Hydrologic and Geomorphic Character – Developments and associated roadway and flood risk management features that have been, and continue to be constructed, have limited the ability of the Santa Ana River and its tributaries to migrate across the floodplain as it once did. Surface flows are also becoming scarcer, especially within tributaries, as more emphasis is put on water recycling and groundwater recharge in drought prone southern California.

The construction of the Prado Dam in 1941 presented major changes to the hydrology and geomorphology of the Santa Ana River. The seasonally impounded water has led to the largest riparian forest in southern California. It has also contributed to changes in the sediment transport regime that have led to aggradation upstream of the dam and incision downstream of the dam that have influenced the type, quality, and amount of natural habitat observed today.

Connectivity – River channels in arid regions provide wildlife movement corridors that are essential to species survival due to the continuous ribbons of vegetation and nearby water that wildlife use for cover and food that may be more limited in drier upland habitats (Levick et al 2008). Culverts spanning State Route 91 and 71 also provide important movement routes for wildlife moving in and out of the project area from core habitats in the Cleveland National Forest, Chino Hills State Park, and the Prado Basin, itself. Strategically placed fencing funnels wildlife to these culverts and keeps them from attempting at-grade crossings of these highways. Euclid Avenue, a heavily trafficked road that crosses Chino Creek within the project area does not have adequate fencing or options for safe passage resulting in frequent mortality for wildlife that attempt at-grade crossings. Pine Avenue, which is projected to connect to State Route 71, will provide the same issues for connectivity as Euclid unless improvements are made.

The homogenization of the aquatic habitat both up and downstream of Prado Dam, as well as the dam itself, have created discontinuities for native aquatic fauna, including the Santa Ana sucker. Also, channel incision and resulting reduction in native habitats within the floodplain have further limited opportunities for wildlife to safely and successfully move linearly along the river and tributary corridors. Improvements to the sediment transport regime would help connect populations of native aquatic species that are currently isolated due to habitat inadequacies.

The project area is also an important stop over for some, and seasonal destination for other bird species migrating along the Pacific Flyway. As was noted previously, over 300 bird species have been documented within the project area and over 125 of those are known to breed in it.

Limiting Habitat – Non-native plant and animal species, severe droughts, and development are a few of the stressors that limit the quantity and quality of habitat within the project area. For example, giant reed (Arundo donax) forms dense, monotypic stands that crowd out native riparian habitat that has little habitat value for native wildlife, makes the riparian area more susceptible to fire, and utilizes tremendous amounts of water. This non-native plant and several others that behave similarly present serious threats to the amount and quality of remaining riparian and aquatic habitats and ecosystem function.

Several non-native wildlife species also limit the functionality of habitats within the basin. These include: feral pigs, which root up and trample stream banks, making them susceptible to erosion and invasion from non-native plant species like giant reed; brown-headed cowbird, a notorious brood parasite; and a host of large non-native predatory fish and crayfish that consume native fauna associated with aquatic environments, including federally listed species like the Santa Ana sucker.

2.4.2 Institutional Recognition

Five species occur within the project area that have the designation of endangered or threatened under the Federal Endangered Species Act. These species are the Santa Ana sucker, the southwestern willow flycatcher, least Bell's vireo, yellow-billed cuckoo, and the coastal California gnatcatcher. Each of these species has designated or proposed critical habitat that also occurs within the project area. Several species covered by the Western Riverside County Multiple Species Conservation Plan (WRCMSHCP), a plan under Section 10 of the FESA, also occur within the project area. Several high priority wildlife corridors designated by the WRCMSHCP also connect to the project area. Cleveland National Forest, which is located adjacent to the project area's southern border in Reach 9 has a Land Management Plan, which guides management of plant and wildlife resources. Several of the species managed by this plan spend time in the national forest and the project area. The Chino Hills State Parks is actively restoring a wildlife corridor at Coal Canyon, within Reach 9. The State Park manages lands immediately north of Reach 9 and west of the Prado Basin. Regional land use plans for communities in Orange, Riverside and San Bernardino Counties also have placed priorities on preservation of open space, wildlife habitat and ecosystem services in their jurisdictions. One of the SARM non-federal sponsors, Orange County Flood Control District, has completed a Habitat Management Plan for Reach 9 in compliance with SARM mitigation commitments that requires consideration of wildlife values for any activities conducted in this area.

2.4.3 Public Recognition

The geographic setting of the project area makes it visible and accessible and therefore of interest to the public. It is situated roughly at the intersection of two heavily traversed highways, State Routes 91 and 71, in the heavily populated Inland Empire. The riparian forests are visible from the highways and are used for various forms of recreation, study, and aesthetic comfort by thousands on a regular basis. Several grass roots support groups are interested in the well-being of the natural resources within the project area. Groups that strive to defend and maintain and improve the beauty and function of the Prado Basin and Santa Ana Canyon include: Santa Ana Watershed Association, Friends of the Santa Ana River Trail, Endangered Habitats League, Inland Empire Waterkeepers, and Center for Biological Diversity. Audubon California has identified the majority of project area located upstream of Prado Dam as a globally important bird area and significant portion of the area downstream of the dam as a state important bird area.

A number of communities located within the Santa Ana River Watershed have developed plans to preserve open space to provide recreational opportunities and to preserve habitats and wildlife connectivity in the region. The State of California purchased 1,400 acres of land adjacent to the study area at Coal Canyon to provide an additional wildlife corridor between Cleveland National Forest and Chino Hills State Park. The city of Anaheim General Plan update recognizes this corridor and the Santa Ana River as significant biological resources within the city.

2.5 PUBLIC SCOPING COMMENTS AND RESOURCES OF CONCERN

A NEPA scoping meeting was held at the Inland Empire Utilities Agency (IEUA) office in Chino on November 28, 2012. Presentations were given at afternoon and evening sessions to

encourage public participation in the scoping process. This NEPA scoping meeting was advertised in the Federal Register on November 16, 2012 (Fed. Reg. 77[222]). Representatives from a variety of Federal, State, and local agencies also participated, including the U.S. Fish and Wildlife Service (USFWS), the Regional Water Quality Control Board (RWQCB), California Department of Fish and Wildlife (CDFW), Santa Ana Watershed Association (SAWA), and the City of Ontario. Interested parties present at the scoping meeting presented comments, concerns and ideas for the study. Additional comments were later received from members of the public who were not able to make the meeting. Future opportunities to engage the public in the planning process will occur when the Draft EIS/ EIR is circulated for public review, at a public hearing that will be scheduled during this time, and when the Final EIS/EIR is circulated for "Final State and Agency" (public) review.

Comments, concerns and ideas from the public provided to date have covered a wide range of interests. Topics ranged from land ownership and land use, to whether or not the dual purposes of the project were mutually exclusive, to restoration ideas for specific species and habitat in general. In particular, commenters noted that the restoration plan should include habitat restoration and connectivity with surrounding lands beyond the project area. One commenter also noted that there was historical evidence of steelhead in the Santa Ana River and possible existing populations in isolated areas of the upper watershed, and that re-establishing habitat and connectivity for this species should be considered in the objectives for this study. The California Department of Fish and Game (now CA Fish and Wildlife) suggested that natural sediment deposition rates be quantified to determine restoration objectives for sediment transport and deposition. Local government officials were also concerned about the impact of restoration activities on existing and planned recreational land uses within Prado Basin. The U.S. Fish and Wildlife Service expressed an interest in additional restoration opportunities for habitats further upstream beyond the limits of the study area.

3.0 PLAN FORMULATION

Based on the study objectives and the identified water resource problems and opportunities discussed in Chapter 2, the Corps Project Delivery Team (PDT) developed preliminary measures that were screened for their suitability to meet study purposes for ecosystem restoration and water conservation. Initial screening of measures was based on planning constraints, past performance of similar actions for other projects, compatibility of measures with known or expected site conditions in the study area, and best professional judgment of PDT members on study objectives and expected measure performance. For both study purposes, the preliminary measures retained from the screening process were then developed in more detail to support evaluation of costs and outputs. The following sections describe the management measures identified and screened for plan formulation, along with the processes used to combine measures into alternative plans for evaluation of impacts and outputs for each project purpose.

3.1 PLAN FORMULATION FOR ECOSYSTEM RESTORATION

Once the project objectives were identified, along with problems, opportunities, planning constraints and considerations, the PDT developed a comprehensive set of management measures for ecosystem restoration. Management measures are features or activities that can be implemented at a specific location to address one or more planning objectives. Management measures are the building blocks of alternative plans and are categorized as structural and nonstructural. Nonstructural measures may be activity-based, such as removal of invasive plants, while structural management measures require construction, such as channel diversions or groins constructed to provide aquatic habitat.

3.1.1 Initial Measures Development and Screening

Initial plan formulation for ecosystem restoration was accomplished through Feasibility Kick-Off Workshops, PDT meetings and follow-on efforts by the Lead Planner and key PDT members in December 2012 and January 2013. Workshops included participation of the PDT, representatives of the Corps' Ecosystem Restoration and Water Conservation Planning Centers of Expertise (PCX) , the non-Federal sponsor (OCWD), U.S. Fish and Wildlife Service, California Department of Fish and Wildlife (formerly Fish and Game), the City of Ontario, the Regional Water Quality Control Board, the Santa Ana Watershed Authority and the Riverside-Corona Resource Conservation District.

The measures were initially evaluated for their relative effectiveness in meeting the project purposes and objectives. The team listed out all potential measures by purpose and then qualitatively assessed the expected performance of the measures for meeting the objectives for ecosystem restoration.

3.1.2 Refinement of Management Measures and Measures Eliminated from Further Consideration

After the completion of the qualitative evaluation of the conceptual measures, the PDT held meetings to collaboratively identify measures that had a low probability of providing benefits in

a cost-effective manner, and to identify preliminary measures that violated planning constraints or that would otherwise be unsuitable for implementation. To define the set of measures to be carried forward for formulation of alternatives, the PDT screened out measures from further consideration based on the following concerns:

- Technical infeasibility, such as violation of study constraints or experience from past restoration and water conservation efforts that demonstrated certain measures would not provide intended benefits.
- Professional judgment from plan formulation workshop experts that proposed measures had undesirable costs or impacts compared to other measures that would provide the same or similar benefits.

The potential measures that were excluded from further consideration are presented in Table 3-1, along with the rationale for their dismissal. Preliminary measures carried forward for inclusion in the plan formulation process are presented in Table 3-2.

After the Alternatives Milestone was completed, preliminary designs for the sediment management system were optimized for cost-effectiveness and potential impacts of transporting excess sediment from the project area for placement. The PDT determined that each of these system components ─ the sediment trap, downstream transport for reintroduction, and excess sediment storage/placement ─ are interdependent. The upstream sediment removal requires both downstream re-introduction and an area for placement of excess material are required to operate as a system in order for sediment management to be financially viable and to provide upstream and downstream benefits.

Table 3-1: Basis for Dismissal of Ecosystem Restoration Measures

Measure Description	Prospective Function of Measure	Basis for Exclusion of Measure from Consideration
Fish by-pass/ladder at Prado Dam	Provides for fish passage to connect upstream and downstream habitat reaches.	Insufficient space to accommodate structure in project area (technical, logistical feasibility)
Engineered log jams and beaver dam analogs	Creates aquatic habitat by providing varied flow conditions.	Potential for sediment and plant matter accumulation from large storm events, would impede movement of native fish species, features do not form naturally in the regional setting. (inconsistent with purpose and objectives)
Re-introduction of native fish species	Re-establish native fish populations where low numbers or absence of fish are noted in formerly occupied habitat.	Habitat conditions in streams where native species have been extirpated are not currently suitable to support re-introduced native species. Past re-introduction efforts have failed. (ineffective at addressing purpose/objectives)
Invert stabilizers placed in stream channels	Reduce channel incision and related isolation of channel habitats from floodplain habitats.	These structures would restrict mobility of native species, in conflict with project objectives. .
Larger scale sediment traps (upstream Santa Ana River)	Provide greater capacity to divert sediment from induced deposition upstream of dam.	Excessive in construction costs and would have extensive impacts to existing habitats during construction.
Habitat management at golf course (Chino Creek)	Re-establish native vegetation communities for riparian habitat structure and function.	Low probability of restoration benefits – not responsive to objectives, real estate acquisition requirements, recreation impacts.
Channel Bank Stabilization – all focal areas.	Reduce channel bank erosion and channel incision.	Inconsistent with objectives to provide habitat functions of natural processes. Reduced lateral channel migration would impede connectivity and disrupt hydrologic conditions of riparian and floodplain habitats.
Removal of Prado Dam to restore sediment transport.	Restore equilibrium to hydraulic gradient and sediment transport.	Violation of constraints, negative effect to flood risk management
Sediment re-entrainment through dam outlet structure.	Provide for sediment passage through the dam outlet structure to restore sediment transport and geomorphic equilibrium	Violation of constraints, increases flood risks and poses hazards to dam safety that threaten loss of life and public safety.

Measure Description	Prospective Function of Measure	Basis for Exclusion of Measure from Consideration
Wildlife connectivity measure at Chino Creek to allow safe passage of terrestrial species at Pine Avenue.	Provide dedicated pathway for wildlife to transit under the Pine Avenue Bridge without crossing traffic lanes.	Wildlife connectivity will be addressed during approval process for new Pine Avenue Extension roadway project. That project will eliminate the need for this measure as a part of the proposed project.
Sediment transport and re-introduction downstream of Prado Dam via conveyer belt system.	Consider conveyor transport to move sediment from upstream removal/storage locations to re-entrainment location downstream of the dam.	Preliminary analyses indicated this would be significantly more expensive and have more noise impacts than slurry pipeline transport.
Floodplain widening at Chino Creek by bank excavation along west side of channel.	Restore Chino Creek channel and riparian habitat by addressing channel incision.	Construction impacts would offset potential benefits and costs would result in poor cost-effectiveness.
Diversion of Chino Creek from existing channel onto floodplain without grade adjustment.	Provide for natural course of Chino Creek to re-establish channel and riparian habitats.	Diversion would fail and flow would return to existing channel course without grade adjustment. (Eliminated during CEICA process.) (technical feasibility)

Table 3-2: Basis for Ecosystem Restoration Measures Carried Forward for Plan Formulation

Measure Description	Prospective Function of Measure	Basis for Measures Carried Forward in Plan Formulation
Sediment Management System	Sediment removal from areas where deposition has covered habitat, and placement of sediment in incised channels. Sediment removal from upstream of Prado Dam restores the hydraulic gradient, stream geomorphology and stream dynamics.	Provides restoration benefits due to hydrologic and geomorphologic changes to channel and floodplain habitats upstream and downstream of the dam.

Measure Description	Prospective Function of Measure	Basis for Measures Carried Forward in Plan Formulation
In-stream habitat features	Provides localized increases in stream velocity and current patterns that provide substrate, dissolved oxygen and current conditions for native aquatic species.	Acceptable alteration of streambed morphology to restore hydrology and geomorphology similar to pre-development conditions.
Invasive plant removal	Eliminates invasive plants that displace native vegetation communities and provides for native plant succession.	Supports refuge, feeding and nesting for native species. Reduces soil moisture demand and hydrologic alteration caused by Arundo.
Planting of native vegetation	Accelerates plant community succession for habitat structure and function.	Provides vegetation community compatible with refuge, feeding and nesting requirements. Provides resilience against return of invasive plants.
Invasive aquatic species removal.	Allows native species to use aquatic habitat for refuge and reproduction.	Reverses habitat alteration by invasive populations to return to conditions that support native species.
Diversion of tributary channels	Addresses channel incision and altered stream gradients induced by land use changes and drainage alternation.	Restores hydrologic conditions and geomorphology to support aquatic habitat form and function.
Measures that provide for wildlife movement around physical barriers in the built environment	Re-establishes connectivity of habitats and increases habitat value for refuge, foraging and other functions.	Reduces mortality of wildlife due to allow native species to support habitat function and complexity.

3.1.3 Siting of Management Measures

After the Alternatives milestone, the measures for ecosystem restoration were refined for combination into alternatives. The design alternatives were developed to a sufficient level of detail to ensure technical feasibility, establish boundary footprints for grading, designate riparian habitat planting areas, determine avoidance requirements for existing and proposed infrastructure, and to provide a basis for detailed cost estimates. For the development of the array of alternatives, each of the measures that had been developed were evaluated for their applicability to each focal area (see Figure 3-1) and inherent aspects that determined or constrained the applicability and siting of measures. The following considerations were used to determine the possible locations for each type of measure:

- Invasive vegetation measures were generally considered applicable at all focal areas with riparian habitats that are affected by invasive plants, particularly *A. Donax*. Based on existing conditions inventories of the focal areas, invasive plant measures are suited to riparian/floodplain habitats in all focal areas.
- Native plantings (with or without invasive vegetation removal) were determined to be applicable in all riparian/floodplain portions of focal areas where open areas grass-dominated vegetation are present. All upstream focal areas were determined to have sufficient open areas that would benefit from native plantings.
- Channel modification/diversion features to address altered channel geomorphology, particularly incised channels. Chino Creek was identified as the applicable focal area for this measure, and several variations of this measure were considered in the development of the initial array of plans. Mill Creek was determined to have extensive periods of dry channel conditions with limited ephemeral flows that would not provide benefits through channel alteration. The Santa Ana River upstream of Prado Dam has sufficient stream power under high flow conditions that extensive structures would be required to divert the channel within the existing floodplain, and any measure would be prohibitively expensive and would have a high probability of unacceptable construction impacts.
- Measures for invasive fauna control were identified as being feasible in all focal areas, and existing conditions identify feral pig and cowbird populations that could be controlled to provide habitat benefits in all upstream focal areas.
- Non-natives aquatic management addressed habitat displacement and disruption caused by introduced aquatic fauna, such as frogs, bass, turtles and crawdads, and is applicable in permanent stream channel environments of the Santa Ana River upstream and downstream of the dam.
- Sediment management through construction and operation of a sediment trap to accumulate sediment flows in a manner to increase the stream gradient upstream of the trap, and that provides a source of material for re-entrainment to sediment-deprived flows downstream of the dam, are inherently dependent on the sediment transport processes of the Santa Ana River mainstem upstream and downstream of the dam.
- Riparian edge management provides restored transitional habitat and supports wildlife mobility. This measure takes advantage of the open water habitat provided by the sediment trap, and is location and function dependent on that feature upstream of the dam on the Santa Ana River.
- In-stream habitat features rely on permanent flow conditions that support existing and restored habitat for Santa Ana Sucker and other aquatic species in the Santa Ana River mainstem upstream and downstream of the dam. Focal areas where stream have

ephemeral flow conditions with frequent and extensive periods of very low flow to dry conditions do not provide locations for these features to effectively provide restoration benefits.

3.1.4 Measures Included in the Final Array of Alternatives

The measures carried forward for development of alternatives were refined from conceptual designs to more detailed plans that supported more rigorous cost estimates and that could be used to determine outputs using an outputs model that quantifies acres of restored habitats by type and annualized habitat units of output. The measures developed for this study would be constructed, operated and maintained by incorporating best management practices, environmental standards and technological advances for environmental sustainability, acceptability and compliance with regulations. These environmental commitments are integral to the measures. The environmental commitments for each measure are summarized in the impact analysis provided in Chapter 5 where they were considered in determining the measures' environmental impacts. The measures carried forward are described below, along with their potential location.

3.1.4.1 Sediment Management (Upstream and Downstream Santa Ana River Mainstem)

The Sediment Management Measure would remove a portion of the incoming sediment into the Prado Basin and re-entrain it into the Santa Ana River downstream of Prado Dam. The primary physical features that would be required to make the sediment management system function properly include: a fore bay entrainment groin, bio-engineered entrainment, transition channel, fill placement floodplain widening, OCWD wetlands channel, sediment trap, sediment trap outlet channel, sediment storage site, sediment re-entrainment system, maintenance roads and bike trail flyover.

Prado Dam acts as a barrier to the natural transport of sediment to the Lower Santa Ana River. The Sediment Management Measure would remove sediment from the Prado Basin and re-entrain some material into the Santa Ana River downstream of Prado Dam. New incoming sediment would be collected in a sediment trap constructed within Prado Basin and removed by a combination of excavation and dredging methods, based on field conditions. The portion of the sediment removed by dredging operations would be conveyed in slurry through an above ground pipeline(s) to a sediment processing/storage site located along the southern margin of Prado Basin near the Corps Field Office. The portion of the sediment removed from the trap by dry excavation methods would be hauled by heavy construction equipment (scrapers and/or off-road haul trucks) to the sediment processing/storage site.

Dredged sediment would be dewatered in a series of dewatering basins. The dewatering process would be managed to remove free water from the sediment, and to segregate fine-grained material from sand. The dewatered sediment would be stockpiled along with the sediment that has been hauled to the storage site by dry excavation methods. The sediment storage sites are required to hold the sediment until such time that the outflow from Prado Dam is sufficient for re-entrainment. Most re-entrainment activities would occur at dam release rates greater than 250 cfs at a 1% concentration by weight. Since 2000, the annual average number of days with flows

greater than 250 cfs is approximately 140 days. Therefore, it has been assumed that on average, re-entrainment operations would occur for 140 days per year 24 hours per day, 7 days per week for a total of 3,360 hours of operation per year. In general, the re-entrainment operations would occur during months that generally receive higher amounts of precipitation. Once sediment has been re-entrained in the lower Santa Ana River it would be distributed downstream by flows in the river. The total annual volume of sediment re-entrained would vary depending on the amount of rainfall in any given year. A summary of likely re-entrainment scenarios with the sediment trap is shown in Table 3-3.

Table 3-3: Sediment Management Summary

Activity	**Sediment Management Quantities (Dry Year Conditions)**	**Sediment Management Quantities (Typical Year Conditions)**	**Sediment Management Quantities (Wet Year Conditions)**
Total Construction Footprint (acres)	558.0		
Annual Volume Removed from Basin (cubic yards)	325,000	750,000	750,000
Annual Volume Re-Entrained Downstream (cubic yards)	200,000	350,000	750,000

Sediment for re-entrainment would be processed to remove fine-grained material through settlement in an impoundment and would be re-mixed into a slurry using water from the Prado Basin. Once the slurry is mixed at the storage site it would be pumped from the storage site through an above ground pipeline around the south eastern side of the Prado Dam spillway, along the levee of the outlet channel to a re-entrainment point at the downstream end of the concrete lined outlet channel. A crane would be positioned on the levee at the re-entrainment point to secure the discharge end of the re-entrainment pipeline and provide a means to move the pipeline around at the re-entrainment location to ensure even dispersion of the slurry into the Lower Santa Ana River. Re-entrainment volumes would be based on target sediment concentrations in the downstream discharge, flow rates in the river downstream of the dam, and monitoring of channel conditions to identify sediment accumulations that could affect flood risk management functions of the SARM project.

Excessive deposition along Reach 9 of the Santa Ana River would be avoided by reducing or temporarily halting re-entrainment operations and allowing flushing flows to re-distribute the sediment downstream. Excessive sedimentation in OCWD's recharge reach of the river downstream of Reach 9 would be mechanically dispersed or removed from the channel by OCWD as a part of their regular operation and maintenance activities for this project. Sediment removed from downstream would be exported off site by trucking. It has been estimated that approximately 10,000 cubic yards of sediment would be re-handled below the 405 Freeway in the concrete lined section of the lower Santa Ana River in a dry year, 17,500 cubic yards in a medium wet year and 37,500 cubic yards in a wet year. Based on historical maintenance records it is believed that most of the sediment that deposits in the concrete lined section of the lower Santa Ana River would deposit downstream of the 405 Freeway crossing. This would require

approximately 588 truck trips annually in a dry year, 1,029 truck trips in a medium wet year and 2,206 trips in a wet year to remove excess sediment from the channel during years 3 through 50 of the project. Dredging could also be used to remove sediment from the concrete lined section of the Lower Santa Ana River near the ocean.

During re-entrainment of sediment, water quality sampling would be conducted at below Prado Dam (upstream of the re-entrainment site) and at a location immediately down gradient of the re-entrainment site. Comparison of the water quality data from these two sites would be used to assess water quality changes during re-entrainment activities. If significant differences between upstream and downstream samples are observed during sediment re-entrainment activities, the rate of sediment re-entrainment would be adjusted to ensure they are within acceptable threshold ranges that are provided in the Regional Water Quality Control Board's Basin Plan and any permits required for re-entrainment operations.

The primary physical features that would be required to make the sediment management system function properly include an entrainment groin, OCWD wetlands pilot channel, transition channel, sediment trap, trap outlet channel, sediment processing/storage site, sediment re-entrainment system and a series of maintenance roads. The components of the Sediment Management Measure are shown in Figure 3-2.

Entrainment Groin

Fore Bay Entrainment Groin
The fore bay entrainment groin would act as a transition area from the existing grade of the Santa Ana River to the bio-engineered entrainment groin. The fore bay area would be kept relatively free of vegetation and would be regularly re-graded to help split flow between the transition channel and the OCWD wetlands channel. The entrainment groin would be situated across the Santa Ana River located approximately 5,500 ft. upstream of River Road Bridge/Santa Ana River Crossing. The entrainment groin would 300 ft. in width and 3,300 ft. in length.

Bio-Engineered Entrainment Groin
The entrainment groin is a low profile rock structure that would control the lateral movement of the Santa Ana River as it enters the transition channel. The entrainment groin would be located approximately 5,470 feet upstream of the River Road/Santa Ana River Crossing. The groin would be approximately 75 ft. wide at its base and would span the entire width of the Santa Ana River, approximately 3,160 ft. and would include a low flow section that would act as the entrance point for flows into the transition channel. The entrainment groin would also include the OCWD Wetlands Pilot Channel inlet structure. The groin would be inter-bedded with native sand material and native plantings to promote riparian growth in the groin. The rock structure of the groin would be constructed over a sheet pile cutoff wall. The sheet pile cutoff wall would be covered by the rock groin and would help to anchor the rock and prevent seepage and erosion through and under the groin.

The low flow section would be constructed of rock and stone to allow for reconfiguration to provide adaptive management of the inlet elevation. The OCWD Wetlands Pilot Channel inlet structure would be incorporated into the groin near the transition channel. The pilot channel inlet would be constructed of reinforced concrete and would include 3 pipes and flow control gates.

A fore bay area above the groin would be kept free of vegetation to allow maintenance personnel to reconfigure and/or remove sediment from the groin fore bay area.

Transition Channel

The purpose of the transition channel would be to direct and convey water and sediment to the sediment collection trap and help control the rate and extent of channel head cut upstream. The transition channel would start at the upstream end of the sediment trap and would extend to the north and east approximately 12,600 feet. The transition channel would have a maximum top width of 300 feet and would vary in depth from approximately 4 ft. to 24 ft. with 3:1 side slopes. The total excavation volume of the transition channel would be approximately 924,000 cubic yards of cut, and 122,000 cubic yards of fill. Three fill areas would be constructed along the transition channel to help re-direct the existing Santa Ana River path into the transition channel. Ten in-stream habitat/grade stabilizing features would be required within the transition channel and where the diversion channel crosses underneath River Road Bridge. These features would partially stabilize the gradient of the channel to prevent catastrophic head-cutting and protect the bridge foundations from excessive erosion/scour. The stabilizers would be bio-engineered to provide native fish habit value.

Three fill areas would be constructed along the transition channel to help re-direct the existing alignment of the Santa Ana River into the transition channel. The locations of the fill area would include the floodplain adjacent to the Santa Ana low flow channel, OCWD wetland channel and the transition channel. The total area of the three fill areas would be approximately 69 acres, with 4:1 side slopes and depth ranging from 6 to 12 feet deep. The total fill volume for all three locations would be 727,840 cubic yards. Material for the three fill areas could come out of the cut volume of the OCWD wetland channel or transition channel. An additional feature of the transition channel would be the construction of a widened floodplain in an area along the northern edge of the transition channel approximately 4,300 ft. downstream of the River Road Bridge Crossing. The widened floodplain footprint would be excavated down approximately 4 ft. to allow storm flows to inundate the area more frequently and to help create higher value riparian habitat in an area that has traditionally been lower value. The new widened floodplain would have 4:1 side slopes up to the existing grade and would require that approximately 209,700 cubic yards of sediment be removed. Approximately 52,870 cubic yards of the material would be used as fill onsite and the remaining 156,830 cubic yards would be moved to the sediment storage site for re-entrainment or permanent storage. The area between the widened floodplain and transition channel would remain elevated and would include a maintenance road separating the two features except for two lowered areas at the northern and southern ends of the widened floodplain. Flows would enter and exit at these two locations to limit the amount of sediment and debris entering the widening floodplain area. Earthen plugs could be temporarily graded into the transition channel to promote more frequent wetting of the widen floodplain area and to help sustain higher groundwater levels in the vicinity of the transition channel. Once the construction of the widen floodplain is completed the area would be planted with native vegetation.

OCWD Wetlands Pilot Channel

The proposed transition channel would lower the grade at the existing OCWD wetlands Diversion Channel thereby making it non-operable. Therefore, the OCWD Wetlands diversion point would be moved upstream and adjacent to the transition channel inlet. The OCWD Wetlands Pilot Channel would be a trapezoidal earthen channel and would be positioned to the

north of the transition channel alignment. The pilot channel would extend from the entrainment groin to the south and west approximately 5,980 ft. and connect to the existing OCWD Wetlands Diversion Channel. A portion of the fill required to construct the pilot channel would come from the excavation of the new pilot channel invert. A second flow control structure (concrete and gated) and earthen overflow spillway would be constructed at the junction of the existing OCWD Wetlands Diversion Channel and OCWD Wetlands Pilot Channel. This structure would provide a means to isolate the OCWD Wetlands Diversion Channel from very large flow events that have the potential to damage the OCWD Wetlands. The diversion channel isolation structure would be constructed of reinforced concrete and would include 3 pipes and flow control gates. The area of impact for the earthen overflow spillway is included in the fill areas described below.

Sediment Trap

The trap would be positioned at the downstream end of the transition channel in an area approximately 7,100 feet south west of the River Road Bridge Crossing. The trap would have an extension of the transition channel down the center of the trap with an average depth of 18 ft. with 3:1 side slopes. The floodplain on either side of the transition channel extension would be lowered an average of 8 ft. to provide trap volume during very high inflow events. A total of 610,000 cubic yards would be removed from the trap to construct its initial geometry. The sediment trap would be constructed over a 3 year period by using dry excavation and hydraulic dredging methods. The new incoming sediment would be collected in a sediment trap basin and would be removed by dredging, conventional dry excavation, or some combination of each as described below.

Dry excavation involves the use of heavy equipment to remove sediment from the sediment trap alignment under a dry (or mostly dry) condition. The collected sediment would be picked up directly by scrapers or placed in off-road haul trucks and/or scrappers with hydraulic excavators and hauled to the sediment storage site for stockpiling. Dry excavation methods would be used until such time that excessive groundwater was encountered or surface water inflow result in the trap site becoming inundated with water. Once the trap becomes filled with water the operations would shift to a hydraulic dredging method.

Hydraulic dredging involves removal of sediment from the trap in a wetted condition. The collected sediment slurry would be conveyed to a sediment storage site though a temporary discharge pipeline and booster pumps system. Multiple dredges could be used to meet production goals. The hydraulic dredges and booster pumps would be sound attenuated to reduce noise impacts to wildlife and allow for extended operations in the Basin. The sediment removal trap would be approximately 58 acres with a central flow through channel with a depth of 18 feet. The overall construction footprint of the sediment management components would be approximately 370 acres. Using the sediment trap, the total estimated sediment volume to be removed from the sediment trap is 25,000,000 cubic yards over 50 years for an average removal rate of 500,000 cubic yards per year. Approximately 16,500,000 cubic yards of the total removed will be re-entrained in the lower Santa Ana River and the remaining 8,500,000 cubic yards will be placed in the dedicated stockpile areas near Prado Dam.

Trap Outlet Channel

The trap outlet channel is a further extension of the transition channel beyond the trap footprint and graded out to daylight. The outlet channel would be plugged with sediment during the storm

season to prevent sediment from flowing to lower elevations in the Prado Basin. During maintenance activities, the plug would be removed to allow the trap to drain and allow the majority of the newly deposited sediment to be dry excavated from the trap during the O&M years. Once the trap has been cleaned, then the plug would be re-installed during the O&M years. The trap outlet would have an excavation volume of 72,800 cubic yards.

Sediment Storage Site

Construction of the sediment storage site would include clearing, grubbing and rough grading of two storage sites within the southern area of Prado Basin. There is a total of approximately 14,830,000 cubic yards of storage volume available at the two sites. The sediment storage sites are situated near the Prado Basin's southernmost Auxiliary Embankment and near the Corps' Prado Field Office.

The west site (Site A) would be used for slurry dewatering, dry sediment stockpiling, re-entrainment mixing and pumping. Sediment from the trap area would be transported to the storage site by dry excavation and /or dredging. The method of removal would depend on the surface and subsurface site conditions each year and could vary from year to year. Dredging operations would be performed during periods when standing water is present in the trap, or during peak nesting season. Nesting season noise impacts would be mitigated by providing sound attenuation measures around the dredges and booster pump stations. The initial sediment removed from the transition channel and trap would be used to construct noise attenuation berms along the west, north and east sides of sediment storage Sites A and B. The berm would reduce construction noise in Prado Basin and would allow around-the clock re-entrainment operations with minimal noise impacts to nesting birds.

The slurry produced from hydraulic dredging removal operations would be processed at the sediment storage site for dewatering, sorting, stockpiling and preparation for re-entrainment back into the Santa Ana River when conditions are favorable. Multiple dewatering basins could be constructed at the Site A location. Slurry would be pumped into one of the dewatering basins to begin the dewatering process. Once the sediment is dewatered it could be relocated and temporarily stockpiled in an area adjacent to the dewatering basins, and wait for re-entrainment. As one dewatering basin is drying, another would be filled by the dredging operations, and the basins would be cycled through filling and dewatering phases.

The storage sites would be constructed to accommodate wet or dry storage of the sediment. A combination of both sediment types could be processed at the same time on Site A. The annual re-entrainment volume would fluctuate with available flows and the Lower Santa Ana River response to re-entrainment. Sediment removed from the trap, which is not re-entrained would be stockpiled on Site A or B for future re-entrainment or long-term storage and made available for fill material for local construction projects, subject to local government requirements and environmental reviews.

In order to construct the sediment management system and maintenance roads, all vegetation within the footprints of the features and maintenance roads would be removed. All clearing and grubbing activities would occur outside of peak nesting season and would be performed under the supervision of biologists. The sediment trap and maintenance road alignments would be adjusted to target areas that predominantly contain arundo or other non-native vegetation. The

above-ground vegetation would be cleared, followed by removal of the vegetation root system for larger plants and trees. The removed vegetation, whenever feasible, would be processed and converted into mulch to re-surface project access roads. Excess biomass or non-native vegetation that has a high probability of re-seeding/regrowth would be disposed of offsite. Vegetation/biomass processing and loading would occur from within the footprints of the sediment storage sites or from within the footprint of the trap and transition channel.

Sediment Re-Entrainment Feature

In general, sediment would be re-entrained under medium to high Prado Dam out flow conditions (greater than 250 cfs) at a 1% concentration by weight. The sediment re-entrainment system would extend from the sediment storage sites, along existing maintenance roads, around the southern edge of the dam's emergency spillway and along the southern edge of the existing concrete lined outlet channel to the re-entrainment point. A series of dredging equipment, hoppers and pumps would be positioned at the storage site and used to reconstitute the stored sediment into a slurry mixture. The slurry would be pumped in above ground pipelines to the re-entrainment site downstream of the dam outlet works. A crane would be positioned on the levee at the re-entrainment site to secure the discharge end of the re-entrainment pipeline and provide a means to move the pipeline around at the re-entrainment location to insure even distribution of the slurry into the Lower Santa Ana River. The maintenance road, pipelines and booster pumps would be 30 feet wide and would run for approximate 6,000 feet from the storage site to the re-entrainment point.

Sediment Re-Entrainment Activities

The sediment re-entrainment system would deliver sediment from the sediment storage site to the re-entrainment location at the end of the Prado Dam concrete lined outlet channel located immediately west of State Highway 71. Once sediment has been re-entrained in the Lower Santa Ana River it would be distributed downstream by flows in the river. A slurry pipeline re-entrainment measure would deliver sediment from the storage area to the re-entrainment location in a wet slurry form. Sediment at the storage site would be in wet form in a slurry holding basin or in dry form in a stockpile. Both storage conditions would require that additional water be added to the sediment to achieve a sediment concentration that would be pump-able/flow-able through the pipeline system. The additional water required to make the slurry mix would be pumped from Prado Basin during re-entrainment operations. The slurry concentration in the pipeline would range from approximately 5 to 20 percent depending on re-entrainment objectives, slurry velocities and pipeline size. A series of booster pumps would be required to maintain slurry velocities and to overcome the elevation change to lift the slurry from the storage site over the auxiliary embankment near the Prado Dam spillway. In order to meet re-entrainment objectives several smaller pipelines could be placed along-side each other. As many as three, 24-inch diameter pipelines could be constructed and used during re-entrainment operations. The alignment of the slurry pipeline(s) would be positioned within a new maintenance road and parallel existing maintenance roads. The pipeline(s) would be placed along the shoulder of the new maintenance road and buried at locations where crossings are required. As many as 4 booster pumps per pipeline could be required (16 total). Each booster pump or grouping of booster pumps would be enclosed by sound attenuation walls to limit noise impacts to wildlife.

A crane would be positioned on the levee at the re-entrainment point to secure the discharge end of the re-entrainment pipeline and provide a means to move the pipeline around at the re-entrainment location to ensure even dispersion of the slurry into the Lower Santa Ana River. Sediment re-entrainment activities could occur at any rate if demonstration releases show that it is feasible to do so. However, most re-entrainment activities would occur at dam release rates greater than 250 cfs at a 1% concentration by weight. Since 2000, the annual average number of days with flows greater than 250 cfs is approximately 140 days. Therefore, it has been assumed that on average, re-entrainment operations would occur for 140 days per year 24 hours per day, 7 days per week for a total of 3,360 hours of operation per year. In general, the re-entrainment operations would occur during months that generally receive higher amounts of precipitation. Once sediment has been re-entrained in the lower Santa Ana River it would be distributed downstream by flows in the river. The total annual volume of sediment re-entrained would vary depending on the amount of rainfall in any given year.

Maintenance Roads

The entrainment groin, transition channel, OCWD wetlands pilot channel and the sediment trap would have maintenance roads around their perimeters to allow for regular maintenance and habitat management. In addition to the primary maintenance roads, a secondary maintenance road would be constructed along the south east side of the sediment management system to provide access to the various features when the primary road is inundated, covered by debris or damaged by storm flows. The roads would be approximately 25 ft. wide with the exception of the primary maintenance road from the trap to the sediment storage site, which would be 50 feet wide to accommodate two-way scraper traffic. All maintenance road surfaces would be made of native materials except for the south maintenance road and the primary trap to storage site road. The trap to storage site road and the primary maintenance road would have decomposed granite (DG) surfaces and 2.5 ft. shoulders to provide all-weather access.

A trail fly-over for the proposed Santa Ana River Bike Trail would also be constructed as a part of the sediment management system. A bike and equestrian trail does not currently exist in this part of Prado Basin, although trail proponents have requested permission from the Corps for its construction and operation. This trail or approval for a trail is not part of the proposed Water Conservation and Ecosystem Restoration Study. A trail fly-over is proposed as part of this study to ensure that accessibility for a possible future trail is not diminished due to the sediment management measure. The fly-over would cross the haul route in an area to the south, east of the Corps' Prado Field Office. The bike trail fly-over would provide safe passage for trail users should a trail through Prado Basin eventually be approved by the Corps and implemented separately from this project, and would not impede sediment management operations. The fly-over would be a reinforced concrete bridge with height of approximately 20 ft. and would have a clear span of approximately 75 ft. The approaches to the bridge would be earthen fill, constructed with sediment from the trap excavation.

3.1.4.2 Operations & Maintenance

Maintenance

Maintenance activities would occur annually after the initial construction period would be completed, during low flow periods in the river and during periods outside of peak nesting season. Biologists would inspect the work areas prior to maintenance activities to avoid impacts

to wildlife. The schedule of the maintenance activities would be driven by environmental and climatological conditions and would vary from year-to-year as conditions change. The primary maintenance activities would include vegetation/debris and sediment removal from all of the features. The maintenance roads around the features would be used to provide access to remove sediment and debris. Annual trimming and mowing of vegetation would provide access to the areas in need of maintenance. The maintenance activities would be performed under the direction and supervision of a biologist to ensure that maintenance activities do not diminish the habitat value of the areas affected.

The amount of sediment re-entrained would be adaptively managed. Regular inspections/surveys of the Lower Santa Ana River would be performed throughout the life of the project. The rate of aggradation (or degradation) would be evaluated and re-entrainment operations would be adjusted to either increase or decrease the re-entrainment rate to best meet Lower Santa Ana River objectives.

Vegetation & Debris Removal

An operational item consistent across all project features includes the removal and disposal of vegetation and biomass imported to the project area by storm flows. Heavy equipment would be used each year to collect and transport vegetation to sediment storage Site B. Once at the storage site the vegetation would be processed and trucked off-site for disposal. Some vegetation could be processed and used as mulch on-site.

Additional Sediment Removal Activities

Additional sediment removal operations beyond dredging/excavating the trap would include reconfiguring and/or removing sediment from the other project features. Maintenance roads around each of the features would provide access for equipment to perform sediment management operations. In general, sediment management operations would occur outside of nesting season with the exception of trap removal operations. Sediment removal from the trap area could occur during nesting season with the use of sound attenuation devices and/or under the supervision of a biologist.

Sediment accumulation from around the entrainment groin could be loaded and scraper hauled to the storage site or it could be re-graded in-place to encourage it to travel down the transition channel and into the trap area for collection and removal.

Sediment accumulated in the OCWD Wetlands Pilot Channel and the Transition Channel would be loaded and scraper hauled directly to the storage site. Channel slopes would be re-graded regularly to fix erosion and maintain the hydraulic capacity of the channels.

Access

Access to and from the sediment management site would occur from State Highway 91, with primary access utilizing the Auto Center Drive access ramps. Construction traffic would use Auto Center Drive to the project site. Once on-site, the footprint of the features and maintenance roads built for the project would be used to access all areas of the site.

Staging
All worker parking and construction activities would be staged from within the footprint of sediment storage Site B or at the Corps' Prado Field Office. Long-term maintenance activities would be staged from these same two locations.

Phasing
Construction activities would start in September of 2021 after peak nesting season. The implementation of the sediment management program would occur in phases over approximately 3 years. The storage sites would be constructed in year 1, the outlet channel and trap in year 2 and the transition channel, OCWD pilot Channel and entrainment groin in year 3. Sediment re-entrainment would start in year 3 and continue through year 50.

3.1.4.3 Chino Creek Channel Restoration – Raised Invert and New Cut Channel

The purpose of the Chino Creek Channel Restoration Measure is to restore and expand native streambed habitat and to promote riparian growth over areas that currently do not receive enough water to support riparian habitat within the Chino Creek Focal Area. Excessive sediment accumulated in the creek over several years would be removed and the existing flows from Chino Creek would be re-routed through a new channel along the west side of the creek that would support increased acreage of native vegetation communities. Non-native vegetation communities would be removed followed by five years of herbicide treatment to ensure that non-native vegetation communities do not re-establish.

As shown in Figure 3-3, the inflow at the north end of the focal area would be split to provide flows to the new cut channel and to maintain adequate flow into the existing Chino Creek alignment to support existing aquatic and riparian habitats. The construction activities would include grading to create a new channel and perimeter berms. A portion of the Chino Creek channel invert at the northern end would be filled in order to force water into the new cut channel. To prevent channel erosion and to help control the hydraulic grade of the new cut channel, a grouted stone drop structure would be constructed in Chino Creek, a pool and riffle structure would be constructed at the outlet of the proposed diversion pipe and a bio-engineered invert stabilizer would be installed at the downstream end of the new channel.

Wildlife fencing would also be a part of this measure along Pine and Euclid Avenues. A total of approximately 16,897 linear feet of fence would be constructed along Pine and Euclid to help direct wildlife to corridor entrances. The fence alignments would be initially be 30 feet wide to facilitate construction. However, once construction is complete, approximately ½ of the fence buffer zone footprints (15 feet wide) would be kept free of vegetation to provide access to the fences and culverts for maintenance.

Construction of this measure would occur in multiple phases over approximately 4 months during year 3 of the project. The initial activities would include clearing and grubbing the footprints of the new cut channel, berms, maintenance road, drop structure, outlet, invert stabilizer and Chino Creek fill area. Vegetation removed would be mulched and re-used as groundcover in the project area or elsewhere within Prado Basin. Excess biomass or invasive plants that present a high probability of re-seeding/regrowth would be disposed of offsite. All

vegetation processing activities would take place within the footprints of the new cut channel area or the creek fill area. The clearing and grubbing phase of the project would start in the fall to avoid the peak of the nesting season and to avoid storm flows in Chino Creek.

The placement of fill material would be required to construct the perimeter berms, fill the existing creek section, and install the invert stabilizers and new diversion pipe. A balanced cut and fill excavation approach would be used to rough grade the site. The total volume of earthwork would be approximately 74,752 cubic yards. The soil excavated from the new cut channel alignment would be used to fill a portion of the existing creek, construct the berms and grade/level the adjacent habitat areas. The perimeter berms would be short (approx. 3 feet high) and wide (28 feet wide at the base with 3:1 side slopes) to avoid wildlife movement constraints.

The section of Chino Creek that would be filled includes 2 sections. The upstream most section would receive partial fill to increase the Chino Creek invert. This section would continue to receive creek flows and remain wetted. The downstream section of the creek near the new division pipe would be completely filled and no longer receive water. This section is approximately 500 ft. long by 35 ft. wide. This would result in a loss of open water surface area of approximate 0.40 acres. The approximate area of new open water surface created by the spreading of water in the new cut channel would 4,700 ft. long by 30 ft. wide, (3.24 acres), resulting in a net gain of approximately 2.84 acres of open water surface area.

The final phase of construction would include activities required to finish grade the new cut channel, maintenance roads, creek fill area and restore portions of the site disturbed by the construction activities. Site restoration would include removal of all equipment from the project site and finish grading of the roads used to access the site. Native plantings would be a part of the final phase to help accelerate the development of native habitat types.

As shown in Table 3-4, implementation of the Chino Creek Channel Restoration Measure would require the removal of 5.2 acres of willow/cottonwood vegetation communities and .07 acres of mixed riparian vegetation communities. Once the reconfiguration of Chino Creek channel is completed, the footprint of the Chino Creek Chanel Restoration Measure would be planted with native vegetation which would provide an additional 112 acres of native vegetation communities.

Table 3-4: Summary of Impacts to Vegetation

Vegetation Community	Temporary Impacts	Permanent Impact
Aquatic	1.6	.16
Willow/Cottonwood	4.9	.35
Mixed Riparian	.07	0.0
Coastal Sage Scrub	0.0	0.0
Coastal sage Scrub/Non-native Weeds	0.0	0.0
Non-Native Weeds	111.4	.14
Eucalyptus	.37	0.0
Arundo	0.0	0.0
Disturbed	0.0	0.0
Urban	1.4	.06
Total	119.7	.71

Access
Access to and from the Chino Creek site would occur from State Highway 71, with primary access utilizing the Euclid Avenue access ramps. Construction traffic would use Euclid Avenue to Pomona Rincon Road to the project site. Once on-site, the footprint of the Raise Invert and Cut New Channel Measure area would be used to access all areas of the site.

Staging
All worker parking and construction activities would be staged from within the footprint of the Raise Invert and New Cut Channel Measure area. Long-term maintenance activities would be staged from the maintenance road within the footprint of the measure area.

Phasing
Construction activities would start in September of 2023 (Year 3) in the Chino Creek Focal Area. Construction of the measure features would take approximately 4 months. Long-term maintenance of the measure would begin in September of 2024 and occur annually from year 5 through year 50.

Monitoring/Maintenance
Maintenance activities would occur annually after the initial construction period would be completed, during low flow periods in the creek and during periods outside of peak nesting season. Biologists would inspect the work areas prior to maintenance activities to avoid impacts to wildlife. The schedule of the maintenance activities would be driven by environmental and climatological conditions and would vary from year-to-year as conditions change.

Biomass and debris generated form storm flows would be removed as needed from the channel annually, if needed. The maintenance road and seasonal/temporary trails through the braided channel area would be used to provide access to remove sediment and debris. Annual trimming and mowing of vegetation would provide access to areas in need of maintenance. The maintenance activities would be performed under the direction and supervision of biologists to

insure that maintenance activities do not diminish the habitat value of the channel and creek areas.

Habitat maintenance activities include those required to trim and maintain vegetation around the channel, maintenance road, berms and in-channel structures. Invasive plants would also be removed from the area on an annual basis. These activities would be performed at various times throughout the year as conditions allow and the work would be done under the direction and supervision of a biologists to insure no wildlife are disturbed and to insure the activities result in a positive habitat impact. Native vegetation would be managed, and if necessary re-planted, in areas significantly damaged by storm flows or in areas where significant disturbance to native plants occur.

3.1.4.4 Invasive Plant Management (All Focal Areas)

The purpose of this measure is to remove invasive plants from all focal areas to encourage the growth of new native vegetation communities and to increase the biological values of existing native vegetation communities. As shown in Figure 3-4, the initial removal would generally start at the upstream extent of the focal area and progress to the south east. After removal activity is completed, five years of herbicide treatment would occur to ensure that non-native plant communities do not reestablish. Removal activities would be performed on small and large scales with varying levels of effort and equipment mixes. Small stands of invasive plants intermingled with native plant species could be removed by hand operations with small equipment and hand tools. Large expansive stands of invasive plants would be removed with heavy equipment and large labor forces. Invasive plants cut in the focal area would be chipped and processed as needed for re-use onsite or removal and disposal from the focal area. Invasive plants that can be effectively being processed to avoid regrowth could be re-used onsite as mulch. Excess biomass or invasive plant types that present a high probability of re-seeding/re-growth would be disposed of offsite. As each area is cleared it would be evaluated by biologists to determine how to best manage that area. Approximately 248 acres of invasive plants would be removed from the SARM Upstream Focal Area, 14 acres from the SARM Downstream Focal Area, and 69 acres from the Chino Creek Focal Area and 59 acres from the Mill Creek Focal Area.

Monitoring and Maintenance

As the measure is implemented, monitoring for adaptive management will be conducted until the success criteria are met for the measure. After the success criteria have been met, adaptive management actions would cease, and routine maintenance would be conducted for 10 years. Monitoring for adaptive management would be conducted in accordance with the Monitoring and Adaptive Management Plan. Maintenance would include routine inspections to detect re-infestation by invasive plants and spot treatments to prevent re-establishment of invasive plants in treated areas.

Access

Access to and from the invasive plant removal sites would occur from State Highways 71 and 91, with primary access occurring from State Highway 71, utilizing the Euclid Avenue access ramps. Pomona Rincon Road would be used to access the site and once on-site, existing maintenance roads and trails would be used for access to invasive plant removal areas. Some

invasive plant zones would be accessed across previously cleared areas prior to native plant regrowth or new plantings.

Staging
All worker parking, biomass processing and ongoing maintenance activities would be staged from within the footprints of the removal areas, at the Chino Creek Native Planting Area or at the OCWD Prado Field office.

Phasing
Invasive Plant Management activities would start in September of 2022 and would generally proceed from the northwest to the southeast across the focal areas. After each year of removal five years of herbicide treatment would occur to ensure that non-native plant communities do not reestablish. Upon completion of adaptive management, maintenance would continue for five years in the focal area.

3.1.4.5 Native Plantings (Chino Creek)

The Native Planting Measure includes activities within the Chino Creek Focal Area to develop an enhanced habitat area in an existing open field to the east of Euclid Avenue and immediately north of Pomona Rincon Road. The 42.9 acre site will be cleared, grubbed and re-graded to achieve proper drainage and construct a new maintenance road. A portion of the site will be re-planted, plantings would include seeding, pole staking, and planting of container plants at select locations across the site. A staging/parking area will be constructed along with the new maintenance road to provide a workspace for monitoring and habitat maintenance. The maintenance road will have an all-weather driving surface (DG) approximately 10 feet wide. The initial construction and planting activities associated with the Native Planting Measure at Chino Creek will be implemented in 2 phases over a period of approximately 3 months during year 2 of Study implementation.

Phase 1 involves invasive plant removal, clearing/grubbing and rough grading activities to clear the field and construct the maintenance road and staging area. Areas of existing native vegetation that are also near the design finished grade will be protected in-place and not be disturbed. However, for planning and cost estimating purposes it has been assumed that the entire site will be cleared and re-graded. Approximately 42.9 acres of will be impacted. The total maintenance trail corridor will measure approximately 15 ft wide, extending from Pomona Rincon Road to the east and south approximately 1,600 ft. The all-weather maintenance road driving surface is approximately 10 ft wide with an additional 2.5 foot wide shoulder along each edge. The road shoulders will be kept clear and maintained to allow for drainage and allow for maintenance equipment to pass. The staging/parking area will measure 40 ft x 200 ft. Of the 42.9 acres, the total area of permanent impact from the parking area and the trail equals approximately 0.73 acres. The remaining 42.17 acres are considered temporary impacts.

Native and invasive plants cleared from the measure area will be processed and chipped as needed for re-use onsite or removal and disposal from the focal area. Invasive plants that can be effectively processed to avoid regrowth may be reused onsite. Excess biomass or invasive plants that present a high probability of re-seeding/regrowth will be disposed of offsite. All construction staging and vegetation processing activities will take place within the footprint of the native

planting area. The clearing and grubbing phase of the project would start in the fall to avoid peak nesting season. Wildlife monitoring will occur during clearing and grubbing to avoid impacts to late nesting birds and other wildlife.

Grading activities will use a balanced cut and fill method to utilize the existing soils on-site. This phase also includes the delivery and placement of the DG needed to construct the maintenance road and staging area surfaces. The DG surface will be approximately 3 inches thick. The total DG surface area of the road and staging area is approximately 0.55 acres. Approximately 222 C.Y. of DG will be imported to construct the road and staging area surface. Eighteen-wheel dump trucks will be used to import the DG and may back-haul excess material or biomass for disposal off site.

Phase 2 activities include those required to finish grade the native planting area, road, and staging area and restore portions of the site disturbed by the construction activities. Site restoration will include removal of all equipment from the project site. This phase also includes the planting of native vegetation communities over the 42.17 acre site.

Maintenance activities will occur annually after the initial construction period is complete, during low flow periods in the creek and during periods outside of peak nesting season. Biologists will inspect the work areas prior to maintenance activities to avoid impacts to wildlife. The schedule of the maintenance activities will be driven by environmental and climatological conditions and will vary from year to year as conditions change. Maintenance activities may be performed in 2 separate phases.

Phase 1 maintenance activities include those required to trim and maintain vegetation along the maintenance road, staging/parking area and within the 42.17 acre native planting area. Any new growth of invasive plants will also be removed from the site. Maintenance work will be done under the direction and supervision of a biologists to insure the maintenance activities result in a positive habitat impact. Extensive use of mechanized equipment will be avoided during peak nesting season and hand labor may be used at times to avoid negative impacts to nesting birds and to avoid damage to high value habitat. In general, the majority of the maintenance activities will occur from September through March in any given year.

Phase 2 maintenance activities include grading to reshape or restore the maintenance road and staging/parking area. Debris from storm events will be removed from the road and minor grading will occur to reshape the road where damage has occurred from storm flows or normal wear-and-tear. Minor amounts (approximately 17 C.Y.) of DG will be imported annually to re-dress the top of the road and staging/parking area. This phase of maintenance would start in the early spring (typically late February) once storm flows have receded, and prior to springtime nesting activity. Wildlife monitoring will occur during road maintenance to avoid impacts to nesting birds and other wildlife.

Schedule and Phasing

Native Planting Measure activities will start in September of 2022 (Year 2) in the Chino Creek Focal Area. Construction of the native planting area, maintenance roads and storage area will take approximately 3 months. Monitoring and adaptive management of the measure will begin in

February of 2023 and continue for 5 years. Maintenance would continue for 10 years beyond completion of the adaptive management period.

Access
Access to and from the native planting site will occur via State Highways 71, with primary access utilizing the Euclid Avenue access ramps. Once on-site, the footprint of the native planting area will be used to access all areas of the site.

Staging
All worker parking, construction deliveries and long-term maintenance activities will be staged from within the footprint of the native planting area, the maintenance road and/or the staging area.

3.1.4.6 Native Plantings (SARM Upstream)

The Native Planting Measure includes activities within the Upstream SARM Focal Area to develop an enhanced habitat area in an existing open field to the north of the Santa Ana River in Prado Basin and to the south of the OCWD Wetlands Diversion Channel. The 41.1 acre site will be cleared, grubbed and re-graded to achieve proper drainage. A portion of the site will be re-planted, plantings would include seeding, pole staking, and planting of container plants at select locations across the site. Areas of existing native vegetation that are also near the design finished grade will be protected in-place and not disturbed. However, for planning and cost estimating purposes it has been assumed that the entire site will be cleared and re-graded. The initial construction and planting activities associated with the Native Planting Measure at Upstream SARM will be implemented over a period of approximately 3 months during year 1 of Study implementation. Study years 2 through 50 will include activities to perform regular monitoring/inspection and maintenance of the native planting area.

Native and invasive plants cleared from the measure area will be processed and chipped onsite for removal and disposal from the focal area. Invasive plants that can be effectively processed to avoid regrowth may be reused onsite. Excess biomass or invasive plants that present a high probability of re-seeding/regrowth will be disposed of offsite. All construction staging and vegetation processing activities will take place within the footprint of the native planting area. This phase of the project would start in the fall as to avoid peak nesting season. Wildlife monitoring will occur during clearing and grubbing to avoid impacts to late nesting birds and other wildlife.

Grading activities will use a balanced cut and fill method to utilize the existing soils on-site. A total of approximately 35,150 C.Y. of soil will be graded on site. This equates to an average 0.5 foot cut over the entire site. The final construction activities for this measure include those required to finish grade the native planting area and restore portions of the site disturbed by the construction activities. Site restoration will include removal of all equipment from the project site.

If the sediment management measure is implemented, then the native plantings described here would be planted at the same location but at a lower elevation in the widen floodplain area.

Maintenance
Maintenance activities will occur annually after the initial construction period is complete, during low flow periods in the Santa Ana River and during periods outside of peak nesting season. Biologists will inspect the work areas prior to maintenance activities to avoid impacts to wildlife. The schedule of the maintenance activities will be driven by environmental and climatological conditions and will vary from year to year as conditions change.

Maintenance activities include those required to encourage the development of native vegetation. New growth of invasive plants will also be removed from the site annually. Maintenance work will be done under the direction and supervision of a biologists to insure the maintenance activities result in a positive habitat impact. Extensive use of mechanized equipment will be avoided during peak nesting season and hand labor may be used at times to avoid negative impacts to nesting birds and to avoid damage to high value habitat. In general, the majority of the maintenance activities will occur from September through March in any given year.

Schedule and Phasing
Native Planting Measure activities will start in September of 2021 (Year 1) in the Upstream SARM Focal Area. Construction of the native planting area will take approximately 3 months. Monitoring and adaptive management would be conducted for 5 years. Once success is declared, long-term maintenance of the measure would continue for 10 years.

Access
Access to and from the native planting site will occur via SR 91, with primary access utilizing the North Lincoln Avenue access ramps. Construction traffic will use Lincoln Avenue to River Road and then to Hellman Ave. Once on-site, the footprint of the native planting area will be used to access all areas of the site.

Staging
All worker parking, construction deliveries and long-term maintenance activities will be staged from within the footprint of the native planting area and from the OCWD Prado Field Office.

3.1.4.7 Native Plantings (Mill Creek)

The Native Planting Measure includes activities within the Mill Creek Focal Area to develop an enhanced habitat area in an existing shallow basin located south west of the OCWD Prado Field Office. The 17.21 acre site will be cleared, grubbed and partially filled to achieve the desired elevations. A total of approximately 27,765 C.Y. of sediment will be scraper hauled from the sediment trap area to fill the shallow basin. A portion of the site will be re-planted by seeding, pole staking, and planting of container plants at select locations across the site. The initial construction and planting activities associated with the Mill Creek Native Planting Measure will be implemented over a period of approximately 3 months during year 2 of Study implementation.

The construction phase of the measure involves invasive plant removal, clearing/grubbing, rough grading and fill activities to clear the existing shallow basin and re-grade the site. Fill material will be imported from the sediment trap in the Upstream SARM Focal Area. Areas of existing native vegetation that are also near the design finished grade will be protected in-place and not

disturbed. However, for planning and cost estimating purposes it has been assumed that the entire site will be cleared and re-graded. Approximately 17.21 acres will be temporarily impacted. Perimeter drainage will be maintained by grading a shallow channel around the southern edge of the site.

Native and invasive plants cleared from the measure area will be processed and chipped as needed for re-use onsite or removal and disposal from the focal area. Invasive plants that can be effectively processed to avoid regrowth may be reused onsite. Excess biomass or invasive plants that present a high probability of re-seeding/regrowth will be disposed of offsite. All construction staging and vegetation processing activities will take place within the footprint of the native planting area. This phase of the project would start in the fall as to avoid peak nesting season. Wildlife monitoring will occur during clearing and grubbing to avoid impacts to late nesting birds and other wildlife.

Maintenance
Maintenance activities will occur annually after the initial construction period is complete and during periods outside of peak nesting season. Biologists will inspect the work area prior to maintenance activities to avoid impacts to wildlife. The schedule of the maintenance activities will be driven by environmental and climatological conditions and will vary from year to year as conditions change.

Maintenance activities include those required to encourage the development of native vegetation. New growth of invasive plants will also be removed from the site annually. Maintenance work will be done under the direction and supervision of a biologists to insure the maintenance activities result in a positive habitat impact. Extensive use of mechanized equipment will be avoided during peak nesting season and hand labor may be used at times to avoid negative impacts to nesting birds and to avoid damage to higher value habitat. In general, the majority of the maintenance activities will occur from September through March in any given year.

Schedule and Phasing
Native Planting Measure activities will start in September of 2022 (Year 2) in the Mill Creek Focal Area. Construction of the native planting area will take approximately 3 months. Monitoring and adaptive management would be conducted until success criteria are met. Maintenance would continue for 10 years after declaration of success through monitoring and adaptive management.

Access
Access to and from the native planting site will occur via State Highways 91, with primary access utilizing the North Lincoln Avenue access ramps. Construction traffic will use Lincoln Avenue to River Road and then to Hellman Ave. Once on-site, the footprint of the native planting area will be used to access all areas of the site.

Staging
All worker parking and construction activities will be staged from within the footprint of the native planting area and from the OCWD Prado Field Office. Long-term maintenance activities will be staged from the OCWD Prado Field Office.

3.1.4.8 Riparian Edge Management (SARM Upstream)

The Riparian Edge Management Measure includes activities within the SARM Upstream Focal Area to enhance and manage riparian edge habitat around other proposed ecosystem measures. As shown in Figure 3-6, riparian edge management would occur around the perimeters of all of the sediment management features. The total area of the riparian edge would be 44.49 acres. For the purposes of impact analysis, it has been assumed that the entire area would be cleared, grubbed and re-graded to eliminate invasive vegetation and provide a smooth grade transition from the sediment management features to the riparian edge, which would provide access for future management of the riparian edge habitat. A portion of the site would be re-planted which would include a combination of seeding, pole staking, and container plants at select locations across the site.

The initial construction of the Riparian Edge Management Measure at the SARM Upstream would be implemented every March and September during the first 3 years. Five years of herbicide treatment, regular monitoring/inspection and maintenance of the management area would occur during Years 4 through 50.

The construction phase of the measure involves invasive plant removal, clearing/grubbing and rough grading activities to create the edges along the sediment management features. Native and invasive plants cleared from the measure area would be processed and chipped as needed for re-use onsite or removal and disposal from the focal area. The final construction activities for this measure include those required to finish grade and re-planting and restoring portions of the site disturbed by the construction activities.

Monitoring/Maintenance
Biologists would inspect the work areas prior to maintenance activities to avoid impacts to wildlife. The schedule of the maintenance activities would be driven by environmental and climatological conditions and would vary from year to year as conditions change. Maintenance activities would include those required to encourage the development of riparian vegetation. New growth of invasive plants would also be removed from the site annually. Extensive use of mechanized equipment would be avoided during peak nesting season and hand labor could be used at times to avoid negative impacts to nesting birds and to avoid damage to higher value habitat. Maintenance activities would occur annually after the initial construction period is complete, during low flow periods in the Santa Ana River and during periods outside of peak nesting season.

Access
Access to and from the native planting site would occur from State Highways 91, with primary access utilizing the Auto Center Drive access ramps. Construction traffic would use Auto Center Drive to get to the west sediment storage site. Once on-site, the prosed maintenance roads would be used to access all areas of the site

Staging
All worker parking and long-term maintenance activities would be staged from the west sediment storage site located near the Corps Prado Dam Field Office.

Phasing
The Riparian Edge Management Measure activities would start in March of 2022 (Year 1) in the SARM Upstream Focal Area. Construction of the Riparian Edge Management Measure would occur every September and March thereafter for a total of 3 years. Long-term maintenance of the measure would begin in September of 2024 and occur every September and March annually from year 4 through year 50.

3.1.4.9 In-Stream Habitat Features (SARM Upstream)

In-stream habitat features in the SARM upstream focal area would be composed of approximately 15 rock groins, measuring 10 ft. x 45 ft. (450 sq. ft.), that would be intended to create localized pools and exposing of existing gravel beds and cobbles that are presumed to be buried under a lens of sand. The SARM upstream in-stream habitat features would be located within the transitional channel leading towards the sediment trap.

The invert grade, channel depth, sediment aggradation and scour would be monitored to help determine potential adaptive management needs. Potential adaptive management activities are expected to include periodic repair to the in-stream habitat features due to damage from high flows, augmentation or removal of rock depending on observed and intended effect to geomorphology and associated aquatic habitat in the vicinity of the features.

Schedule and Phasing
The In-Stream Habitat Measure construction activities will start in September of 2023 (Year 3) in the Upstream SARM Focal Area. Construction of the features area will take approximately 2 months. Long-term maintenance of the measure will begin in March of 2024 and occur annually from year 4 through year 50.

Access
Access to and from the in-stream habitat sites will occur via SR 91, with primary access utilizing the Auto Center Drive access ramps. Construction traffic will use Auto Center Drive to get to the west sediment storage site. Once on-site, the sediment features access roads will be used to access the in-stream habitat work area.

Staging
All worker parking and construction activities will be staged from within the footprint of the west sediment storage site located near the Corps Prado Field Office. Long-term maintenance activities will be staged from this same location.

3.1.4.10 In-Stream Habitat Features (SARM Downstream)

The general intent of the In-Stream Habitat Measure would be to enhance habitat for native fish such as the Santa Ana sucker and arroyo chub. In-Stream Habitat Features of the downstream focal area would help reverse channel incision and increase the frequency of water spreading out from the incised, low flow, channel thereby enhancing the habitat along the Lower Santa Ana River through Reach 9. The in-stream habitat features would be located in the low flow channel in select locations from Prado Dam, extending downstream to the Weir Canyon/Santa Ana River

Crossing. The footprints of the habitat features would be in the active channel and would require minor clearing and excavation to construct the features. There would be approximately 15 in-stream habitat features constructed in the invert of river channel. Each feature would be constructed of derrick stone, riprap and other rock materials. The features could include the placement of individual rocks and groupings of rock to help sequester sediment upstream of the features and raise the channel invert. Features could also include rock groins and boulder weirs because the canyon geomorphology in this area is more likely to present exposed boulders and bedrock. Construction of the measure would occur during low flow periods in the Lower Santa Ana River. Sediment cut from the subgrade of each feature footprint would be re-distributed above and below each feature to help initiate the benefits of the measure.

At the SARM Downstream Focal Area 15 in-stream habitat features, each measuring 70 ft. x 100 ft. (7,000 sq. ft.) would be constructed. These features would induce upstream sediment deposition and localized downstream scour. These features would expose coarser grained sediment in localized scour areas to serve as fish habitat, and would also sequester sediment that is being re-entrained into Reach 9 as a part of the sediment management measure to help address observed channel incision.

Monitoring/Maintenance
Performance monitoring activities would occur annually after the initial construction period is complete. Biologists would inspect the sites to assess the effectiveness of the measure. The rate and extent of aggradation near each feature would be controlled by adaptively managing the sediment re-entrainment activities upstream.

Access
Access to and from the upper in-stream habitat sites would occur from State Highway 91 and State Highway 71, with primary access utilizing the Green River Road access ramps. Construction traffic would use Green River Road to get to the trails leading to the in-stream habitat sites. Existing trails would be used to access the in-stream habitat work areas. Vehicle access to and from the lower in-stream habitat sites would occur from State Highway 91, with primary access utilizing the Gypsum Canyon Road access ramps. Once on-site the existing trails would be used to access in-stream habitat work areas.

Staging
All worker parking and construction activities would be staged from within the footprints of each site specific staging area.

Phasing
The In-Stream Habitat Measure construction activities would start in September of 2022 (Year 2) in the SARM Downstream Focal Area. Construction of the features would take approximately 3 months. Long-term monitoring of the measure would begin immediately after construction and occur regularly during sediment re-entrainment.

3.1.4.11 Cowbird Trapping (Santa Ana River Mainstem Upstream, Mill Creek, Chino Creek)

The Cowbird Trapping Measure would provide control for this non-native avian species that parasitizes native songbird nests. The measure would include trapping and removal of cowbirds, and would be implemented at the SARM Upstream, Chino Creek and Mill Creek Focal Areas. Access and staging areas for this measure are shown in Figure 3-7. Within all four Focal Areas approximately 5,707 acres of area has been proposed for cowbird trapping. Approximately 3,865 acres of area have been proposed for cowbird trapping at the SARM Upstream Focal Area, 1,390 acres at the Chino Creek Focal Area and 452 acres at the Mill Creek Focal Area. Cowbird trapping activities include placing traps throughout the focal areas and regularly checking and maintaining traps. The number of traps and their placement would change over time, as needed, to control the species. Regular monitoring across the focal areas would help identify which locations would benefit the most from cowbird trapping.

Monitoring Maintenance
Once the initial population of cowbird have been removed, regular inspection and maintenance of the focal area would be performed for the 50-year life of the project to ensure cowbirds do not re-populate the focal areas.

Access
Access to and from the project area would occur from Interstate 15, State Highway 91 and State Highway 71. Primary access to the staging areas would occur off of State Highway 91 to Auto Center Drive. Once at the staging areas, access would occur along existing trails, newly constructed maintenance roads associated with other measures, across footprints of invasive plant stands or along temporary trails

Staging
The staging areas for this measure would be located at the OCWD Prado Wetlands Field office and the USACE Prado Field Office. All worker, worker traffic and disposal transfer operations would be based out of these 2 locations.

Phasing
Cowbird trapping would start in September of 2021 (Year 1) in the upstream focal areas and continue for the first 5 years. Management activities areas would move around within the focal areas as needed to respond to cowbird population movements. Years 6 – 50 would include activities to perform regular inspection, trap maintenance and cowbird removal from the focal areas. Management efforts would fluctuate during the operation and maintenance period as environmental conditions change and as cowbird populations move and adapt.

3.1.4.12 Non-Native Aquatic Species Management (SARM Upstream and Downstream)

The Non-Native Aquatic Species Management Measure includes activities to control and/or remove invasive aquatic species. The focus would be on large predatory fish species, such as carp, bass, and catfish that prey on or compete with native fish such as the Santa Ana sucker and arroyo chub. A combination of removal techniques such as netting, seining or electroshocking

could be used. Non-Native Aquatic Species Management would occur within the SARM Upstream Focal Area and the SARM Downstream Focal Area. Approximately 67 acres of open water habitat at the SARM Upstream Focal Area has been proposed for Non-Native Aquatic Species Management. Approximately 68 acres of open water habitat has been proposed for Non-Native Aquatic Species Management at the SARM Downstream Focal Area. Access and staging areas for this measure are shown in Figure 3-8.

Non-Native Aquatic Species Management activities could occur year-round and would be performed under the supervision of certified biologist to ensure disturbance of native aquatic species, nesting birds and other wildlife would be avoided.

Efforts to implement non-native aquatic species management would occur after large flow events that push many of the non-native species downstream. Removal efforts would utilize electroshocking, seining, and dip nets, or other similar methods to remove non-native aquatic species from the system. Non-native aquatic species management events would be expected to occur on an average of 2-5 times per year, with 1-2 days spent on each watercourse per event.

Monitoring/Maintenance
Once the initial populations of non-native species have been removed, regular inspection and maintenance of the focal area would be performed for the 50-year life of the project to ensure non-native species do not re-populate the focal area.

Access
Access to and from the project area would occur from Interstate 15 and State Highway 91. Primary access to the staging area would occur off of State Highway 91 to North Lincoln Avenue to River Road to Hellman Avenue. Once at the staging area, access would occur along existing trails, newly constructed trails associated with other ecosystem restoration measures, across footprints of invasive plant stands or from temporary trails.

Staging
The staging area for this measure would be located at the OCWD Prado Wetlands Field office. All worker, worker traffic and disposal transfer operations would be based out of this location.

Phasing
Non-Native Aquatic Species Management would start in November of 2021 in the SARM Upstream Focal Area and would continue for the first 5 years. Management activities would be focused within areas that contain flowing or standing water year-round. These areas are primarily the low-flow channel of the Santa Ana River, OCWD wetlands, and localized pools throughout the focal area and near Prado Dam. Years 6-50 would include activities to perform regular inspection and maintenance of the focal area. Management efforts would fluctuate during the operation and maintenance period as environmental conditions change and new non-native aquatic populations develop.

Adaptive Management
Measures could include changes to the frequency of management events, since they are dependent on weather.

3.1.4.13 Feral Pig Management (SARM Upstream, Mill Creek, Chino Creek)

The Feral Pig Management Measure would provide for the monitoring and control of feral pigs through a combination of trapping, telemetry and other population control techniques. The Feral Pig Management Measures would be implemented at the SARM Upstream, Chino Creek and Mill Creek Focal Areas. Within all three Focal Areas a total of 5,007 acres of area has been proposed for Feral Pigs Management. Approximately 3,865 acres of area have been proposed for Feral Pigs Management at the SARM Upstream Focal Area, 1,390 acres at the Chino Creek Focal Area and 452 acres at the Mill Creek Focal Area. Access and staging areas for this measure are shown on Figure 3-9.

Feral pigs would be trapped using box traps, corral traps, panelized corral traps or other similar methods. A portion of the trapped pigs would be removed from the system and others would be fitted with a satellite collar equipped with GPS receivers and released. This "Judas" technique is intended to help decipher where pigs tend to congregate. Since they are social animals, individual pigs will generally seek out other pigs. The ability to follow the pigs due to their GPS enabled collars would help locate future traps, follow movement patterns, and document potential habitat degradation caused by the pigs (Christie, Jocelyn et al., 2014). Initial site selection for traps would likely be based on field observations and camera traps to find concentrations of pig activity. The type of trap used would be based on local site conditions. It would be advantageous to try different trap and baiting designs in an effort to learn which works best for long term management.

After initial trapping efforts, activities subsequent would include monitoring of pigs fitted with GPS collars and would be followed on with similar efforts. The locations for traps would be informed by lessons learned from GPS data gathered from "Judas" pigs, field observations, and camera trap results.

Schedule and Phasing
Feral Pig Management will start in September of 2021 (Year 1) in the upstream focal areas and continue for the first 5 years of Study implementation. Management activities areas will move around within the focal areas as needed to respond to feral pig population movements. Years 6 – 50 will include activities to perform regular inspection, maintenance and removal of feral pigs from the focal areas. Management efforts will fluctuate during the operation and maintenance period as environmental conditions change and as feral pig populations move and adapt.

Access
Access to and from the project area will occur from Interstate 15, SR 91 and SR 71. Primary access to the staging areas will occur off of SR 91 to North Lincoln Avenue and to Serfas Club Drive. Once at the staging areas, access will occur along existing trails, newly constructed maintenance roads associated with other Study measures, across footprints of invasive plant stands or via temporary trails.

Staging
The staging areas for this measure will be located at the OCWD Prado Wetlands Field Office and the Corps Prado Field Office. All worker, worker traffic and disposal transfer operations will be based out of these 2 locations.

3.1.5 Initial Array of Ecosystem Restoration Alternatives

The refined measures developed by the PDT were combined into thematic alternatives for the team to assess potential duplication or conflicts among individual measures and to determine whether individual measures are dependent on other measures for their function. After the initial set of measures had been identified, a series of thematic plans were formulated for initial evaluation of restoration techniques at increasing scales of investment and intensity of alteration of existing environmental conditions. In increasing order of plan commitment and cost, the preliminary alternatives included:

- Basic Plan: restoration techniques that involve lower intensity alteration and level of investment, with two basic components: Water Conservation at 505' elevation year-round, and Invasive Vegetation Removal at upstream focal areas.
- Medium Chino Plan: added measures to address disrupted channel/aquatic environment geomorphology and hydrology (sediment removal, braided channel at Chino Creek, stabilize streambed of Santa Ana River mainstem)
- Widely Supported Plan: more extensive level of effort for restoration and wider range of habitat types provided (sediment management, riparian edge habitats, invasive animal removal)
- All Inclusive Plan: a complete suite of available compatible measures for restoration (added floodplain widening and restoration upstream SAR and aquatic habitat features at Chino Creek)

A Value Engineering workshop was completed in 2014. In addition to identifying some modification of individual measures to improve cost-effectiveness, the workshop recommended completion of a Cost Effectiveness Incremental Costs Analysis (CEICA) to ensure combinable measures were used to derive a range of alternatives that could be compared and evaluated for plan selection.

3.1.6 Formulation of Final Array for Ecosystem Restoration

The initial CEICA analysis on the refined measures was performed in 2016. Outputs for cost effectiveness calculations were based on Combined Habitat Assessment Protocol (CHAP) results of AAHU (Average Annual Habitat Unit) for each measure included in the analysis. CHAP is an accounting tool that uses spatially explicit methodology to measure habitat quality by evaluating biodiversity and their functions within a habitat type and/or structural condition. The results of the initial CEICA were used to identify a potential array of alternatives for detailed analysis.

3.1.6.1 CHAP Analysis in Plan Formulation

The habitat evaluation framework used for the Prado Basin Ecosystem Restoration Project is known as CHAP or Combined Habitat Assessment Protocol. The Corps used CHAP to quantify restoration outputs of the individual restoration measures and alternatives for plan formulation, evaluation and comparison. The following description is a brief summary of the CHAP methodology. A more detailed description is provided in Appendix D.
Instead of calculating economic benefits in monetary terms, Corps ecosystem restoration projects calculate the value and benefits of habitat using established habitat assessment methodologies.

Habitat Units (HUs) are one of the currencies the Corps uses to rate and compare the value of one ecosystem restoration alternative to another. CHAP involves a triad assessment of habitat, species, and functions (O'Neil et al., 2005), and can provide assessments at multiple scales. The CHAP method generates habitat units (HUs) based on an assessment of multiple species (all potential species at a site), habitat features, and functions by habitat type.

One CHAP unit, or HU, can be characterized as the per-acre value of a polygon, or area, multiplied by the acres encompassed in that particular polygon. Each polygon is defined as contiguous areas of individual habitat types considered in the model. This allows the score to reflect the benefits of contiguous habitat areas, while including the areal extent of each habitat type. The per-acre value is a function of the number and types of species present, functions being performed by those species, and the possible number of functions provided by the habitat types associated with the area or polygon. A small polygon can have an extremely high per-acre value, due to the presence of a high number of species performing a high number of functions in high quality habitat versus a large polygon with low per-acre value, due to the presence of few species and, or a lower quality habitat. To evaluate the overall output over time, HUs are calculated for individual years during the period of analysis (50 years). The outputs projected for theses specific yearly values are then averaged over time as Average Annual Habitat Units (AAHU). Detailed information on definition of habitat types, delineation of polygons and related technical procedures is provided in Appendix D.

Baseline Condition

The first step in the CHAP analysis was to document existing conditions and associated "baseline" habitat value throughout the study area. This involved: (1) preliminary mapping, (2) field inventory, (3) developing a list of all the species that are known to or could potentially occur in each habitat type, (4) data compilation and analysis, and (5) conversion to Habitat Units (HUs). Habitat type, structural conditions, and Key Environmental Correlates (KECs) within each polygon were identified and recorded. KECs are structural, biotic, abiotic and anthropogenic habitat elements that support wildlife species at a site. Key Ecological Functions (KEFs), which are the ecological roles performed by each species within the ecosystem, were also defined. KEFs refer to the main ways organisms use, influence, and alter their biotic and abiotic environments. KEFs include functions that organisms perform in the environment, such as a grazer, sap feeder, carrion feeder, seed disperser, etc. Information from previous surveys and input from resource agencies and experienced biologists familiar with the area (the Habitat Evaluation Team) were used to develop the list of species, KECs and KEFs and for data analysis.

All of this information was compiled, analyzed and used to develop per-acre habitat values for each polygon. The per-acre value represents the intrinsic worth of an area to fish and wildlife, determined by and accounting for species, habitats, and functions. Specifically, CHAP per acre habitat values for each polygon are derived by summing two matrices: a species/function matrix that relates all potential species at a site to the KEFs provided by those species and the ecology of a site; and a habitat/function matrix which relates the KECs to the KEFs. This total per-acre value was multiplied by its acreage to determine HUs for each polygon. These values were then summed across all polygons to calculate the total HUs for a particular condition or alternative scenario. In sum, for each polygon:

Per Acre Value x Acres = HUs.

The habitat assessment identified ten native and non-native habitat types or land uses currently existing within the Study Area, totaling 6,785 acres. These were mapped as 572 individual polygons. The baseline existing condition assessment calculated that these acres have a total existing CHAP habitat value of 134,906 HUs.

Per-acre value, or simply HUs/acre is used to compare the habitat value of CHAP polygons within the Study Area to identify the highest and lowest functioning areas. Valley Foothill Riparian and Riverine habitat types were determined to have the highest per-acre habitat value of the habitat types, and Valley Foothill Riparian contributes the most to overall habitat value. Valley Foothill Riparian comprises 53% of the Study Area, and is contributing 69.5% of the overall existing habitat value of the Study Area.

Future Without-Project Alternative

The future without project analysis forecasts the conditions in the Study Area for 50 years into the future assuming that no restoration project is implemented (i.e. No Action alternative). The 50-year future without project analysis assesses three future time periods, 5 years, 25 years and 50 years from the base year.

To undertake this assessment, several projections were made to assess habitats over the 50-year time period. These projections are based on past and current trends in habitat condition in the area. Specifically, reasonable predictions include: 1) populations of threatened and endangered species will decline; 2) there will be an increase in presence of invasive plant species throughout the Study Area; 3) fires threatening the Study Area will continue to occur but will be suppressed; 4) sediment deposition above the Prado Dam along with channel incision below Prado Dam (Reach 9) will persist; 5) current mitigation efforts by the Corps and OCWD within the Study Area will continue to occur; 6) climate change will impact the status of the ecosystem in the 50 year without project analysis period; 7) habitat conditions present directly above the dam will expand due to increased capacity of water conservation; and 8) Prado Dam will remain a barrier to river system connectivity.

To determine a change in habitat values over time from the existing conditions, projections were made to estimate changes to the species, habitat, and/or function parameters in the future. Applying these changes over several time periods required forecasting to estimate the amount of alteration that might be expected during each time period. To display the future without project conditions and visualize these changes in value over time, forecasted changes to the habitat were applied to the habitat mapping, while changes to the species and functions were applied to their respective data sets.

Habitat value in the Study Area is already severely depressed due to the presence of invasive species and the lack of a natural flood/sediment flow regime. Based on the CHAP analysis, habitat value within the Study Area is projected to decline over the next 50 years assuming no restoration activity is implemented. The Study Area is projected to decline steadily in habitat value, with an overall decline of 5% after 5 years, 18% after 25 years, and 28% after 50 years. In the absence of restoration in the Study Area, the existing riparian areas that currently provide the most habitat value per acre will continue to degrade. Ecosystem functions in the Study Area will also continue to diminish.

Future With-Project Scenarios

The combinations of measures (alternatives) that were ultimately carried forward for full analysis in this study were evaluated and compared to determine the potential increase in habitat values that they would provide, if implemented, compared to the baseline and future without-project condition. The net outputs for each set of combined measures for the final array plans were determined from the CHAP outputs and compared to the future-without-project conditions to account for expected changes in the project area that would not be attributed to project features to calculate the net output of each final array plan and to compare the outputs and costs of the alternatives.

3.1.6.2 Final Array Formulation for Ecosystem Restoration

When the Abbreviated Cost Risk Analysis (ACRA) was performed for the proposed final array for ecosystem restoration, construction, operations and maintenance costs for plans that included sediment management more than doubled because of the uncertainty associated with transport and placement of excess sediment removed from the basin. Revised contingency costs and update designs were provided for the individual measures and the CEICA was rerun to ensure that more reliable costs were used as the basis for selecting the final array of alternatives. Table 3-5 identifies the individual measures included in the analysis, along with the revised construction costs, average annual costs, and average annual habitat units (AAHU).

To formulate the final array, each measure/focal area combination had been separately assessed for habitat output then assessed for combinability with other features, dependency on other features, and synergy from combining features. When two or more management measures are dependent, that relationship is considered in CEICA and retained in plan formulation. When management measures are not combinable, that relationship is specified in the Institute of Water Resources (IWR) Plan software, which produces the CEICA. In this manner only mutually exclusive and independent alternatives are formulated, which is a requirement of plan formulation. These criteria were entered to establish all possible combinations of features and associated habitat outputs and costs. These combinations established by the criteria entered into IWR Plan become the alternative plans. Dependency, combinability, and synergy have been developed by the PDT based on consideration of function, requirements and location of the individual measures at the relevant focal areas. These relationships are presented in Table 3-6.

Table 3-5: Restoration Measures, Costs and Outputs

Measure Name	First Cost ($)	Ave Cost/yr ($)	Base Year HUs	Year 5 HUs	Year 25 HUs	Year 50 HUs	AAHUs
SARM Upstream Measures							
Upstream sediment management system	$75,006,895	$7,836,008	754	6,034	11,732	13,810	10,278
Invasive plant management	$5,544,814	$558,989	6,095	15,707	27,150	31,976	24,443
Riparian edge management	$1,675,095	$84,969	-170	619	1,185	1,411	1,032
Instream habitat features	$3,593,347	$139,066	207	217	138	138	161
Non-native aquatics management	$749,240	$110,510	508	475	301	395	378
Native plantings	$1,614,776	$79,931	94	467	642	763	601
SARM Downstream Measures							
Instream habitat features	$6,028,326	$231,762	2,065	6,754	11,089	13,320	10,111
Invasive plant management	$3,509,249	$185,065	2,796	5,274	7,907	8,566	7,158
Non-native aquatics management	$899,088	$132,611	212	164	154	342	206
Chino Creek Measures							
Invasive plant management	$1,985,710	$282,558	513	1,048	1,591	1,483	1,374
Raise existing invert and cut new channel	$7,214,093	$331,000	1,088	1,798	2,595	2,799	2,371
Raise existing invert and braided channel	$7,106,309	$326,856	794	1,737	2,528	2,820	2,317
Instream habitat features	$572,184	$30,651	4	4	2	2	3
Non-native aquatics management	$524,468	$77,357	26	26	25	24	25
Native plantings	$2,855,695	$127,979	699	1,011	1,253	1,350	1,189
Mill Creek Measures							
Invasive plant management	$1,686,427	$86,778	523	999	1,389	1,586	1,298
Non-native aquatics management	$374,620	$55,255	36	36	35	34	35
Native plantings	$769,939	$38,101	58	219	292	296	263
All Upstream Areas - Measures							
Feral pig management	$1,695,146	$250,026	349	322	278	246	285
Cowbird trapping	$1,489,115	$219,638	117	108	94	93	98

While cost effectiveness and incremental cost analysis are important criteria for establishing economically rational alternatives, other decision guidelines need to be applied to determine the National Ecosystem Restoration (NER) Plan. The Federal objective for ecosystem restoration is to restore degraded ecosystem structure, function, and dynamic processes to a less degraded, more natural condition. Specifically, the NER Plan is the justified alternative and scale having the maximum excess of monetary and non-monetary beneficial effects over monetary and nonmonetary costs. These decision guidelines for identifying the NER plan include:

- Output targets
- Output thresholds
- Cost limits
- Breakpoints in incremental cost/output graph
- Unintended consequences

Table 3-6: Measure Conflicts and Dependencies

Solution	Not Combinable with:	Solution	Dependent on:
Chino Creek Raise Invert & New Cut Channel	Chino Creek Raise invert & Braided Channel	Riparian Edge Mgmt (SARM upstream)	SARM Sediment Management System
		Instream Habitat Features (upstream & downstream SARM)	SARM Sediment Management System

The CEICA analysis was performed in a three-step process because the number of features, 20, exceeded the computational capabilities of IWR Plan software. To get around this limitation CEICA analysis was first performed on the features located in SARM upstream and downstream. A CEICA model was then run for features within Chino and Mill Creek. Chino/Mill Creek did not contain any measures with dependencies. This kept all measures with dependencies and the corresponding dependent measures within the SARM grouping. Non-combinable measure pairings also did not extend beyond either SARM or Chino/Mill Creek ensuring that all non-combinable measures are accounted for.

The overall Best Buy plans are shown below in Table 3-7 and Figure 3-12. Note that Figure 3-12 does not include the largest Best Buy Plan (BB Plan 18), for graphical display purposes given the very large incremental cost per output for that plan.

Four of the Best Buy Plans (including the No Action Plan) were selected to carry forward into the Final Array. These plans include Best Buy Plans 1 (No Action), 9, 11, and 14. Table 3-8 summarizes the features of the Final Array Plans. Note that the Cowbird Trapping measure was added to each of the Final Array Action Plans, with a first cost of $1,489,114 and an incremental output of 98 AAHUs. The justification for including this measure in the Final Array is based on the consideration of the PDT and sponsor's subject matter experts that cowbird trapping is essential for the restored riparian habitats to effectively host the native bird populations that play important roles in the function and dynamics of riparian habitats. Because these habitat functions are demonstrated by the presence of populations of indicator species, rather than solely the condition of the habitat without consideration of predatory species, the measure's output is indicated by native bird populations that make use of the habitat, rather than just the habitat itself, which is the output metric evaluated through CHAP.

Table 3-7: Best Buy Incremental Costs and Outputs[1]

BB Plan	Adds Measure(s)	In Location	First Cost	AAC	AAHU	Incr. AAC	Incr. AAHU	Incr.AAC/AAHU
1	No Action							
2	Invasive plant management	SARM US	$5,544,814	$559,000	24,443	$559,000	24,443	$23
3	Invasive plant management	SARM DS	$9,054,063	$744,000	31,601	$185,000	7,158	$26
4	Invasive plant management	Mill Creek	$10,740,489	$831,000	32,899	$87,000	1,298	$67
5	Native plantings	Chino Creek	$13,596,184	$959,000	34,088	$128,000	1,189	$108
6	Native plantings	SARM US	$15,210,960	$1,039,000	34,689	$80,000	601	$133
7	Raise existing invert and cut new channel	Chino Creek	$22,425,054	$1,370,000	37,060	$331,000	2,371	$140
8	Native plantings	Mill Creek	$23,194,993	$1,408,000	37,323	$38,000	263	$144
9	Invasive plant management	Chino Creek	$25,180,703	$1,691,000	38,697	$283,000	1,374	$206
10	Non-native aquatics management	SARM US	$25,929,943	$1,802,000	39,075	$111,000	378	$294
11	Sediment Management System US/DS + Riparian edge management US + Instream Habitat Features (DS)	SARM US/DS	$108,640,259	$9,955,000	60,496	$8,153,000	21,421	$381
12	Non-native aquatics management	SARM DS	$109,539,347	$10,088,000	60,702	$133,000	206	$646
13	Instream habitat features	SARM US	$113,132,694	$10,227,000	60,863	$139,000	161	$863
14	Feral Pig Management	All	$114,827,841	$10,477,000	61,148	$250,000	285	$877
15	Non-native aquatics management	Mill Creek	$115,202,461	$10,532,000	61,183	$55,000	35	$1,571
16	Cowbird Trapping	All	$116,691,575	$10,752,000	61,281	$220,000	98	$2,245
17	Non-native aquatics management	Chino Creek	$117,216,043	$10,829,000	61,306	$77,000	25	$3,080
18	Instream habitat features	Chino Creek	$117,788,227	$10,860,000	61,309	$31,000	3	$10,333

[1]Feral Pig Management and Cowbird Trapping Measures located in SARM Upstream, Chino Creek and Mill Creek Focal Areas

Best Buy Plan 9 - This plan was the smallest best buy plan determined to minimally meet planning objectives. It provides 38,795 AAHUs. The total first cost is approximately $36.8 million, with an average annual cost of about $1.98 million. The incremental AAC/AAHU of Best Buy Plan 9 relative to Best Buy Plan 8 is $206, which represents a substantial increase over some smaller Best Buy Plans, but still low compared to larger scale plans. Relative to the No Action Plan, the incremental AAC/AAHU is about $51. This plan indirectly provides restoration of hydrologic processes by removing Arundo and reducing evapotranspiration, but it does not directly restore hydrologic processes and isolation of habitat caused by channel incision on the Santa Ana River upstream and downstream reaches.

Best Buy Plan 11 - This plan adds to Plan 9 and provides a substantial increase in output, generating 60,594 AAHUs. The total first cost is approximately $138 million, with an average annual cost of about $13.2 million. The incremental AAC/AAHU of this plan relative to Best Buy Plan 9 is $514. This plan is the first to feature the sediment management system along the Santa Ana River Mainstem (SARM), as well as in-stream habitat features in the SARM downstream area and riparian edge management features upstream, which are both dependent upon implementation of the sediment management system. This plan also adds non-native aquatics management in the SARM upstream area. These additional features raise the cost considerably – the first cost is about $101 million higher than Best Buy Plan 9, and average annual costs are approximately 6.7 times higher than the annual costs for Best Buy Plan 9. However, the increase in output of 21,799 AAHUs results in a low incremental cost per AAHU.

The incremental AAC/AAHU for this best buy plan is substantially lower than larger scale best buy plans.

Table 3-8: Final Array Ecosystem Restoration Plan Features

BB Plan[1]	Measure(s) Added	In Location
1	No Action	
9	-	
	-Invasive Plant Mgt.	All Locations
	-Native Plantings	SARM US, MC, CC
	-Raise Invert/Cut New Channel	CC
	-Cowbird Trapping*	SARM US, CC, MC
11	-Non-native Aquatics Mgt.	SARM US
	-Sediment Mgt. System	SARM US/DS
	-Riparian Edge Mgt.	SARM US
	-Instream Habitat Feature	SARM DS
14	-Non-Native Aquatics Mgt.	SARM DS
	-Feral Pig Management	SARM US, CC, MC
	-Instream Habitat Features	SARM US

[1]Best buy plans add measures to the smaller plans in the array. Plan 11 includes measures from Plan 9, and Plan 14 includes measures from Plans 9 and 11.

Best Buy Plan 14 – This plan adds to Plan 11 and is the largest plan carried forward to the Final Array, and is projected to generate 61,246 AAHUs. This represents an increase of 652 AAHUs relative to Best Buy Plan 11. The total first cost of Best Buy Plan 14 is approximately $146.1 million, with an average annual cost of about $13.8 million. The incremental first cost and annual cost of Best Buy Plan 14 relative to Best Buy Plan 11 are about $8.4 million and $608,000, respectively. This plan adds non-native aquatics management in the SARM downstream area, in-stream habitat features in the SARM upstream area, and feral pig management throughout all focal areas. Relative to Best Buy Plan 11, the incremental AAC/AAHU for this final array plan is larger than smaller scale plans, and at $950 it is substantially lower than larger scale best buy plans.

3.2 WATER CONSERVATION PLAN FORMULATION

3.2.1 Water Conservation Measures Development

Current and proposed water conservation measures for this study all rely on retention of water at Prado Dam for water conservation that is then released at a rate that allows additional volumes of water to be diverted to OCWD's existing recharge facilities located adjacent to the Santa Ana River downstream of Prado Dam. The existing water conservation provisions of the Prado Dam Water Control Plan allows retention of water to 498 feet water surface elevation (WSE) NGVD during flood season (October through February), and to 505 feet WSE NGVD during non-flood season (March through September) for controlled release for diversion and use by OCWD's recharge facilities. All water surface elevations cited in this document are in feet NGVD 1929 (NGVD). Prado dam has been operated for additional water conservation capacity through approved minor deviations from the Water Control Plan that allow dam operation for water retention to 505 feet WSE and controlled release on a year round basis. Currently, a major deviation has been approved by the USACE South Pacific Division that allows for this continued level of operation for water conservation for a five year period, through 2023.

During initial plan formulation, the PDT evaluated potential water conservation measures, including plan formulation efforts conducted for a 2005 draft water conservation feasibility report on Prado Basin (USACE, 2005). Based on this prior study and the existing water conservation operations at Prado Dam, the PDT identified a range of measures that had been considered in a previous study. A number of these measures have substantially greater costs and impacts of implementing water conservation to elevations higher than WSE 505 feet, including environmental impacts and flooding impacts within the basin. For water conservation retention at WSE between 498 feet and 505 feet, the project would incur similar operating costs as operating for water conservation at 505 feet but with proportionally lower yields. Based on these considerations, a decision was made at the Alternatives Milestone Conference, through coordination and agreement with the Corps South Pacific Division and Headquarters representatives, to carry forward water conservation at up to 505 feet WSE at any time during the year.

The formulation for water conservation that selected the 505 WSE approach was based on existing conditions in the study area, including OCWD's infrastructure for diversion and infiltration of water from the Santa Ana River downstream of Prado Dam and the environmental commitments made by OCWD for water conservation operations that accounted for environmental effects and benefits associated with the Prado Dam Water Control Plan deviations that had been reviewed by resource agencies with interests in the environmental resources and threatened and endangered species that are present in the basin and that must be considered in water conservation operations.

For each of the potential measures considered, water surface elevations were identified for water conservation operations. Water conservation that has occurred under the Prado Dam Water Control Plan and approved deviations have designated pool elevations for water conservation on either a seasonal or year-round basis. Previously, the Water Control Plan provided for dam operations with a non-flood season WSE of 505 feet, with flood season operations limited to 498 feet. The lower elevation for water conservation during flood season provided an additional

safety factor by ensuring an adequate storage capacity for flood risk management operations without having to rely on higher volume releases prior to arrival of storm events in the upper Santa Ana River watershed. Advances in the accuracy and reliability of weather forecasting has allowed adoption of Water Control Plan Deviations to allow for year round operations at 505 feet WSE. If forecast conditions predict a storm arrival that would require additional capacity to manage runoff from the upper watershed, these conditions can now be predicted with sufficient lead time to allow for releases at a higher rate to accommodate storm flows and ensure acceptable flood risks for downstream areas protected by Prado Dam.

The PDT evaluated the previous operations under the Water Control Plan for Prado Dam and approved deviations and determined that the year round operation at 505 feet WSE maximized yield for the water conservation effort while ensuring that the flood risk management performance of the Santa Ana River Mainstem project, including Prado dam, was not compromised. The basis for identifying the scale of the measure and basic approach to water conservation carried forward is summarized in Table 3-9. Based on these considerations, Water Conservation at 505 WSE on a year-round basis was determined to maximize net benefits in terms of the net value of the water provided and cost savings for OCWD customers, and is the National Economic Development (NED) plan for Water Conservation. Detailed evaluations of supply scenarios and relative benefits based on costs of alternative water supplies to OCWD that provide the basis for savings provided by water conservation are explained in detail in the Economics Appendix of this document.

3.2.2 Water Conservation Measures for Alternative Plans

Once the basic approach for Water Conservation was identified in the preliminary plan formulation and the measure's operational and performance requirements had been determined, the PDT then considered adaptations that may be required for the Water Conservation plan to be implemented with the measures of the Ecosystem Restoration plans that had been identified for the final array. The PDT determined that Water Conservation is compatible with each of the final array plans. The only issue that requires adaptation of the Water Conservation plan based on the accompanying restoration plan is sediment accumulation changes in Prado Basin that would occur because of water conservation operations. Based on OCWD's experience with ongoing water conservation at Prado Dam, the PDT recognized that sediment removal could be included in the Water Conservation measure to address changes in sediment accumulation that might displace or degrade habitat. This feature would be included in the Water Conservation measure only if it is implemented in conjunction with an Ecosystem Restoration plan that does not include a sediment management measure for Ecosystem Restoration (Best Buy Plan 9). For final array plans that combine Water Conservation with a restoration plan that includes Sediment Management for Ecosystem Restoration, the Water Conservation measure would not require sediment removal. This is because the restoration Sediment Management Measure addresses sediment accumulation at much larger scale to address the geomorphologic and hydrologic conditions that provide restoration benefits related to sediment management on the Santa Ana River mainstem. The version of the Water Conservation measure without sediment removal would be compatible with Ecosystem Restoration Best Buy plans 11 and 14 in the final array. The following sections describe the measure versions that are needed for combined plans that cover the final array alternatives for Ecosystem Restoration.

Table 3-9: Water Conservation Measures Screening

Water Conservation Measure	Scale and Effectiveness	Resource Considerations
Prado Dam 498 WSE flood season/ 505 WSE non-flood season	Limited yield for water conservation due to lower pool elevation during flood season. Similar costs as measures with higher yield.	Flood risk management: provides highest safety factor for downstream flood risk Environmental: No additional inundation impacts beyond those addressed by Water Control Plan deviation. Recreation: no additional restrictions or impacts on recreation.
Prado Dam 500 WSE flood season/ 505 WSE non-flood season	Slight increase in yield over 498/505 WSE measure for higher pool elevation during flood season.	Flood risk management: provides similar risk management outcomes as 498/505 WSE measure. Environmental: No additional inundation impacts beyond those addressed by operation under Water Control Plan deviation. Recreation: no additional restrictions or impacts on recreation.
Prado Dam 505 WSE year-round	Maximizes potential yield for the 505 WSE limit. Relies on advanced weather forecasting to provide acceptable flood risk management capacity	Flood risk management: provides acceptable flood risk management by increasing release rate prior to storm events. Environmental: No additional inundation impacts beyond those for operation under Water Control Plan deviation. Recreation: no additional restrictions or impacts on recreation.
Prado Dam 508 WSE year-round	Provides greater yield than possible with a 505 WSE limit. May exceed capacity of diversion/infiltration infrastructure of OCWD.	Flood risk management: Risk uncertainty would require additional hydrologic/hydraulic modeling. Environmental: Additional impacts of inundation above 505 WSE would require additional environmental commitments. Recreation: Additional impacts would occur to facilities above elevation 505, requiring relocation or seasonal use restrictions.

Prado Dam, the PDT recognized that sediment removal could be included in the Water Conservation measure to address changes in sediment accumulation that might displace or degrade habitat. This feature would be included in the Water Conservation measure only if it is implemented in conjunction with an Ecosystem Restoration plan that does not include a sediment management measure for Ecosystem Restoration (Best Buy Plan 9). For final array plans that combine Water Conservation with a restoration plan that includes Sediment Management for Ecosystem Restoration, the Water Conservation measure would not require sediment removal. This is because the restoration Sediment Management Measure addresses sediment accumulation at much larger scale to address the geomorphologic and hydrologic conditions that provide

restoration benefits related to sediment management on the Santa Ana River mainstem. The version of the Water Conservation measure without sediment removal would be compatible with Ecosystem Restoration Best Buy plans 11 and 14 in the final array. The following sections describe the measure versions that are needed for combined plans that cover the final array alternatives for Ecosystem Restoration.

3.2.2.1 Water Conservation with Small Scale Sediment Removal for Water Conservation without Ecosystem Restoration Sediment Management System (SARM Upstream)

This version of the Water Conservation Measure would be implemented at the SARM Upstream Focal Area if Water Conservation is implemented in an alternative that does not include a sediment management system for ecosystem restoration, because of the additional features that would be needed to address impacts of Water Conservation if it is implemented without sediment management. The measure would permit the surface water elevation in the buffer pool at Prado Dam to be maximized up to 505 ft., NGVD, at any time of year due to a significant runoff event that provides this opportunity for water conservation. The Water Conservation measure would include two sediment removal actions to address habitat impacts associated with induced sediment accumulation along the Santa Ana River upstream of the dam (see Figure 3-10). 125,000 cubic yards of sediment would be removed from the upstream reach of the Santa Ana River in two events for a total removal of up to 250,000 cubic yards of sediment excavated and placed in the sediment placement areas (Area A and Area B) to address additional sediment accumulation that would occur due to water conservation operations over the period of analysis, since water conservation would be implemented without the sediment management measure in this alternative. Sediment removal requirements for Water Conservation implemented without sediment management for Ecosystem Restoration is based on observation of the past performance of similar Water Conservation activities conducted under deviations from the current Water Control Plan for Prado Dam and Reservoir and consultation with agencies that have responsibility for resources affected by those operations.

The sediment removal activities would involve five primary activities; the construction of a sediment removal trap, construction of a sediment storage/green waste processing area, sediment removal by dry excavation, onsite storage/processing of the sediment material, and the hauling of the removed sediment to an offsite location.

The proposed sediment removal trap would be constructed outside of the nesting season (after August 15 and before March 1) near the discernable end of the Santa Ana River, within the southeast portion of Prado Basin near elevation 505 ft. The sediment removal trap would consist of approximately 13.2 acres and would have a maximum depth of 12 feet. A 25-foot-wide project access road would be constructed from the sediment removal trap to the sediment storage site and around the perimeter of the sediment removal trap. The access road around the perimeter of the sediment removal trap would provide a buffer between the sediment removal activities and adjacent habitat.

In order to construct the sediment removal trap and project access roads, all vegetation within the footprint of the sediment removal trap and project access roads would be removed. The vegetation removal would occur outside of nesting season. The above-ground vegetation would

be cleared, followed by removal of the root system. The removed vegetation would be processed and converted into mulch to re-surface project access roads or would be trucked offsite for disposal.

To process the green waste and to temporarily store sediment removed from the sediment removal trap, an approximate 32.4 acre sediment storage site would be prepared by clearing or mowing surface vegetation on the site outside of the nesting season, and grading/re-contouring the area as necessary. At the sediment storage site the green waste would be processed and converted to mulch, and the sediment removed from the sediment removal trap would be placed for permanent storage at the sediment storage area (see Figures 3-8 and 3-4).

A combination of dry excavation and hydraulic dredging would be used to remove sediment from the sediment removal channel. Once the vegetation is removed heavy equipment would begin excavation of the sediment removal channel to create a pool for hydraulic dredging. An area of approximately 200 feet in length, 200 feet in width and 12 feet in depth would be excavated in the wetted channel of the Santa Ana River.

Once the pool is created, a hydraulic dredge would travel up and down the sediment removal channel by anchoring spuds into the ground. As the suction pipeline operates, one of the spuds is lifted while the other remains anchored. The barge would then pivot around the anchored spud causing the barge to rotate. This process is known as walking and is repeated along the entire sediment removal channel while drawing in slurry. As the hydraulic dredge barge travels along the sediment removal channel, a discharge pipeline would trail behind floating on top of the water surface. In the event there is not enough water for the dredge to operate, the sediment would be removed by dry excavation.

The collected sediment slurry would be conveyed to the sediment storage site though a temporary 12 inch to 18 inch above ground discharge pipeline with the assistance of booster pumps. Once the sediment reaches the sediment storage site the water/sediment mixture would be separated in settling basins to remove the water. Once the water has been removed, the sediment would be stockpiled onsite.

The sediment removed from the Prado Basin would be hauled to onsite placement areas identified for the Sediment Management Measure for Ecosystem Restoration in the event that Water Conservation is implemented without the Sediment Management Measure.
The sediment removal component of this measure would only be implemented with Plan 9. Plans 11 and 14 include larger scale sediment removal activities that would replace the sediment management activities of this measure. The water conservation component of this measure will be implemented with all alternatives except for the No Action Alternative. Average annual costs and damages for this plan are summarized in Table 3-10.

Table 3-10: Summary of Operating Costs and Economic Losses for Water Conservation with Incidental Sediment Removal

Damage/Cost Category	**Average Annual Damage**
Incidental Sediment Mitigation	$124,100
Operation and Maintenance	$103,000
Flood Risk	
Recreation Loss	$2,400
Cleanup & Repair	$1,900
Total	**$231,400**

Schedule and Phasing
Modified Dam operations required to implement the flood season water conservation WSE would occur annually starting in Year 1 and extend through Year 50. Initial construction of the sediment removal features and the initial removal of 125,000 C.Y. would occur in year 1. At approximately year 25 the final 125,000 C.Y. would be removed from the trap area. Years 2 – 50 would include regular annual wildlife and habitat monitoring as well as maintenance road upkeep and riparian edge management.

Access
Access to and from the sediment management site will occur via SR 91 utilizing the Serfas Club/Auto Center Drive access ramps. Auto Center Drive will be used to access the site and once on-site, existing and new maintenance roads will be used for access to the sediment trap.

Staging
All worker parking, construction, sediment removal and ongoing maintenance activities will be staged from within the footprint of the sediment storage site or from the U.S. Army Corps Prado Field Office.

3.2.2.2 Water Conservation without Additional Sediment Removal for Water Conservation implemented with Ecosystem Restoration Sediment Management System (Upstream SARM)

The Water Conservation Plan would amend the current Prado Dam Water Control Plan by allowing a permanent increase in the water surface elevation of the buffer pool during the flood season, (October 1st to February 28) from 498 ft. up to 505 ft. During the non-flood season, the buffer pool would continue to operate at a maximum water elevation of 505 ft. at any time of year due to a significant runoff event that provides this opportunity for additional water conservation, as it does currently. Additionally, the Water Conservation Plan includes a permanent reduction on the average non-storm outflow release rate from Prado Dam from March 1 to August 30 from 500 cfs to 350 cfs to maximize groundwater recharge potential. The increase in the buffer pool during the flood season would provide up to approximately 10,000 acre-feet of additional temporary storm water capture capacity. Based on modeling conducted by the Corps for the Feasibility Study, increasing the buffer pool to water elevation 505 ft. would on average result in approximately 6,000 acre-feet of additional water per year for conservation and groundwater recharge.

Implementation of the Water Conservation Plan would have the potential to result in higher elevation pooling and additional days of inundation in the Prado Basin. To estimate the additional days of inundation Michael Baker International Company evaluated results from HEC-5 computer model used by the Corps in its analysis of different water conservation levels at the Prado Dam. For the economic analysis in the Feasibility Report and for the purposes of environmental impact analysis, an inflow scenario was developed for project initial Year 2021 through future Year 2071. The Supplemental Water Conservation Analysis is presented in its entirety in Appendix B. The average additional days of inundation from the implementation of the Water Conservation Measure that are estimated to occur in the Prado Basin by each month of the year are shown in red text in Table 3-12. The areas within the Prado Basin that are bounded by the contours of 498 ft. and 505 ft. are shown in Figure 3-11. During the flood season from October 1 to February 28/29 the top elevation of the buffer pool would be increased to water elevation 505 ft. from 498 ft. compared to the existing Water Conservation operations. This change in the operation plan would make the maximum buffer pool elevation 505 ft. during the non-flood season and flood season. Average annual costs and damages for this plan are summarized in Table 3-11.

Schedule and Phasing

Modified Dam operations required to implement the flood season water conservation WSE would occur annually starting in Year 1 and extend through Year 50.

Table 3-11.: Summary of Operating Costs and Economic Losses for Water Conservation without Incidental Sediment Removal

Damage/Cost Category	**Average Annual Damage**
Operation and Maintenance	$103,000
Flood Risk	
Recreation Loss	$2,400
Cleanup & Repair	$1,900
Total	**$136,300**

Table 3-12: Inundation Days for Water Conservation

Time Period		**Days of inundation above selected pool elevations {increase from existing water conservation shown in red}**										
		470'	**480'**	**490'**	**494'**	**498'**	**500'**	**505'**	**510'**	**520'**	**530'**	**540'**
Average Monthly	**October**	2-3	1-3	1-2	0-1	0	0	0	0	0	0	0
		0-1	0-1	0-1	0	0	0	0	0	0	0	0
	November	8-12	6-10	5-8	2-4	1	0-1	0	0	0	0	0
		0	0	0	0	0-1	0-1	0	0	0	0	0
	December	12-16	11-15	10-14	7-11	4-8	3-6	0-1	0	0	0	0
		0-1	0-1	1	2	4-7	3-6	0	0	0	0	0
	January	19-25	18-24	16-22	13-20	10-17	8-14	1-2	0	0	0	0

Time Period		Days of inundation above selected pool elevations {increase from existing water conservation shown in red}										
		470'	480'	490'	494'	498'	500'	505'	510'	520'	530'	540'
		1-3	2-4	3-4	4-6	8-15	7-13	1	0	0	0	0
	February	19-26	18-26	17-25	15-23	11-19	10-17	2	1	0	0	0
		3-4	4-5	5-6	6-8	9-16	9-16	1	0	0	0	0
	March 1-14	7-12	6-12	5-12	4-11	3-9	2-8	0-1	0	0	0	0
		2	2-3	1-3	1-5	1-5	1-5	0-1	0	0	0	0
	March 15-31	12-14	11-14	11-13	10-12	9-10	8-9	1	0	0	0	0
		1-3	1-3	1-3	2-4	2-4	2-3	1	0	0	0	0
	April	13-21	12-20	11-19	9-17	7-13	5-11	0	0	0	0	0
		0-4	0-4	0-4	0-4	0-2	0-1	0	0	0	0	0
	May	5-13	5-12	4-11	3-8	3-6	2-4	0	0	0	0	0
		0-1	0-1	0-1	0	0	0	0	0	0	0	0
	June	1-3	1-3	1-3	1-2	1-2	0-1	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0
	July	0-1	0-1	0-1	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0
	August	1	1	1	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0
	September	1-2	1	1	0-1	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0
annual average range		98-149	91-141	82-131	65-109	49-86	41-71	6-7	2	0	0	0
		10-16	11-18	13-22	17-29	25-51	22-45	3-5	0	0	0	0
Note: range in days of inundation values is based on estimated OCWD recharge rate ranging from 350 to 500 cfs												

Access
Access to and from the dam operations center will be the same as for current operations.

Staging
All worker parking, and ongoing operations activities will occur at the dam operations center. Scheduling and determination of release rates for Prado Dam would be determined by Corps operations personnel and would be determined based on judgment informed by precipitation and inflow forecasts as well as real time measurements of rainfall and stream flow data.

3.3 FINAL ARRAY COMBINED PLANS FOR ECOSYSTEM RESTORATION AND WATER CONSERVATION

The measures and plans formulated for each project purpose were formulated independently, as described in the previous sections of this chapter. The evaluation of conflicts and dependencies between plans for the different study purposes determined that the Water Conservation plan

requires a component for additional sediment removal in combined plans only for alternatives where the Ecosystem Restoration Plan does not include the Sediment Management System Measure. The final array of combined plans is provided in Table 3-13.

Table 3-13: Final Array Combined Plans for Ecosystem Restoration and Water Conservation

Final Array Plan Number	1 (No Action)	2	3	4
Ecosystem Restoration Plan Component	None	Best Buy Plan 11	Best Buy Plan 9	Best Buy Plan 14
Water Conservation Plan Component	None	Water Conservation at WSE 505 (No Sediment Removal)	Water Conservation at WSE 505 With Sediment Removal	Water Conservation at WSE 505 (No Sediment Removal)

The combined plans in the final array have incidental benefits and cost considerations that are accounted for in the plan comparisons. Specifically, implementing Ecosystem Restoration in combination with Water Conservation increases the habitat outputs of restoration measures located in the focal areas within Prado Basin. Conversely, implementing Water Conservation in combination with Ecosystem Restoration plans that include sediment management as a measure for ecosystem restoration eliminates the requirement for additional sediment removal as part of the Water Conservation plan. This reduces costs and increases the economic effectiveness of Water Conservation for combined alternatives that include sediment management as a restoration measure, relative to the cost effectiveness of Water Conservation combined with the Ecosystem Restoration alternative that does not include sediment management for restoration outputs (Best Buy Plan 9).

The alternatives presented in the final array for detailed consideration are composed of various plans, as explained in this Chapter. These alternatives represent the spectrum of reasonable alternatives that substantially respond to the purpose and need statement. Agencies are obligated to evaluate a reasonable range of alternatives in enough detail so that a reader can compare and contrast the environmental effects of the various alternatives. The EIS portion of this IFR evaluates the impacts associated with each alternative and discloses the impacts by reach or major feature where appropriate.

The alternatives considered in detail provide a range of restoration efforts, with Alternative 3 including the lowest level of restoration and Alternative 4 the most intensive and largest footprint of restoration. Therefore, identification of variations or alternatives within this spectrum generally would not require a supplemental IFR and instead would be addressed in the final IFR.

Ultimately, this process is intended to result in an informed recommendation of a project for authorization. The recommended project could be any of the four action alternatives and one no-action alternative analyzed in this draft IFR. The recommended project could also be a plan that modifies one of the four action alternatives to add features present in another alternative, or to substitute one or more reach plans from a larger alternative, or any other plan within the

spectrum analyzed in the final IFR. The environmental impacts of the combined plan alternatives are presented in Chapter 5, the comparison of plans by their combined outputs, impacts and costs is provided in Chapter 6, and the Tentatively Selected Plan and its implementation requirements are presented in Chapter 7.

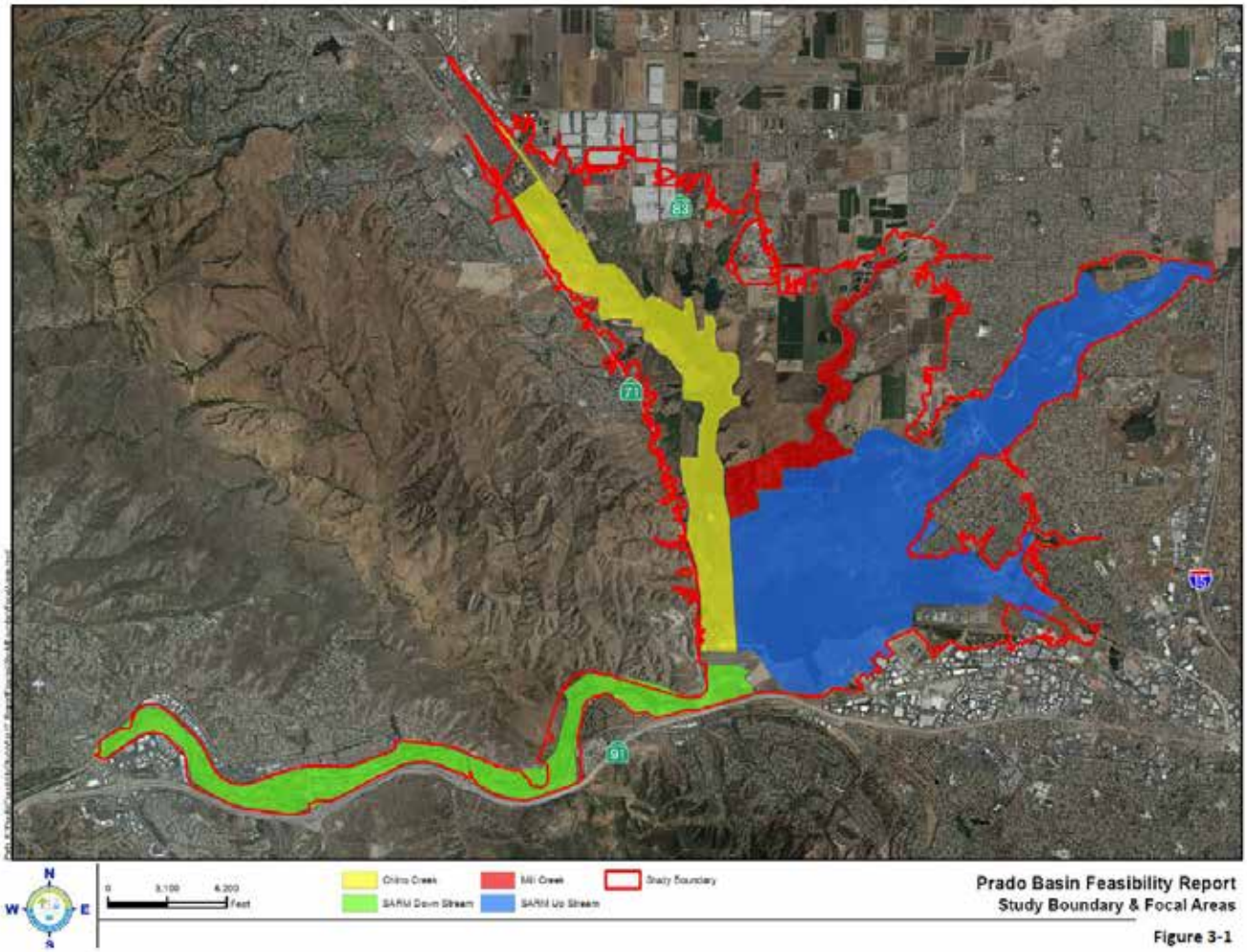

Figure 3-1: Study Boundary and Focal Areas

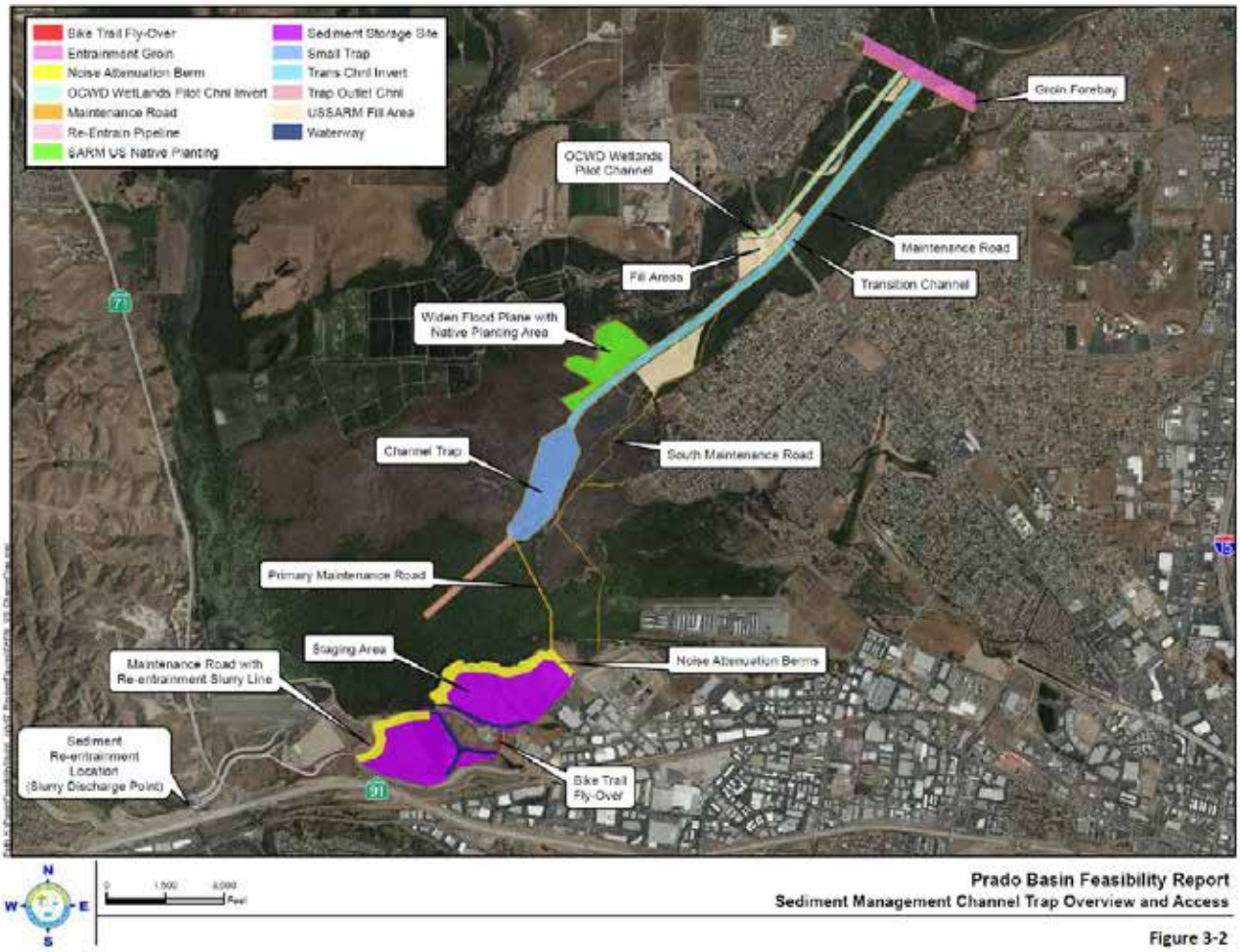

Figure 3-2: Sediment Management Channel Trap Overview and Access

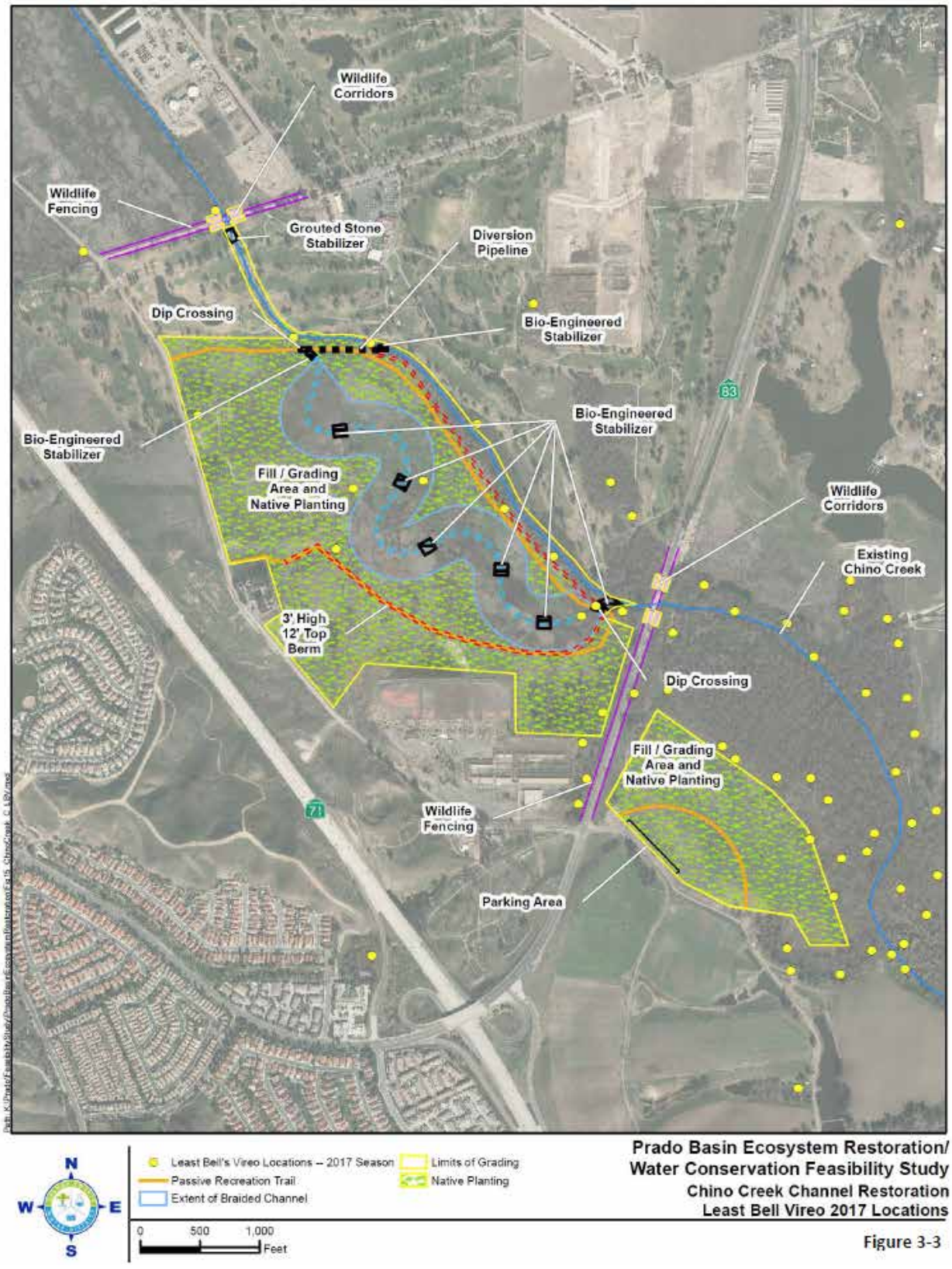

Figure 3-3: Chino Creek Channel Restoration Least Bell Vireo 2017 Locations

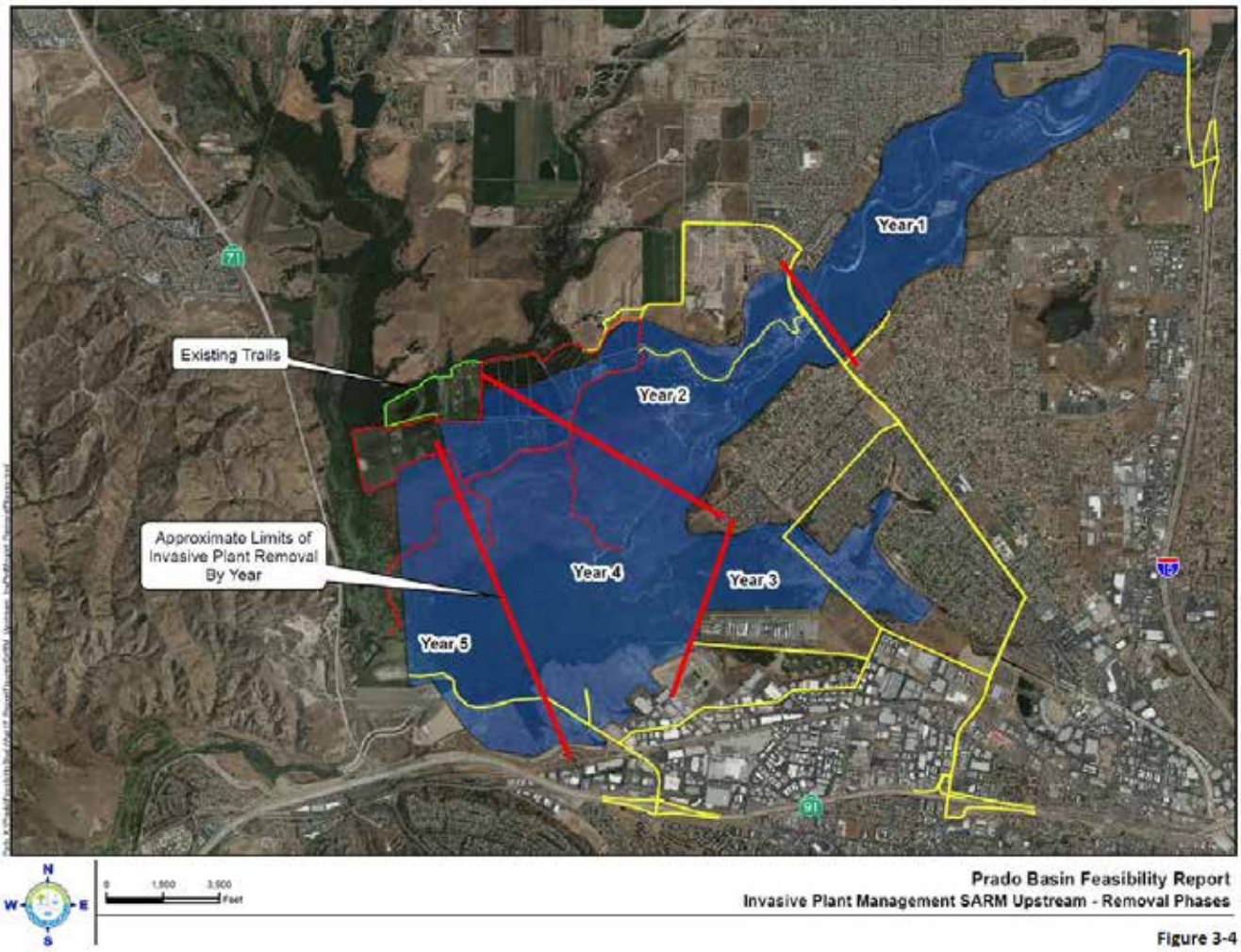

Figure 3-4: Invasive Plant Management SARM Upstream – Removal Phases

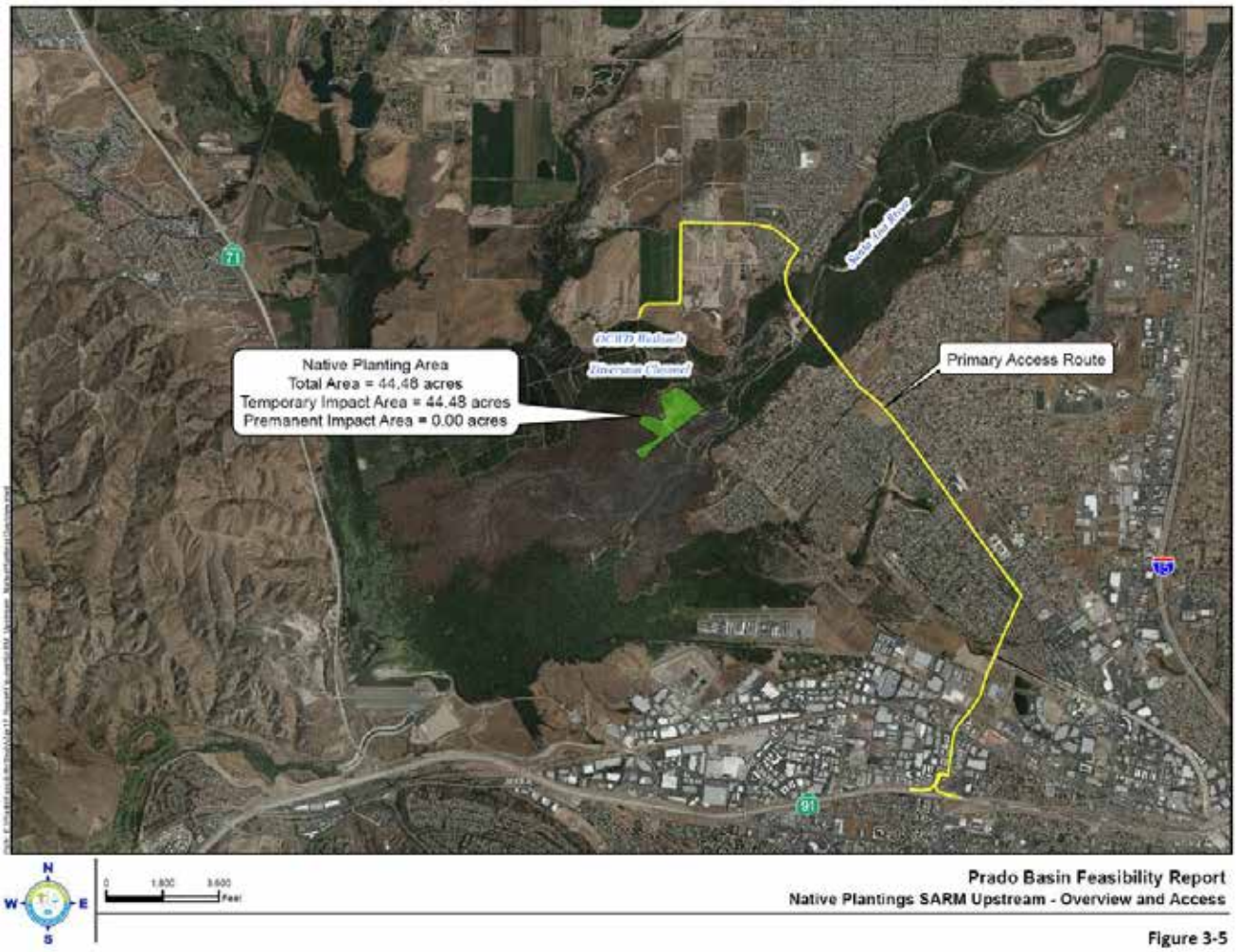

Figure 3-5: Native Plantings SARM Upstream – Overview and Access

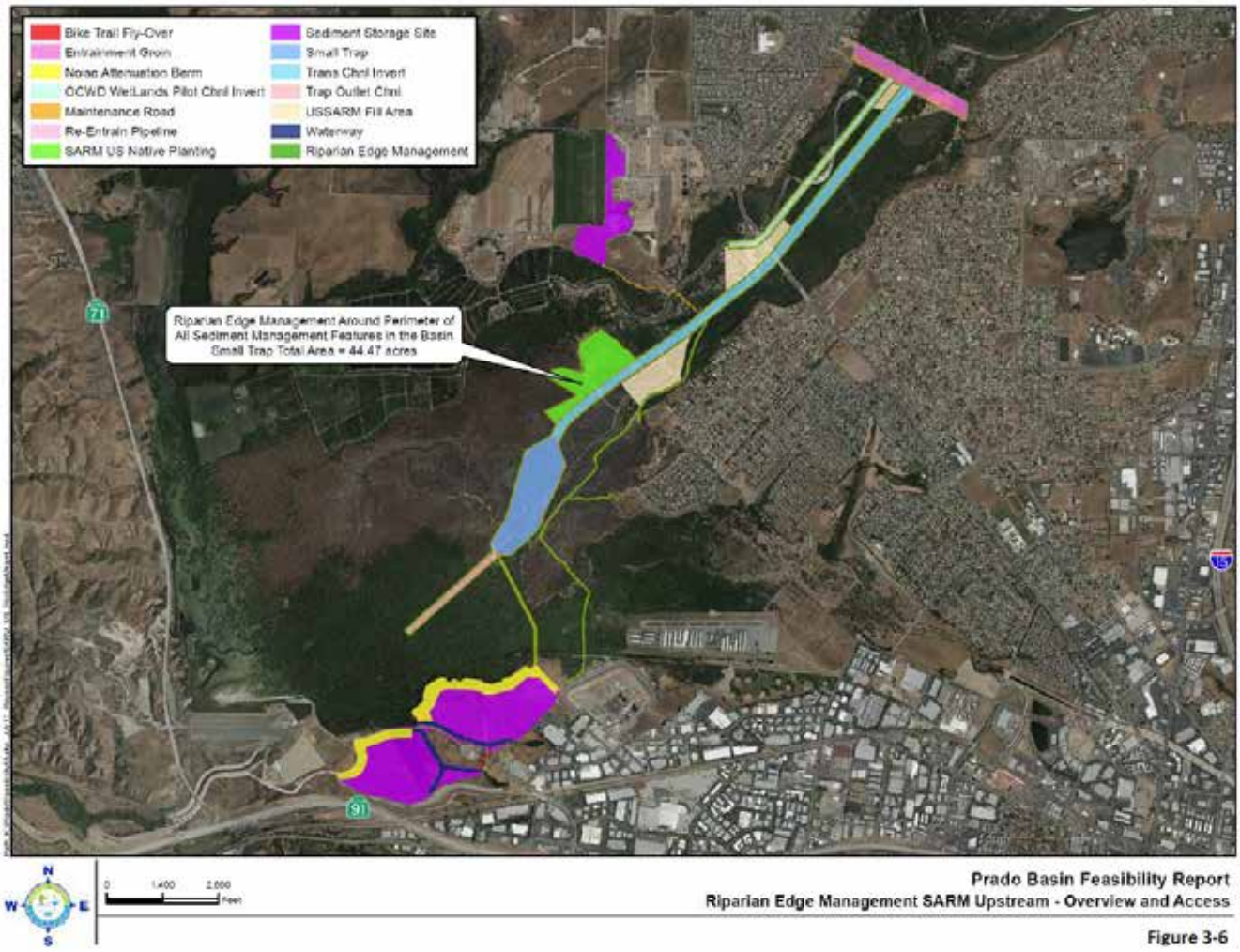

Figure 3-6: Riparian Edge Management SARM Upstream – Overview and Access

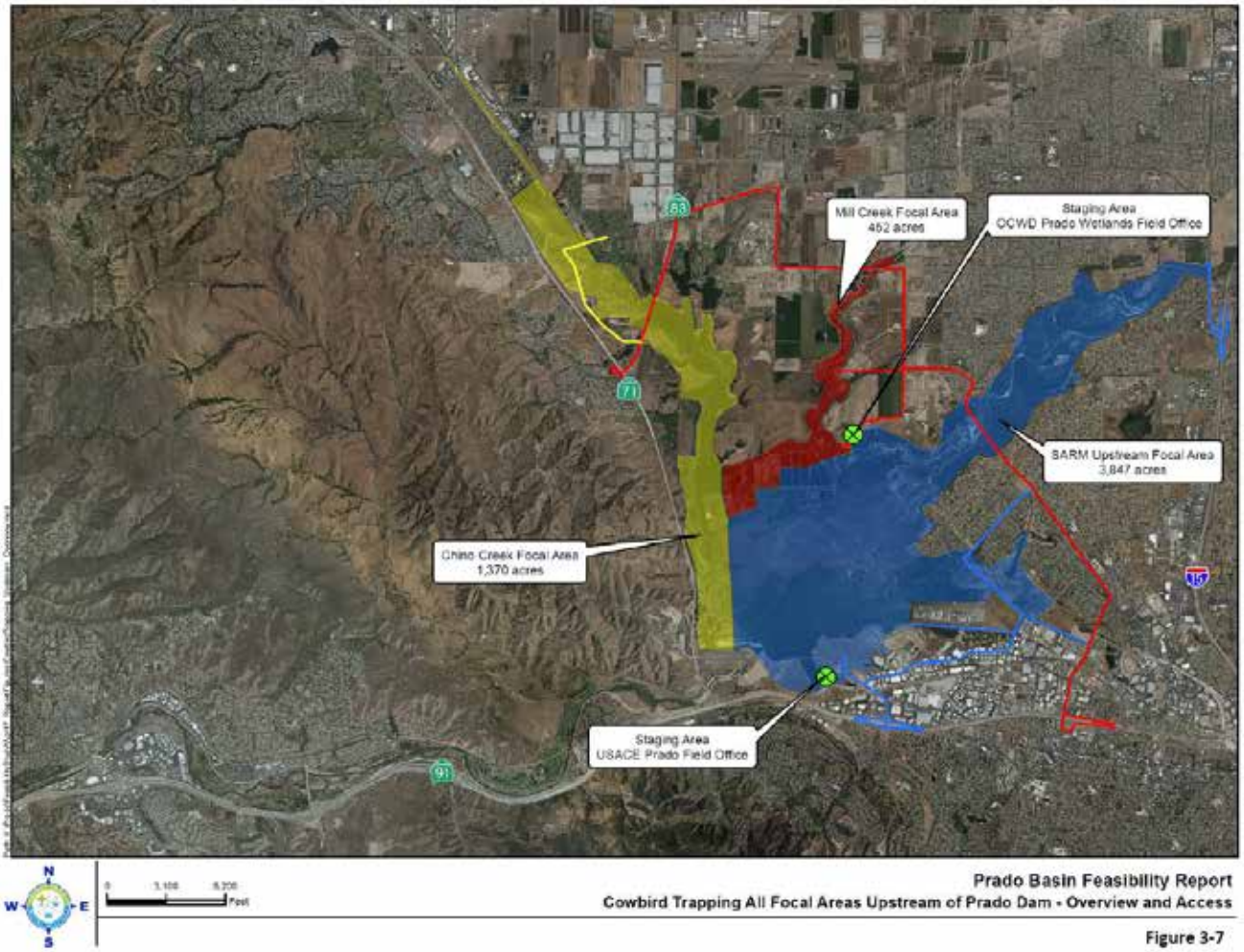

Figure 3-7: Cowbird Trapping All Focal Areas Upstream of Prado Dam – Overview and Access

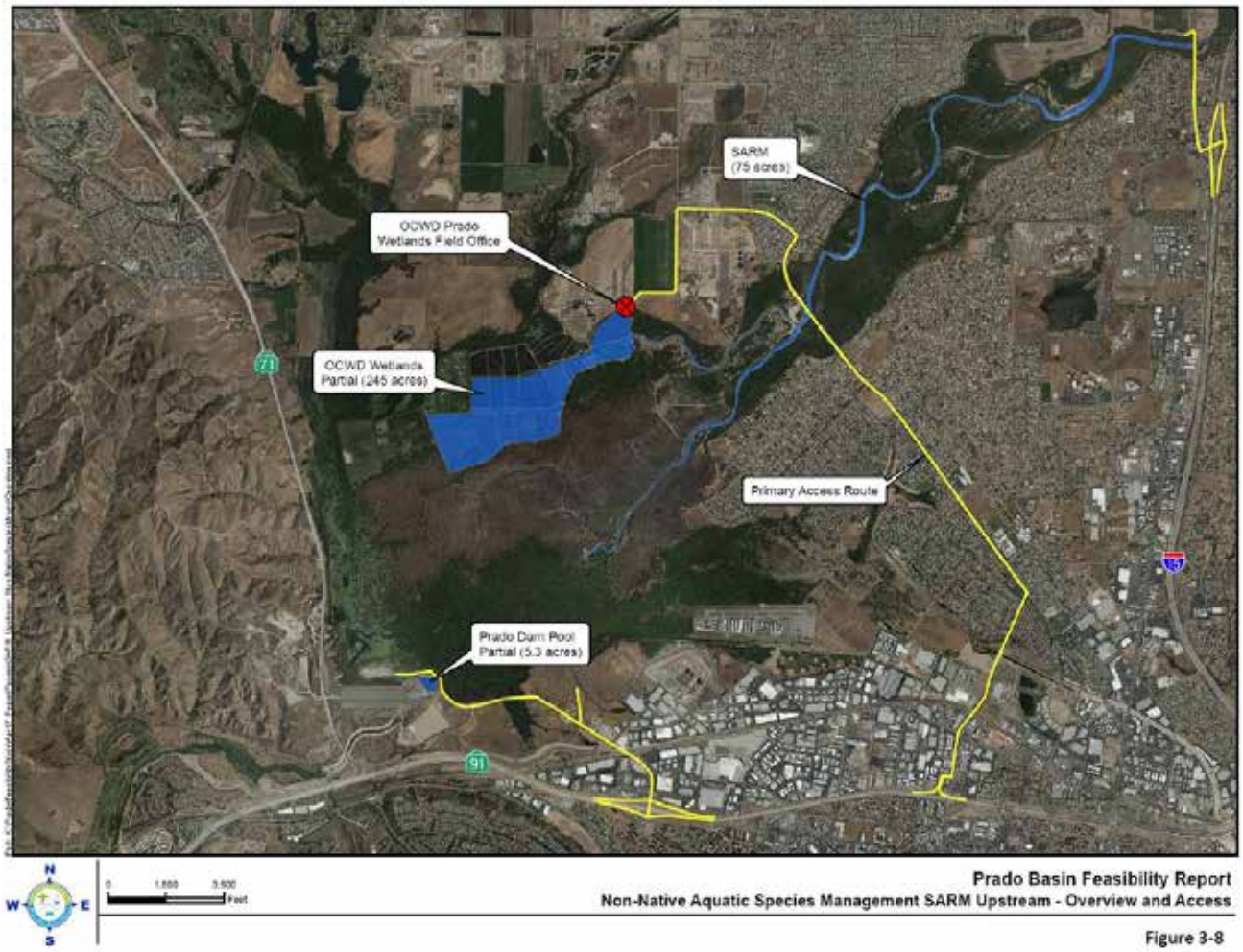

Figure 3-8: Non-Native Aquatic Species Management SARM Upstream – Overview and Access

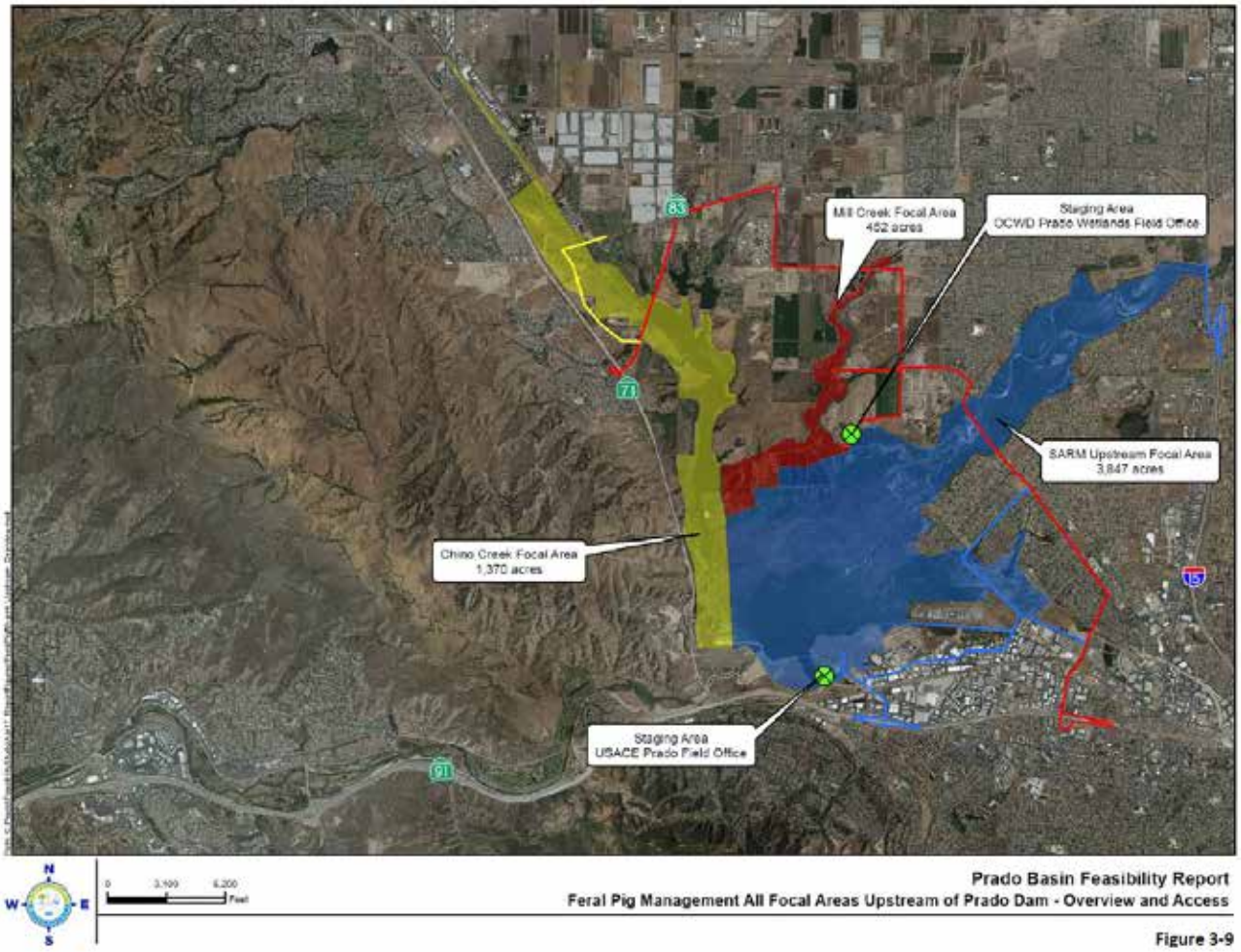

Figure 3-9: Feral Pig Management All Focal Areas Upstream of Prado Dam – Overview and Access

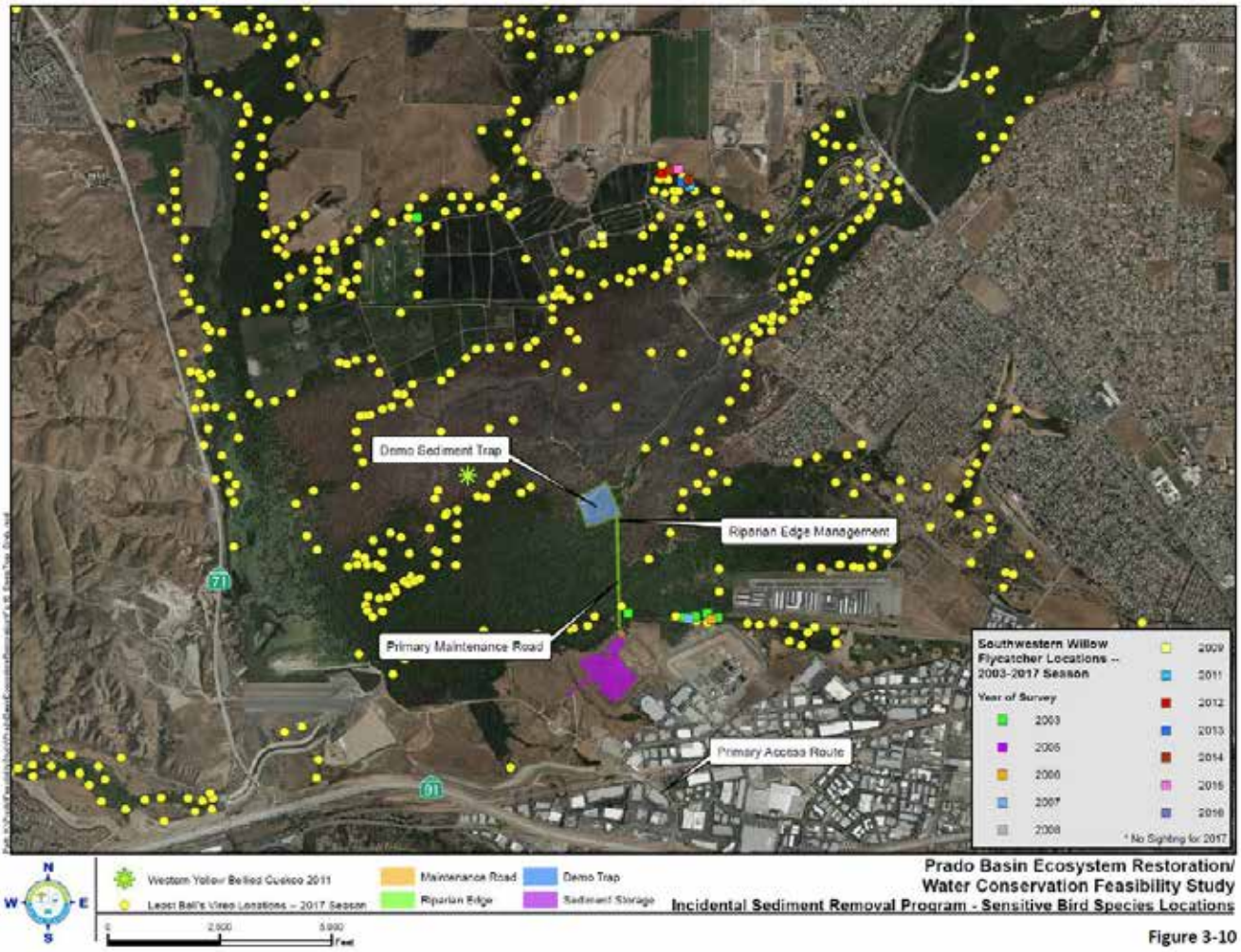

Figure 3-10: Incidental Sediment Removal Program – Sensitive Bird Species Locations

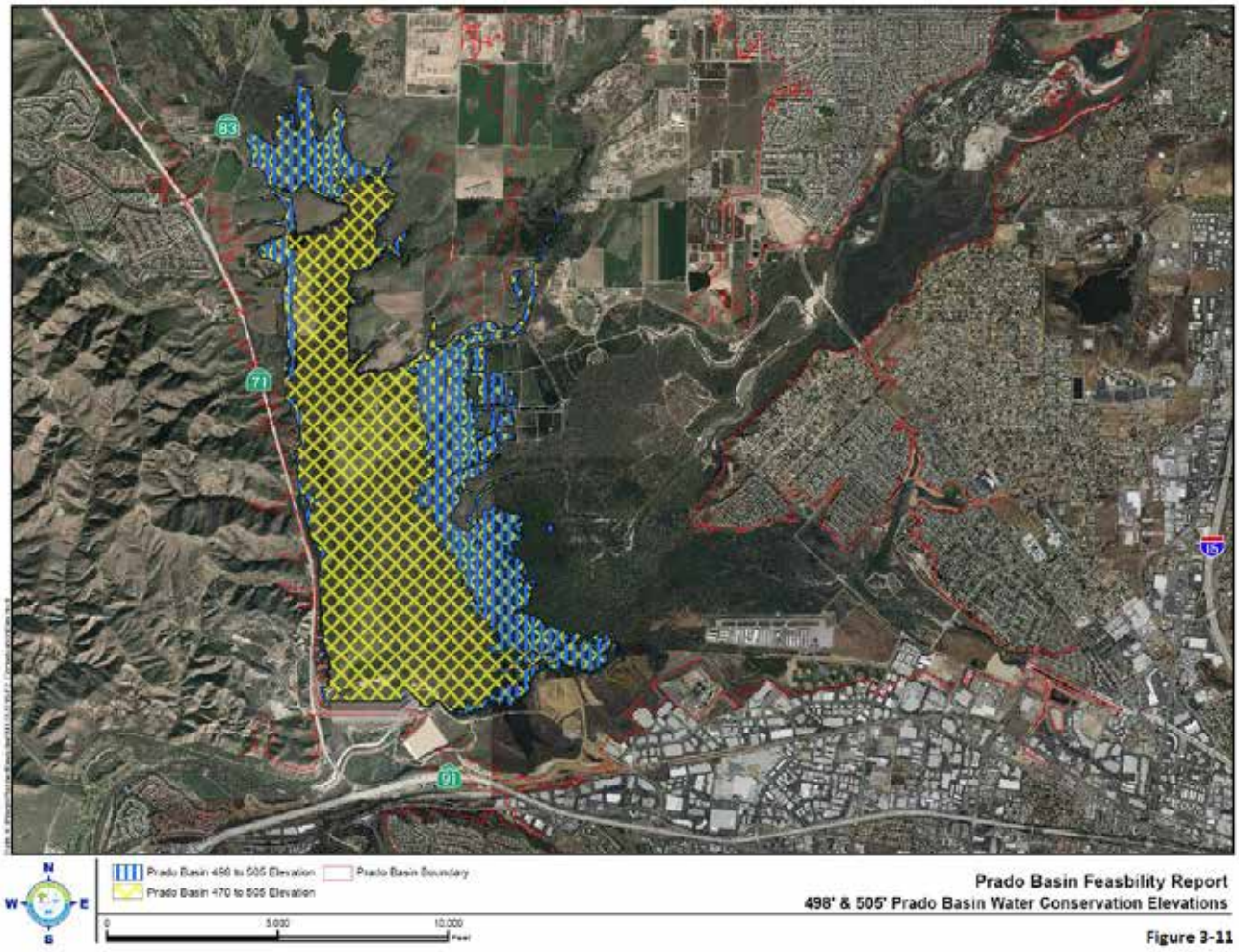

Figure 3-11: 498’ and 505’ Prado Basin Water Conservation Elevations

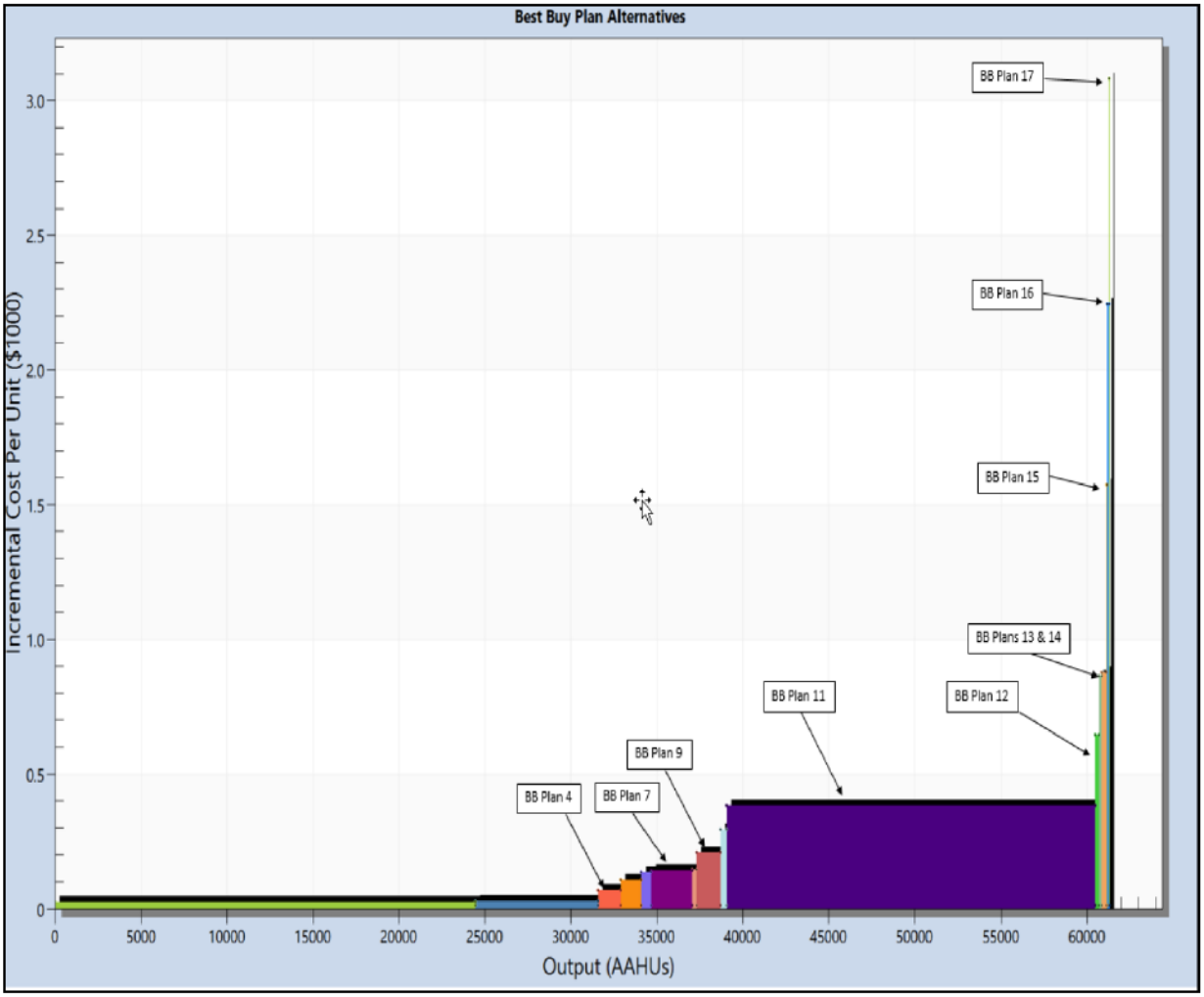

Figure 3-12. Incremental Cost and Output Display for Best Buy Plans
(note Best Buy Plan 18 not included because of high incremental cost)

Figure 3-12: Incremental Cost and Output Display for Best Buy Plans
(note Best Buy Plan 18 not included because of high incremental cost)

4.0 AFFECTED ENVIRONMENT

4.1 EARTH RESOURCES

The Prado Basin is composed of sediments from the Tertiary, Miocene, and lower Pliocene age (10 to 25 million years old). The sediment consists primary of friable sandstones with hard siltstone, shale interbeds, and scattered lens of conglomerate. The reservoir area of the basin is referred to as the Puente formation which was formed during uplift of the region over the past two to three million years. This uplifting deformed the Puente formation with extensive warping and faulting of the area. A geologic map of the study area is shown on Figure 4-1.

Soils in the Prado Basin 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 some of the narrow hillside gullies. Recent alluvial deposits reach a known maximum thickness of 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.

As shown in Figure 4-1 approximately 10 feet to 25 feet of fill material has deposited in the location where the Sediment Management Measure would be implemented. The major source of sediment deposited in the basin is from the Santa Ana River. The shape of the deposited sediment originating from the Santa Ana River has occurred in fan-type pattern. The layers of deposited sediment are thickest at the eastern end of the basin and becomes increasing thinner towards the dam.

Downstream from Prado the Santa Ana River (Reach 9) meanders naturally along a 9-mile course through the Santa Ana Canyon, except for about three miles where the river is channelized. Recent alluvium that contain saturate sands with smaller lens of silt, gravel, and clay is present in the Santa Ana River Channel. Sedimentation in this area is a dynamic process due to irregular flood events. Sediment consists mainly of coarse material 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.

Topography
Prado has a varied topography with elevations ranging from approximately 490 feet above sea level to 566 feet. The majority of Prado Basin consists of areas of low lope within the 0 to 2 percent range. Smaller portions of the basin contain moderate slopes ranging from 3 percent and 15 percent and even smaller portions of the basin contains steep high slopes steeper than 15 percent. The steeper slopes are located along the hills bordering the basin to the east.

Groundwater
Groundwater within the Prado Basin is influenced by the Santa Ana River and tributaries and the elevation of the water stored behind Prado Dam. Subsurface flows within the upper Santa Ana Valley funnel into a natural bedrock constriction at the intersection of the Easter Puente Hills and

the Santa Ana Mountains. Groundwater flows discharge to the ground surface in this region. Exploratory borings conducted within the study area have encountered groundwater between 5 and 20 feet below ground surface. Closer to the dam, the soils are typically underwater during and shortly after the rainy season. The depth to groundwater table varies seasonally and generally decreases during the rainy season.

Faulting and Seismic Activity

An earthquake fault is defined as a fracture in a portion of the earth's crust along which rock on one side has moved relative to rock on the other side. Most faults are the result of repeated displacements over a long period of time. An inactive fault is a fault that has not experienced earthquake activity within the last 300 million years. An active fault is one that has experienced earthquake activity in the past 11,000 years. A fault that has moved within the last two to three million years but has not been proven by direct evidence to have moved within the last 11,000 years, is considered potentially active.

The study area is in a seismically active area, and the potential for strong ground motion in the study area is likely. According to the California Geologic Survey, the Chino Section of the Elsinore Fault Zone ("Chino Fault") extends in a generally north-south direction through the western side of Prado Basin, near State Highway 71. The location of the fault is shown in Figure 4-2. The major faults within a 30- mile radius of the study area and the maximum moment magnitude are shown in Table 4-1.

Table 4-1: Regional Active Faults

Fault/Fault Zones	Distance to Site (miles)	Maximum Earthquake Magnitude
Elsinore Fault	0.0	6.8
Sierra Madre Fault Zone	15.3	7.1
Sierra Madre Ault Zone	17	6.5
Newport Inglewood Fault	25	7.1
San Andreas Fault	27	7.1
Raymond Fault	29	6.5

Liquefaction

Liquefaction is the phenomenon in which loosely deposited soils located below the water table undergo rapid loss of shear strength due to excess pore pressure generation when subjected to strong earthquake-induced ground shaking. Liquefaction is known generally to occur in saturated or near-saturated cohesion-less soils at depths shallower than 50-feet below the ground surface.

Given the loose sandy soils and shallow groundwater in Prado Basin, liquefaction of soils within the project limits is likely in the event of a large nearby earthquake.

Landslide Hazards

According to the California Geologic Survey, most of the Prado Basin area is not susceptible to landslide hazards due to slope instability, topographic relief and geologic structures. However, near Chino Hills, there is evidence of ancient to recent landslides. A review of aerial imagery

indicates that there is evidence of previous slope failures as indicated by across-bedding rotational or joint plane failures along the bluff faces, particularly in the area immediately west of Highway 71 where the bluff face is significantly higher and steeper than the hills to the west.

4.2 AIR QUALITY AND GREENHOUSE GASES

Air Quality

Air quality is regulated at the Federal, State and regional air basin level and each agency has a different level of regulatory responsibility. The United States Environmental Protection Agency (EPA) regulates at the Federal level. The California Air Resources Board (CARB) regulates at the State level. Air Quality Management District's regulate at the regional air basin level.

The study area is in western Riverside County and Orange County within the South Coast Air Basin (Air Basin). The Air Basin includes Orange County and the non-desert portions of Los Angeles, Riverside and San Bernardino Counties. The South Coast Air Quality Management District (SCAQMD) is the agency principally responsible for comprehensive air pollution control in the Air Basin.

The climate of western Riverside County and eastern Orange County is called an interior valley sub-climate of Southern California's Mediterranean-type climate and is characterized by hot dry summers, mild moist winters with infrequent rainfall, moderate afternoon breezes and generally fair weather. The topography and climate of Southern California combine to make the Air Basin an area of high air pollution potential. During the summer months, a warm air mass frequently descends over the cool, moist marine layer produced by the interaction between the ocean's surface and the lowest layer of the atmosphere. The warm upper layer forms a cap over the cooler surface layer and inhibits the pollutants from dispersing upward. Light winds during the summer further limit ventilation. Additionally, abundant sunlight triggers the photochemical reactions that produce ozone and majority of particulate matter.

Air pollutant emissions in the Air Basin are generated from stationary, mobile, and natural sources. Stationary sources can be divided into two major subcategories: point and area sources. Point sources occur at an identified location and usually are associated with manufacturing and industry. Examples are boilers or combustion equipment that produce electricity or generate heat. Area sources are distributed widely and produce many small emissions. Examples of area sources include residential and commercial water heaters, painting operations, portable generators, lawn mowers, agricultural fields, landfills, and consumer products such as barbeque lighter fluid and hair spray. Construction activities that create fugitive dust such as excavation and grading also contribute to area source emissions. Mobile sources refer to emissions from on- and off-road motor vehicles, including tailpipe and evaporative emissions. On-road sources may be operated legally on roadways and highways. Off-road sources include aircraft, trains, and construction equipment. Mobile sources account for majority of the air pollutant emissions within the air basin. Air pollutants also can be generated by the natural environment such as when fine dust particles are pulled off the ground surface and suspended in the air during high winds.

SCAQMD has divided the Air Basin into 38 air-monitoring areas with a designated ambient air monitoring station representative of each area. The study area is in air Monitoring Area 22,

which covers the Corona/Norco Area. The nearest air monitoring station to the study area is the Mira Loma Van Buren Monitoring Station (Mira Loma Station). The monitored pollutant levels from the Mira Loma Station are shown in Table 4-2. Table 4-2 shows that ozone and particulate matter (PM_{10} and $PM_{2.5}$) are the air pollutants of primary concern in the study area. Other pollutants of concern in the Air Basin include Toxic Air Contaminants.

Ozone

Ozone is a secondary pollutant as it is not directly emitted. Ozone is the result of chemical reactions between other pollutants, most importantly hydrocarbons and NO_2, which occur only in the presence of bright sunlight. Pollutants emitted from upwind cities react during transport downwind to produce the oxidant concentrations experienced in the area.

Nitrogen Dioxide

Nitrogen Oxides (NO_X) is the generic term for a group of highly reactive gases which contain nitrogen and oxygen. While most NO_X is colorless and odorless, concentrations of nitrogen dioxide (NO_2) can often be seen as a reddish-brown layer over many urban areas. NO_X form when fuel is burned at high temperatures, as in a combustion process. The primary manmade sources of NO_X are motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fuel.

Particulate Matter

Particle matter (PM) is the term for a mixture of solid particles and liquid droplets found in the air. PM is made up of several components including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. The size of particles is directly linked to their potential for causing health problems. Particles that are less than 10 micrometers in diameter (PM_{10}) are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. Particles that are less than 2.5 micrometers in diameter ($PM_{2.5}$) have been designated as a subset of PM_{10} due to their increased negative health impacts and its ability to remain suspended in the air longer and travel further.

Table 4-2: Local Area Air Quality Monitoring Summary
(Mira Loma Station)

Pollutant (Standard)	Year[1]		
	2014	2015	2016
Ozone:			
Maximum 1-Hour Concentration (ppm)	0.138	0.127	0.140
Days > CAAQS (0.09 ppm)	**17**	**29**	**34**
Maximum 8-Hour Concentration (ppm)	0.102	0.104	0.106
Days > NAAQS (0.070 ppm)	**52**	**51**	**65**
Days > CAAQs (0.070 ppm)	**55**	**51**	**70**
Nitrogen Dioxide:			
Maximum 1-Hour Concentration (ppb)	57.7	68.1	64.9
Days > NAAQS (100 ppb)	0	0	0

Pollutant (Standard)	Year[1]		
	2014	2015	2016
Inhalable Particulates (PM_{10}):			
Maximum 24-Hour Concentration (ug/m^3)	85.0	112.0	88.0
Days > NAAQS (150 ug/m^3)	0	0	0
Days > CAAQS (50 ug/m^3)	**15**	**20**	ND
Annual Arithmetic Mean (AAM) (ug/m^3)	42.9	48.1	37.5
Annual > NAAQS (50 ug/m^3)	No	No	No
Annual > CAAQS (20 ug/m^3)	**Yes**	**Yes**	**Yes**
Ultra-Fine Particulates ($PM_{2.5}$):			
Maximum 24-Hour National Measurement (ug/m^3)	73.6	56.6	45.6
Days > NAAQS (35 ug/m^3)	**9**	**17**	**2**
Annual Arithmetic Mean (AAM) (ug/m^3)	14.6	14.1	ND
Annual > NAAQS and CAAQS (12 ug/m^3)	**Yes**	**Yes**	ND

Notes: Exceedances are listed in **bold.** CAAQS = California Ambient Air Quality Standard; NAAQS = National Ambient Air Quality Standard; ppm = parts per million; ppb = parts per billion; ND = no data available.
[1] Data obtained from Mira Loma Station.
Source: http://www.arb.ca.gov/adam/

Toxic Air Contaminant Levels in the Air Basin

Toxic Air Contaminants (TACs) is a term that is defined under the California Clean Air Act and consists of the same substances that are defined as Hazardous Air Pollutants (HAPs) in the Federal Clean Air Act. There are over 700 hundred different types of TACs with varying degrees of toxicity. Sources of TACs include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. Cars and trucks release at least 40 different toxic air contaminants. The most important of these TACs, in terms of health risk, are diesel particulates, benzene, formaldehyde, 1,3-butadiene, and acetaldehyde. Public exposure to TACs can result from emissions from normal operations as well as from accidental releases. Health effects of TACs include cancer, birth defects, neurological damage, and death.

Attainment Status

The EPA and the CARB designate air basins where ambient air quality standards are exceeded as "nonattainment" areas. If standards are met, the area is designated as an "attainment" area. If there is inadequate or inconclusive data to make a definitive attainment designation, they are considered "unclassified." National nonattainment areas are further designated as marginal, moderate, serious, severe, or extreme as a function of deviation from standards. Each standard has a different definition, or 'form' of what constitutes attainment, based on specific air quality statistics. For example, the Federal 8-hour carbon monoxide (CO) standard is not to be exceeded more than once per year. Therefore, an area is in attainment of the CO standard if no more than one 8-hour ambient air monitoring values exceeds the threshold per year. In contrast, the Federal annual $PM_{2.5}$ standard is met if the 3-year average of the annual average $PM_{2.5}$ concentration is less than or equal to the standard.

The current federal and state attainment designations for the Basin are shown in Table 3. As shown in Table 4-3, the Air Basin has been designated by EPA for the National standards as non-attainment for ozone and $PM_{2.5}$ and partial non-attainment for lead. Currently the Air Basin is in attainment with National Ambient Air Quality Standards (NAAQS) for carbon monoxide, sulfur dioxide, nitrogen dioxide, and PM_{10}. The Air Basin has been designated by the CARB as a non-attainment area for ozone, PM_{10}, $PM_{2.5}$ and lead. Currently the Basin is in attainment with the ambient air quality standards for carbon monoxide, nitrogen dioxide (1-hour) and sulfur dioxide.

Table 4-3: South Coast Air Basin Attainment Status

Pollutant	State Status	National Status
Ozone (1-hour)	Nonattainment	Nonattainment – Extreme
Ozone (8-hour)	Nonattainment	Nonattainment – Extreme
Carbon monoxide	Attainment	Attainment – Maintenance
Nitrogen dioxide (annual)	Attainment	Attainment – Maintenance
Nitrogen dioxide (1-hour)	Attainment	Unclassifiable/Attainment
Sulfur dioxide	Attainment	Unclassifiable/Attainment
PM_{10}	Nonattainment	Attainment – Maintenance
$PM_{2.5}$	Nonattainment	Nonattainment – Serious
Lead (Los Angeles County)	Nonattainment	Nonattainment Partial
Lead (other parts of Basin, including the project area)	Attainment	Attainment
Source of State status: SCAQMD, 2016		

Greenhouse Gases

Constituent gases of the Earth's atmosphere, called atmospheric greenhouse gases (GHGs), play a critical role in the Earth's radiation amount by trapping infrared radiation from the Earth's surface, which otherwise would have escaped to space. Prominent greenhouse gases contributing to this process include carbon dioxide (CO_2), methane (CH_4), ozone (O_3), water vapor, nitrous oxide (N_2O), and chlorofluorocarbons (CFCs). This phenomenon, known as the Greenhouse Effect, is responsible for maintaining a habitable climate. Anthropogenic emissions of these greenhouse gases in excess of natural ambient concentrations are responsible for the enhancement of the Greenhouse Effect and have led to a trend of unnatural warming of the Earth's natural climate, known as global warming or climate change. Emissions of gases that induce global warming are attributable to human activities associated with industrial/manufacturing, agriculture, utilities, transportation, and residential land uses. According to the CARB website, transportation is responsible for around 41 percent of the State's greenhouse gas emissions, followed by the industrial sector (23%) and electricity generation (10%). Emissions of CO_2 and N_2O are byproducts of fossil fuel combustion. Methane, a potent greenhouse gas, results from off-gassing associated with agricultural practices and landfills. Sinks of CO_2, where CO_2 is stored outside of the atmosphere, include uptake by vegetation and dissolution into the ocean. GHGs have varying global warming potential (GWP). The GWP is the potential of a gas or aerosol to trap heat in the atmosphere; it is the cumulative radiative forcing effects of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to the reference gas, CO_2.

4.3 LAND USE/RECREATION

The Prado Basin consists of approximately 9,740 acres of land up to the 566-ftl elevation. The U.S. Government is the major landowner in the Prado Basin owning approximately 6,623 acres, and has acquired flood easements on all lands it does not own within the inundation area of the reservoir. OCWD is the second largest landowner owning approximately 2,150 acres. Historically, the reservoir has been used primarily for agriculture purposes, such as dairies, ranches and farms. The primary purpose of lands within the basin is for flood risk management and all other uses are subordinate. In addition, land uses on property held by OCWD are constrained by flowage easements held by the U.S. Government. A variety of land uses are currently found within and surrounding the Prado Basin, including urban, agriculture and recreational. Other land uses within the basin must be consistent with the flood control purpose of Prado Dam and the Santa Ana River Project. Land uses within the Prado Basin 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 agriculture 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.
- Mineral leases from BLM, who controls subsurface rights with the reservoir, mainly to oil producers.

4.3.1 Prado Basin Existing Land Uses

The Prado Basin lies within the boundaries of the County of Riverside, County of San Bernardino and the City of Corona. Existing land uses within the Prado Basin are shown in Figure 4-3. Maps of real estate ownership for the project area are provided in the Real Estate Plan (Appendix O).

4.3.1.1 County of Riverside

The Riverside County portion of the Prado Basin is generally bounded by the mountainous area west of State Route 71, State Route 91 and the intersection of State Route 71 and Euclid Avenue. Below is a listing of existing land uses within the Riverside County area of the basin.

Orange County Water District Prado Constructed Wetlands: The OCWD Prado Constructed Wetlands is situated between elevation 490 ft. and elevation 540 ft. When in full operation, the Prado Wetlands consist of approximately 465 acres of area with 46 individual ponds, a series of intervening dikes, maintenance roads, and 45 weir boxes. A weir box is a rectangular or square box shaped structure with stop logs or ‘weir’ plates that can be adjusted or removed vertically to control the water level in a basin or wetland cell. The outlet from the weir box is typically a pipe that conveys water to the next basin or conveyance channel. Water is diverted into the wetlands from a diversion berm located downstream of River Road Bridge. The diversion berm consists of a sand dike, culverts, canal gates and 1.25 miles of conveyance channels. The Prado Wetlands

have been engineered for treating approximately 100 cubic feet of water per second of the Santa Ana River for nitrate removal. After the water is treated, the treated water is discharged to Chino Creek where it blends with other sources in the Prado Basin. The blended flows pass through Prado Dam and are captured downstream by OCWD and percolated into the Orange County Groundwater Basin.

Raahauges Hunting Club: OCWD has lease with Mike Raahauge's Shooting Enterprises for recreational duck hunting within the ponds. Raahauges Hunting Club is situated between elevation 510 ft. and elevation 544 ft. The hunting club provides public hunting for large waterfowl and upland fowl hunting and operates through a lease with OCWD. The land is leased from OCWD.

Splatter S Duck Hunting Club: The Splatter S Duck Hunting Club is an approximate 40-acre water fowl hunting facility located between elevation 485 ft. and elevation 520 ft. The area is developed with refuge ponds, shooting blinds and a barn structure. The barn structure is located at elevation 520 ft. The land is leased from Riverside County.

Prado Basin Duck Club: The Duck Lease Ponds are an existing 66-acre duck hunting facility located between elevation 480 ft. and elevation 486 ft. that operates through a lease with OCWD.

Prado Basin Park: Prado Basin Park is situated between elevation 525 ft. and elevation 573 ft. The park includes the crossroads Riverview Park Inc. and consists of 826 acres and provides passive and active recreation uses and renaissance fairs and historic reenactments.

4.3.1.2 County of San Bernardino

The San Bernardino County portion of the Prado Basin lies in the northern part of the basin, east of State Route 71. The majority land uses are recreation-oriented land uses. The following existing land uses within the County of San Bernardino area of the basin

Prado Regional Park: Prado Regional Park is operated by San Bernardino County Regional Parks. The park is situated between elevation 490 ft. and elevation 560 ft. The park size is 2,280 acres and consists of passive and recreation uses, including camping, hiking, biking, historic reenactment, fishing, softball fields and soccer fields. Also included on the park site are the Prado Recreation Dog Training and the Oranco Bowmen Archery Range.

Prado Recreation (Dog Training): The Prado Recreation Dog Training is situated between elevation 490 ft. and elevation 566 ft. The facility consists of a total of 585 acres and provides dog boarding and dog training activities. The dog boarding uses are located at an elevation of approximately 554 ft. Most of the land for dog training is located between elevations 490 ft. and 505 ft.

Prado Olympic Shooting Park: The shooting park is situated between elevation 510 ft. and elevation 520 ft. and contains trap and shooting facilities, pistol range, rifle range and a pro shop.

Oranco Bowmen Archery Range: The Oranco Bowmen Archery Range is situated between elevation 520 ft. and elevation 560 ft. This land use is an archery range that provides target areas and hillside targets.

Prado Equestrian Center: The Prado Equestrian Center is a concession of San Bernardino County Regional Parks and is located above elevation 560 ft. The equestrian center includes both horse riding facilities and office and a tack shop.

El Prado Golf Course: The El Prado Golf Course is situated between elevation 510 ft. and elevation 567 ft. and contains two separate 18-hole public golf courses.

Pomona Valley Model Airplane Club: The Pomona Valley Model Airplane Club provides remote control model airplane flying and includes a runway approximately 800 feet long by 50 feet wide. It is located above elevation 505 ft.

4.3.1.3 City of Corona

The City of Corona sphere of influence extends to the southern portion of the Prado Basin. Existing land uses with within the City of Corona sphere of influence are discussed below.

Butterfield Stage Trail Park: Butterfield Stage Trail Park is situated between elevation 527 ft. and elevation 550 ft. The sports park consists of 64 acres and contains seven public ball fields.

Corona Municipal Airport: Corona Municipal Airport is situated between elevation 513 ft. and elevation 528 ft. The airport is a recreational airport used predominately for small private planes. The airport also contains a flight training center, aircraft maintenance facilities and a café.

City of Corona Leases: The lease areas are located in the southern part of the Prado Basin and situated between elevation 505 ft. and elevation 543 ft. At this time there are no land uses on the properties. The City of Corona has identified the lease areas for future park use.

4.3.2 Existing Land Uses Downstream Prado Dam

Downstream of Prado Dam, there are several existing land uses located along the Santa Ana River, outside of the flood plain. These existing land uses include; Chino Hills State Park, Featherly Regional Park, Santa Ana River Canyon RV Park, Green River Golf Course, OCWD recharge facilities and Savi Ranch Shopping Center and residential land uses along both sides of the river in the cities of Corona, Anaheim and Yorba Linda. Downstream of the City of Anaheim, within the City of Santa Ana within the wetted channel of the river is the River View Golf Course. The River View Golf Course is an existing 18-hole public golf course that several holes bisected by the river requiring golfers to cross the river to play. The golf course is periodically inundated with flows from the Santa Ana River and Santiago Creek, which drains into the Santa Ana River at the River View Golf Course.

4.3.3 Relevant Planning and Policy Documents

The following is a listing of relevant planning and policy documents that have been identified for the focal areas that comprise the study area.

4.3.3.1 Upper Santa Ana River Focal Area

Prado Dam Water Control Plan
The current operations at Prado Dam are directed by the USACE 2003 Interim Water Control Plan for Prado Dam (Water Control Plan). The Water Control Plan describes how the reservoir would be regulated. Under the Water Control Plan, water can be stored in the buffer pool up to elevation 498 ft. during the flood season and up to elevation 505 ft. during the non-flood season. Additionally, the Water Control Plan establishes the rate of water released from the dam under non-storm and storm conditions. Under non-storm conditions the release rates range from 200 cfs to 500 cfs to allow OCWD to capture and percolate the flows and prevent losing water to the ocean. Under storm conditions, the target release rate would be up to 5,000 cfs for flood risk management or even up to 10,000 cfs, if an extreme flood runoff volume is forecast.

U.S. Army of Engineers Prado Dam Recreation Master Plan
The existing Prado Dam Recreation Master Plan was prepared in 1976. The intent of the Prado Dam Recreation Master Plan is to guide the orderly and coordinated development of recreation lands in the Prado Dam reservoir area. However, the Prado Dam Recreation Master Plan is over 25 years old and no longer adequately implements the Corps policies and goals for the Prado Dam. Presently, the Corps is in the process of updating the Prado Dam Recreation Master Plan.

Riverside County General Plan
The western portion of the focal area is situated in unincorporated Riverside County and is included within Temescal Canyon Area Plan of the Riverside County General Plan. The General Plan designates the focal area for Open Space Conservation land uses. Several policies have been established that provide for the protection of natural resources and for the expansion of recreation uses along the Santa Ana River Corridor.

San Bernardino County General Plan
According to the San Bernardino County General Plan, the Prado Basin is situated within the West Valley Sub-Regional Planning Area of San Bernardino County. The West Valley contains six major cities, that includes; Chino, Chino Hills, Fontana, Montclair, Ontario, Rancho Cucamonga and Upland. The County of San Bernardino limits are primarily located north of the 566 ft. elevation in the central portion of the Prado Basin. The County Land Use designation for this area is open space.

City of Eastvale General Plan
The eastern portion of the focal area, just south of River Road Bridge is located within the City of Eastvale. According to the General Plan the study area is designated conservation, open space, recreation and water. The intent of the open space designations is to provide for the preservation of natural and scenic resources, flood control protection and to provide for active and passive recreation uses.

City of Corona
The Prado Basin study area is located within the City of Corona Sphere of Influence. The area is not included in the City's General Plan and there are no City of Corona planning programs that apply to the project area. However, a portion of the sediment storage site is located on lands that are under lease agreement between the Corps and the City of Corona for future park uses.

4.3.3.2 Lower Santa Ana River Focal Area

County of Orange General Plan
The Featherly Park is in unincorporated Orange County, and the relevant planning program is the County of Orange General Plan. The area is planned for open spaces uses.

Riverside County General Plan
A portion of the focal area, just west of Prado Dam is included within the County of Riverside General Plan. The General Plan designates the area for open space and conservation uses.

City of Anaheim General Plan
A portion of the focal area is included within the City of Anaheim. The General Plan designates the Santa Ana River for water related uses. The intent of the water designation is to provide for the preservation natural and scenic resources and water conservation along the Santa Ana River.

City of Yorba Linda General Plan
A portion of the focal area is included within the City of Yorba Linda. The General Plan identifies the Santa Ana River for water related uses. The intent of the water designation is to provide for the preservation natural and scenic resources and water conservation along the Santa Ana River.

4.3.3.3 Chino Creek Focal Area

Riverside County General Plan
A portion of the focal area, south of Euclid Avenue is included within the County of Riverside Genera Plan. The General Plan identifies the Santa Ana River for open space and conservation uses.

Chino Hills General plan
A small portion of the Chino Creek Focal Area is included within the City of Chino Hills General Plan. The General Plan designates the area private and public open space.

City of Chino General Plan
A portion of the focal area, north of Euclid Avenue is included within the City of Chino General Plan. The General Plan designates the focal area for open space and recreation uses. The intent of the open space and recreation designation is to maintain the area as open space for recreation uses.

4.3.3.4 Mill Creek Focal Area

City of Chino General Plan
The General Plan identifies the focal area for open space and recreation uses.

4.4 WATER RESOURCES

The study area is located within the Santa Ana River Watershed. The watershed is approximately 2,650 square miles and is the drainage area for lands in Riverside County, San Bernardino County and Orange County. As shown in Figure 4-4 there are four major tributaries that drain into the Prado Basin; Santa Ana River, Chino Creek, Cucamonga Creek (which flows into Mill Creek) and Temescal Wash. All water bodies converge behind Prado Dam.

Santa Ana River
The Santa Ana River is the most prominent hydrologic feature within the Santa Ana River Watershed. The Santa Ana River is over 100 miles in length and has over 50 contributing tributaries. Within the Prado Basin the river has four major tributaries: Chino Creek, Cucamonga Creek (which flows into Mill Creek) and Temescal Wash. Sources of flows in the river and its tributaries include high groundwater, storm flow, irrigation runoff and discharge of treated effluent from wastewater treatment plants.

Chino Creek
Chino Creek is an approximate 13-mile stream that extends from the San Gabriel Mountains to the Santa Ana River within the Prado Basin. The creek receives storm water flows and nuisance flows from a 218 square mile watershed. Additionally, the creek receives effluents from multiple wastewater treatment plants.

Cucamonga Creek/Mill Creek
Mill Creek collects storm water runoff and nuisance flows from an approximate 77 square mile watershed that incorporates the Cities of Ontario, Chino, Rancho Cucamonga and Upland. Upstream of the Prado Basin, Mill Creek is lined with concrete and is referred to as Cucamonga Creek. As the creek enters into Prado Basin, Mill Creek transitions into a natural earthen stream that meanders in a southwesterly direction before its confluences with the Santa Ana River.

Temescal Wash
Temescal Creek is an approximately 29-mile-long watercourse in Riverside County flowing primarily in a northwestern direction, it connects Lake Elsinore with the Santa Ana River. It drains the eastern slopes of the Santa Ana Mountains on its left and on its right the western slopes of the Temescal Mountains along its length. With a drainage basin of about 1,000 square mile watershed, it is the largest tributary of the Santa Ana River. The Prado basin consists of a series of wetlands where Temescal Creek merges with the Santa Ana.

Groundwater Basins
The study area encompasses two groundwater basins, the Chino Basin, which includes the Prado Basin Management Zone and the Orange County Groundwater Basin, located downstream of the SARM. The Prado Basin Groundwater Management Zone is generally defined by the 566-foot elevation NAVD29 within the Prado Basin and is defined in the Santa Ana Regional Board's

Basin Plan as the southerly portion of the Chino Groundwater Basin. The groundwater management zone extends from Prado Dam up to Chino Creek to where Mill Creek becomes Cucamonga Creek and to the concrete lined portion of Temescal Wash. The groundwater management zone is a thin aquifer with relatively shallow depth to groundwater and is significantly affected by the surface flows and subsurface flows in the Prado Basin.
The Orange County Groundwater Basin underlies central and northern Orange County and is bordered by the Santa Ana Mountains to the east, the Pacific Ocean to the west, the Newport-Inglewood Fault to the southwest and Coyote Hills to the north. The basin is contiguous and directly connected with the Central Basin of Los Angeles County to the northwest.

Surface Water Quality

The water quality of the Santa Ana River, Chino Creek and Mill Creek and the Prado Basin are under the jurisdiction of the Santa Ana Region Regional Water Quality Control Board. The Basin Plan designates beneficial uses for waters in the Santa Ana River Watershed and provides quantitative and narrative criteria for a range of water quality constituents applicable to certain receiving water bodies in order to protect beneficial uses. The beneficial uses established in the Basin Plan are shown in Table 4-4.

Table 4-4: Description of Beneficial Uses

Beneficial Use
Groundwater Recharge (GWR) waters are used for natural or artificial recharge of groundwater for purposes that may include, but are not limited to, future extraction, maintaining water quality or halting saltwater intrusion into freshwater aquifers.
Water Contact Recreation (REC-1) waters are used for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses may include, but are not limited to swimming, wading, water skiing, skin and scuba diving, surfing, whitewater activities, fishing and use of natural hot springs.
Non-Contact Water Recreation (REC-2) waters are used for recreational activities involving proximity to water, but not normally body contact with water where ingestion of water would be reasonably possible. These uses may include, but are not limited to picnicking, sunbathing, hiking, beachcombing, camping, boating, tide pool and marine life study, hunting, sightseeing and aesthetic enjoyment in-conjunction with the above activities.
Warm Freshwater Habitat (WARM) waters support warm water ecosystems that may include but are not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates.
Limited Warm Freshwater Habitat (LWARM) waters support warm water ecosystems which are severely limited in diversity and abundance as the result of concrete-lined watercourses and low, shallow dry weather flows which result in extreme conditions.
Cold Freshwater Habitat (COLD) waters support coldwater ecosystems.
Preservation of Biological Habitats of Special Significance (BIOL) waters support designated areas of habitats.
Wildlife Habitat (WILD) waters support wildlife habitats that may include, but are not limited to the preservation and enhancement of vegetation and prey species used by waterfowl and other wildlife.
Rare, Threatened or Endangered Species (RARE) waters support habitats necessary for the survival and successful maintenance of plant or animal species designated under state or federal law as rare, threatened or endangered.
Municipal and Domestic Supply (MUN) waters are used for community, military, municipal or individual water supply systems. These uses may include, but are not limited to drinking water supply.
Agricultural Supply (AGR) waters are used for farming, horticulture or ranching. These uses may include, but are not limited to irrigation, stock watering, and support of vegetation for range grazing.
Industrial Service Supply (IND) waters are used for industrial activities that do not depend primarily on water quality. These uses may include, but are not limited to mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection and oil well depressurization.
Industrial Process Supply (PROC) waters are used for industrial activities that depend primarily on water quality. These uses may include, but are not limited to, process water supply and all uses of water related to product manufacture or food preparation.
Navigation (NAV) waters are used for shipping, travel, or other transportation by private, commercial or military vessels.
Hydropower Generation (POW) waters are used for hydroelectric power generation.

Beneficial Use
Commercial and Sportfishing (COMM) waters are used for commercial or recreational collection of fish or other organisms
Estuarine Habitat (EST) waters support estuarine ecosystems including, but not limited to preservation or enhancement of estuarine habitats, vegetation, fish, shell fish or wildlife.
Marine Habitat (MAR) waters support marine ecosystems that include, but are not limited to, preservation or enhancement of marine habitats, vegetation such as kelp, fish, shell fish or wildlife.
Spawning, Reproduction and Development (SPWN) waters support high quality aquatic habitats suitable for reproduction and early development of fish.
Shellfish Harvesting (SHEL) waters support habitats suitable for shellfish collected for human consumption, commercial or sports purposes.

Beneficial Uses of Surface Water

The beneficial uses for Santa Ana River Reach 1, 2, 3 and the Tidal Prism, Chino Creek Reach 1A and 1B, and Mill Creek are shown in Table 4-5.

Table 4-5: Study Area Surface Water Beneficial Uses

	Santa Ana River Reach 3	Santa Ana River Reach 2	Santa Ana River Reach 1	Tidal Prism Santa Ana River	Chino Creek Reach 1A	Chino Creek Reach 1B	Mill Creek
GWR	X	X	NL	NL	NL	NL	NL
REC-1	X	X	X	X	X	X	X
REC-2	X	X	X	X	X	X	X
WARM	X	X	I	NL	X	X	X
WILD	X	X	I	X	X	X	X
RARE	X	X	NL	X	X	X	X
AGR	X	X	NL	NL	NL	NL	NL
COMM	NL	NL	NL	X	NL	NL	NL
MAR	NL	NL	NL	X	NL	NL	NL
MUN	NL	NL	NL	NL	NL	NL	NL
IND	NL	NL	NL	NL	NL	NL	NL
PROC	NL	NL	NL	NL	NL	NL	NL
X-Present or Potential Beneficial Uses; I-intermittent beneficial Use; NL-Not Listed							

Water Quality Objectives

The Basin Plan establishes Water Quality Objectives for water bodies within the Santa Ana River Watershed. The water quality objectives for Santa Ana River Reach 1, 2, 3 and the Tidal Prism, Chino Creek Reach 1A and 1B, Mill Creek, Orange County Groundwater Basin and for the Prado Basin Management Zone are shown in Table 4-6.

Table 4-6: Water Quality Objectives (mg/L)

Reach	TDS	Hardness	Sodium	Chloride	Nitrogen	Sulfate	Chemical Oxygen Demand
Santa Ana River Reach 1	NA	NA	NA	NA	NA	NA	NA
Santa Ana River Reach 2	650	NL	NL	NL	NL	NL	NL
Santa Ana River Reach 3	700	350	110	140	10	150	30
Tidal Prism Santa Ana River	NL	NL	NL	NL	NL	NL	NL
Chino Creek Reach 1A	700	350	110	140	10	150	30
Chino Creek reach 1B	550	240	75	75	8	60	15
Mill Creek (Prado Area)	NL	NL	NL	NL	NL	NL	NL
NL = not listed							

The annual average water quality observations for the surface water reaches that have specified water quality objectives in the Basin Plan are shown in the Table 4-7 below.

Table 4-7: Water Quality Observations (mg/L)

Reach	TDS	Hardness	Sodium	Chloride	Nitrogen	Sulfate	Chemical Oxygen Demand
Santa Ana River Reach 2	541	NL	NL	NL	NL	NL	NL
Santa Ana River Reach 3	554	234	94	115	3.2	89	11.2
Chino Creek Reach 1A	NS	NS	NS	NS	NS	NS	NS
Chino Creek reach 1B	268	NA	NA	72	0.3	42	10

NL- Not Listed NS- not sampled NA-not available
Source: The 2016 Annual Report of Santa Ana River Water Quality, 2017 prepared by the Santa Ana Watershed Project Authority

Section 303 (d) Water Bodies

Under Section 303 (d) of the Clean Water Act, the State Regional Water Quality Control Board is required to develop a list of impaired water bodies. Each of the individual Regional Water Quality Control Boards are responsible for establishing priority rankings and developing action plans, referred to as total maximum daily loads (TMDLs) to improve water quality of water bodies included in the 303(d) list. A is listing of 303(d) impaired water bodies within the project area in shown in Table 4-8.

Table 4-8: Impaired Water Bodies

Water Body	Impairment
Santa Ana River, Reach 3	Copper, lead, indicator bacteria
Chino Creek Reach 1A	Nutrients, indicator bacteria
Chino Creek Reach 1B	Chemical Oxygen, Nutrients, indicator bacteria
Cucamonga Creek Reach 1	Cadmium, copper, lead, zinc
Mill Creek (Prado Area)	Indicator bacteria, nutrients, total suspended solids

Various waterbodies in the Prado Basin are listed on the state 303(d) list of impaired waters due to high densities of fecal coliform bacteria indicator, as shown above. The Regional Board adopted a TMDL for fecal coliform bacterial indicators in December 2014. The TMDL became effective when the EPA gave its final approval on May 16, 2007. The Middle Santa Ana River Bacterial Indicator TMDL, that includes the water bodies listed above, established waste load allocations for urban runoff and storm water and confined animal feeding operation discharges, and load allocations for agricultural and natural sources. The waste load and load allocations were established for both fecal coliform and E. coli. The TMDL includes a detailed Implementation Plan which describes a variety of activities that must be undertaken to meet water quality standards for the impaired waterbodies. Under the direction of the Regional Board, the Middle Santa Ana Watershed TMDL Task Force comprised of 18 agencies implements Comprehensive Bacteria Reduction Plans to identify, monitor and control sources of bacterial indicators.

Nutrients and salinity for surface waters and groundwater basins in the Santa Ana River watershed are managed comprehensively by the Regional Water Quality Control Board. The

program is implemented by the Basin Monitoring Program Task Force, a group comprised of water districts and wastewater treatment agencies. Historical ambient or baseline conditions were calculated for levels of total dissolved solids and nitrate-nitrogen in each of the 39 groundwater management zones. For surface water bodies, a waste load allocation model is used to evaluate the potential impact of wastewater discharges and other source of salinity on underlying groundwater basins.

The impairments for cadmium, copper, lead, zinc, chemical oxygen demand, and total suspended solids have not been addressed through adoption of a TMDL or other method.

Santa Ana River

The Santa Ana Regional Water Quality Control Board Basin Plan (Basin Plan) divides the Santa Ana River into reaches. Reach 3 is defined as the portion of the river downstream from Mission Bridge to Prado Dam. Reach 2 is defined as the portion of the river below Prado Dam to 17th Street in Santa Ana.

During non-storm conditions, the majority of flow in the river is wastewater effluent. Flows in the Santa Ana River through the Prado Basin are measured at a location immediately below Prado Dam. The sampling location is referred to as "at Below Prado Dam." Total annual flow (water year defined as October 1 to September 30) is reported by the Santa Ana River Watermaster. For the past twenty years the minimum flow was 86,500 acre-feet in water year 2013-2014, the maximum flow was 638,500 acre-feet in water year 2005-2005, and the twenty-year average was 221,000 acre-feet.

Chino Creek

Chino Creek is an approximate 13-mile stream that extends from the San Gabriel Mountains to the Santa Ana River within the Prado Basin. The creek receives storm water flows and nuisance flows from a 218 square mile watershed. Additionally, the creek receives effluents from multiple wastewater treatment plants. The creek enters the Prado Basin and generally runs in a southeast direction between Chino Hills and flows roughly parallel to SR-71. This segment of Chino Creek is concrete lined. About six miles above the mouth, the streambed changes from a concrete lined channel to an earthen channel. The creek enters the El Prado Golf Course and meanders south to its confluence with the Santa Ana River. In 2004, Reach 1 of Chino Creek was subdivided into two reaches, Reach 1A and 1B. Reach 1A extends from the SAR confluence to downstream of the confluence with Mill Creek. Reach 1B extends from the confluence of Mill Creek to the beginning of the concrete-lined channel south of Los Serranos Road. Water quality data are not collected in Reach 1A as it encompasses an area upstream of Prado Dam which is difficult to access, and during the winter months is commonly inundated. The USGS maintains a gauging station, 11073360, located along Chino Creek at Schaefer Avenue below the confluence with San Antonio Creek. This station recorded flows totaling 15,411 acre-feet.

Cucamonga/Mill Creek

Mill Creek collects storm water runoff and nuisance flows from an approximate 77 square mile watershed and treated wastewater from Inland Empire Utility Agency's Reclamation Plant #1. Upstream of the Prado Basin, Mill Creek is lined with concrete and is referred to as Cucamonga Creek. As the creek enters into Prado Basin, Mill Creek transitions into natural earthen stream that meanders in a southwesterly direction before its confluences with the Santa Ana River.

USGS maintains a gauging station, 11073495, located along Cucamonga Creek near Mira Loma. In 2016, this station recorded flow totaling 18,850 acre-feet.

Temescal Creek

The Basin Plan does not specify any water quality objectives for Temescal Creek. There are no 303(d) listed impairments for Temescal Creek. The USGS maintains a gauging station 11072100 located along Temescal Creek, above Main Street at Corona. In 2016, this station recorded flows totaling 5,006 af.

Groundwater

The study area encompasses two groundwater basins, the Chino Basin, which includes the Prado Basin Management Zone, and the Orange County Groundwater Basin. The beneficial uses for the Orange County Groundwater Basin and for the Prado Basin Management Zone are shown in Table 4-9.

Table 4-9: Groundwater Basins Beneficial Uses

	GWR	REC-1	REC-2	WARM	WILD	RARE	AGR	COMM	MAR	MUN	IND	PROC
Prado Basin Management Zone	NL	X	X	X	X	X	X	NL	NL	NL	NL	NL
Orange County Groundwater Basin	NL	NL	NL	NL	NL	NL	X	NL	NL	X	X	X

NL-Not Listed
X-Existing or Potential

The Basin Plan establishes Water Quality Objectives for groundwater basins within the Santa Ana River Watershed. The water quality objectives for Orange County Groundwater Basin and for the Prado Basin Management Zone are shown in Table 4-10.

Table 4-10: Water Quality Objectives (mg/L)

Reach	TDS	Hardness	Sodium	Chloride	Nitrogen	Sulfate	Chemical Oxygen Demand
Prado Basin Management Zone	NL	NL	NL	NL	NL	NL	NL
Orange County Groundwater Basin	580	NL	NL	NL	3.4	NL	NL

NL- Not Listed

Prado Basin Management Zone

The Prado Basin Management Zone (PBMZ) is defined in the Regional Water Quality Control Board's Basin Plan and is generally bounded by the 566-foot elevation NAVD29 within the Prado Basin. The groundwater management zone extends from Prado Dam up to Chino Creek to where Mill Creek becomes Cucamonga Creek and to the concrete lined portion of Temescal Wash. The groundwater management zone is a think aquifer with relatively shallow depth to

groundwater and is significantly affected by the surface flows and subsurface flows in the Prado Basin. A portion of the Prado Basin also overlies the Temescal Groundwater Basin.

There is little groundwater storage in the PBMZ. Any groundwater in storage is forced to the surface because the foot of Prado Dam extends to bedrock and subsurface flows cannot pass through the barrier created by the dam and surrounding hills. For the purpose of regulating discharges that would affect the PBMZ and downstream waters, the Regional Board designates this as a surface water management zone rather than a groundwater management zone.

The Inland Empire Utilities Agency and the Chino Basin Watermaster are required by the Regional Water Quality Control Board to maintain hydrologic control of groundwater flow from southern portion of the Chino Basin groundwater basin to prevent groundwater with elevated levels of nitrogen and salinity from reaching the Santa Ana River in the Prado Basin. This is achieved through management of groundwater levels in the basin and operation of desalters that pump and treat poor quality groundwater in the southern portion of the Chino Basin. The desalter operations achieves hydrologic control by reversing groundwater flow away from the Santa Ana River.

Shallow groundwater samples from three wells along the Santa Ana River in the southern portion of Chino Basin in 2017 averaged 618 mg/L for total dissolved solids and 5.2 for nitrate-nitrogen. (Chino Basin Watermaster Annual Maximum Benefit Report 2017)

Orange County Groundwater Basin

The Orange County Groundwater Basin underlies central and northern Orange County and is bordered by the Santa Ana Mountains to the east, the Pacific Ocean to the west, the Newport-Inglewood Fault to the southwest and Coyote Hills to the north. The basin is contiguous and directly connected with the Central Basin of Los Angeles County to the northwest. The Santa Ana River water that flows through Prado Dam is a major supply of water to recharge the Orange County Groundwater Basin.

Management of salt and nitrate concentrations in the basin is part of the watershed-wide salinity management program under the direction of the Regional Water Quality Control Board. Water quality objectives for the Orange County Groundwater Basin are 580 mg/L for total dissolved solids and 3.4 mg/l for nitrate-nitrogen (as N). The Regional Water Board requires that the ambient quality of groundwater in each of the Management Zones be recomputed every three years for TDS and nitrate. The most recent re-computation was completed in 2017 for the 20-year period ending in 2015. Ambient water quality concentrations for the Orange County Groundwater Basin for total dissolved solids was 600 mg/L and for nitrate-nitrogen (as N) was 3.0 mg/L.

4.5 BIOLOGICAL RESOURCES

Prado Basin

Prado Basin is located within the Santa Ana River Watershed. There are four major tributaries that drain into the Prado Basin; Santa Ana River, Chino Creek, Cucamonga Creek (which flows into Mill Creek) and Temescal Wash. All of these water bodies converge upstream of Prado Dam. The biological setting in the Prado Basin is significantly influenced by the presence of

Prado Dam. As a result of combination of high groundwater, storm flow accumulation held in the reservoir, ongoing sewage treatment plant effluent and irrigation runoff, perennial flows occur throughout much of the Prado Basin. During the winter months the river maintains flow throughout Prado Basin. In the summer months the surface flow is substantially reduced but is typically still present.

Prado Basin consists of a wide mixture of biological resources and habitats, including; cottonwood/willow riparian forest, riparian scrub, herbaceous riparian, freshwater ponds, freshwater marsh, and riverine. Riparian forest is the most dominant wetland habitat in the Prado Basin. The dominant plant species within the riparian forest are black willow, (*Salix goodingii*), arroyo willow (*Salix lasiolepis*), Freemont cottonwood, (*Populus fremontii*) eucalyptus, sycamore (*Platanus recemosa),* and mulefat (*Baccharis salicifolia*).

The riparian habitat within Prado Basin is a dynamic community that is dependent upon periodic flooding. Winter flows create areas of scour and sedimentation that cycle portions of the community back to earlier successional stages. Periodic floods of large magnitude and migration of the river channel lay down fresh alluvial deposits where seeds can germinate, and plant roots can take hold. The basin contains an expansive riparian forest. At lower elevations in the basin, the riparian forest coverage is nearly complete with an over-story of trees reaching as high as 50 feet and an understory of both native vegetation and non-native vegetation. At the higher elevations in the basin the forest is patchier, and the understory consists of more non-native vegetation.

The riparian forest in the Prado Basin contains an abundance and diversity of bird species. Neotropical migrants depend on deciduous trees and shrubs for foraging during migration. The mature trees provide numerous cavities for cavity dependent wildlife and the taller trees are used by nesting raptors. The emergent vegetation at the water's edge provides escape cover, shade and a source of food for fish. The basin supports a wide variety of mammal, amphibian and reptile species, several of which are biologically significant. Additionally, the Prado Basin functions as a wildlife movement corridor between core habitats in the Chino Hills, the Santa Ana Mountains and Prado Basin and the undeveloped Santa Ana River Floodplain.

Santa Ana River Prado Dam to River Road

The segment of the Santa Ana River (SAR) extending from the River Road Bridge/Santa Ana River crossing downstream into Prado Basin can be divided into two sub-segments. The upper segment, extending from River Road Bridge downstream to the south and west is approximately 10,000 feet, and is typically a well-defined channel composed of primarily sand channel slopes and a sand river bed. The river bed gradation ranges from very fine sand to coarse sand with occasional, brief and intermittent gravel deposits. This segment of the Santa Ana River receives high amounts of sediment deposition and can often move laterally during large flow events. The slope of the river in this location typically ranges from 0.003 to 0.0001, depending on sedimentation and river flow conditions. The segment of the Santa Ana River extending from 10,000 feet below River Road Bridge, south and west 7,000 feet to the Prado Dam embankment is indiscernible as a single river channel and can be defined as a series of braided streams meandering towards the Prado Dam outlet works. The braided stream beds and stream bank gradations are composed of a higher silt and clay content than what is present in the upper segment. The slope of the braided streams in this location of the basin can vary dramatically

depending on their location in the basin and annual sedimentation deposition, but typically range from 0.01 to 0.0001.

Santa Ana River Reach 9

The stretch of the Santa Ana River occurring downstream of Prado Dam to Weir Canyon Road, referred to as Reach 9, runs through Santa Ana Canyon and has several distinctive characteristics. At the Prado Dam outlet structure to the Green River Golf Course the river has a relatively flat slope. Within this reach the river flow is perennial and the floodplain is covered with riparian vegetation. The banks are moderately incised with vegetated islands that dot the main channel. Near the Green River Golf Course, the slope increases, and the river becomes more incised. Between the Green River Golf Course and Imperial Highway, the flood plain becomes much more expansive with several flow splits forming natural islands. Riparian vegetation is mostly concentrated near the river bank. Except for a drop structure located downstream of Weir Canyon, this reach does not contain any other water control structures. The bed material in Reach 9 is much coarser than the sandy bed material of the river above Prado Dam. Reach 9 bed material generally consists of gravels and cobbles compared to the predominantly sand substrate characteristic of the river upstream of Prado Dam. The dominant bed form in this reach is pool-riffle, where high gradient high velocity riffles flow into low gradient low velocity pools. Additionally, there are several stretches where the river has a plane bed, where the gradient and velocity are approximately constant, and the river bottom material is dominated by gravel and cobble.

The Corps is currently implementing major improvements and associated mitigation for the Santa Ana River Mainstem Project (SARM), which includes flood risk reduction measures within Prado Basin and along the Santa Ana River downstream to the Pacific Ocean. Also included in Reach 9 is the Corps Santa Ana Sucker Perennial Stream Restoration Project, which is a mitigation feature for SARM.

4.5.1 Study Area Vegetation Communities

The study area contains a diverse assemblage of vegetation communities. For mapping purposes similar vegetation types were grouped together under one classification. Figure 4-5 provides an overview of vegetation communities within the study area. The descriptions of each vegetation classification and a listing of the plant species that can be found in each vegetation community is presented below.

Cottonwood/Willow/Mulefat: The Cottonwood/Willow/Mulefat classification has been designated on lands that consist predominately of Fremont Cottonwood (*Populus fremontii),* Black Willow (*Salix gooddingii),* Arroyo Willow (S*alix lasiolepis*), Narrow-leaf Willow (*Salix exigua),* Mulefat *(Baccharis salicifolia)* with minor components of Western Sycamore (*Platanus racemosa).*

Mixed Riparian: The Riparian Mixed classification has been applied to lands that consist of 50% native riparian vegetation and 50% non-native riparian vegetation. Mixed Riparian vegetation within the project area includes; Fremont Cottonwood (*Populus fremontii),* Black Willow (*Salix gooddingii),* Arroyo Willow (S*alix lasiolepis*), Narrow-leaf Willow (*Salix exigua),*

Mulefat *(Baccharis salicifolia),* Elderberry (*Sambucus mexicana*), Cocklebur (*Xanthium*) and Caster Bean (*Ricinus communis*)

Coastal Sage Scrub: The Coastal Sage Scrub classification has been applied to areas that consist of 90% cover or greater of coastal sage scrub vegetation. The Coastal Sage Scrub Series includes California Sagebrush (*Artemisia californica*), California Bush Sunflower (*Encelia californica*), California Buckwheat (*erigonum fasciculatum*), Black Sage (*Salvia mellifera*) and White Sage (*Salvia apiana*)

Mixed Coastal Sage Scrub /Non-Native Grasses/Weeds: The Mixed Coastal Sage Scrub /Non-Native Grasses/Weeds classification has been applied to areas that consist of approximately 50% cover of Coastal sage Scrub and 50% cover of non-native grasses and weeds. The Coastal Sage Scrub Series includes California Sagebrush *(Artemisia californica*), California Bush Sunflower (*Encelia californica),* California Buckwheat (*erigonum fasciculatum*), Black Sage (*Salvia mellifera*) and White Sage (*Salvia apiana).* Non-native grasses and non-native weeds present include; Black Mustard (*Brassica nigra*), Poison Hemlock (*Conium maculatum*), Starthistle (*Centaurea spp.),* and Castor Bean (*Ricinus communis*).

Non-Native Grasses/Weeds: The Non-native grasslands and weeds classification has been applied to lands that consist of 90% cover or more of non-native grasses and non-native weeds. Non-native grasses and non-native weeds present include; Black Mustard (*Brassica nigra*), Poison Hemlock (*Conium maculatum*), Starthistle (*Centaurea spp*.), and Castor Bean (*Ricinus communis*).

Eucalyptus: The Eucalyptus classification has been applied to lands that consist predominantly of Eucalyptus Trees, with less than 10% cover of other vegetation.

Arundo: The Arundo (*Arundo donax*) classification has been applied to lands that consist predominantly of Arundo, with less than 10 % cover of other vegetation.

Oak Tree: The Oak Tree classification has been applied to lands that contain clusters of Oak Trees.

Wetlands: The Wetland classification has been applied to lands that operate as constructed wetlands.

Open Water: The Open Water classification represents portion of the project area that consists of water bodies, including stream systems, pools and ponds.

Agriculture: The Agriculture classification has been applied to lands that are in agriculture production.

Recreation: The Recreation classification has been applied to lands that provide recreation, including but not limited to parks, shooting ranges and golf courses.

Urban: The Urban classification has been applied to lands that are developed with developed urbanized land uses.

Disturbed: The Disturbed classification has been applied to lands that have been disturbed by human presence, such as compacted and frequently disturbed soils.
A summary of vegetation communities in the Prado Basin between elevations 470 ft. to 498 ft., 498 ft. to 505 ft. and 505 ft. to 530 ft. is shown in Table 4-11 and a summary of Reach 9 vegetation is shown in Table 4-12.

Table 4-11: Prado Basin Vegetation Communities

Vegetation Community	Acres Between 470 ft. and.498 ft.	Acres Between 498 ft. and 505 ft.	Acres Between 505 ft. and 566 ft.
Cottonwood/Willow	852.5	431.9	1887.9
Mixed Riparian	98.8	0.2	198.3
Coastal Sage Scrub	0.0	0.0	23.2
Coastal Sage Scrub/Non-Native Weeds	0.0	0.0	46.3
Open Water	34.2	0.5	236.8
Non-Native Weeds/Grasses	50.4	54.7	1893.9
Arundo	0.0	8.3	608.0
Disturbed	0.7	1.3	30.8
Eucalyptus	23.6	17.5	113.7
Constructed Wetlands	91.8	166.7	235.6
Agriculture	0.0	1.7	1797.9
Recreation	4.0	11.9	31.6
Urban	0.0	0.0	1225.4
Total	1,156.0	694.7	8329.4
Source: Orange County Water District and U.S. Army Corps of Engineers.			

Table 4-12: Santa Ana River Reach 9 Vegetation Communities (Acres)

Vegetation Community	Acres
Mixed Riparian	321.6
Open Water	54.8
Coastal Sage Scrub	77.2
Non-Native Weeds/Grasses	172.9
Mix Coastal Sage Scrub/Non-Native Weeds	105.5
Arundo	11.3
Eucalyptus	1.1
Agriculture	41.1
Oak	.54
Urban	436.5
Wetlands	2.7
Total	1225.2
Source: Orange County Water District and Untied States Army Corps Engineers	

4.5.1.1 Special Status Plant Species

A database search of special status plant species listed in the California Native Plant Society Online Survey of Rare Plants, U.S. Department of Interior Information Planning and Conservation System Database and the California Department of Fish and Game Natural Diversity Data Base for the Prado Dam, Black Star Canyon and Corona North U.S.G.S. Quadrangles was conducted to determine the potential for special status plant species to occur within the study area. A complete listing of special status plant species identified within the three quadrangle areas and the potential for the plant species to occur within the study area is shown in Table 4-13. The determination on the potential occurrence of the species was based on the following criteria:

Present: The species is commonly observed or observed within the study area within the last year.

High: The study area supports suitable habitat and the species has been observed within last 2 years.

Moderate: The study area supports suitable habitat and the species has not been observed within last 2 years.

Low: The study area lacks suitable habitat for the species.

Table 4-13: Sensitive Plant List

	FED	CA	CNPS	Required Habitat	Potential Occurrence
Plants					
Chaparral sand verbena *(Abronia villosa var. aurita)*	NL	NL	1B.1	Coast Bluff Scrub & Chaparral with sandy soils. Flowering period January to September.	Low Potential
Coulters saltbrush (*Atriplex coulteri)*	NL	NL	1B.1	Coastal Bluff Scrub, Strand, Coastal Sage Scrub, valley and foothill grass lands. Flowering period March to October.	Low Potential
Brauntons milk-vetch (*Astragalus brauntonii)*	E	NL	1B.1	Dry open areas in chaparral with sandstone and rocky clay soils. Coastal Sage Foothills. Flowering period February to July.	Low Potential
Malibu baccharis (*Baccharis malibuensis)*	NL	NL	1B.1	Chaparral, cismontane and riparian woodlands, coastal scrub. Flowering period August.	Low Potential
Plummers mariposa lily (*Calochortus plummerae*)	NL	NL	1B.1	Chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, valley and foothill grass lands. Flowering period May to July.	Low Potential
Intermediate mariposa lily (*Calochortus weedii var. ntermus)*	NL	NL	1B.2	Chaparral, Coastal Sage Scrub, Valley and Foothill Grasslands. Flowering period May to July.	Low Potential
Luck Morning-Glory *(Calystegia felix)*	NL	NL	3.1	Riparian Scrub Flowering March to September	Low Potential
Smooth Tarplant	NL	NL	1B.1	Valley and Foothill grassland and riparian	Low

	FED	CA	CNPS	Required Habitat	Potential Occurrence
(Centromadia pungens laevis)				woodland. Flowering period April to September.	Potential
San Fernando Valley spineflower (*Chorizanthe parryi var. Fernandina)*	C	E	1B.1	Sandy coastal scrub and desert scrub. Flowering period April to June.	Low Potential
Long-spined spineflower (*Chorizanthe polygonoides var. longispina)*	NL	NL	1B.2	Chaparral, coastal scrub, meadows, seeps, valley and foothill grass lands. Flowering period April to July.	Low Potential
Slender horned Spineflower (*Dodecahema leptoceras)*	E	E	1B.2	Sandy places Coastal Sage Scrub, Chaparral, cismontane woodlands, stream banks and washes. Flowering period April to June.	Low Potential
Many-stemmed dudleya *(Dudleya multicaulis)*	NL	NL	1B.2	Coastal Sage Scrub, chaparral, valley grasslands. Flowering period April to July.	Low Potential
Santa Ana River woollystar *(Eriastrum densifolium ssp. Sanctorum)*	E	E	1B.1	Sandy gravelly soils on River Floodplain. Flowering period May to September.	Low Potential
Heart-leaved pitcher sage (*lepechinia cardiophylla)*	NL	NL	1B.2	Closed Cone Conifer Forest, Cismontane Woodland. Flowering period April to July.	Low Potential
Robinsons Pepper grass *(Lepidium virginicum Robinson)*	NL	NL	4.3	Chaparral, Coastal Scrub	Low Potential
Jokerst's monardella *(Monardella australis)*	NL	NL	1B.1	Lower Montane Coniferous Forest Flowering period June to September	Low Potential
California beardtongue (*penstemon califoricus)*	NL	NL	1B.2	Lower montane coniferous forest, pinyon and juniper woodland. Flowering period may – June	Low Potential
Allen's pentachaeta *(pentachaeta aurea ssp. Allenii)*	NL	NL	1B.1	Valley Grassland, Southern Oak Woodland. Flowering period March to June.	Low potential
White rabbit tobacco (*Pseudognaphalium leucocephalum)*	NL	NL	2.2	Occurs in sandy washes. Flowering period July to November.	Low Potential
Coulters matilija poppy (*Romneya coulteria)*	NL	NL	4.2	Dry washes, disturbed sage scrub, chaparral and often found in burn areas. Flowering period March to July.	High Potential
Salt Spring checkerbloom (*Sidalalcea neomexicana)*	NL	NL	2.2	Chaparral, coastal scrub, lower montane conifer forest. Flowering period March to June.	Low Potential
San Bernardino aster (*Symphyotrichum defoliatum)*	NL	NL	1B.2	Occurs in freshwater Wetlands. Flowering period July to November.	Low Potential
Federal/State E- Endangered T-Threatened SC-Species of Concern NL-Not Listed	**CNPS Category and Threat Ranks** 1B- Plants rare, threatened, or endangered in California and elsewhere 2-Plants rare, threatened, or endangered in California but more common elsewhere 3-Plants about which we need more review 4-Plants of limited distribution 1 Seriously Endangered; .2 Fairly Endangered; .3 Not Very Endangered				

As shown in Table 4-13, there would be low potential for special status plant species to occur within the study area, except for Coulter's matilija poppy which was identified to occur in upland areas along Reach 9. Under the No Federal Action/No Project Alternative there would be no changes to the existing condition of the study area and there would continue to be a low potential for special status plant species except for Coulter's matilija poppy to occur within the study area.

4.5.2 Wildlife Species

A review of the U.S. Department of Interior Information Planning and Conservation System Database and California Department of Fish and Wildlife California Diversity Data Base for the Prado Dam and Corona North Canyon USGS Quadrangles was conducted to determine the potential for special status wildlife species to occur within the study area. A complete listing of sensitive wildlife species identified within the two quadrangle areas and the potential for the species to occur within the study area is shown in Table 4-14. The determination on the potential for the species to occur within the study area was based on the following criteria.

Present: The species is commonly observed, or trace signs of the species were observed within the study area within the last year.

High: The study area supports suitable habitat and the species has been observed within the last 2 years and within 2 miles of the study area.

Moderate: The project area supports suitable habitat.

Low: The study area lacks suitable habitat.

Table 4-14: Potential Special Status Wildlife Species

	FED	CA	MSHCP	General Habitat	Potential Occurrence in Action Area
Reptiles					
Orange-throated whiptail *(Aspidoscelis hyperythra)*	NL	SSC	C	Low level Coastal Sage Scrub, Chaparral, Grass, Oak Woodland. Prefers washes, sandy areas with patches, brush.	**Moderate Potential:** The study area contains suitable habitat.
Red Diamond Rattlesnake (*Crotalus ruber)*	NL	SSC	C	Chaparral, Woodland and grassland and desert areas that have dense brush and large rocks or boulders.	**Moderate Potential.** The study area contains suitable habitat.
Coast horned lizard *(Phrynosoma blainvillii)*	NL	SSC	NC	Most common in lowlands along sandy washes with scattered low brushes, requires open areas for sunning, bushes for cover and abundant supply of ants and other food sources.	**High Potential.** The study area contains suitable habitat. Species last reported within last 2 years.
Two-striped Garter Snake (*Thamnophis hammondii*)	NL	SSC	NC	Along streams with rock beds and riparian growth.	**Moderate Potential.** The study area contains suitable habitat
California red-sided garter snake (*Thamnophis sirtalis infernalis*)	NL	SSC	C	Forest, mixed woodlands, grassland, marshes and streams.	**High Potential.** The study area supports suitable habitat and the species has been observed in within last 2 years.
Birds					
Tricolored blackbird (*Agelaius tricolor)*	NL	E	C	Wetlands, Agricultural Fields.	**High Potential.** The study area contains suitable habitat and the

	FED	CA	MSHCP	General Habitat	Potential Occurrence in Action Area
					species has been observed in within last 2 years.
Grasshopper sparrow (*Ammodramus savannarum)*	NL	SSC	C	Dense grasslands on rolling hills, in valleys and on hillsides, favors native grasslands with scattered shrubs.	**High Potential**. The study area contains suitable habitat. Species last reported 2015 near Prado Dam Spillway.
Long-eared owl *(Asio otus)*	NL	SSC	C	Riparian bottomlands within tall willow and cottonwood trees, live oak trees near streams, needs adjacent open land productive of food sources and the presence of old nests.	**Moderate Potential.** The study area contains suitable amount of habitat.
Yellow Warbler (*Dendroica Brewsteri)*	NL	SSC	C	Riparian vegetation associations, prefers willows, cottonwood, sycamores for nesting and foraging.	**Present.**
Least Bell's vireo *(Vireo bellii pusillus)*	E	E	C	Summer resident of southern California in low riparian habitats in vicinity of water or dry river bottoms, nests placed along margins of bushes or on twigs landing on pathways, usually willow, mesquite or mulefat.	**Present.**
Coastal California gnatcatcher *(Polioptila californica*)	T	SSC	C	Permanent resident of coastal sage scrub, low scrub, in arid washes, on mesas and slopes.	**Present:** November 2017, one pair of gnatcatchers reported sediment storage site.
Western yellow billed cuckoo (*Coccyzus americanus occidentalis)*	T	E	C	Species typically require a minimum of 25 acres of area and forage predominantly in cottonwood tree stands.	**Moderate Potential.** The study area supports suitable habitat. Within the last 15 years 2 sightings have been reported in the Prado Basin, 1 in 2000 and 1 in 2011. However, both species were transit and not annual resident to the basin.
Cooper's hawk *(Accipiter cooperii)*	NL	SSC	C	Woodlands, nest sites mainly in riparian growths of deciduous trees.	**Present.**
Southwestern willow flycatcher (*Empidonax traillii extimus)*	E	E	C	Breeds in willow riparian forest and shrub.	**High Potential.** The study area supports study suitable habitat. Last reported in 2015 near OCWD Prado Wetlands.
Yellow breasted chat (*Icteria virens*)	NL	SSC	C	Summer resident, inhibits riparian thicket of willow and other brushy thickets near water courses, nests in low dense riparian vegetation.	**Present.**
Double-crested cormorant (*Phalacrocorax auritus*)	NL	SSC	C	Inhabits lakes, rivers, reservoirs, estuaries or ocean for foraging, nests in tall trees or rugged slopes near aquatic environments.	**Present.**
Great blue heron (*Ardea herodias*)	NL	SSC	C	Inhabits shallow estuaries, fresh and saline emergent wetland areas.	**Present.**
Sharp-shinned hawk (*Accipiter striatus*)	NL	SSC	C	Nests in conifer and riparian forests, prefers north facing slopes near water.	**Present.**
Vaux's swift *(Chaetura vauxi)*	NL	SSC	NC	Breeds in coniferous and mixed coniferous forests, requires large diameter trees, hollow trees form	**High Potential:** The study area supports suitable habitat. Species has been reported in Prado Basin within last 2 years.

	FED	CA	MSHCP	General Habitat	Potential Occurrence in Action Area
				breeding, forages in areas of open water.	
Northern harrier *(Circus cyaneus)*	NL	SSC	C	Prefers open country, grasslands, stepps, wetland meadows, agriculture fields, roost and nest on ground in shrubby vegetation often at edge of marshes.	**Present.**
California horned lark *(Eremophila alpestris action)*	NL	SSC	C	Short-grass prairie, mountain meadows, open coastal plains and fallow grain fields.	**High Potential.** The study area supports marginal suitable habitat. Species has been reported in Prado Basin within last two years.
Merlin *(Falco columbarius)*	NL	SSC	C	Tidal estuaries, open woodlands. Edges of grasslands, requires clumps of trees or windbreaks for roosting in open country.	**Present.**
Loggerhead Shrike *(Lanius ludovicianus)*	NL	SSC	C	Broken woodland, riparian woodland, pinyon-juniper woodland and washes.	**High Potential.** The study area supports suitable habitat and species is known to forage in upland habitats within Prado Basin and has been reported within last two years.
White-tailed Kite (*Elanus leucurus*)	NL	FP		Marsh, Swamp	**Present.**
Amphibians					
Western Pond Turtle *(Emys marmorata)*	NL	SSC	NL	Perennial Ponds, Lakes, Rivers, Streams, Creeks, Marshes, and Irrigation Ditches.	**High Potential.** The study area contains suitable habitat and the species has been observed within study area within last 2 years.
Western spadefoot (*Spea hammondii)*	NL	SSC	C	Vernal Pools, Riparian Habitats	**Moderate Potential**. The study area contains suitable habitat.
Fish					
Santa Ana sucker (*Catostomus santaanae*)	T	SSC	C	Cool, Clear Streams, Rivers, rocky Bottom in riparian woodlands.	**Moderate Potential.** The study area is within designated critical habitat. Habitat quality is marginal.
Southern California arroyo chub (*Gila orcutti)*	NL	SSC	C	Freshwater Rivers, Creeks, and Streams in riparian woodlands.	**Low Potential.** The Prado Basin does not contain adequate amounts of suitable habitat.
Federal E-Endangered T-Threatened C-Candidate for Listing NL-Not Listed			State E-Endangered T-Threatened SSC-Species Special Concern FP-Full Protected NL-Not Listed		MSHCP C-Covered NC-Not Covered

4.5.2.1 Critical Habitat

Least Bell's Vireo (vireo) Critical Habitat

As shown in Figure 4-6, the study area includes lands that are designated critical habitat for the vireo. The primary constituent elements for the vireo include riparian woodland vegetation that generally contains both canopy and shrub layers and includes some associated upland habitats. Vireos typically occupy low riparian growth either in the vicinity of water or in dry parts or river bottoms. The center of activity is within a few feet of the ground, in the fairly open twigs canopied above by the foliage of willows and cottonwoods. Most typical plants frequented are

willows, mulefat, and wild blackberry. As shown in Table 4-15, there is approximately 3,349.36 acres of critical habitat for the vireo within the study area.

Southwestern Willow Flycatcher (flycatcher) Critical Habitat
As shown in Figure 4-6, the study area includes lands that are designated critical habitat for the flycatcher. The primary constituent elements for the flycatcher are thickets of riparian shrubs and small trees with adjacent surface water such as willows, cottonwoods, mulefat, and other wetland plants. The surface water must be available from May to September during breeding season. As shown in Table 4-15, there are approximately 1,493 acres of critical habitat for the flycatcher within the study area.

Western Yellowed Billed Cuckoo (cuckoo) Critical Habitat
Critical habitat for the western yellow-billed cuckoo was proposed in 2014. Presently, the current ruling is being revised by USFWS. The final ruling is expected sometime in 2018. Based on the ruling it appears that approximately 4,305 acres of critical habitat for the cuckoo would be proposed within the study area.

Coastal California Gnatcatcher (gnatcatcher) Critical Habitat
As shown in Figure 4-6, critical habitat for the gnatcatcher is designated on the terraces along Reach 9 of the Santa Ana River. Gnatcatcher critical habitat occurs in the Reach 9 portion of the Action Area only. Its main purpose is to provide connectivity and genetic interchange between populations of the species in the Santa Ana Mountains and Chino/Puente Hills (USFWS 2010). As shown in Table 4-15, Reach 9 contains approximately 313 acres of critical habitat for the gnatcatcher.

Santa Ana Sucker (sucker) Critical Habitat
As shown in Figure 4-6, designated critical habitat for the sucker extends along the Santa Ana River from above the Seven Oaks Dam in the San Bernardino Mountains into a portion of Prado Basin and along the Santa Ana River downstream from Prado Dam to Imperial Highway in Orange County. The primary constituent elements that have been recognized as essential critical habitat for the sucker include; a functioning hydrological system that experiences peaks and ebbs in the water column reflecting seasonal variation in precipitation throughout the year; a mosaic of loose sand, gravel, cobble and boulder substrates in a series of riffles, runs, pools and shallow sandy margins, water depths greater than 1.2 inches, non-turbid water or only seasonally turbid water, water temperatures less than 86 degree and stream habitat that includes algae, aquatic emergent vegetation, macro invertebrates and riparian vegetation.

As shown in Table 4-15 there are approximately 377.5 acres of designated critical habitat above elevation 505 ft. Even though this area is designated critical habitat, this reach of the Santa Ana River lacks the required primary constituent elements to support the species, such as a cobble and boulder substrate, series of riffles and pools, shallow sandy margins and perennial water depths greater than 1.2 inches.

Along Reach 9 there are approximately 613.8 acres of designated critical habitat. This reach of the river does contain several of the required primary constituent elements. However, because of high populations on non-native fish it would be unlikely that populations of suckers would persist.

Table 4-15: Study Area Critical Habitat (Acres)

Critical Habitat	470 ft.to 498 ft.	498 ft. to 505 ft.	Above 505 ft.to 566	Reach 9	Total
Least Bell's vireo	961.7	507.5	1880.1	0.0	3349.36
Southwestern willow flycatcher	0.0	0.77	1492.5	0.0	1493.29
*Western yellow billed cuckoo	1004.9	614.0	2686.1	0.0	4,305.0
Coastal California gnatcatcher	0.0	0.0	0.0	313.21	313.2
Santa Ana sucker	0.0	0.0	377.50	613.8	991.3
*Final Ruling Expected 2018 (USFWS)					

Jurisdictional Waters

The USACE regulates the discharge of dredged or fill material into Waters of the U.S. pursuant to Section 404 of the Clean Water Act (CWA). Implementing regulations for the CWA define waters of the U.S. as "rivers, creeks, streams, and lakes extending to their headwaters and any associated wetlands." Wetlands are defined as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions." The Section 404 regulatory review process entails an assessment of potentially adverse impacts to USACE jurisdictional waters of the U.S. (WOUS).

For purposes of Section 404 of the CWA, the lateral limits of jurisdiction over non-tidal water bodies extend to the ordinary high-water mark (OHWM), in the absence of adjacent wetlands. When adjacent wetlands are present, CWA jurisdiction extends beyond the OHWM to the limits of the adjacent wetlands. OHWM refers to "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas (33 CFR 328.3(e))."

The proposed project area encompasses the Prado Dam Basin, the Santa Ana River, Chino Creek, and Mill Creek. In general, the drainages are non-wetland waters of the US. As shown in Figure the adjacent floodplains are considered wetland waters of the US. Prado Dam Basin is considered a wetland waters of the US up to the 514 ft. contour elevation.

Wildlife Movement Corridors

The Santa Ana River is a major drainage that connects coastal regions of Orange County with interior regions of Riverside and San Bernardino counties. The riparian and upland plant communities that occur in and adjacent to the Santa Ana River provide habitat for a variety of resident and migratory wildlife species including several special-status species. The river provides 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 the regional corridor.

The stretch of the Santa Ana River and corresponding floodplain within the vicinity of Reach 9 study area is surrounded by a variety of developed land uses. As a result, the floodplain is the primary habitat area in the study area. The river and corresponding undeveloped floodplain provide a corridor for wildlife to move up and down the river and allows access to linkages to additional core habitat areas, such as the Santa Ana Mountains, Prado Basin, and Chino Hills, upstream and to a more limited extent downstream of Reach 9 study area, but dispersion becomes further restricted southwest due to channelization of the streambed and adjacent development.

The Chino Hills State Park and Cleveland National Forest in the Santa Ana Mountains are separated by the Santa Ana River Canyon near Prado Basin. The linkage between core habitats in the Santa Ana Mountains, the Prado Basin, and the Puente-Chino Hills was once several miles wide. It is now extremely limited, due in large part to SR-91, the Corona Expressway (SR-71), and urban development. The only passageways remaining for wildlife to utilize to safely traverse SR-91 and SR-71 are freeway under crossings. As shown in Figure 4-8, there are 20 under crossings run beneath SR-91 that can provide connections for wildlife moving. These passageways can provide connections for wildlife moving between remaining patches of quality habitat. The culverts under SR-91 are used extensively by small mammals as well as by mountain lions. In particular undercrossing 91-09, known as the "Coal Canyon" underpass, is an important wildlife movement corridor for numerous wildlife species. Additionally, under crossing 91-17, known as "B Canyon" near the BNSF Railroad Bridge, is an important crossing for wildlife as it consists as a 12-foot by 12-foot cement box culvert, which occurs beneath SR-91 and Green River Road and opens up to a small drainage. This culvert provides a relatively safe passage for wildlife beneath SR-91, between the Santa Ana Mountains to the south and the Chino Hills to the north. Bobcat, grey fox, coyotes, and several other mammalian species, have been documented using this culvert on a regular basis.

4.5.2.2 Conservation Programs

Western Riverside County Multiple Species Habitat Conservation Plan
The Prado Portion of the study area is included within the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP). The study area is included within Existing Core Area A, which is defined as areas that contain a block of habitat of appropriate size, configuration, and vegetation characteristics to generally support the life history requirements of one or more covered species. The core functions as a linkage, connecting Orange County to the west and San Bernardino County to the north. The objective of the MSHCP in this area is to maintain riparian habitat within the existing core and along the existing core edges, the maintenance of existing floodplain processes and the maintenance of water quality along the Santa Ana River.

County of Orange Santa Ana Canyon Habitat Management Plan
The Santa Ana River Reach 9 portion of the study area is included within the County of Orange Santa Ana Canyon Habitat Management Plan (HMP). The HMP addresses the floodplain and open wildlife habitat in the Santa Ana Canyon below Prado Dam and provides for planning and management continuity for the canyon habitat from Prado Dam downstream to Weir Canyon. The HMP lists permitted activities within the study area that include; maintenance, repair and operations of flood control works, utilities, trails, bridges, park facilities, habitat restoration, use

of recreation trails, hiking, bicycling, construction of remaining regional trail and bikeway segments, wildlife viewing, camping, picnicking and golfing.

4.6 CULTURAL RESOURCES

Cultural resources are locations of past human activity, occupation, or use on the landscape. The term denotes a wide range of heritage assets including, but not limited to: archaeological sites such as lithic scatters, villages, procurement areas, resource extraction sites, rock shelters, rock art, and shell middens; and historic era sites such as trash scatters, homesteads, railroads, ranches, logging camps, and buildings or structures that are generally over 50 years old. Cultural resources also include aspects of the physical environment that are associated with cultural practices or beliefs of a living community that are both rooted in that community's history and are important in maintaining its cultural identity (Parker and King 1998). Commonly referred to as Traditional Cultural Properties (TCP), these areas are afforded the same consideration as other cultural resources.

4.6.1 Cultural Resources Setting

Horizon chronologies are used to describe and provide a general framework of prehistoric periods of Southern California.

Horizon I: Early Man or Paleo-Indian Period (11,000 BCE[1] to 7,500 BCE): This early stage of human occupation is commonly referred to as the Paleo-Indian Period today. The precise start of this period is still a topic of considerable debate. At inland archaeological sites, the surviving material culture of this period is primarily lithic, consisting of large, extremely well made stone projectile points and tools such as scrapers and choppers. Encampments were probably temporary, located near major kills or important resource areas.

Horizon II: Milling Stone Assemblages (7,500 BCE to 1,000 BCE): Encompassing a broad expanse of time, the Milling Stone Period was named for the abundant milling stone tools associated with sites of this period. These tools, the mano and metate, were used to process small, hard seeds from plants associated with shrub-scrub vegetation communities. An annual round of seasonal migrations was likely practiced, with movements coinciding with ripening vegetal resources and the periods of maximal availability of various animal resources. Along the coast, shell midden sites were common site types. Some formal burials, occasionally with associated grave goods, are also evident. Milling stones were common and projectile points were comparatively rare during this period of time, hunting was less important than the gathering of vegetable resources.

Horizon III: Intermediate Cultures (1,000 BCE to 750 CE[2]). The Intermediate Period is identified by a mixed strategy of plant exploitation, terrestrial hunting, and maritime subsistence strategies. Chipped stone tools (e.g., projectile points) generally decrease in size, but increase in

[1] BCE is defined as "Before Common Era" and generally refers to that time period commonly referred to as "Before Christ" (B.C.).

[2] CE is defined as "Common Era" and generally refers to that time period commonly referred to as "annō Dominī" (A.D.).

number. Abundant bone and shell remains have been recovered from sites dating to these time periods. In coastal areas, the introduction of the circular shell fishhook and the growing abundance of fish remains in sites over the course of the period suggest a substantial increase in fishing activity during the Intermediate Horizon. It is also during this time period that mortar and pestle use intensified dramatically. The mano and metate continued to be in use on a reduced scale, but the greatly intensified use of the mortar and pestle signaled a shift away from a subsistence strategy based on seed resources to that of the acorn. It is probably during this time period that the acorn became the food staple of the majority of the indigenous tribes in Southern California. This subsistence strategy continued until European contact. The material culture became more diverse and elaborates and included steatite containers, perforated stones, bone tools, ornamental items, and asphalt adhesive.

Horizon IV: Late Prehistoric Cultures (750 CE to 1769 CE: During the Late Prehistoric Period, exploitation of many food resources, particularly marine resources among coastal groups, continued to intensify. The material culture in the Late Prehistoric Horizon increased in complexity in terms of the abundance and diversity of artifacts being produced. The recovery and identification of a number of small projectile points during this period likely suggests a greater utilization of the bow and arrow, which was likely introduced near the end of the Intermediate Period. Shell beads, ornaments, and other elements of material culture continue to be ornate, varied, and widely distributed; the latter evidence suggests elaborate trade networks. The Late Prehistoric Period includes the first few centuries of early European contact (1542–1769 CE); it is also known as the Protohistoric Period as there was a low level of interaction between native Californians and Europeans prior to Portolá's overland expedition in 1769. In the few centuries prior to European contact, the archaeological record reveals substantial increases in the indigenous population. Some village sites could have contained as many as 1,500 individuals. Apparently, many of these village sites were occupied throughout the year rather than seasonally. This shift in settlement strategy was likely influenced by improved food procurement and storage technology, which enabled population growth and could have helped stimulate changes in sociopolitical organization.

Evidence is growing that prehistoric cultural change has been much more variable through time and across culture areas than previously thought. Cultural traits such as maritime economies, seafaring, complex trade networks, and year-round occupation of villages appear to have developed much earlier than previously thought. Culture change during the Late Prehistoric Period, in particular, could have been driven more by environmental and resource pressures than optimal adaptation to the environment.

Ethnographic Period

At the time of European contact, both Riverside and San Bernardino Counties were the home of the Gabrielino. The Gabrielino are those people and their descendants who became associated with Mission San Gabriel Arcángel, which was established in south-central Los Angeles County on September 8, 1771, in what has ever since been called the San Gabriel Valley. Today, these people are sometimes referred to as the *Tongva,* although the term apparently originally (i.e., before the arrival of Euro-Americans) referred to the inhabitants of the San Gabriel Valley only. In either case, the inhabitants of Santa Catalina Island and San Clemente Island are often included as being parts of this tribe, as are the Fernandeño, who inhabited most of the San Fernando Valley.

The ancestral Gabrielino arrived in the Los Angeles Basin probably before 500 BCE as part of the so-called Shoshonean (Takic speaking) Wedge from the Great Basin region and gradually displaced the indigenous peoples, who were probably Hokan speakers. Large, permanent villages were established in the fertile lowlands along rivers and streams and in sheltered areas along the coast. Eventually, Gabrielino territory encompassed the watersheds of the Los Angeles, San Gabriel, Rio Hondo, and Santa Ana Rivers, which includes the greater Los Angeles Basin, to perhaps as far south as Aliso Creek, as well as portions of the San Fernando, San Gabriel, and San Bernardino Valleys. Gabrielino territory also included the islands of San Clemente, San Nicholas, and Santa Catalina.

The subsistence economy of the Gabrielino was one of hunting and gathering. The surrounding environment was rich and varied, and the natives were able to exploit mountains, foothills, valleys, deserts, and coasts. As was the case for most native Californians, acorns were the staple food (by the Intermediate Horizon), supplemented by the roots, leaves, seeds, and fruit of a wide variety of flora (i.e., cactus, yucca, sage, and agave). Fresh and saltwater fish, shellfish, birds, insects, and large and small mammals were exploited. A Gabrielino community known to be located near the study area was named *Pashiinonga*. Located on the Rancho del Chino, the name was apparently the Tongva name for the Rancho. Its inhabitants were forcibly relocated to Mission San Gabriel.

The Prado Basin also lies within the southernmost territory of the Serrano Indians. The Serrano, so named by the Spanish because of their tenure in the San Bernardino Mountains, occupied that region from the mountains, downstream along the Mojave River and eastward to the Mojave sink; southward to as far as the Prado Basin and the northern foothills of the Santa Ana Mountains. Serrano Indians in the vicinity of the Mojave sink were known by the Desert Mojave as *Vanyume.* The Serrano spoke a language from the Takic subfamily of the Uto-Aztecan linguistic family. Serrano territory was bound on the north, east, and west by Numic-speaking groups consisting of Paiute/Chemehuevi, Kawaiisu, and Panamint, respectively. Serrano territory was frequented by these groups and intermarriage was common. Although little ethnographic data exists describing the settlement subsistence systems of the Serrano, they probably lived similarly to Kitanemuk and Cahuilla. Serrano subsisted by hunting and gathering seasonally and exploiting large and small game as well as a variety of staple vegetal foods such as acorns, pinyon nuts, mesquite beans, chia, rice grass, tubers, and greens. Mountain and high desert resources were exploited seasonally and permanent and semi-permanent villages formed from autonomous political patrilineal clans, maintaining bonds with neighboring clans through economic, marital, and ceremonial reciprocity.

Historic Period

The Prado Basin was named for the lush grassy flood plains that characterized that portion of the Santa Ana Canyon. The rich forage attracted Native Americans for thousands of years and provided a prehistoric route from the Colorado River region to the west coast. Similarly, the Santa Ana Canyon signified one of the most important overland routes for European travelers from California's interior southern deserts to the west coast. In 1938, the Prado Dam was authorized for construction by Riverside County. Periodic flooding down the Santa Ana Canyon was successfully halted following the construction of the dam.

4.6.2 Area of Potential Effects

Federal regulations require that the federal agency define the area of potential effects (APE) for any federal undertaking. The APE is the geographical area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties (36 CFR 800.16). The Corps has defined the APE as the study area which approximately follows the planned 566' flood storage capacity elevation within the Basin, and the seven- mile reach of river downstream of Prado Dam. The APE includes those areas that may be directly or indirectly affected by the implementation of the undertaking and reflects a reasonable and good-faith effort to capture the potential for visual, auditory, and other non-direct effects (Appendix I).

Cultural Resources Identification Efforts

By the nature of feasibility studies, some identification efforts would need to be delayed until a future phase of the study. Consequently, the Corps, in consultation with the State Historic Preservation Officer (SHPO), OCWD, Indian Tribes, and other interested parties, would develop a Programmatic Agreement (PA) in accordance with 36CFR800.14, in order to fulfill their obligations under Section 106 of the NHPA. In order to compare the alternatives and identify potential impacts to cultural resources, the Corps and OCWD have completed a record search, reconnaissance surveys, and have initiated consultation with the SHPO and the Indian Tribes who may attach religious or cultural significance to properties within the APE. Those identification efforts and their results are described in this subsection.

Record Searches

While the APE includes the entire study area, record searches were limited to the four focal areas where specific project measures are being considered along with an 1/8-mile buffer. Records searches and literature reviews were conducted at the Eastern Information Center (EIC) at University of California, Riverside for the sites located in the northwest corner of Riverside County (i.e. the lower portion of the Mill Creek Focal Area and Chino Creek Focal Area, the SARM Upstream Focal Area, and the western portion of the SARM Downstream Focal Area and at the South Central Coastal Information Center (SCCIC) for the sites located in San Bernardino County (i.e. the upper portion of the Mill Creek Focal Area and Chino Creek Focal Area) and Orange County (i.e. the eastern portion of the SARM Downstream Focal Area). Sources consulted included archaeological records, Archaeological Determinations of Eligibility, historic maps, and the Historic Property Data File (HPDF) maintained by the California Office of Historic Preservation. The HPDF contains listings for the California Register of Historical Resources (CRHR) and/or NRHP, California Historical Landmarks, and California Points of Historical Interest.

SARM Downstream Focal Area

The SCCIC and EIC records searches and literature reviews showed that 36 cultural resources studies have been completed within a 1/8th mile radius of the SARM Downstream Focal Area. Of those, four include all or part of the focal area. As shown in Table 4-16, 22 cultural resource sites have been recorded within $^{1}/_{8}$ mile of the SARM Downstream Focal Area. Of those, two are within the boundaries of the focal area.

Table 4-16: Cultural Resource Sites Recorded within One-Eighth mile of SARM Downstream Focal Area

Site Number	Recorder/Year	Description
Orange County		
CA-ORA-000614*	Hall 1975	Lithic scatter
CA-ORA-000615	Desautels 1975	Lithic scatter, rockshelter
CA-ORA-000617	Brown 1994	Lithic scatter, quarry
CA-ORA-000647	Brown 1994	Lithic scatter, quarry
CA-ORA-000648	Brown 1994	Lithic scatter
CA-ORA-000755	York and Mullen 1996	Lithic scatter
CA-ORA-000756	Beck and Allen 1996	Lithic scatter
CA-ORA-000758	Beck and Allen 1996	Lithic scatter
CA-ORA-000759	Beck and Allen 1996	Lithic scatter
CA-ORA-000780	York and Mullen 1996	Lithic scatter
CA-ORA-000817*	Douglas 1979	Lithic scatter, habitation debris
CA-ORA-001073	Desautels 1983	Lithic scatter
CA-ORA-001074	Desautels 1983	Lithic scatter
CA-ORA-001075	Desautels 1983	Lithic scatter, groundstone
CA-ORA-001076	Desautels 1983	Lithic scatter
CA-ORA-001358	Cottrell 1988	Lithic scatter
CA-ORA-001484H	Maxon 1996	Historic residence
CA-ORA-001660	Holmes and Vader 2006	Lithic scatter
CA-ORA-001741	Bissell 1986	Lithic scatter
CA-ORA-1478	White 1994	lithic scatter
Riverside County		
CA-RIV-5222H	Toren 1995	Remnants of Railroad Bridge
CA-RIV-4730	Sanka 2010	Prado Dam Facility
*Recorded within the focal area		

SARM Upstream Focal Area

The EIC records search and literature review showed that 40 cultural resource investigations have been conducted within a $^{1}/_{8}$-mile radius of the SARM Upstream Focal Area. Of those, 17 include all or part of the focal area. As identified in Table 4-17, 25 cultural resources have been recorded within a 1/8- mile radius of the SARM Upstream Focal Area. Of those, 15 are within the boundaries of the focal area.

Table 4-17: Cultural Resource Sites Recorded Within One-Eight Mile SARM Upstream Focal Area

Site Number	Recorder/Year (most recent)	Description/Eligibility
Riverside County		
CA-RIV-0652	No data on file with EIC	No data on file with EIC
CA-RIV-1039H*	Selverston 1995	Historic
CA-RIV-1042	Hall 1975	Lithic scatter
CA-RIV-1043	Hall 1975	Lithic scatter

Site Number	Recorder/Year (most recent)	Description/Eligibility
Riverside County		
CA-RIV-1044H*	Selverston 1995	Pate Ranch
CA-RIV-1451*	Hammond 1977	Prehistoric/historic
CA-RIV-2754	Brock and Langenwalter 1983	Prehistoric
CA-RIV-2755	Brock and Langenwalter 1983	Prehistoric
CA-RIV-2778	Langenwalter and Brock 1984	Serrano House
CA-RIV-2802*	Langenwalter and Brock 1984	Historic
CA-RIV-3372*	Brock 1985	Historic
CA-RIV-3694*	Dittmer 1994	Historic
CA-RIV-3740*	Brock and Elliot 1989	Historic
CA-RIV-4728H	Hampson and Kaptain 1992	Historic
CA-RIV-4730*	Sanka 2010	Prado Dam Facility
CA-RIV-5308*	Unknown	Prehistoric site
CA-RIV-5523H*	Toren 1995	Remnants of Farm
CA-RIV-5524H*	Toren 1995	Homestead
CA-RIV-5783*	Love 1995	Historic
CA-RIV-5809*	Brock and Smith 1996	Historic
CA-RIV-7844*	Duff 2005	Historic
CA-RIV-8400	Minor 2007	Prehistoric site
P-33-006524*	Richie 1983	Historic Site
P-33-012622	Unknown	Prehistoric site
P-33-012900	Schwartz 1981	Prehistoric site
*Recorded within the focal area.		

Chino Creek Focal Area

The SCCIC and EIC records searches and literature reviews showed that 66 cultural resources studies have been completed within a $^1/_8$- mile radius of the Chino Creek Focal Area. Of those, 20 included some or all of focal area. As identified in Table 4-18 cultural resources have been recorded within $^1/_8$ mile of the Chino Creek Focal Area. Of those, nine are located within the focal area.

Table 4-18: Cultural Resource Sites Recorded Within One-Eighth Mile Chino Creek Focal Area

Site Number	Recorded/Year (Most Recent)	Description
CA-SBR-001543	Langenwalter and Brock 1983	Prehistoric Site
CA-SBR-0015717H	Langenwalter and Brock 1983	Prehistoric Site
CA-SBR-002317H	Douglas 1980	Yorba Slaughter Adobe
CA-SBR-004032	Macko 1982	Prehistoric lithic Scatter
CA-SBR-006024H	Toren 1987	Joseph Slaughter Residence
CA-SBR-006025H*	Toren 1987	Hode Slaughter Ranch
CA-SBR-006026H*	Toren 1987	Wells Ranch
CA-SBR-006817H	McKenna 1991	Pomona-Rincon Road
CA-SBR-007010H	Alexandrowicz 1991	Hunters Hill
CA-SBR-007137H	Greenwood and Associates 1992	Historic

Site Number	Recorded/Year (Most Recent)	Description
CA-SBR12354	CRM tech 2004	Unknown
CA-SBR-13412	Dice 2007	Historic water Conveyance Structure
CA-SBR-013627*	Sanka 2012	Historic Structure
CA-SBR-013729*	Dice 2007	Historic Site
CA-SBR-024903*	Dice 2012	Cypress Channel Historic Structure
CA-RIV-0100	Macko 1998	Lithic, Ceramic Scatter, Historic Structure
CA-RIV-0653*	Hogan 1998	Lithic, Ceramic Scatter, Adobe Structure
CA-RIV1098	Hogan 1998	Lithic Scatter, Hearth
CA-RIV-2203	Schwartz 1981	Historic Site
CA-RIV-2778*	Langenwalter and Brock 1984	Serrano House
CA-RIV-2797*	Langenwalter and Brock 1984	Prehistoric Site
CA-RIV-3508	Panek 1978	Historic Site
CA-RIV-4727	Hampson 1992	Historic Site
CA-RIV-4760	Hampson 1992	Historic Site
CA-RIV-4761	Hampson and Kaptain 1992	Historic Site
P-33-013543	Unknown	Prehistoric Site
P-33-013544	Unknown	Prehistoric Site
* Located within focal area		

Mill Creek Focal Area

The SCCIC and EIC Records searches and literature reviews showed that 16 cultural resources studies have been completed within a $^1/_{8-}$ mile radius of the Mill Creek Focal Area. Of those, nine included some or all of the focal area As shown in Table 4-19, 14 cultural resource sites have been recorded within a $^1/_8$-mile radius of the Mill Creek Focal Area. Of those, six are located within the focal area.

Table 4-19: Cultural Resource Sites Recorded Within One-Eighth Mile Mill Creek Focal Area

Site Number	Recorder/Year	Description
San Bernardino County		
CA-SBR-002845*	Wetherbee et al. 2008	Chino-Corona Road Site
P-36-013408*	Dice 2007	historic farm
P-36-013409*	Dice 2007	historic farm
P-36-013412*	Dice 2007	Water conveyance system
CA-SBR-12613H*	Sanka et al. 2012	Southern Sierras Powerline
P-36-028586	Yates 2012	Historic building
P-36-060001*	Nelson 1975	Prehistoric lithic scatter
Riverside County		
CA-RIV-2754	Brock and Langenwalter 1983	Prehistoric
CA-RIV-2755	Brock and Langenwalter 1983	Prehistoric
CA-RIV-2803	Langenwalter and Brock 1984	Prehistoric
CA-RIV-2804	Langenwalter	Prehistoric
CA-RIV-4728H	Hampson and Kaptain 1992	Historic
CA-RIV-4730	Sanka 2010	Prado Dam Facility
CA-RIV-5253	Toren 1995	Remnants of farm
*Located within focal area		

4.6.3 Native American Tribal Coordination

OWCD Tribal Coordination

Section 21080.3.1 of the Public Resources Code requires OCWD to consult with any California Native American Tribe that requests consultation for potential impacts to tribal cultural resources. In accordance with the Public Resources Code, if a tribe wishes to engage in consultation, the tribe must respond to the Lead Agency within 30 days of receipt of the notification request.

The Native American Heritage Commission (NAHC) was notified of the ecosystem restoration proposed in the Prado Basin and was requested to review their sacred lands inventory to determine if any Native American cultural resources were recorded. On April 30, 2015 the NHAC indicated that they had no record of tribal resources. To ensure that there are not any unknown records of Native American cultural resources, the NAHC recommended tribes affiliated with the overall area be notified.

On February 14, 2017, OCWD, contacted the three tribes that have requested to be informed of OCWD projects under AB 52: Joyce Stanfield Perry, Tribal Manager, Juaneño Band of Mission Indians, Acjachemen Nation, Andrew Salas, Chairman, Gabrieleno Band of Mission Indians, Kizh Nation and Anthony Morales, Chief San Gabriel Band of Mission Indians. Both Joyce Stanfield Perry from Juaneño Band of Mission Indians, Acjachemen Nation, and Andrew Salas from the Gabrieleno Band of Mission Indians, Kizh Nation indicated that Prado Basin has high sensitivity for presence of tribal resources and recommended Native American monitoring when earth disturbing activities would be occurring.

Corps Tribal Consultation

The Corps requested a Sacred Land File Search from the NAHC in May of 2018 for the APE. On May 7, 2018, the NAHC responded that the results of the file search were negative and provided a list of Tribes culturally affiliated to the APE (Appendix I). The Corps contacted the Tribes via letter dated June 4, 2018, provided a brief project description, requested their comment on the appropriateness of the APE and sought their assistance in identifying properties of religious or cultural significance (TCPs).

The following Federally recognized Tribes were contacted: Agua Caliente Band of Cahuilla Indians, Campo Band of Mission Indians, Ewiiaapaayp Band of Kumeyaay Indians, Jamul Indian Village, La Jolla Band of Luiseno Indians, La Posta Band of Mission Indians, Manzanita Band of Kumeyaay Nation, Pala Band of Mission Indians, Pauma Band of Luiseno Indians, Pechanga Band of Mission Indians, San Pasqual Band of Mission Indians, Soboba Band of Luiseno Indians, Sycuan Band of the Kumeyaay Nation, and the Viejas Band of Kumeyaay Indians (Capitan Grande Band of Diegueno Mission Indians of California).

Additionally, the following non-federally recognized Tribes were contacted: Gabrieleno Band of Mission Indians-Kizh Nation, Gabrieleno/Tongva San Gabriel Band of Mission Indians, Gabrielino/Tongva Nation, Gabrielino Tongva Indians of California Tribal Council, Gabrielino-Tongva Tribe, Juaneno Band of Mission Indians, Juaneno Band of Mission Indians Acjachemen Nation-Belardes, and the Rincon Band of Mission Indians.

In response, the Pechanga Band of Mission Indians and the Gabrieleno Band of Mission Indians-Kizh Nation have both requested to consult on the undertaking. At this stage, specific properties of religious or cultural significance have not been identified be either Tribe. The Agua Caliente Band of Cahuilla Indians responded to the Corps letter by saying that the undertaking is outside of their traditional use area and they are deferring to the other Tribes in the area.

Reconnaissance Survey

As part of the OCWD's and the Corps' efforts to identify cultural resources, OCWD retained the services of VCS Environmental to complete a Phase I Cultural Resources Study for the proposed project which included a record search (see above) and a reconnaissance level archaeological field inspection of the focal areas. The purpose of the field inspection was to spot check the existing conditions and to ensure there are not obvious cultural resources constraints to the proposed project. No new sites were located during the reconnaissance level field inspection. Results of this reconnaissance field investigation are detailed in the cultural resource report entitled, *Phase 1 Cultural Resource Assessment for the Prado Basin Feasibility Study* (Maxon 2018), included in Appendix I to this IFR.

Initial reconnaissance surveys of the Chino and Mill Creek Focal Areas were conducted in April and May of 2015. Each of the locations were between 95 and 100 percent obscured by dense vegetation. On May 21, 2015, portions of the SARM Downstream Focal Area were visited. All areas included in this field visit were shrouded by dense vegetation and could not be adequately inspected.

Additional reconnaissance surveys were undertaken in 2018. On January 4, 2018, VCS Environmental examined the proposed sediment storage area within the SARM Upstream Focal Area and four of the nearby archaeological sites in order to establish their current condition and proximity to the currently proposed sediment storage area. On May 3, 2018, VCS Environmental and OCWD spent a full day driving and walking the accessible portions of the four Focal Areas in the Prado Basin to determine existing conditions, vegetation coverage, and the status of cultural resources (if possible) within each of the four focal areas.

4.7 PALEONTOLOGICAL RESOURCES

Paleontological resources are fossilized evidence of past life found in the geologic record. Paleontological resource localities are sites where the fossilized remains of extinct animals and/or plants have been preserved. Despite the huge volume of sedimentary rock deposits preserved worldwide and the enormous number of organisms that lived through time, preservation of plant or animal remains as fossils is a rare occurrence. Because of their rarity, fossils are considered significant records of ancient life.

Paleontological sensitivity is the potential for a geologic unit to produce scientifically significant fossils. This potential or sensitivity is determined by rock type, the past of the rock unit producing the fossil materials, and what fossil sites are recorded in the unit. A threefold classification of sensitivity is used by many paleontologists working in southern California. A high sensitivity indicates that paleontological resources are currently observed or are recorded within the study area and/or the unit has a history of producing numerous significant fossil remains. A moderate sensitivity indicates paleontological resources have been recovered from

the unit and there is likelihood that fossils would be exposed by earth moving activities. A low potential indicates significant fossil are not likely to be found because of random fossil distribution pattern, the extreme youth of the rock unit, and/or method of rock formation such as alternation by heat and pressure.

According to the Draft Environmental Impact Report No. 521 for the General Plan Amendment No. 960, Section 4.9 Cultural and Paleontological Resources, the project area contains the following paleontological sensitive mapped areas: High A (Ha), Low, and Undetermined. High A sensitivity is based on geologic formations or mapped rock units that are known to contain or have the correct age and depositional conditions to contain significant paleontological resources. These include rocks of Silurian or Devonian age and younger that have potential to contain remains of fossil fish, and Mesozoic and Cenozoic rocks that contain fossilized body elements and trace fossils such as tracks, nests, and eggs. Low potential are lands for which previous field surveys and documentation demonstrate as having a low potential for containing significant paleontological resources subject to adverse impacts. Undetermined potential are areas underlain by sedimentary rocks for which literature or unpublished studies are not available have undetermined potential for containing significant paleontological resources.

According to the Orange County General Plan, Chapter VI Resources Element, Figure VI-9 Paleontology General Areas of Sensitivity, the project area is located within the Yorba Linda – Eastern Puente Hills area. The Resources Element identifies the following Paleontological Resources Policies:

- To identify paleontological resources through literature and records research and surface surveys.
- To monitor and salvage paleontological resources during the grading of a project.
- To preserve paleontological resources by maintaining them in an undisturbed condition.

According to the County of San Bernardino General Plan, Section V Conservation Element , the county is host to numerous locales of significant paleontological resources. The General Plan does not include paleontological sensitivity mapping.

Based on Paleontological Overview of Prado Basin prepared for the Corps, the Prado Basin is immediately underlain by non-marine sedimentary deposits of Quaternary age. The area along the Santa Ana River is floored by unconsolidated stream alluvium of Holocene age (less than 10,000 years B.P.), which because of their geologically young age, are not considered to be fossiliferous and the paleontological sensitivity would be considered low.

Along the southern areas of Prado Basin are underlain by poorly to semi-consolidated, commonly reddish silts, sands, and occasional beds and stringers of fine gravel comprising older alluvial stream terrace deposits of the Santa Ana River drainage system. These deposits are late Pleistocene to early Holocene in age. Deposits of this character and age have produced late ice-age land vertebrate fossils from the nearby eastern Puente Hills and other scattered localities in the greater Los Angeles Basin.

4.8 TRAFFIC AND CIRCULATION

Traffic operations are quantified through the determination of Level of Service (LOS). Level of Service is a qualified measure of traffic operating conditions, whereby a letter grade "A" through "F" is assigned to an infrastructure facility, such as an intersection, freeway mainline, or freeway ramp.

Signalized intersections are analyzed using the Intersection Capacity Utilization (ICU) technique. To calculate an ICU value, the volume of traffic using the intersection is compared with the capacity of the intersection. ICU is usually expressed as a volume to capacity (V/C) ratio. The V/C represents that portion of the hour required to provide sufficient capacity to accommodate all intersection traffic if all approaches operate at capacity. The same LOS thresholds in terms of roadway segment V/C ratio and intersection ICU apply to both types of analysis. The V/C ratio (ICU) and corresponding Level of Service (LOS) are shown in table 4-20.

Table 4-20: Intersection Capacity Utilization (ICU) LOS Criteria

Level of Service	Volume to capacity Ratio/ICU
A	0.00-0.60
B	0.61-0.70
C	0.71-0.80
D	0.81-0.90
E	0.91-1.00
F	>1.00

The definitions of level of service for uninterrupted flow (flow unrestricted by the existence of traffic control devices) are:

- LOS A represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream.
- LOS B is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver.
- LOS C is in the range of stable flow but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by intersections with others in the traffic stream.
- LOS D represents high density but stable flow. Speed and freedom to maneuver are severely restricted, and the driver experiences a generally poor level of comfort and convenience.
- LOS E represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform value. Small increases in flow will cause breakdowns in traffic movement.
- LOS F is used to define forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount which can traverse the point. Ques form behind such locations.

Traffic Circulation System

Implementation of the alternatives would generate traffic within nine jurisdictional areas for traffic control, which include: Riverside County, Orange County, City of Chino, City of Corona,

City of Costa Mesa, City of Fountain Valley, City of Irvine, City of Norco, and City of Yorba Linda. The proposed ecosystem restoration measures would be implemented in four focal areas. Traffic generated by the project is proposed to obtain access to the regional freeway system using local roadways and wherever possible designated truck routes to and from the freeways. The freeways that would be access by the project would include SR-91, SR-71, I-15, I-5 and I-405.

The Upstream Santa Ana River Focal Area is located approximately one mile north of the SR-91 freeway and would have regional access to the SR-91 Freeway from Auto Center Drive and Lincoln Avenue. Proposed access routes for activities occurring in the Upstream Stream Santa Ana River Focal Area are shown in Figure 4-9.

The Downstream Santa Ana River Focal Area is located approximately one-half mile north of the SR-91 Freeway and would have regional access to the SR-91 Freeway from Gypsum Canyon Road and Green River Road. Within Downstream Santa Ana River Focal Area, there is a Lower Santa Ana River Reach where maintenance activities would occur to remove sediment deposited near the tidal prism resulting from the sediment re-entrainment activities. The Lower Reach is located approximately one and one-half miles south of the I-405 Freeway and would have regional access to the I-405 Freeway from Santa Ana River Maintenance Road onto Talbert Avenue and then onto Harbor Boulevard. Proposed access routes for activities occurring in the Downstream Santa Ana River Focal Area are shown in Figure 4-10. Figures 4-11 depicts the access route Lower Santa Ana River Reach where maintenance activities would occur.

The Chino Creek Focal Area is located approximately one-half mile east of the SR-71 Freeway and would have regional access to the SR-71 Freeway via Euclid Avenue and Pine Avenue (future connection). Proposed access routes for activities occurring in the Chino Creek Focal Area are shown in Figure 4-12.

The Mill Creek Focal Area is located approximately three and one-half miles north of the SR-91 Freeway and would have regional access to the SR-91 Freeway from River Road and Lincoln Avenue. Additionally, the Mill Creek Focal Area, east of the SR-71 Freeway could have regional access to the SR-71 Freeway from Euclid Avenue and Pine Avenue. Proposed access routes for activities occurring in the Mill Creek Focal Area are shown in Figure 4-13.

4.8.1 Existing Traffic Conditions

Existing average daily traffic volumes were obtained from 24-hour traffic counts on local roadways and from the 2016 Traffic Volumes on California State Highways by the California Department of Transportation and are shown in Figures 3 through 7 of the Traffic Impact Analysis, Appendix J of this document. The study roadway segments are currently operating at acceptable LOS for existing traffic conditions, except for the following study area freeway and roadway segments that are currently at or near capacity:

Freeway Segments

- I-15 Freeway from Temescal Canyon Road to Ontario Avenue
- I-405 Freeway from Sand Canyon to University Drive
- I-405 Freeway from Culvert Road to Jamboree Boulevard

- I-405 Freeway from Harbor Boulevard to Euclid Street

Roadway Segments

- Pine Avenue from Euclid Avenue to east of Euclid Avenue
- Euclid Avenue from Pine Avenue to Pomona-Rincon Road
- Euclid Avenue from Pomona-Rincon Road to SR-71 Freeway

It should be noted that currently Pine Avenue on the east side of SR-71 does not connect to Euclid Avenue. Pine Avenue between Euclid Avenue and Fairfield Ranch Road within the City of Chino is currently closed as the roadway was washed out at Chino Creek. It is anticipated that once the Pine Avenue roadway segment between Euclid Avenue and Fairfield Ranch Road is re-opened and the future planned connection of Pine Avenue west to the SR-71 Freeway is completed, traffic volumes on Euclid Avenue would be reduced and would return to acceptable Levels of Service.

4.9 NOISE

Noise is defined as unwanted sound. Sound becomes unwanted when it creates a nuisance that interferes with normal activities, or when it causes physical harm or otherwise adversely affects human health. The standard unit of measurement of the loudness of sound is the decibel (dB). The zero point on the dB scale is based on the lowest sound level that a healthy, unimpaired human ear can detect. Changes of 3 dB or fewer are only perceptible in laboratory environments. An increase of 10 dB represents a 10-fold increase in acoustic energy, while 20 dB is 100 times more intense, and 30 dB is 1,000 times more intense. Each 10-dB increase in sound level is perceived as approximately a doubling of loudness.

Numerous methods have been developed to measure sound over a period of time, including: Equivalent Sound Level (L_{eq}), Community Noise Equivalent Level (CNEL), Day/Night Average Sound Level (L_{dn}) and Maximum Noise event (L_{max}). Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, state law requires that, for planning purposes, an artificial dB increment penalty be added to quiet-time noise levels in a 24-hour noise descriptor called CNEL.

4.9.1 Effects of Noise

Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Extended periods of noise exposure above 90 dBA could result in permanent hearing damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear even with short-term exposure. This level of noise is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by the feeling of pain in the ear. This is called the threshold of pain. A sound level of 190 dBA would rupture the eardrum and permanently damage the inner ear. Table 4-21 summarizes typical noise sources, levels, and responses.

Table 4-21: Noise Levels and Human Response

Noise Source	Noise Level dBA	Response
Library	30	Very quiet
Refrigerator humming	40	Quiet
Quiet office	50	Quiet
Normal conversation	60	Intrusive
Vacuum cleaner	70	Telephone use difficult
Freight train at 50 feet	80	Interferes with conversation
Heavy-duty truck at 50 feet	90	Annoying
Jet takeoff at 2,000 feet	100	Very annoying; hearing damage at sustained exposure levels
Unmuffled motorcycle	110	Maximum vocal effect; physical discomfort
Jet takeoff at 200 feet	120	Regular exposure over one minute risks permanent hearing loss
Shotgun firing	130	Pain threshold
Carrier jet operation	140	Harmfully loud
Source: Melville C. Branch and R. Dale Beland, 1970.		

Ground Absorption

The sound drop-off rate is highly dependent on the conditions of the land between the noise source and receiver. To account for this ground-effect attenuation (absorption), two types of site conditions are commonly used in traffic noise models, soft-site and hard-site conditions. Soft-site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. For point sources, a drop-off rate of 7.5 dBA for each doubling of distance from the point source is typically observed over soft ground with landscaping, as compared with a 6.0 dBA for each doubling of distance over hard ground such as asphalt, concrete, stone and very hard packed earth. Caltrans research has shown that the use of soft-site conditions is more appropriate for the application of the Federal Highway Administration (FHWA) traffic noise prediction model used in this analysis.

4.9.2 Noise Barrier Attenuation

For a noise barrier to work, it must be high enough and long enough to block the view of the noise source. A noise barrier is most effective when placed close to the noise source or receiver. A noise barrier can achieve a 5 dBA noise level reduction when it is tall enough to break the line-of-sight and greater heights increase the noise reduction. When the noise barrier is a berm instead of a wall, the noise attenuation can be increased by another 3 dBA.

4.9.3 Existing Noise Environment

Prado Basin is surrounded by wide variety of land uses that influence ambient noise environment. Along the periphery of the basin are commercial and industrial land uses as well as State Route 91 and State Route 71. Additionally, surface streets carry vehicles throughout the basin that contribute to the ambient noise environment. Depending the day and time along these areas the noise levels are generally high and drop off substantially towards the interior of the basin to almost rural environment.

The primary sources of noise are traffic on the SARM downstream focal area where the SR-91 is located (approximately 360 feet to 4,000 feet from the focal area); traffic on East La Palma Avenue (located approximately 150 feet north of SARM downstream focal area); and the Burlington Northern and Santa Fe Railway (BNSF) that runs along East La Palma Avenue to the north (approximately 150 feet to 1,000 feet from the focal area). The Riverside County General Plan estimates the LDN noise contour associated with operations on these tracks extends approximately 600 to 700 feet north and south of the tracks.

As part of the 1993 Yorba Linda General Plan Noise Element development process, noise measurements were taken within the Featherly Regional Park near the intersection of Gypsum Canyon Road and SR-91. The noise measurements demonstrated a sound level of 65.9 dBA at approximately 200 feet from the predominant noise sources: Gypsum Canyon Road and SR-91. This noise level is significantly above the City of Yorba Linda noise ordinance limits of 55 dBA. Additionally, a noise study near the construction area for the Santa Ana River: Reach 9, Phases 4, 5A, 5B, & BNSF Bridge project "SAR project" (also within the SARM downstream focal area) revealed that traffic noise at SR-91 was approximately 79.6 dBA (Corps 2001a). The Riverside County General Plan estimates 65 Day-Night Average Noise Level (Ldn) noise contour associated with operations on BNSF Railroad tracks. On the north side of the SAR project construction area is a set of three railroad tracks used by freight and passenger trains. According to sound level estimates provided in the City of Yorba Linda General Plan Noise Element, sound levels from railway operations range from 55 to 60 dBA at residential properties on the north side of the SAR project construction area (approximately 900 feet from the tracks) to 70 to 75 dBA at homes nearest the tracks. The railway noise can also occur at any time of the day or night. As a result, many homes experience significant, existing noise impacts from the railway that are frequently above the ordinance noise limits.

Heavy trucks can generate vibrations that depend on vehicle type, weight, and pavement conditions. Existing vibration in the SAR project construction site vicinity would be related to heavy truck traffic on East La Palma Avenue and SR-91. There are also railroad tracks that travel in the vicinity of the SAR project construction site.

Other sources of noise include Corona Municipal Airport and traffic from major streets and highway such as Railroad and Rincon Streets, Butterfield Road, BNSF railway and SR-91 in the SARM downstream focal area; Chino Municipal Airport and traffic from Euclid and Pine Avenues and the SR-71 in the Chino Creek focal area. Corona Municipal Airport is a small, single runway, recreation airport used mostly by private planes. It is located at the southern part of the Prado Reservoir (approximately 2,000 feet southeast of the SARM upstream focal area) and BNSF and SR-91 (approximately 6,000 feet to the south). Railroad and Rincon Streets, Butterfield Road are approximately 3,000 feet to 5,000 feet east and southeast of the focal area. The 70 and 65 CNEL contour extends to the south within the basin. Chino Municipal Airport is a two-runway airport north of the Prado Basin and is approximately 6,000 feet north of the Chino Creek focal area. Euclid and Pine Avenues are within distance of the proposed ecosystem restoration measure and the SR-7 is approximately 2,000 feet west of the focal area. The southernmost portion of the 65 CNEL contour extends south within the basin area.

Sensitive Noise Receptors

Some land uses are considered more sensitive to elevated noise levels because of the purpose and intent of the use. Places where people are meant to sleep, or places where a quiet environment is necessary for the function of the land use, are normally considered sensitive. For instance, residential areas, schools, places of worship, and hospitals are more sensitive to noise than are commercial and industrial land uses. The nearest sensitive receptors for the SAR Upstream focal area include residential development on both sides of the transitional channel at distances greater than 1,000 ft, near Archibald Avenue to the north and Norco Street to the south. Additional sensitive receptors located near the residential areas include Ronald Reagan and Barton Elementary Schools, which are approximately greater than 2,500 feet north of the sediment channel site and Highland Elementary School is approximately 6,000 feet east of the groin forebay area. The nearest sensitive receptors for the Chino Creek focal area include residential uses along the hills west of the SR71, and east of the SR71, approximately 1,000 feet from the restoration site. The closest schools in the Chino and Chino Hills areas are approximately 3 miles to the north of the restoration site. The nearest sensitive receptors in the SAR downstream focal area include residential development, which are approximately 300 feet north of the SAR. To the south are additional residential development located up on the hills between the SR91 and Weir Canyon Road at approximately 1,200 feet. Bryant Ranch Elementary School is the only school near the site and is located at approximately 3,000 feet to the north on Pso De Toronto Street.

4.10 AESTHETICS

The proposed project areas consist of Chino Creek, Mill Creek, upper and lower SAR and Prado Basin and are surrounded by single family residential development, industrial development and open space habitat areas. The SAR is an approximately 100-mile long waterway that runs from the San Bernardino Mountains to Huntington Beach in southern California. These rivers and associated riparian habitats provide visual relief from the urbanization of the surrounding cities of Yorba Linda, Anaheim Hills, Chino Hills, Eastvale, Corona, and unincorporated Riverside County. The Lower SAR runs from Prado Dam, in Riverside County, to its terminus approximately 30 miles downstream, at Huntington Beach, Orange County.

Remnant aesthetically pleasing areas within the vicinity of the proposed project area include the undeveloped riparian areas along the river, Prado Regional Park, and Chino Hills State Park located in the vicinity of the project focal areas.

4.10.1 Santa Ana River Upstream Focal Area

As shown in Figures 4-14 to 4-16 the Santa Ana River Upstream Focal Area contains an expansive riparian forest. At lower elevations in the basin, the riparian forest coverage is nearly complete with an over story of trees reaching as high as 50 feet. The Santa Ana River meanders through thethick riparian forest creating a passive natural open space setting. The vegetation along the river consists of a combination of native and exotic trees, shrubs and grasses. The open space aesthetic resources in the basin are influenced by the operation of Prado Dam. The dominating visual element in the basin is open water when water levels in the reservoir area are high. The dominating visual element in the basin is riparian forest lands when water levels in

reservoir area are low. The interior of the focal area is rural with minimal anthropogenic disturbances. The edges of the focal area near River Road Bridge contain residential uses which provide views of the basin. The southern portion of the focal area near the proposed sediment storage site is more urbanized containing an assortment of commercial and industrial land uses, including Corona Airport and Corona Metro Rail Station. State Route 91, an Eligible State Scenic Highway is situated south of the focal area and provides limited views of the basin.

4.10.2 Lower Santa Ana River Focal Area.

Figure 4-17 to 4-19 show views of the Lower Santa Ana River Focal Area. The dominant visual element with the Lower Santa River Focal Area is the Santa Ana River. Downstream of Prado Dam the river is mostly a meandering natural channel with riparian vegetation overhanging along the banks. Along this upper reach the river skirts residential communities and the Green River Golf Course. Downstream of the Green River Golf course the river becomes braided and dotted with riparian vegetation islands. Within this reach are Yorba Regional Park and Featherly Regional Park which both provide public views of the river. Downstream of Weir Canyon, the river becomes more channelized has it enters OCWD's ground water recharge area. Situated along this reach of the river are residential, commercial and industrial land uses that contribute light and glare to the evening sky. State Route 91 which parallels the alignment of the river provides intermittent views of the river.

4.10.3 Chino Creek Focal Area

The Chino Creek Focal Area is situated along the western edge of the Prado Basin. As shown in Figure 4-20 the focal area consists of expanses of open spaces fields and riparian forest. Chino Creek extends through the El Prado Golf Course merging with the Santa Ana River near base of Prado Dam. The creek has been modified and confined for flood control. However, it exists in a natural condition with a soft bottom and well-defined banks. The flows are perennial and consist mostly of effluent discharged from upstream water treatment plants and urban runoff. During the summer months the base flows are generally calm and absent of riffles, waterfalls or pools. Along the edges the focal area rows of eucalyptus trees which provides a visual buffer between focal area State Route 71, an Eligible State Scenic Highway. Sweeping views of the Prado Basin are provided off SR-71, which is generally perched high enough in elevation to provide views over the tree line. Other distant public scenic vistas into Prado Basin are provided from Chino Hills State Park.

4.10.4 Mill Creek Focal Area

The Mill Creek Focal Area is situated in northern portion of Prado Basin. Figure 4-21 shows views of the Mill Creek Focal Area. The dominant visual element is the Mill Creek which meanders through the focal area. The creek largely exists in a natural condition with thickets of riparian vegetation along its banks providing a visual buffer between the creek and emerging urban development occurring in this area. Situated at the northern reach of the focal area is the Mill Creek Wetlands which provides public views of Mill Creek. Downstream of the Mill Creek Wetlands, Mill Creek meanders through open grassland areas, skirting the OCWD wetlands before merging with Chino Creek.

4.11 PUBLIC HEALTH AND SAFETY

As part of preparation of the Prado Basin Water Conservation Feasibility Study. A Hazardous, Toxic and Radioactive Waste (HTRW) Study was prepared. No HTRW sites were identified that would have the potential to adversely affect the study area. The study did identify thirteen oil wells in the study area. The Prado Petroleum Company formally operated a total of 13 oil wells between elevation 493 feet and 505 feet. Within the central-west portion of the lower basin. All 13 wells were properly abandoned. Three of the abandoned oil wells were lease through the federal government and are locate at an elevation of 500 feet. The government leasehold area is approximately 195 acres. Ten of the abandoned wells are oil and gas rights underlying a portion of land previously owned by the Santa Ana River Development Company. These wells range in elevation from 493 feet to 505 feet. The surface area of the previous leases was approximately 472 and was acquired by OCWD in 1967.

A search for potential of potential HTRW sites within the study area was conducted f the State of California Regional Water Quality Control Board's online Geotracker website. This search was limited to the files available on the website only. A more complete review of actual (hard copy) regulatory agency files related to each site found on the website was not conducted. According to the Geotracker file review, there were six site HTRW related properties found within approximately 1,100 feet of the Santa Ana River floodplain. There are numerous other sites (approximately fifty) within a mile of the floodplain, but these six were the closest to the river. All of these sites are in a "case closed" regulatory status. This means that there is no further human health related concerns for these sites related to HTRW contaminants.

For all sites, the Santa Ana Regional Water Quality Control Board (SARWQCB) and the Riverside County Department of Environmental Health (RCDEH) are the environmental regulatory agencies, with the SARWQCB or the Department of Toxic Substances Control (DTSC) as the lead agency. Files recorded on website were from one or both agencies. The six HTRW sites found in the Geotracker website search are as follows:

1. Corona Municipal Airport. 1973 Aviation Drive, Corona, CA 91720. Files found amongst both agencies. Two 10,000- gallon aviation fuel underground storage tanks (USTs) removed in 2000 and site was "closed" in 2004.

2. Corona Brine Ponds. 2205 Rail Road, Corona CA 92880. Wastewater treatment brine ponds were remediated in 1990 and placed back into service until 2004. Ponds were taken out of service in 2004 and remediated again in 2006. The ponds are currently being monitored for groundwater contamination as part of the overall closure. As a result, this site is closed as to the remedy, but open as to the ongoing monitoring.

3. Dallope Dairy. 2877 River Road, Norco, CA 91760. Former dairy farm, with several underground storage tanks removed (one 1,000 and one 4,000 UST) and limited gasoline/diesel fuel soil contamination remedied in 1994 to 1998 and is "closed" as of 1995.

4. Green Acres Elementary. East Valley Pkwy, Norco, CA 92880. Former school empty land, but now occupied by residential development. Site was investigated/studied for

HTRW contaminants in shallow surface soils in 1999 to 2001. Human health risk assessment conducted and resulted in no endangerment from environmental contaminants in soil to residential population (school children population). Site was issued a no further action and is "closed" as of 2001.

5. Green Waste River Ranch. 14545 River Road, Corona, CA 91720. Site was former composting vegetation (green) waste operation and is "closed" as of 1965.

6. Alcoa Aluminum Plant. 1450 Rincon Street, Corona, CA 91720. Former aluminum plant that was remedied for solvents in the groundwater and soils from 2001 to 2003, along with a groundwater monitoring action in 2000. Site is "closed" as of 2006.

In addition, to help characterize the chemical profile of sediment in the Prado Basin, the Prado Basin Sediment Management Demonstration Project 100% Engineering Analysis report was conducted by OCWD in November 2014 in which limited boring samples were taken from the incoming sediment deposited by the Santa Ana River. Although not comprehensive, these samples do provide some representation of past and recent sediment deposited in the basin. As shown in Table 4-22, the boring samples showed non-detectable levels of total petroleum hydrocarbons, volatile organic compounds, organophosphorus, pesticides, PCBs, chlorinated herbicides and hexavalent chromium. Low concentrations of heavy metals were detected. However, these levels were well below the EPA Region 9 levels published in 2009 and are within the regional background range for soils in the region suggesting that there are no health risks.

Table 4-22: Summary of Soil Environmental Test Results

Boring	Depth	Test	Result
12	11-11.5	TPH-GRO	ND
12	11-11.5	VOCs	ND
12	21-21.5	Organophosphorus Pesticides	ND
12	31-31.5	Metals	*
3	6-6.5	TPH-DRO/ORO	ND
3	11-11.5	PCBs	ND
3	21-21.5	VOCs	ND
3	25.5-26	TPH-DRO/ORO	
3	31-31.5	Total Inorganic Nitrogen	88 mg/kg
16	5-5.56	VOC	ND
16	5-5.6	Organophosphorus Pesticides	
16	16-16.5	Metals	*
16	16-16.5	Chlorinated Herbicides	ND
16	21-21.5	Total Dissolved Solids	4500 mg/kg
16	26-26.5	Hexavalent Chromium	ND
16	30.5-31	Pesticides	ND
28	2.5	Metals	ND
28	2.5	TPH-CCID	ND
28	12.5	VOCs	ND
28	12.5	Organophosphorus Pesticides	ND
29	2.5	VOCs	ND
29	2.5	Organophosphorus Pesticides	ND
29	12.5	Metals	*

Boring	Depth	Test	Result
29	12.5	TPH-CCID	ND
* Low levels of some metals (arsenic, barium, chromium, cobalt, copper, lead, nickel, vanadium and zinc were detected above PQL. Detectable concentrations of metals are below EPA Region 9 Regional Screening levels Source: Golder 2015			

While the report by OCWD mentioned above covers some portions of the study area, the HTRW study has not been completed for the entire study area. Thus, a Phase I ESA or a HTRW for the entire study area, or separately for its various parts will be done at Pre-Construction Engineering Design (PED) due to the limited coverage of the soil borings associated with the Prado Basin Sediment Management Demonstration Project 100% Engineering Analysis report.

Wild Land Fire Risks

According to the Riverside County General Plan the Prado Basin has moderate potential for wild land fire susceptibility.

Operation of Prado Dam

The current operations at Prado Dam are directed by the USACE 2003 Interim Water Control Plan for Prado Dam (Water Control Plan). The Water Control Plan describes how the reservoir would be regulated. Under the Water Control Plan, water can be stored in the buffer pool up to elevation 498 ft. during the flood season and up to elevation 505 ft. during the non-flood season. Additionally, the Water Control Plan establishes the rate of water released from the dam under non-storm and storm conditions. Under non-storm conditions the release rates range from 200 cfs to 500 cfs to allow OCWD to capture and percolate the flows and prevent losing water to the ocean. Under storm conditions, the target release rate would be up to 5,000 cfs for flood risk management or even up to 10,000 cfs, if an extreme flood runoff volume is forecast.

4.12 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

The study area encompasses three counties and is within or adjacent to seven cities. To describe the existing socioeconomic conditions at the county-wide and city-wide levels, Southern California Local Profiles Report data was analyzed.

4.12.1 Population

Population summaries for counties and cities included within the study area are shown in Table 4-23 and Table 4-24. Population summary data is the most recent data available (2017) from the U.S. Census Bureau (available at www.census.gov).

Table 4-23: 2017 County Population Summaries

	Riverside County	San Bernardino County	Orange County City
Total Population	2,423,266	2,157,404	3,190,400

Table 4-24: 2017 City Population Summaries

	Corona	Norco	Chino	Eastvale	Chino Hills	Yorba Linda	Anaheim
Total Population	167,836	26,761	89,797	63,211	80,374	68,229	352,497

4.12.2 Population Ethnicity

Summary of population ethnicity for counties and cities included within the study area are shown in Table 4-25 and Table 4-26.

Table 4-25: 2017 County Percentages of Ethnicity Summaries

	Riverside County	San Bernardino County	Orange County
Hispanic	49.1	53.4	34.2
White	35.4	28.6	40.5
Asian	7.0	7.6	21.0
Black	7.2	9.4	1.0
American Indian	1.9	2.1	1.0
Native Hawaiian/Pacific Islander	0.4	0.5	0.4

Table 4-26: 2017 City Percentages of Ethnicity Summaries

	Corona	Norco	Chino	Eastvale	Chino Hills	Yorba Linda	Anaheim
Hispanic	43.2	31.5	52.2	39.3	27.6	16.5	53.6
White	37.6	57.3	25.7	19.7	32.0	60.7	26.0
Asian	11.5	3.6	11.7	27.5	33.2	17.8	16.0
Black	4.8	4.2	5.7	8.6	4.1	1.1	2.2
American Indian	0.5	0.4	0.6	0.4	0.3	0.1	0.4
Native Hawaiian/Pacific Islander	0.5	0.3	0.2	0.1	0.2	0.1	0.5

4.12.3 Income Levels

Summary of average household incomes for counties and cities included within the study area are shown in Table 4-27 and Table 4-28.

Table 4-27: 2017 County Average Household Income Level and Poverty Percentages

	Riverside County	San Bernardino County	Orange County City
Income Level	$57,972	$54,469	$78,145
Poverty Percent	15.3	17.6	11.1

Table 4-28: 2017 City Average Household Income Level and Poverty Percentages

	Corona	Norco	Chino	Eastvale	Chino Hills	Yorba Linda	Anaheim
Income Level	$72,309	$87,067	$72,832	$104,940	$97,222	$119,697	$61,826
Poverty Percent	11.7	7.9	12.2	7.3	6.7	3.8	16.2
Source Riverside County, San Bernardino County, Orange County SCAG 2017 Local Profiles Report							

4.12.4 Housing

The summary of housing for counties and cities included within the study area are shown in Table 4-29 and Table 4-30.

Table 4-29: 2017 County Housing Summaries

	Riverside County	San Bernardino County	Orange County
Total Households	705,716	618,922	1,017,012
Average Household Size	3.25	3.32	3.04

Table 4-30: 2017 City Housing Summaries

	Corona	Norco	Chino	Eastvale	Chino Hills	Yorba Linda	Anaheim
Total Households	49,350	7,133	19,92	14,089	24,034	21,829	100,004
Average Household Size	3.26	3.32	3.43	4.13	3.21	3.07	3.42

4.12.5 Employment

Unemployment data is compiled of the U.S. Bureau of Labor and Statistics. While data is not collected on the same scale as the income and demographic information from the U.S. Census Bureau (i.e. county and city), information is available at the level of the metropolitan area (see Table 4-31).

Table 4-31: National and Regional Employment Characteristics (Sept 2018)

	Riverside – San Bernardino – Ontario Census Area	State of California	United States
Unemployment Rate	4.1 %	4.1 %	3.7 %

4.12.6 Environmental Justice

According to the most recent U.S. Census Bureau data, minorities account for the majority of the population within all three pertinent counties (Table 4-25). San Bernardino County has the highest proportion of minority population with around 71%, followed by Riverside County with around 65%, and Orange County having the lower minority proportion at around 60%. At the city scale, only Yorba Linda and Norco have less than 50% of the population comprised of minorities, while the remaining cities in the area range from around 62% to 80% minority (see Table 4-26). While these minority percentages are generally greater than the national average, the population of the state of California has a significantly higher proportion of minorities than the national average (see Table 4-32).

Table 4-32: National and State Demographics and Income

	State of California	United States
DEMOGRAPHICS		
Hispanic	39.1	18.1
White	37.2	60.7
Asian	15.2	5.8
Black	6.5	13.4
American Indian	1.6	1.3
Native Hawaiian/Pacific Islander	0.5	0.2
INCOME		
Income Level	$63,783	$55,322
Poverty Percent	13.3	12.3

County-level poverty percentages show that Riverside and San Bernardino Counties have a higher poverty level than either the state or National averages, while Orange County has a lower poverty percentage. However, at the city level as shown in Table 4-28, all of the cities in the vicinity of the project area have lower poverty levels than the state and national average with the exception of Anaheim at 16.2% poverty.

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations (1994), directs Federal agencies and state agencies receiving Federal funds to assess the effects of their actions on minority and/or low-income populations within their region of influence. The order requires agencies to develop strategies to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/ or low-income populations.

The US Environmental Protection Agency (EPA) has published *Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses* (USEPA, 1998) which indicates that a minority population exists when either:
The minority population of the affected area is greater than fifty percent of the affected area's general population.

The minority population percentage of the affected area is meaningfully greater than the population percentage in the general population or other appropriate unit of geographic analysis. An environmental justice screening analysis must determine whether any significant impacts of the project would disproportionately and adversely impact local low-income and/or minority populations. If a disproportionate impact is determined, mitigation measures must be implemented to reduce the adversity of the impact to a less than significant level.

4.13 UTILITIES

4.13.1 Onsite Utilities

Several utility features cross the project area, including water and sewer lines, a large-capacity gas pipeline and overhead power lines. Of the utility line crossings and facilities located within

Prado Basin, only two are located in vicinity of potential measures included in the final array plans. A 30-inch diameter SoCal Gas line crosses the southern portion of Prado Basin that is located beneath the proposed location of the soil stockpile areas of the Sediment Management System for Ecosystem Restoration. However, this line would be removed prior to any construction of features proposed under this study, as the gas line must be removed accommodate construction of the new spillway for Prado Dam as part of the Santa Ana River Mainstem Project for flood risk management. That construction has already been authorized by Congress and funds have been appropriated for this work.

The other utility in the vicinity of a project measure is a Southern California Electric 500kV overhead high- tension line that crosses the basin just north of the proposed location of the Chino Creek Channel Restoration measure. This line crosses Chino Creek north of the proposed location of the measure, and the power lines are high enough that they would not impede access to the construction area. The footings for the towers nearest the footprint of the Chino Creek Measure are west of Highway 71 and east-northeast of Chino Creek outside the construction area of the measure.

4.13.2 Offsite Utility

The primary offsite utility structure within the study area is the Inland Empire Brine Line (IEBL)/Santa Ana Regional Interceptor Line (SARI). The IEBL/SARI Line is a 23-mile long wastewater pipeline that extends from Prado Dam to the Orange County Sanitation District Sewage Treatment Plant Number 2 in the City of Huntington Beach. The IEBL/SARI serves segments of San Bernardino County, Riverside County and Orange County and conveys raw sewage and brine to the Orange County Sanitation District Sewage Treatment Plant Number 2. In San Bernardino and Riverside Counties, the pipeline is owned by Santa Ana Watershed Project Authority (SAWPA). IEBL/SARI Line alignment extends along the southern and western ends of the Prado Basin between elevations 470 ft. and 566 ft. Within the Santa Ana Canyon area, the original SARI Line, now abandoned in place, crossed the river in several locations, running easterly in and along the floodway of the Santa Ana River between Weir Canyon Road in the City of Anaheim and the Green River Golf Club property. The relocated SARI Line, completed in August 2014, now crosses below the river at the southwest end of the Green River Golf Club property just east of the Coal Canyon Wildlife Undercrossing and then continues westward along the south side of the river under the SAR multi-use trail and bikeway to the Gypsum Canyon Road Bridge. It then passes under the southern bridge abutment and proceeds west through the Canyon RV Park and then continues under the flood control maintenance road along the top of the south bank of the river to the control gate behind the SAVI Ranch commercial area.

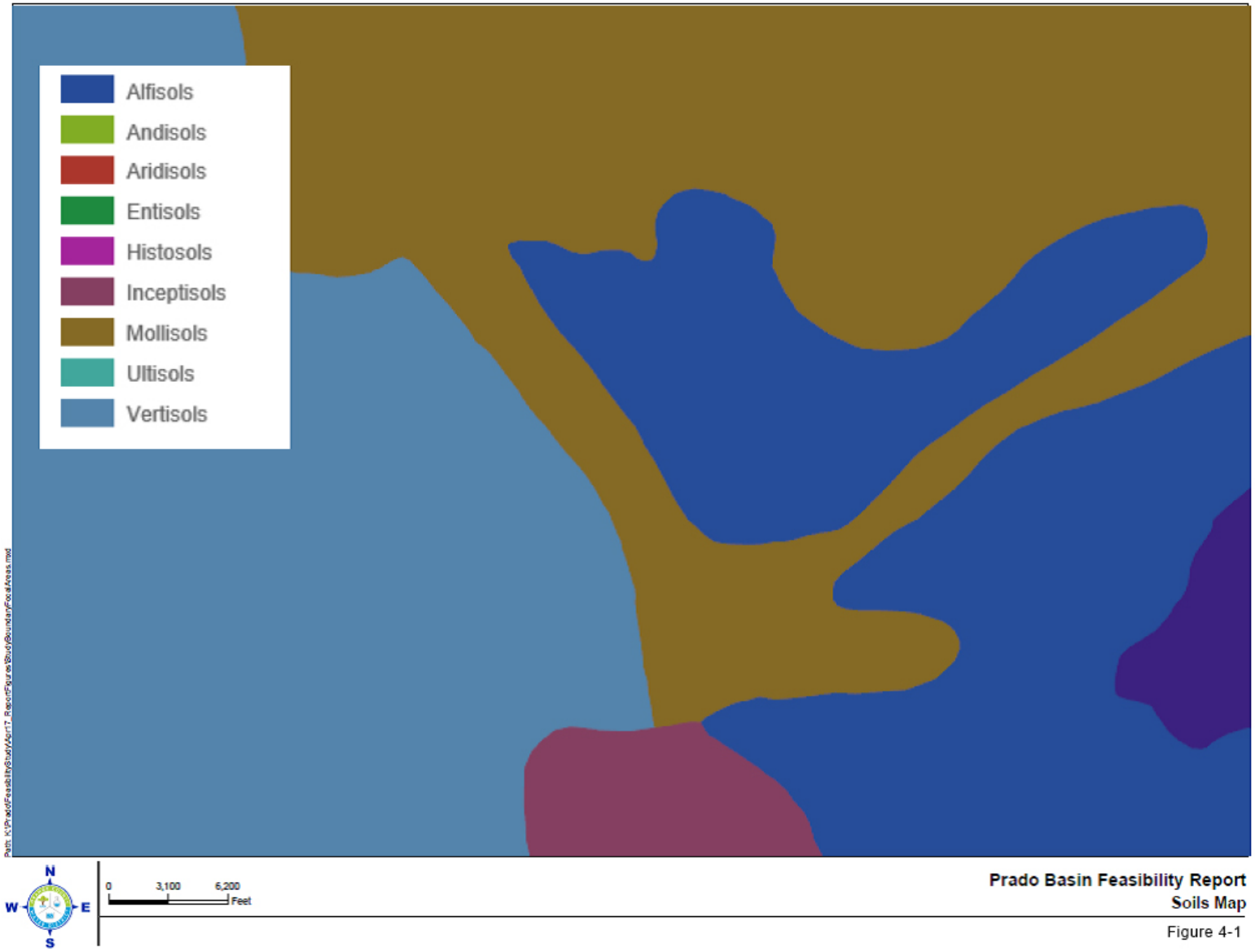

Figure 4-1: Soils Map

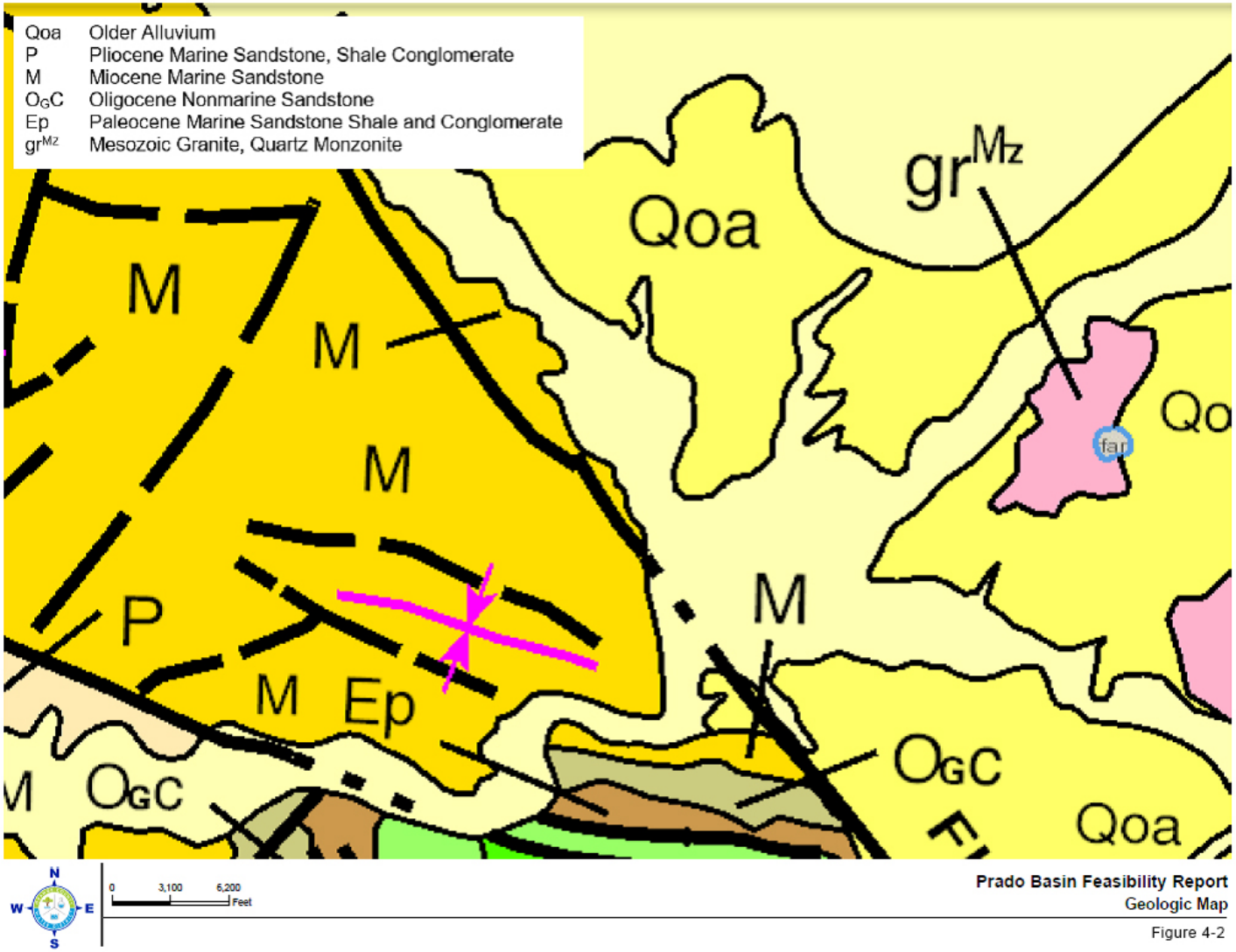

Figure 4-2: Geologic Map

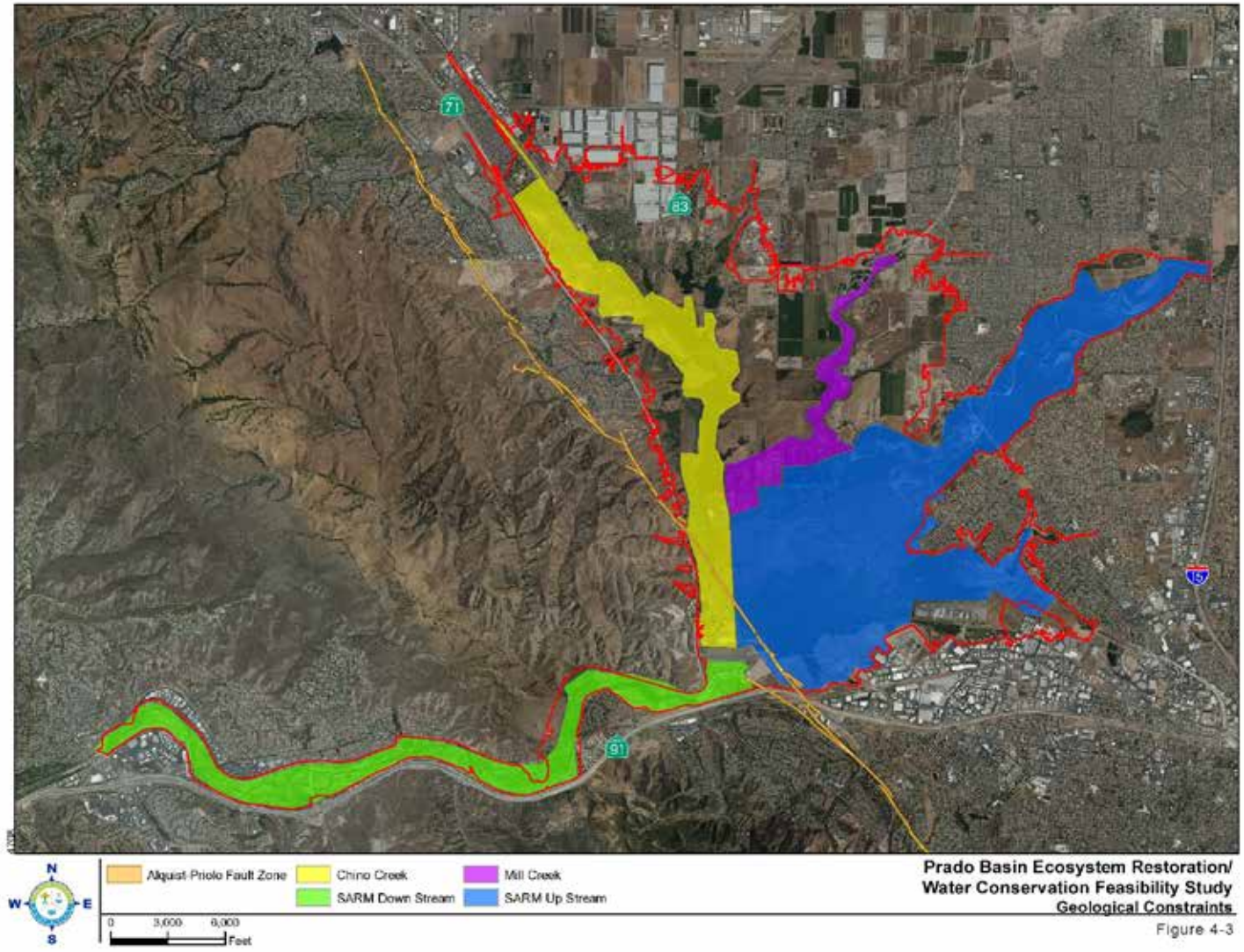

Figure 4-3: Geological Constraints

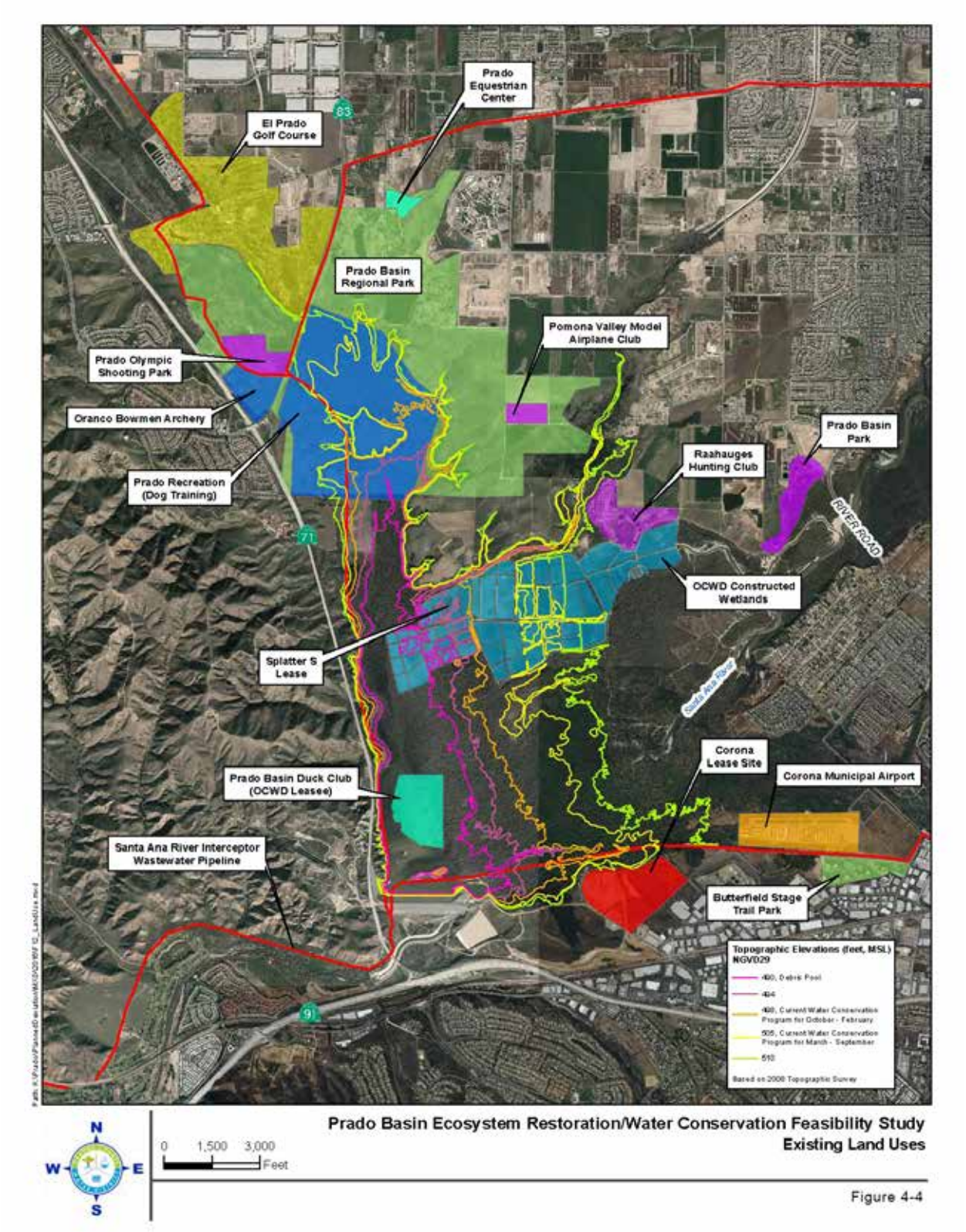

Figure 4-4: Existing Land Uses

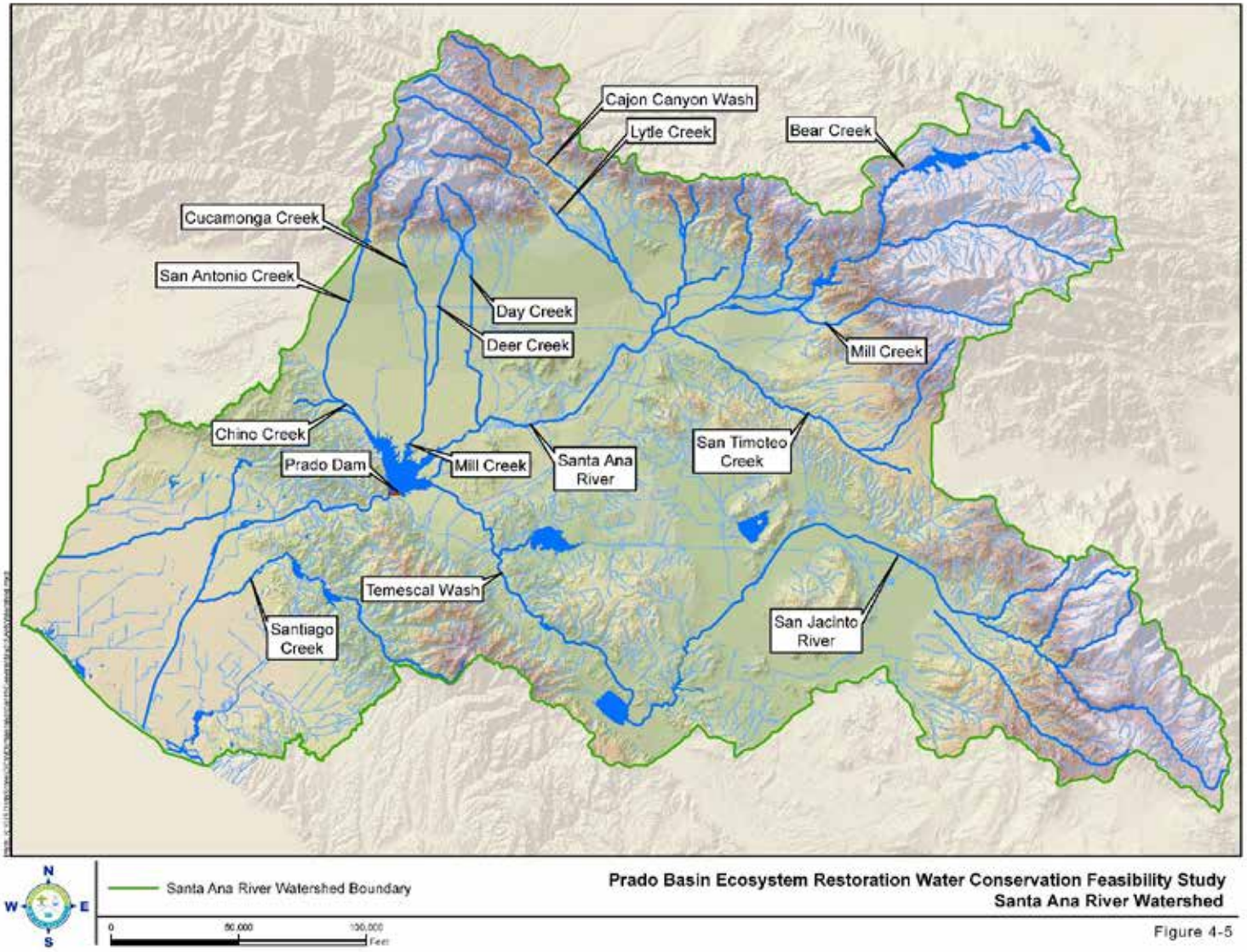

Figure 4-5: Santa Ana River Watershed

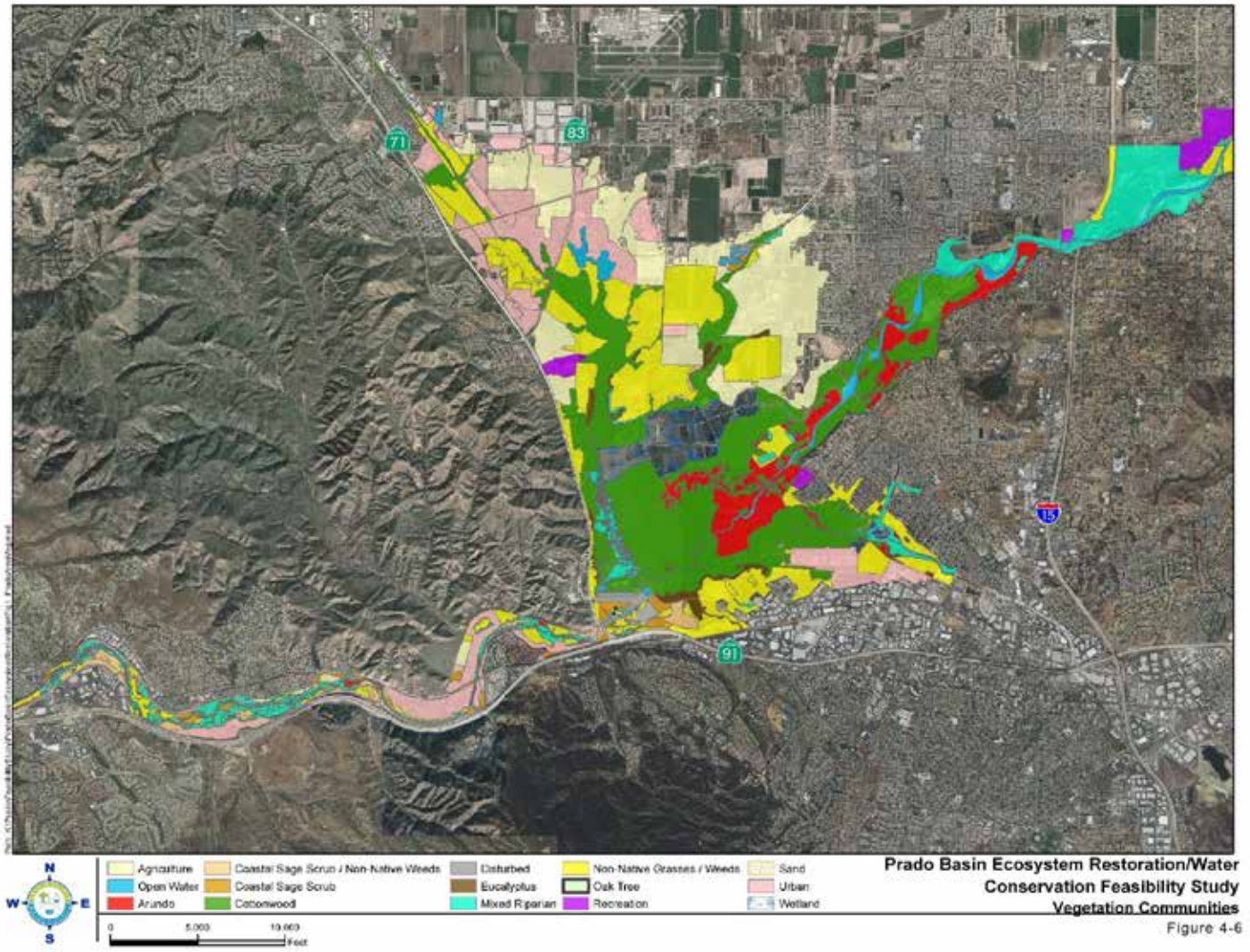

Figure 4-6: Vegetation Communities

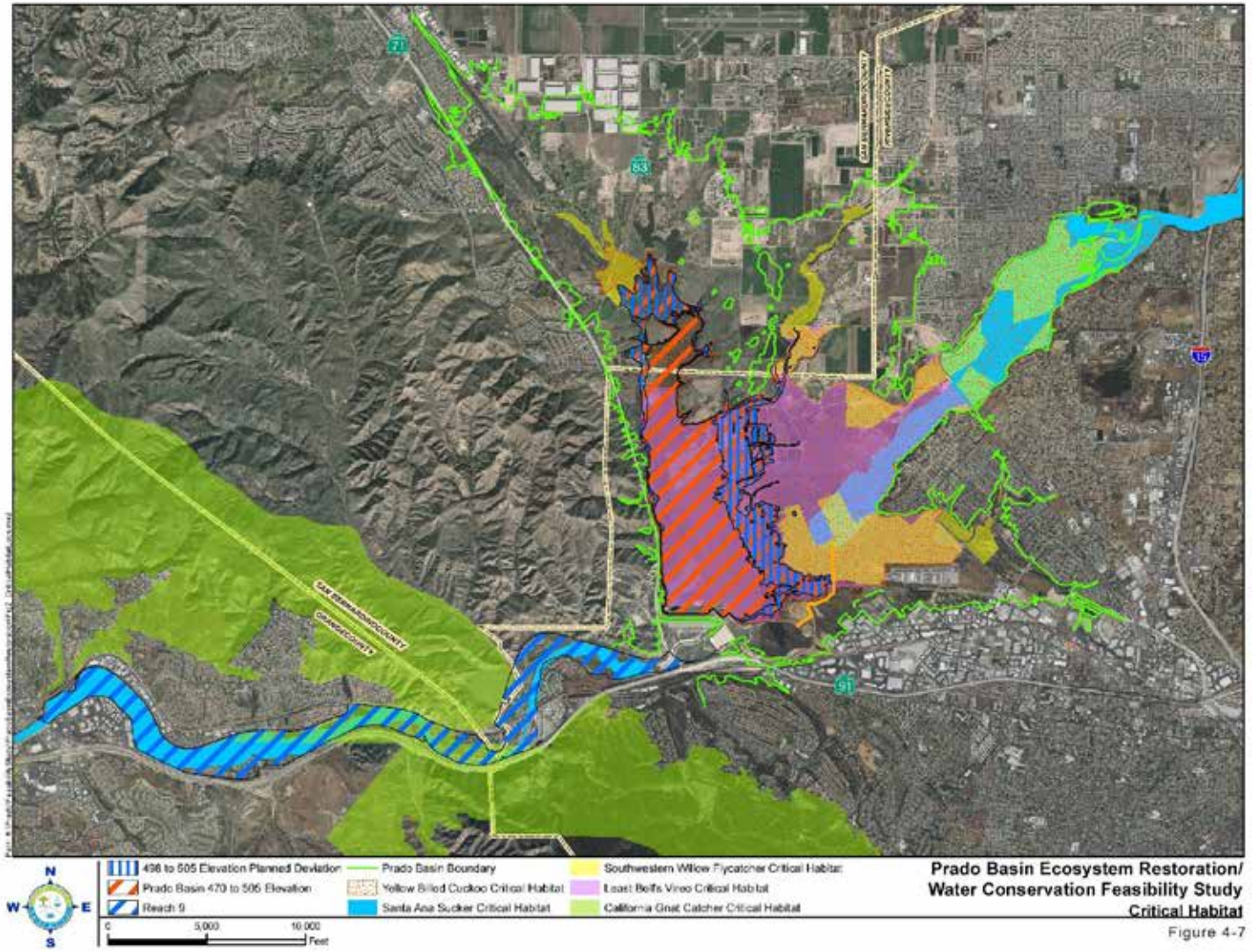

Figure 4-7: Critical Habitat

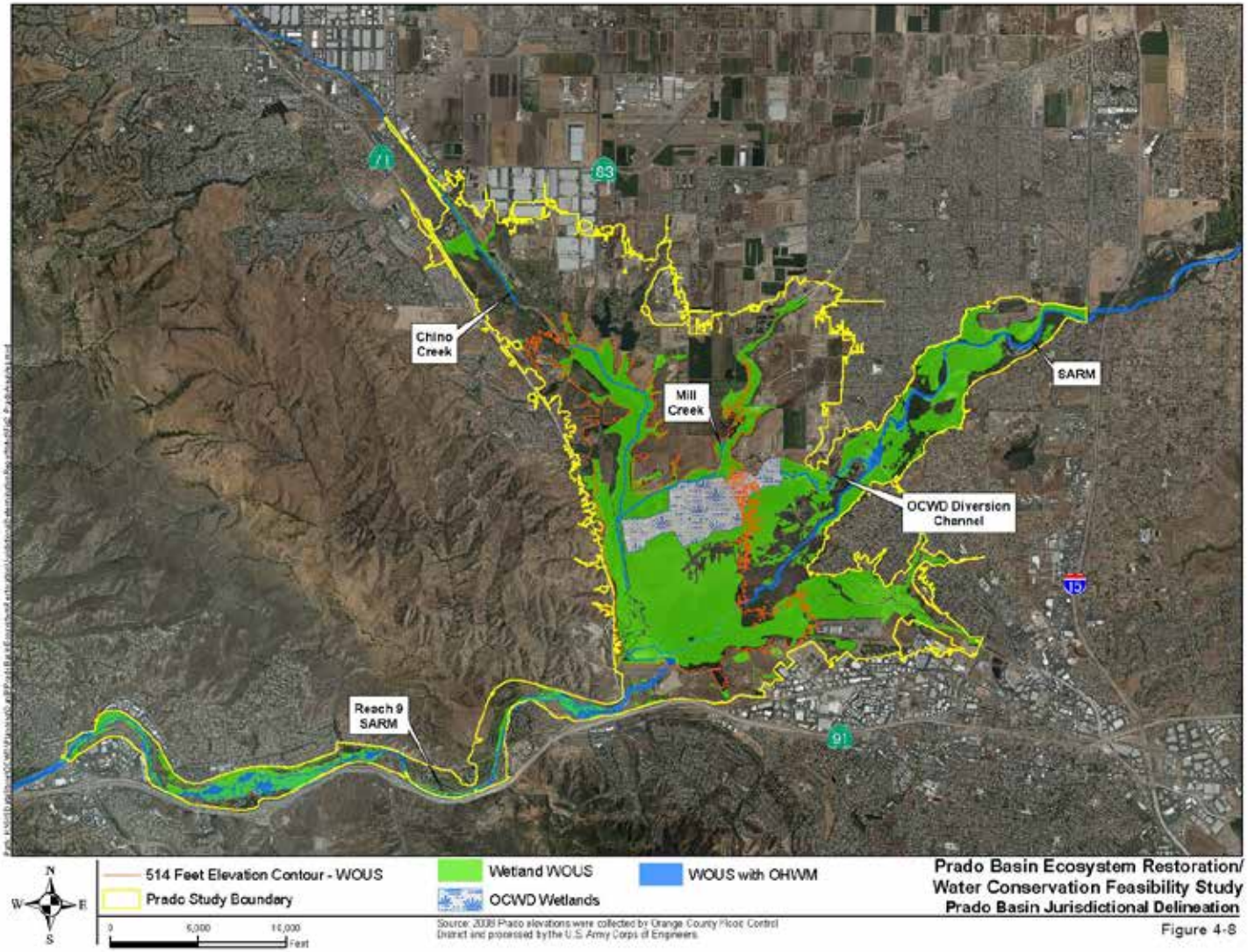

Figure 4-8: Prado Basin Jurisdictional Delineation

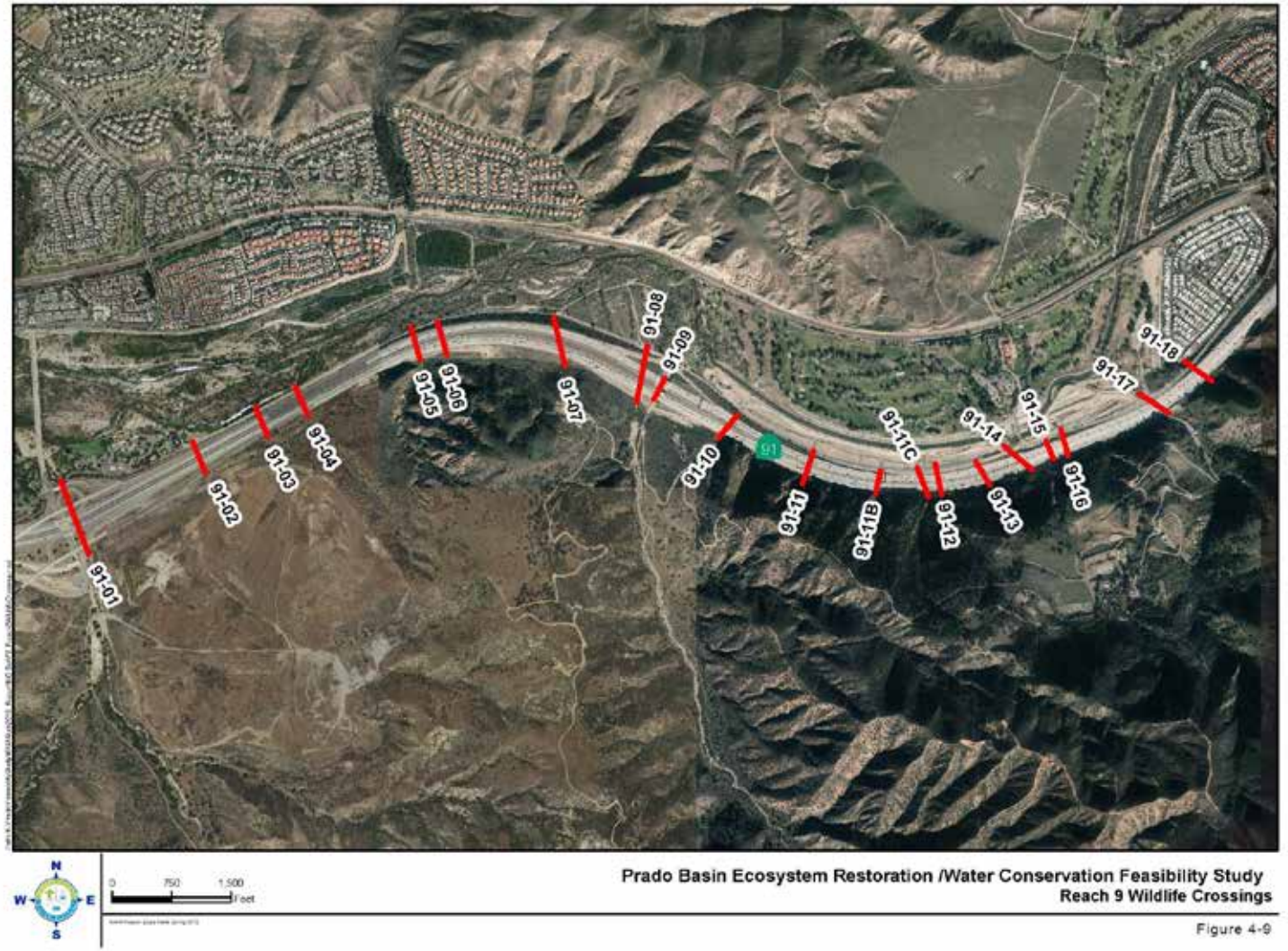

Figure 4-9: Reach 9 Wildlife Crossings

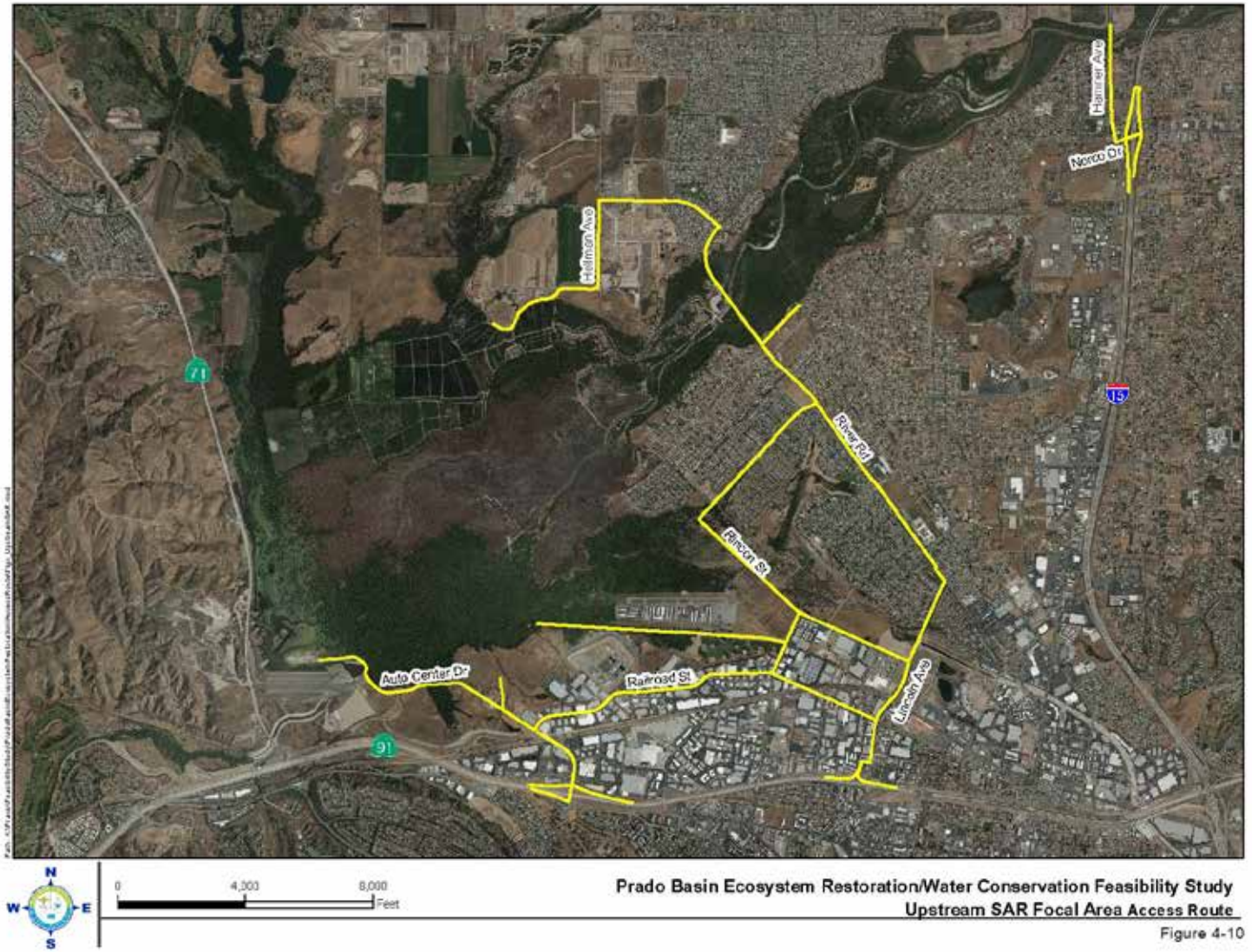

Figure 4-10: Upstream SAR Focal Area Access Route

Figure 4-11: Downstream SAR Focal Area Access Route

Figure 4-12: SAR Lower Reach Focal Area Access Route

Figure 4-13: Chino Creek Focal Area Access Route

Figure 4-14: Mill Creek Focal Area Access Route

View Prado Basin Holding Water

View Prado Basin Holding Water

Prado Basin Ecosystem Restoration/Water Conservation Feasibility Study
Existing Views Upper Santa Ana River Focal Area
Figure 4-15

Figure 4-15: Existing Views Upper Santa Ana River Focal Area

Prado Basin Northeast View from Prado Dam Dry Condition

Prado Basin Northwest View from Prado Dam Dry Condition

Prado Basin Ecosystem Restoration/Water Conservation Feasibility Study
Existing Views Upper Santa Ana River Focal Area
Figure 4-16

Figure 4-16: Existing Views Upper Santa Ana River Focal Area

View Upstream River Road Bridge

View Downstream River Road Bridge

Prado Basin Ecosystem Restoration/Water Conservation Feasibility Study
Existing Views Upper Santa Ana River Focal Area
Figure 4-17

Figure 4-17: Existing Views Upper Santa Ana River Focal Area

View Santa Ana River Downstream of Prado Dam

View Santa Ana River at Green River Golf Course

Prado Basin Ecosystem Restoration/Water Conservation Feasibility Study
Existing Views Lower Santa Ana River Focal Area
Figure 4-18

Figure 4-18: Existing Views Lower Santa Ana River Focal Area

View of Santa Ana River at Gypsum Canyon

View of Santa Ana River Between Weir Canyon and Gypsum Canyon

Prado Basin Ecosystem Restoration/Water Conservation Feasibility Study
Existing Views Lower Santa Ana River Focal Area
Figure 4-19

Figure 4-19: Existing Views Lower Santa Ana River Focal Area

View of Santa Ana River at Weir Canyon

View Santa Ana River at Imperial Highway

Prado Basin Ecosystem Restoration/Water Conservation Feasibility Study
Existing Views Lower Santa Ana River Focal Area
Figure 4-20

Figure 4-20: Existing Views Lower Santa Ana River Focal Area

View of Chino Creek Near State Route 71

View of Chino Creek from Intersection Pine Avenue and El Prado Road

Prado Basin Ecosystem Restoration/Water Conservation Feasibility Study
Existing Views Chino Creek Focal Area
Figure 4-21

Figure 4-21: Existing Views Chino Creek Focal Area

View of Mill Creek Focal Area from Mill Creek Wetlands

View of Mill Creek Wetlands to the South

Prado Basin Ecosystem Restoration/Water Conservation Feasibility Study
Existing Views Mill Creek Focal Area
Figure 4-22

Figure 4-22: Existing Views Mill Creek Focal Area

5.0 ENVIRONMENTAL CONSEQUENCES

The first part of this chapter is composed of resource-specific impact sections addressing direct and indirect effects of construction and operation and maintenance of the final array of alternatives, formatted as described below. Following this analysis, the remainder of the chapter addresses cumulative impacts and other sections required for inclusion under NEPA and, or CEQA, including growth-inducing impacts, identification of any unavoidable significant adverse impacts, the relationship between short-term uses of the environment and maintenance and enhancement of long-term productivity, and irreversible and irretrievable commitments of resources.

Environmental Resource Area: Identifies the environmental issue or resource type to be discussed (e.g., Geology, Land Use, Biological Resources, etc.).

Regulatory Framework: Provides a short description of regulations relevant to the applicable resource area.

Impact Significance Criteria*:* Identifies one or more threshold of significance for impacts to the applicable resource area. For this IFR, the impacts analysis typically adopts the CEQA thresholds of significance stated for each resource. However, for some resources, additional NEPA significant thresholds are identified. For certain resources such as air quality and greenhouse gases, the NEPA analysis does not adopt the CEQA thresholds and therefore also applies separate significance criteria in accordance with relevant federal and state requirements.

Environmental Commitments: Includes project design features and Best Management Practices (BMPs) that have been incorporated into the project description of each alternative to avoid and/or reduce potential impacts.

Impact Analysis: Evaluates the environmental impacts of the no action alternative and the three action alternatives. The action alternatives each include implementation of both a Water Conservation Plan and an Ecosystem Restoration Plan, which in turn includes a combination of restoration measures. Beneficial and adverse effects of these plans and measures are considered, including direct and indirect effects resulting from construction and long-term operation and maintenance activities. Impacts of the Water Conservation Plan and the Ecosystem Restoration Plan measures within each alternative are evaluated. Effects of adaptive management (contingency) measures (see Appendix E), which may include minor changes in methods, location, or timing of the ecosystem restoration measure in order to meet performance criteria, are described under Operation and Maintenance headers as they would occur during the Operation and Maintenance timeframe.

Effects from the first action alternative (Alternative 2) described under each environmental resource area are described independently. Effects of Alternatives 3 and 4 are described in comparison to Alternative 2, and any differences are noted.

Cumulative effects are analyzed in Section 5.13.

Level of Impact: The level of impact for each alternative and for each resource is based on the evaluation of identified significance criteria and incorporation of environmental commitments. A conclusion of either no impact, less than significant impact, or significant impact is reached. Impacts, whether they are significant or less than significant, are further identified as being either adverse or beneficial.

5.1 ALTERNATIVES EVALUATED

Alternative 1 (No Federal Action/No Project)
Under NEPA (42 CFR, Part 1502.14), a No Federal Action Alternative must be considered, while under CEQA, a No Project Alternative must also be considered. The No Federal Action/No Project Alternative provides the basis for comparison with other alternatives, as it represents a scenario under which nothing would be done to address the identified need for the Proposed Action. Under the No Federal Action/No Project Alternative, Prado Dam would continue to operate with a maximum buffer pool water surface elevation of 498 ft. during the flood season and 505 ft. during the non-flood season (except for a 5-year time period where a deviation from the Water Control Plan will allow for water to be held at 505 ft. year-round), and no ecosystem restoration activities would occur within the Prado Basin or along the Santa Ana River.

Alternatives 2-4 (Action Alternatives)
As described in Chapter 3 and in Table5-1 below, many of the ecosystem restoration measures are identical for each Alternative. For example, the Chino Creek Restoration measure in Alternative 2 is the same as that in Alternative 3 or 4. The water conservation plan evaluated under Alternative 2 is the same plan that is included in Alternative 4. As a result, and as described below, the impacts associated with construction of identical plans and measures would be the same regardless of which Action Alternative (if any) is selected. Some measures or plans, however, may be implemented at different locations or at a different scale depending on the alternative, or are only present within certain alternatives. In those cases, the discussion addresses the difference in impacts -- beneficial or adverse -- among the alternatives. As discussed in Chapter 3.0, the plan ultimately selected may be an alternative within the spectrum of the final array alternatives fully analyzed in this draft IFR.

Table 5-1: Plans/Measures Under Each Alternative

	Alternative 2				**Alternative 3**				**Alternative 4**			
Measure or Plan	**DSR**	**USR**	**CC**	**MC**	**DSR**	**USR**	**CC**	**MC**	**DSR**	**USR**	**CC**	**MC**
Water Conservation Plan		**X**								**X**		
Water Conservation Plan with Incidental Sediment Removal						**X**						
Ecosystem Restoration Plan, with the following measures:												
Sediment Management	**X**	**X**							**X**	**X**		
Chino Creek Restoration			**X**				**X**				**X**	
Invasive Plant Management	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**

	Alternative 2				Alternative 3				Alternative 4			
Measure or Plan	**DSR**	**USR**	**CC**	**MC**	**DSR**	**USR**	**CC**	**MC**	**DSR**	**USR**	**CC**	**MC**
Native Plantings		**X**	**X**	**X**		**X**	**X**	**X**		**X**	**X**	**X**
Riparian Edge Management		**X**								**X**		
Instream Habitat Features (Upstream)										**X**		
Instream Habitat Features (Downstream)	**X**								**X**			
Cowbird Trapping		**X**	**X**	**X**		**X**	**X**	**X**		**X**	**X**	**X**
Non-Native Aquatic Management		**X**							**X**	**X**		
Feral Pig Management										**X**	**X**	**X**

DSR- Downstream Santa Ana River Focal Area
USR-Upstream Santa Ana River Focal Area
CC-Chino Creek Focal Area
MC-Mill Creek Focal Area

5.2 EARTH RESOURCES

5.2.1 Regulatory Framework

Numerous environmental laws and regulations govern the geologic and seismic resources in the study area. An overview of some of the more pertinent regulations and responsible agencies is presented below.

5.2.1.1 Federal Regulations

The United States Geologic Survey (USGS)
The USGS of the U.S. Department of the Interior provides reliable scientific information to describe and understand the earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life. The USGS does not have regulatory authority/jurisdiction, but rather it provides scientific information that can be used to help mitigate impacts from natural disasters such as earthquakes, landslides, and volcanoes.

Federal Soil Protection Act
The purpose of the Federal Soil Protection Act is to protect and/or restore the functions of the soil on a permanent, sustainable basis. Protection and restoration activities include prevention of harmful soil changes, rehabilitation of the soil of contaminated sites and rehabilitation of water contaminated by contaminated soils. Additionally, the requirements of the Federal Clean Water Act through the National Pollution Discharge Elimination System provide guidance for protection of geologic and soil resources.

Section 402 Clean Water Act
Construction projects which disturb one or more acres of soil are required to obtain coverage under a General Construction Permit (GCP) by the State Water Resources Control Board

(SWRCB). The GCP requires the filing of a Notice of Intent (NOI) with the SWRCB and the preparation of a Storm Water Pollution Prevention Plan (SWPPP).

5.2.1.2 State Regulations

California has promulgated several regulations regarding geology and soils. The International Building Code regulates construction practices including sections pertinent to design and construction to avoid geotechnical hazards. The codes include design standards and general design parameters for seismic design. The State Building Standards Commission is responsible for administering California's building codes, including adopting, approving, publishing, and implementing codes and standards.

California Earthquake Fault Zoning Act ("Alquist-Priolo" Act)
The Alquist-Priolo Earthquake Fault Zoning Act, enacted in 1972, regulates development near active faults to mitigate the hazards of surface fault-rupture. Under the act, the State Geologist is required to delineate special study zones along known active faults. The act also requires that prior to approval of a project within a mapped active fault zone, a geologic study is required to be prepared to define and delineate any hazards from surface fault rupture. A 50-foot setback for building structures from any known trace of an active fault is required. There is a mapped "Alquist-Priolo" fault zone for the Chino Fault that passes through the project area just northeast of Prado Dam.

The study area is in a seismically active region and could be subject to ground rupture, seismic shaking, and liquefaction from several active faults in the region. The Elsinore Fault, for instance, extends in a north to south direction through the western end of the study area, including Chino Creek.

Seismic Hazards Zone Mapping Act
The Seismic Hazards Zone Mapping Act, enacted in 1990, was developed to protect the public from the effects of strong ground shaking, liquefaction, landslides, or other ground failure and hazards caused by earthquakes. The act requires the State Geologist to delineate various seismic hazard zones and requires cities, counties, and other local permitting agencies to regulate certain development projects within those mapped zones. The southern part of the project area downstream of Prado Dam has been mapped by the California Geologic Survey and includes both liquefaction hazard and landslide hazard zone. However, the area including Prado Dam and the Prado Basin upstream of the dam has not been mapped. The study area is in a seismically active region and within an area where historic occurrence of liquefaction has occurred.

5.2.2 Impact Significance Criteria

The impact criteria below were taken from Appendix G of the CEQA guidelines and are also being adopted for NEPA. For purposes of this analysis, Alternatives 1, 2, 3, or 4 would have a significant impact related to Earth Resources if the alternative would:

IMPACT GEO-1: Expose people or structures to significant adverse effects, including the risk of loss, injury, or death involving rupture of an earthquake fault, strong seismic ground shaking, liquefaction or an unstable geologic unit [i.e., a landslide].

IMPACT GEO-2: Result in substantial soil erosion or the loss of topsoil.

5.2.3 Environmental Commitments

EC-GEO-1: Prior to the start of construction, the construction contractor would obtain coverage under the General Construction Permit (GCP) by the State Water Resources Control Board (SWRCB) and in compliance with the permit would file a Notice of Intent with the Regional Water Quality Control Board (RWQCB) and prepare and implement appropriate BMPs within a Storm Water Pollution Prevention Plan (SWPPP).

EC-GEO-2: Uncovered stockpiles of sediment material shall be regularly watered until re-entrained or re-graded/hydroseeded to minimize water and wind erosion.

5.2.4 Earth Resource Impacts

5.2.4.1 **IMPACT GEO-1**: Expose people or structures to significant adverse effects, including the risk of loss, injury, or death involving rupture of an earthquake fault, strong seismic ground shaking, liquefaction, or an unstable geologic unit

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, neither the Water Conservation Plan nor the Ecosystem Restoration Plan measures would be implemented. There would be no change to the study area condition. The study area would still be situated within an active seismic area and would be subject to ground rupture, seismic shaking, and liquefaction.

ALTERNATIVE 2: PROPOSED ACTION

Water Conservation Plan (Elevation 505 year-round)

Direct Impacts

According to the California Geologic Survey Seismic Hazard Zone Map Prado Dam Quadrangle, the Elsinore Fault Zone extends in a north- to south direction at the western end of Prado Basin, near State Highway 71. The Elsinore Fault is an active fault capable of producing an earthquake of 6.8 on the Richter scale. This magnitude earthquake would be large enough to result in ground surface rupture impacts in the Prado Basin. According to the Alquist-Priolo Act if an active fault is present, a structure for human occupancy cannot be placed over the trace of the fault and must be setback 50 feet from the fault zone. The Water Conservation Plan would not involve the construction of habitable or permanent infrastructure structures that would be subject to significant ground rupture impacts. Holding water within the Basin at a higher elevation and for a longer period than currently authorized would not result in geologic instability that could lead

to an increased potential for earthquakes or other seismic events. The potential for liquefaction would not increase. No direct impact related to this criterion would occur.

Indirect Impacts
The study area is located within the vicinity of several active faults and could be subject to seismic shaking impacts and liquefaction impacts if an earthquake occurs in the regional area. The Water Conservation Plan would not involve the construction of habitable or permanent infrastructure structures that would be subject to seismic shaking impacts or liquefaction impacts. Implementation of the Water Conservation Plan would not increase the risk of seismic ground shaking impacts or liquefaction impacts over the current condition and therefore would not expose people or structures to significant adverse effects.

Long Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities associated with Water Conservation Plan that would affect earth resources.

Ecosystem Restoration Plan

Sediment Management Measure

Direct Impacts
The Elsinore Fault Zone does not extend where the Sediment Management Measure would be implemented. Therefore, there would be low probability for ground rupture impacts, and potential impacts would be less than significant.

Indirect Impacts
The study area is located within the vicinity of several active faults and could be subject to seismic shaking impacts and liquefaction impacts if an earthquake occurs in the regional area. The Sediment Management Measure would not involve the construction of any structures occupied by people or the construction of critical infrastructure subject to seismic shaking impacts, liquefaction or landslide impacts that would threaten safety. Some of the components of the sediment management system could potentially sustain damage during a seismic event. However, all of the components could be removed, replaced or repaired if needed. Dredging, re-entrainment and associated changes in hydrology would not trigger a seismic event or increase the potential for liquefaction. Potential adverse fault rupture impacts, seismic ground shaking impacts, liquefaction and landslide impacts would be less than significant.

Long Term Operation and Maintenance Impacts
Long term operation and maintenance impacts associated with Sediment Management Measure would not involve any activities that would increase the risks of ground rupture impacts, seismic ground shaking impacts, liquefaction or landslide impacts over the current condition. Adaptive management would include adjustments to methods, quantities and possibly locations of material excavated and, or re-entrained to ensure that success criteria are met. Similar to other operation and maintenance activities, adaptive management would not increase the risk presented by seismic events and would have a less than significant impact.

Chino Creek Channel Restoration Measure

Direct Impacts
The Elsinore Fault Zone does extend through the Chino Creek Focal area where the Chino Creek Restoration Measure would be implemented. There would be the potential for ground rupture to occur in the area, although this would not be caused or worsened by construction of this measure. Because Chino Creek Channel Restoration Measure would not involve the construction of any habitable structures or critical infrastructure the potential impact would be less than significant.

Indirect Impacts
The study is located within a regional area that contains several active faults and could be subject to seismic shaking impacts and liquefaction impacts if an earthquake occurs in the regional area. Implementation of the Chino Creek Channel Restoration Measure would not involve the construction of any habitable structures or critical infrastructure subject to ground rupture, seismic shaking impacts, liquefaction or landslide impacts that would threaten safety. Because Chino Creek Channel Restoration Measure would not involve the construction of any habitable structures or critical infrastructure the potential impact would be less than significant.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance associated with Chino Creek Restoration Measure would not involve any activities that would increase the risks of ground rupture impacts, seismic ground shaking impacts, liquefaction or landslide impacts over the current condition. Therefore, there would be potential impact to earth resources from long-term operation and maintenance would be less than significant. Adaptive management may require the occasional use of equipment to adjust gradient, channel dimensions or plantings to ensure that success criteria are met. Similar to other maintenance activities, potential impact would be less than significant.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Treatment Measure, In-stream Habitat Features Measure Downstream

Direct Impacts
The Elsinore Fault Zone does not extend through the areas where the above ecosystem restoration activities would be implemented and does not include activities that would increase the risk for ground rupture impacts. The in-stream habitat features consist of rock structures placed within the wetted channel of the Santa Ana River. The rock structures would be keyed into the streambed which would require minor excavation, but this would not cause or create any potential for increased seismic shaking, liquefaction, landslides or other geologic instability. If the feature is damaged by an earthquake or other seismic event, this would not create a hazard for any other structures in the vicinity. Any impact would be less than significant.

Indirect Impacts
The above ecosystem restoration measures would be implemented in areas that would be subject to seismic shaking impacts and liquefaction impacts. The proposed measures would not involve the construction of structures that would be occupied by people or involve a high number of onsite workers that would be subject to seismic shaking impacts, or liquefaction impacts that would threaten safety.

Long Term Operation and Maintenance Impacts
Long-term operation and maintenance impacts associated with the above measures would not involve any activities that would increase the risks of ground rupture impacts, seismic ground shaking impacts, liquefaction or landslide impacts over the current condition. Adaptive management of in-stream habitat features may require the occasional use of equipment to reposition or bring in additional rocky material to ensure that success criteria are met. Supplemental watering may be needed for a period of time to support achievement of percent cover criteria and successful restoration of target vegetation communities as part of adaptive management for riparian habitat restoration. As with other maintenance activities, potential impact would be less than significant.

Cowbird Trapping Measure, Non-Native Aquatic Species Management

Direct Impacts
The Elsinore Fault Zone does not extend through the areas where the above ecosystem restoration activities would be implemented and does not include activities that would increase the risk for ground rupture impacts.

Indirect Impacts
The above wildlife management measures would be implemented in areas that would subject to seismic shaking impacts and liquefaction impacts. The proposed measures would not involve the construction of structures that would occupied by people or involve a high number of onsite workers that would be subject to seismic shaking impacts, or liquefaction impacts that would threaten safety.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance impacts associated with the above measures would not involve any activities that would increase the risks of ground rupture impacts, seismic ground shaking impacts, liquefaction or landslide impacts over the current condition. Adaptive management may include adjustments to cowbird control and fish removal methods, level of effort, and/or trap locations. As with other maintenance activities, potential impact would be less than significant.

Level of Impact for Alternative 2
Less than significant impact. Construction and long-term operation and maintenance activities would not increase the risk or exposure of people to significant adverse seismic ground rupture, seismic shaking impacts, or liquefaction impacts over the current condition.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 year-round with Incidental Sediment Removal)

Direct Impacts
Compared to Alternative 2, the level of potential impacts related to seismic hazards from the Water Conservation Plan would be similar. No adverse impacts would occur.

Compared to Alternative 2, the scale of the sediment removal activities proposed in Alternative 3 would be substantially smaller and therefore even less chance of seismic shaking impacts. Similar to Alternative 2, the incidental sediment removal activities would not involve the construction of any structures occupied by people or the construction of permanent infrastructure. Potential impact would be less than significant.

Indirect Impacts
As with Alternative 2, any indirect impacts would be less than significant.

Long-Term Operation and Maintenance Impacts
As with Alternative 2, any long-term operation and maintenance or adaptive management impacts would be less than significant.

Ecosystem Restoration Plan

Direct, Indirect, and Future Operation and Maintenance Impacts

Chino Creek Channel Restoration Measure: This measure is the same as described in Alternative 2 and therefore the level of potential impacts would be the same. Potential impact would be less than significant.

Invasive Plant Management Measure, Native Plantings Measure: These measures are the same as described in Alternative 2 and therefore the level of potential erosion would be the same and would be less than significant.

Cowbird Trapping Measure: This measure is the same as described in Alternative 2 and therefore the level of potential impacts would be the same and would be less than significant. The Cowbird Trapping Measure would not involve the construction of habitable structures or infrastructure subject to direct ground rupture impacts or indirect seismic shaking impacts, liquefaction impacts or landslide impacts.

Level of Impact for Alternative 3
Less than Significant. Construction and long-term operation and maintenance activities would not increase the risk or exposure of people to significant adverse seismic ground rupture, seismic shaking impacts, or liquefaction impacts over the current condition.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 year-round)

Direct Impacts
The Water Conservation Plan included in Alternative 4 is the same as the Water Conservation Plan in Alternative 2. Therefore, direct impacts would be the same and would be less than significant.

Indirect Impacts
The Water Conservation Plan included in Alternative 4 is the same as the Water Conservation Plan in Alternative 2. Therefore, indirect impacts would be the same and would be less than significant.

Long-Term Operation and Maintenance Impacts
The Water Conservation Plan included in Alternative 4 is the same as the Water Conservation Plan in Alternative 2. Therefore, long-term operation, maintenance and adaptive management impacts would be the same and would be less than significant.

Ecosystem Restoration Plan

Direct Impacts

Sediment Management Measure
This measure is the same as described in Alternative 2 and therefore the level of potential impacts related to ground rupture, seismic shaking, liquefaction and landslides would be the same and would be less than significant.

Chino Creek Channel Restoration Measure
This measure is the same as described in Alternative 2 and therefore the level of potential impacts related to ground rupture, seismic shaking, liquefaction and landslides would be the same and would be less than significant.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure, In-Stream Habitat Features Measure Downstream
These measures are the same as described in Alternative 2 and therefore the level of potential impacts would be the same and would be less than significant. The above ecosystem restoration measures would not involve the construction of structures occupied by people or involve a high number of onsite workers. No structures would be subject to ground rupture, seismic shaking impacts, liquefaction or landslide impacts that would threaten safety.

In-Stream Habitat Features Measure Upstream
Under Alternative 4, In-Stream Habitat Features would also be constructed within the SARM Upstream Focal Area. The in-stream habitat features consist of rock structures placed within the wetted channel of the Santa Ana River. The rock structures would be keyed into the streambed which would require minor excavation, but this would not cause or create any potential for increased seismic shaking, liquefaction, landslides or other geologic instability. If the feature is damaged by an earthquake or other seismic event, this would not create a hazard for any other structures in the vicinity. Potential impact would be less than significant.

Non-Native Aquatic Species Management Measure, Feral Pig Management Measure, Cowbird Management Measure
Implementation of the proposed wildlife management measures would not involve the construction of structures occupied by people or the construction of infrastructure subject to ground rupture, seismic shaking impacts, liquefaction or landslide impacts. Potential impacts

associated with ground rupture, seismic shaking, liquefaction and landslide impacts would be less than significant.

Indirect Impacts
With the exception of feral pig management, expanded non-native aquatics control to include downstream areas, and placement of instream habitat features in the upstream transition channel, all of the other measures are the same as described for Alternative 2, and therefore indirect impacts would be the same and would be less than significant. Feral pig management and non-native aquatics control would not require any excavation or significant ground disturbance and therefore would not cause or create any geologic instability. Minor excavation would be required to construct the in-stream habitat features, but this would not trigger any seismic activity or result in any significant indirect impact.

Long-Term Operation and Maintenance Impacts
With the exception of feral pig management, expanded non-native aquatics control to include downstream areas, and placement of instream habitat features in the upstream transition channel, all of the other measures are the same as described for Alternative 2, and therefore impacts from long-term operation and maintenance would be the same and would be less than significant. Continued implementation of feral pig management and non-native aquatics control would not require any excavation or significant ground disturbance and therefore would not cause or create any geologic instability. Minor excavation may be required to implement adaptive management activities for the in-stream habitat features to ensure that success criteria are met, but this would not trigger any seismic activity or result in any significant impact.

Level of Impact for Alternative 4
Less than significant impact. Construction and long-term operation and maintenance activities would not increase the risk or exposure of people to significant adverse seismic ground rupture, seismic shaking impacts, or liquefaction impacts over the current condition.

5.2.4.2 **IMPACT GEO-2**: Results in substantial soil erosion or the loss of topsoil

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under No Federal Action/No Project Alternative, neither the water conservation plan nor the ecosystem restoration plan would be implemented. There would not be any excavation or grading activities that would expose uncovered soils and potentially increase erosion impacts.

ALTERNATIVE 2: PROPOSED ACTION

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts
The Water Conservation Plan would not involve any activities that would directly uncover soils and cause potential erosion impacts.

Indirect Impacts
There are no activities associated with the Water Conservation Plan that would indirectly cause off-site erosion impacts.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities maintenance activities associated with Water Conservation Plan that would uncover soils and cause erosion impacts.

Ecosystem Restoration Plan
Rather than addressing effects measure-by-measure as is done for most other significance criteria and resource categories, effects related to soil erosion and loss of topsoil can be presented more clearly by considering the total amount of excavation and grading that would occur with implementation of all proposed ecosystem restoration measures under each alternative. This cumulative analysis is presented below.

The total amount of grading impacts associated with Water Conservation and Ecosystem Restoration Plan under Alternative 2 is shown in Table 5-2.

Table 5-2: Alternative 2 Grading Impacts

SARM Upstream Focal Area	Acres	SARM Downstream Focal Area	Acres	Chino Creek Focal Area	Acres	Mill Creek Focal	Acres
Water Conservation	0.0	Invasive Plant Management	14.0	Chino Creek Channel Restoration	120.2	Invasive Plant Management	57.0
Sediment Management	559.2	In-Stream Habitat Features	3.1	Invasive Plant Management	69.0	Native Plantings	17.2
Invasive Plant Management	248.0			Native Plantings	42.9		
Native Plantings	41.1						
Total	848.3		17.1		232.1		74.2
(1) Grading impacts included within Construction Footprint for Sediment Management Measure. Only measures with grading impacts are included in this table.							

Implementation of several of the proposed ecosystem restoration measures would require excavation and grading activities that would uncover soils. The exposed soils could be subject to erosion impacts caused by water and wind. As shown in Table 5-1, under Alternative 2, each measure would disturb at least one acre by grading activities and would be required to comply with Section 402 of Clean Water Act. Prior to the start of grading activities Environmental Commitment EC-GEO-1 would be implemented which would obtain General Construction Permit, file a NOI with SWRCB and prepare and implement a Storm Water Pollution Prevention Plan, which would include a list of BMPs to minimize potential soil erosion impacts. With the implementation of Environmental Commitment EC-GEO-1 potential adverse erosion impacts would be less than significant.

The proposed Sediment Management Measure would stockpile an average of 175,000 cubic yards (cy) of material annually at the sediment storage site. Stockpiled sediment material would

potentially be subject to water and wind erosion impacts. To minimize potential onsite erosion impacts, the stockpiled sediment material would be regularly watered by water trucks until it is re-entrained pursuant EC-GEO-2. With the implementation of Environmental Commitment EC-GEO-2, potential erosion impacts from the stockpiling of sediment material at the sediment storage site would be less than significant.

Indirect Impacts
Heavy construction equipment involved with the construction and operation of the ecosystem restoration measures proposed in Alternative 2 could track sediment and transport it to offsite locations. Storm water could also carry loosened sediment beyond the project limits. Preparation of a SWPPP and implementation of Environmental Commitments EC-GEO-1 and EC-GEO-2 would also avoid and minimize indirect erosion impacts that could occur if loosened material is transported offsite through stormflows or by tracked equipment. With the implementation of Environmental Commitments EC-GEO-1 and EC-GEO-2 potential indirect impacts would be less than significant.

Long Term Operation and Maintenance Impacts
Long-term operation and maintenance activities under Alternative 2 would include the removal and disposal of vegetation, debris and sediment and recondition of access roads which could involve the use of heavy construction. Long-term operation and maintenance activities could potentially uncover some soils and expose them to erosion impacts; however, implementation of EC-GEO-1 and EC-GEO-2 would minimize erosion.

Level of Impact for Alternative 2
Less than significant impact. Construction and long-term operation and maintenance impacts would not result in substantial soil erosion or the loss of topsoil.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 year-round with Incidental Sediment Removal) and Ecosystem Restoration Plan

Direct Impacts
The total amount of grading impacts associated with Water Conservation and Ecosystem Restoration Plan under Alternative 3 is shown in Table 5-3.

Table 5-3: Alternative 3 Grading Impacts

SARM Upstream Focal Area	Acres	SARM Downstream Focal Area	Acres	Chino Creek Focal Area	Acres	Mill Creek Focal	Acres
Water Conservation with Incidental Sediment Removal	39.70	Invasive Plant Management	14.0	Chino Creek Channel Restoration	120.2	Invasive Plant Management	57.0
Invasive Plant Management	248.0			Invasive Plant Management	69.0	Native Plantings	17.2
Native Plantings	41.1			Native Plantings	42.9		
Total	328.8		14.0		232.1		74.2

As shown in Table 5-3, under Alternative 3, each measure would disturb at least one acre by grading activities and would be required to comply with Section 402 of Clean Water Act. Prior to the start of grading activities Environmental CommitmentEC-GEO-1 would be implemented which would include obtaining a General Construction Permit, filing a NOI with SWRCB and preparing and implementing a Storm Water Pollution Prevention Plan, which would include a list of BMPs to minimize potential soil erosion impacts. With the implementation of Environmental Commitment EC-GEO-1 potential adverse erosion impacts would be less than significant. Compared to Alternative 2, overall grading would be less and therefore the impacts would be less.

Indirect Impacts

Preparation of a SWPPP and implementation of Environmental Commitments EC-GEO-1 and EC-GEO-2 would also avoid and minimize indirect erosion impacts that could occur if loosened material is transported offsite through stormflows or by tracked equipment. With the implementation of EC-GEO-1 potential indirect impacts would be less than significant
The sediment management program would include deposition of a total of 250,000 cy of sediment at the sediment storage site over the 50-year period of analysis. At the estimated rates of sediment accumulation, the stockpiles would not reach their maximum dimensions for many years (likely decades). There would be the potential that this material would be subject to water and wind erosion impacts. To minimize potential erosion impacts this material would be regularly watered until it is either graded to conform with surrounding topography and replanted or removed pursuant to EC-GEO-2. Potential for erosion impacts at the sediment storage site would be less than significant.

Long-Term Operation and Maintenance Activities

Compared to Alternative 2, long term operation maintenance activities would be substantially less and would have less potential to result in substantial soil erosion or loss of topsoil. To minimize potential erosion impacts associated with long term operation and maintenance activities, Environmental Commitments EC-GEO-1 and EC-GEO-2 would be implemented. Potential erosion impacts would be less than significant.

Level of Impact for Alternative 3
Less than significant impact. Construction and long-term operation maintenance impacts would not result in substantial soil erosion or the loss of topsoil.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 year-round with Incidental Sediment Removal) and Ecosystem Restoration Plan

The total amount of grading impacts associated with Water Conservation and Ecosystem Restoration Plan under Alternative 3 is shown in Table 5-4.

Table 5-4: Alternative 4 Grading Impacts

SARM Upstream Focal Area	Acres	SARM Downstream Focal Area	Acres	Chino Creek Focal Area	Acres	Mill Creek Focal	Acres
Water Conservation	0.0	Invasive Plant Management	14.0	Chino Creek Channel Restoration	120.2	Invasive Plant Management	57.0
Sediment Management	559.2	In-Stream Habitat Features	3.1	Invasive Plant Management	69.0	Native Plantings	17.2
Invasive Plant Management	248.0	Non-Native Aquatic Management	0.0	Native Plantings	42.9	Cowbird Trapping	0.0
Native Plantings	41.1						
Total	848.3		17.1		232.1		74.2
(1) Grading impacts included within Construction Footprint for Sediment Management Measure. Only measures that include grading activity are included in this table.							

Direct Impacts
Under Alternative 3, the same Water Conservation Plan is proposed. Potential direct impacts would be the same.

As shown in Table 5-1, under Alternative 3, each measure would disturb at least one acre by grading activities and would be required to comply with Section 402 of Clean Water Act. Prior to the start of grading activities Environmental CommitmentEC-GEO-1 would be implemented which would include obtaining a General Construction Permit, filing a NOI with SWRCB and preparing and implementing a Storm Water Pollution Prevention Plan, which would include a list of BMPs to minimize potential soil erosion impacts. With the implementation of Environmental Commitment EC-GEO-1 potential adverse erosion impacts would be less than significant.

Indirect Impacts
As described for Alternative 2, the operation of heavy construction equipment could track sediment and indirectly transport it to offsite locations. With the implementation of EC-GEO-1 and EC-GEO-2 potential adverse indirect erosion impacts would be less than significant.

Long-Term Operation and Maintenance Impacts
Alternative 4 would require essentially the same long-term operation and maintenance requirements and would have the same potential for erosion impacts. With implementation Environmental Commitments EC-GEO-1 and EC-GEO-2 long-term operation and maintenance impacts would be less than significant.

Level of Impact for Alternative 4
Less than Significant impact. Construction and long-term operation and maintenance impacts would not result in substantial soil erosion or the loss of topsoil.

5.3 AIR QUALITY AND GREENHOUSE GASES (GHG)

5.3.1 Regulatory Framework

Sources of air emissions in the Air Basin are regulated by the EPA, CARB, and SCAQMD. In addition, regional and local jurisdictions play a role in air quality management. The role of each regulatory agency is discussed below.

5.3.1.1 Federal Regulations

The federal Clean Air Act (CAA) of 1963 and its subsequent amendments form the basis for the nation's air pollution control effort. The EPA is responsible for implementing most aspects of the CAA. Basic elements of the act include the NAAQS for major air pollutants, hazardous air pollutant standards, attainment plans, motor vehicle emission standards, stationary source emission standards and permits, acid rain control measures, stratospheric ozone protection, and enforcement provisions. The CAA delegates the enforcement of the federal standards to the states. In California, the CARB is responsible for enforcing air pollution regulations. In the Air Basin, the SCAQMD has this responsibility.

General Conformity Rule
Section 176(c) of the CAA states that a federal agency cannot issue a permit for, or support an activity within, a nonattainment or maintenance area unless the agency determines it will conform to the most recent EPA-approved State Implementation Plan (SIP). This means that projects using federal funds or requiring federal approval must not: (1) cause or contribute to any new violation of a NAAQS; (2) increase the frequency or severity of any existing violation; or (3) delay the timely attainment of any standard, interim emission reduction, or other milestone. The General Conformity Rule was updated in March 2010.

Based on the present attainment status of the Air Basin (see Table 4-3), a federal action would conform to the SIP if its annual emissions remain below 100 tons of CO or PM2.5, 70 tons of PM10, 10 tons of NOx or VOC, or 25 tons of lead. These *de minimis* levels apply to both construction and operation activities. SCAQMD Rule 1901 adopts the guidelines of the General Conformity Rule. Note that estimates of lead emissions were not calculated for construction and operations phases of the proposed project. Lead emissions from mobile sources in California have significantly decreased due to the near elimination of lead in fuels, and as such mobile source emissions of lead are negligible. Thus, CalEEMod does not provide estimates for lead

emissions. However, given the anticipated negligible lead emissions that would be generated by implementation of any of the project alternatives, all alternatives are assumed to be under the *de minimis* thresholds for lead of 25 tons per year.

State Implementation Plan

For areas that do not attain the NAAQS, the CAA requires the preparation of a SIP, detailing how the State will attain the NAAQS within mandated timeframes. In response to this requirement, the SCAQMD and Southern California Association of Governments (SCAG) developed the 2003 Air Quality Management Plan (2003 AQMP) (SCAQMD, 2003a). The focus of the 2003 AQMP was to demonstrate attainment of the federal PM10 standard by 2006 and the federal one-hour O3 standard by 2010, while making expeditious progress toward attainment of State standards. The 2003 AQMP also includes a NO2 maintenance plan.

The SCAQMD and SCAG, in cooperation with the CARB and the EPA, have developed the 2007AQMP for the primary purposes of demonstrating compliance with the new PM2.5 and 8-hour O3 NAAQS. This plan also provides additional measures beyond the 2003 AQMP for the attainment of the PM10 standard that was not attained by 2006, the one-hour O3 NAAQS (the standard was revoked by the EPA, but the SCAQMD is still tracking progress towards attainment of this standard), and other planning requirements. The SCAQMD Governing Board adopted the Final 2007 AQMP on June 1, 2007 (SCAQMD, 2007). Since it will be more difficult to achieve the 8-hour O3 NAAQS compared to the 1-hour O3 NAAQS, the 2007 AQMP contains substantially more emission reduction measures compared to the 2003 AQMP. The 2003 AQMP is still the latest approved Attainment Plan for PM10; however, the SCAQMD submitted a PM10 Re-designation Request and Attainment Plan for the Air Basin to EPA in 2010 that is currently pending EPA action.

EPA approved the 2007 8-hour O3 plan in March 2012 and approved nearly all elements of the 2007 PM2.5 plan in September 2012. However, in August 2012 EPA proposed to withdraw approval of parts of the approved ozone planning requirements (VMT emissions offset demonstration) and proposed to find that the 1-hour O3 plan is inadequate for meeting the standard, which would require a new attainment plan be submitted as part of a revised SIP within 12 months of approval of this proposed inadequacy finding. The SCAQMD is currently in the process of preparing the 2012 AQMP and published the Draft 2012 AQMP in July 2012, a revised Draft 2012 AQMP in September 2012, and a Draft Final 2012 AQMP in November 2012.

On June 11, 2007, the EPA re-designated the Air Basin from nonattainment to attainment for the CO one- hour and eight-hour NAAQS. The EPA also approved a SIP revision for the Air Basin nonattainment area in California as meeting the CAA requirements for maintenance plans for CO. The EPA made an adequacy finding and approved motor vehicle emission budgets, which are included in the maintenance plan. The EPA also approved the California motor vehicle inspection and maintenance (I/M) program as meeting the low enhanced I/M requirements for CO in the South Coast region (EPA, 2007).

Non-Road Diesel Fuel Rule
In May 2004, the EPA set sulfur limits for non-road diesel fuel. Under this rule, starting January 1, 2012 (EPA, 2004), diesel fuel used by all non-road equipment (not including marine and aircraft fuel) would be limited to 15 ppm sulfur, which would be equivalent to the sulfur content restrictions of the California Diesel Fuel Regulations.

Emission Standards for On-Road Trucks
To reduce emissions from on-road, heavy-duty diesel trucks, the EPA established a series of cleaner emission standards for new engines, starting in 1988. These emission standards regulations have been revised over time and the latest effective regulation, the 2007 Heavy-Duty Highway Rule, provides for reductions in PM, NOx, and non-methane hydrocarbon emissions that were phased in during the model years 2007 through 2010 (EPA, 2000).

Environmental Protection Agency Diesel Fuel Rule
This EPA rule limited the sulfur content in on-road diesel fuel to 15 ppm starting June 1, 2006 45 (EPA 2006a).

Off-Road Diesel Engine Rule
To reduce emissions from off-road diesel equipment, the EPA established a series of increasingly strict emission standards for new engines. Locomotives and marine vessels are exempt from this rule. Manufacturers of off-road diesel engines would be required to produce engines with certain emission standards under the following compliance schedule:

- Tier 1 standards were phased in from 1996 to 2000 (year of manufacture), depending on the engine horsepower category.
- Tier 2 standards were phased in from 2001 to 2006.
- Tier 3 standards were phased in from 2006 to 2008.
- Tier 4 standards, which likely will require add-on emissions control equipment to attain them, will be phased in from 2008 to 2015.

Greenhouse Gases
Greenhouse gas (GHG) emissions are not currently subject to Federal standards. Effective April 5, 2017, the Council on Environmental Quality withdrew its "Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews." Thus, no thresholds of significance are established for greenhouse gases under NEPA. Rather, in compliance with the NEPA implementing regulations, the anticipated estimates of greenhouse gas emissions are included herein for the purpose of disclosure under NEPA without expressing a judgment as to their significance.

5.3.1.2 State Regulations

California Clean Air Act
In California, the CARB is designated as the responsible agency for all air quality regulations. The CARB, which became part of the California Environmental Protection Agency (Cal/EPA) in 1991, is responsible for implementing the requirements of the federal CAA, regulating emissions from motor vehicles and consumer products, and implementing the California Clean Air Act of

1988 (CCAA). The CCAA outlines a program to attain the California Ambient Air Quality Standards (CAAQS) for O_3, NO_2, SO_2, and CO by the earliest practical date. Since the CAAQS are often more stringent than the NAAQS, attainment of these more stringent CAAQS will require more emission reductions than what will be required to show attainment of the NAAQS.

Assembly Bill (AB) 1807 – Air Toxics Program

AB 1807 established California's Air Toxics Program in 1983. The Air Toxics Program is a two-phased program for the identification and control of air toxics. During the first phase (identification), the CARB and the Office of Environmental Health Hazard Assessment (OEHHA) prepare draft reports on exposure assessment and health assessment. The draft reports are distributed for public review and comment. Comments can be made in writing or at public workshops. The report is then submitted to the independent scientific review panel (SRP), which reviews the reports for scientific accuracy and submits its findings to the CARB. The SRP is a nine-member group of professionals with backgrounds in disciplines such as medicine, atmospheric science, statistics, and toxicology. The SRP members are appointed by the Governor or the State legislature. At a public hearing, the Board decides whether to list the substance as a TAC.

Once the CARB identifies a substance as a TAC, it begins the second phase (control) of California's TAC program. In this phase, an assessment is conducted to determine the need for, and degree of, further controls. As in the identification phase, public outreach is an essential element in the development of a control plan and any control measures. The CARB works with districts and holds numerous public workshops and individual meetings with stakeholders in an open public process. If appropriate, each air toxic control measure is then adopted by the CARB at a public hearing.

AB 2588 – Air Toxics "Hot Spots" Information and Assessment Act

AB 2588, enacted in 1987, is designed to provide information to State and local agencies and to the general public on the extent of airborne emissions from stationary sources and the potential public health impact of those emissions. The "Hot Spots" Act requires that OEHHA develop risk assessment guidelines for the "Hot Spots" Program (Health and Safety Code Section 44360[b][2]). In addition, the "Hot Spots" Act specifically requires OEHHA to develop a "likelihood of risks" approach to health risk assessment. The "Hot Spots" Act requires stationary sources of TACs to prepare facility-wide health risk assessments in accordance with OEHHA guidelines, and to notify the public in the event of a potential health risk. The "Hot Spots" Act also establishes criteria for requiring implementation of risk reduction measures for high- risk facilities.

Heavy Duty Diesel Truck Idling Regulation

This CARB rule became effective February 1, 2005 and prohibits heavy-duty diesel trucks from idling for longer than five minutes at a time, unless they are queuing, provided the queue is located beyond 100 feet from any homes or schools (CARB, 2006a).

CARB Drayage Truck Regulation

This CARB rule became effective December 3, 2009. The regulation requires trucks to meet engine emission requirements by a certain date. Under Phase 1, by December 31, 2012, all trucks

must reduce PM emissions by 85 percent and must meet 2007 engine emission standards. The Drayage Truck Regulation also requires trucks to be registered in the Drayage Truck Registry.

California Diesel Fuel Regulations
In 2004, the CARB set limits on the sulfur content of diesel fuel sold in California for use in on-road and off-road motor vehicles (CARB, 2004). Under this rule, diesel fuel used in motor vehicles except harbor craft and intrastate locomotives has been limited to 500 ppm sulfur since 1993. The sulfur limit was reduced to 15 ppm beginning on September 1, 2006. Diesel fuel used in harbor craft in the Air Basin also was limited to 500 ppm sulfur starting January 1, 2006 and was lowered to 15 ppm sulfur on September 1, 2006.

Statewide Portable Equipment Registration Program (PERP)
The PERP establishes a uniform program to regulate portable engines and portable engine–driven equipment units (CARB, 2005b). Once registered in the PERP, engines and equipment units may operate throughout California without the need to obtain individual permits from local air districts, as long as the equipment is located at a single location for no more than 12 months. There may be construction equipment that would be required to be PERP registered, but there are no known operating emissions sources that would be subject to this regulation.

Heavy-Duty Diesel Truck Idling Regulation
This CARB rule affected heavy-duty diesel trucks in California beginning in 2008. The rule requires that heavy-duty trucks be equipped with a non-programmable engine system that shuts down the engine after 5 minutes to prevent long idling times or, as an alternative, meet a stringent NOX idling emission standard.

On-Road Heavy-Duty Diesel Vehicles (In Use) Regulation
On December 12, 2008, CARB approved the on-road heavy-duty diesel vehicle (in use) regulation to significantly reduce PM and NOX emissions from existing diesel vehicles operating in California. The regulation applies to nearly all diesel-fueled trucks and buses with a gross vehicle weight rating (GVWR) greater than 14,000 pounds that are privately or federally owned and for privately and publicly owned school buses.

Starting January 1, 2012, the regulation would phase-in requirements for heavier trucks to reduce PM emissions with exhaust retrofit filters that capture pollutants before they are emitted to the air or by replacing vehicles with newer vehicles that are originally equipped with PM filters. Starting on January 1, 2015, lighter trucks with a GVWR of 14,001 to 26,000 pounds with engines that are 20 years or older would need to be replaced with newer trucks. Starting January 1, 2020, all remaining trucks and buses would need to be replaced so that they would all have 2010 model year engines or equivalent emissions by 2023.

Greenhouse Gas Emissions
Responding to growing scientific and political concern regarding global climate change, California has recently adopted a series of laws to reduce the level of GHGs in the atmosphere and emissions of GHGs from commercial and private activities within the state. Assembly Bill (AB) 1493 requires the development and adoption of regulations to achieve “the maximum feasible reduction of greenhouse gases” emitted by noncommercial passenger vehicles, light-

duty trucks, and other vehicles used primarily for personal transportation. It also requires CARB to design and implement emission limits, regulations, and other measures to reduce GHG emissions to 1990 levels by 2020.

Local Regulations and Agreements

The SCAQMD is primarily responsible for planning, implementing, and enforcing federal and State ambient standards within this portion of the Air Basin. As part of its planning responsibilities SCAQMD prepares Air Quality Management Plans and Attainment Plans as necessary based on the attainment status of the air basins within its jurisdiction. The SCAQMD is also responsible for permitting and controlling stationary source criteria and air toxic pollutants as delegated by the EPA.

Through the attainment planning process, the SCAQMD develops the SCAQMD Rules and Regulations to regulate sources of air pollution in the Air Basin (SCAQMD, 2012b). The applicable SCAQMD rules to the Project are listed below.

SCAQMD Rule 401 – Visible Emissions

This rule prohibits discharge of air contaminants or other material, which are as dark or darker in shade as that designated No. 1 on the Ringelmann Chart or obscure an observer's view.

SCAQMD Rule 402 – Nuisance

This rule prohibits discharge of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public; or that endanger the comfort, repose, health, or safety of any such persons or the public; or that cause, or have a natural tendency to cause, injury or damage to business or property.

SCAQMD Rule 403 – Fugitive Dust

The purpose of this rule is to control the amount of PM entrained in the atmosphere from man-made sources of fugitive dust. Under Rule 403, no person shall conduct active operations without utilizing the applicable best available control measures to minimize fugitive dust emissions. Construction and operation fugitive dust emission sources are subject to this rule, which covers all fugitive dust emissions sources, such as unpaved and paved roads, storage piles, and earthmoving operations.

Additional requirements apply to operations on a property with 50 or more acres of disturbed surface area, or for any earth-moving operation with a daily earth-moving or throughput volume of 5,000 cy or more three times during the most recent 365-day period. These requirements include submittal of a dust control plan, maintaining dust control records, and designating a SCAQMD-certified dust control supervisor.

SCAQMD Rule 1113 – Architectural Coatings

This rule requires manufacturers, distributors, and end-users of architectural and industrial maintenance coatings to reduce VOC emissions from the use of these coatings, primarily by placing limits on the VOC content of various coating categories.

SCAQMD Regulation XI – Source Specific Standards
This regulation is composed of several dozen individual rules, most of which are not applicable to the project.

SCAQMD Regulation XIII – New Source Review
This regulation requires the permitting of new stationary sources and requires the use of BACT to control criteria pollutant emissions and requires offsetting emissions, other than CO, if they are over four tons per year.

5.3.2 Impact Significance Criteria – Air Quality Significance Thresholds

The following discussion identifies the air quality significance thresholds used to determine whether alternative impacts would be significant under NEPA and/or CEQA.

5.3.2.1 NEPA Threshold

The following impact significance criteria were used to evaluate air quality impacts associated with the project alternatives under NEPA. For purposes of this analysis, the air quality impacts of Alternatives 1, 2, 3, or 4 would be considered significant under NEPA if:

IMPACT AIR-1: Project-related emissions exceed General Conformity de minimis levels as established in 40 CFR 93.153(b).

5.3.2.2 CEQA Thresholds

The following impact significance criteria are derived from Appendix G of the CEQA Guidelines, and are the same criteria utilized by SCAQMD and are consistent with County and City General Plans included in the study area. The following significance criteria were used to evaluate air quality impacts associated with the project alternatives under CEQA. For purposes of this analysis, the air quality impacts of Alternatives 1, 2, 3, or 4 would be considered significant under CEQA if:
IMPACT AIR-2: Conflicts with or obstruct implementation of the applicable air quality plan.
IMPACT AIR-3: Violates any air quality standard, increases frequency or severity of an existing or projected air quality violation, or delays timely attainment of any standard.
IMPACT AIR-4: Results in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable national or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).
IMPACT AIR-5: Exposes sensitive receptors to substantial pollutant concentrations.
IMPACT AIR-6: Creates objectionable odors affecting a substantial number of people.

5.3.2.3 Significant Criteria Evaluation Methods

IMPACT AIR-1 was assessed by comparing the General Conformity de minimis thresholds for the Air Basin (Table 5-7) against the total direct and indirect emissions for each alternative. The EPA established the General Conformity Rule on November 30, 1993. The rule implements the

CAA conformity provision, which mandates that the Federal government not engage, support, or provide financial assistance for licensing or permitting, or approve any activity not conforming to an approved CAA implementation plan. The purpose of the General Conformity Rule was to ensure that Federal activities do not hamper local efforts to control air pollution. The total quantified emissions of nonattainment or maintenance pollutants from both direct and indirect sources is compared to rates listed in Title 40, Part 51, Section 51.853(b), considered the de minimis levels, where, if they are determined to exceed those levels, the Federal agency is required to conduct a Conformity Determination.

Since all activities are located within the South Coast Air Basin, the de minimis levels are based on attainment designations/classifications in the Air Basin. Table 5-7 shows the General Conformity de minimis levels.

IMPACT AIR-2 was assessed using the SCAQMD regional pollutant criteria pollutant emission thresholds (Table 5-5). These thresholds are based on the volume of pollution emitted rather than on actual ambient air quality because the direct air quality impact of a project is not quantifiable on a regional scale. The SCAQMD CEQA Handbook states that any project in the Air Basin with daily emissions that exceed any of the identified significance thresholds should be considered as having an individually and cumulatively significant air quality impact. For the purposes to this air quality impact analysis, a regional air quality impact would be considered significant if emissions exceed the SCAQMD significance thresholds identified in Table 5-5.

Table 5-5: SCAQMD Regional Criteria Pollutant Emission Thresholds of Significance

	Pollutant Emissions (pounds/day)						
	VOC	NOx	CO	SOx	PM10	PM2.5	Lead
Construction	75	100	550	150	150	55	3
Operation	55	55	550	150	150	55	3

Source: SQAQMD CEQA Handbook

IMPACT AIR-3 was also assessed by comparing the worst case daily emissions for each alternative to the SCAQMD daily emissions thresholds (Table 5-5). SCAQMD emissions thresholds are developed in consideration of both existing air quality conditions in the region, as well as future attainment of air quality standards. Therefore, if emissions are below the SCAQMD thresholds, emissions are not expected to increase the frequency or severity of existing or projected air quality violations, or delay timely attainment of air quality standards.

IMPACT AIR-4 was assessed in accordance with CEQA Guidelines Section 15130(b) using a three-tiered approach to assess cumulative air quality impacts, which includes.

- Consistency with the SCAQMD project specific thresholds for construction and operations;
- Project consistency with existing air quality plans; and
- Assessment of the cumulative health effects of the pollutants.

IMPACT AIR-5 was assessed using SCAQMD developed Localized Significant Thresholds (LSTs). SCAQMD has also provided Final Localized Significance Threshold Methodology (SCAQMD 2008), which details the methodology to analyze local air emission impacts. The LST Methodology found that the primary emissions of concern are NO2, CO, PM10, and PM2.5.

The significance thresholds for the local emissions of NO_2 and CO are determined by subtracting the highest background concentration from the last 3 years of these pollutants from Table 5-6 below, from the most restrictive ambient air quality standards for these pollutants that are outlined in the LSTs. Since PM10 and PM2.5 currently exceed the most restrictive ambient air quality standards in the South Coast Air Basin, their thresholds have been directly based on the LSTs, and, therefore, background concentrations of PM10 and PM2.5 are not factored into the threshold. Table 5-6 shows the LSTs for NO_2, CO, and PM10 and PM2.5.

Table 5-6: SCAQMD Localized Criteria Pollutant Thresholds of Significance

Pollutant	Averaging Time	Significance Threshold[1]
Carbon Monoxide	1-hour	20 ppm
	8-hour	9 ppm
Nitrogen Dioxide	1-hour	180 ppb
	Annual	30 ppb
PM10	24-hour – Construction	10.4 µg/m^3
	24 hour – Operation	2.5 µg/m^3
	Annual	1.0 µg/m^3
PM2.5	24-hour - Construction	10.4 µg/m^3
	24 hour – Operation	2.5 µg/m^3

Notes: [1] For CO and NO_2 the significance threshold is based on ambient plus project conditions. For PM10 and PM2.5 the significance threshold is based on project only concentrations
Source: SCAQMD;

Table 5-7: General Conformity De Minimis Levels

Criteria Pollutant	NAAQS Designation	De Minimis Levels (Tons/Year)
Ozone 1- hour (VOC or NOx)	Nonattainment (Extreme)	10
Ozone 8-hour	Nonattainment (Extreme)	10
CO	Attainment (Maintenance)	100
NO_2	Attainment (Maintenance)	100
SO_2	Attainment	100
PM_{10}	Attainment (Maintenance)	100
$PM_{2.5}$	Nonattainment (Serious)	100

IMPACT Air 6 was assessed according to the SCAQMD CEQA Handbook states that an odor impact would occur if the proposed project creates an odor nuisance pursuant to SCAQMD Rule 402, which states:

> "A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property. The provisions of this rule shall not apply to odors emanating from agricultural operations necessary for the growing of crops or the raising of fowl or animals."

If the proposed project results in a violation of Rule 402 with regards to odor impacts, then the proposed project would create a significant odor impact.

Fugitive Dust
Rule 403 governs emissions of fugitive dust during construction activities and requires that no person shall cause or allow the emissions of fugitive dust such that dust remains visible in the atmosphere beyond the property line or the dust emission exceeds 20 percent opacity, if the dust is from the operation of a motorized vehicle. Compliance with this rule is achieved through application of standard Best Available Control Measures, which include but are not limited to the measures below. Compliance with these rules would reduce local air quality impacts to nearby sensitive receptors.

5.3.2.4 CEQA Greenhouse Gas Significance Thresholds

The proposed project is located within the jurisdiction of the SCAQMD. In order to identify significance criteria under CEQA for development projects, SCAQMD initiated a Working Group, which provided detailed methodology for evaluating significance under CEQA. At the September 28, 2010 Working Group meeting, the SCAQMD released its most current version of the draft GHG emissions thresholds, which recommends a tiered approach that provides a quantitative annual threshold of 3,000 $MTCO_2e$ for all land use projects. Although the SCAQMD provided substantial evidence supporting the use of the above threshold, as of May 2017, the SCAQMD Board has not yet considered or approved the Working Group's thresholds. Originally SCAQMD had stated that they were waiting to approve the Working Group's thresholds dependent on the outcome of the State Supreme Court decision of the California Building Industry Association v. Bay Area Air Quality Management District (BAAQMD), which was filed on December 17, 2015. However, since that court decision has been decided for some time now, the most likely time for the SCAQMD Board to consider the Working Group thresholds will be in combination with the consideration of the updated CEQA Air Quality Handbook that is currently being revised by SCAQMD staff. In order to provide a conservative analysis, the Working Group's draft thresholds have been utilized. Therefore, the proposed project would be considered to create a significant cumulative GHG impact if the proposed project would exceed the annual threshold of 3,000 $MTCO_2e$.

For the purpose of this analysis, the GHG emissions of Alternatives 1, 2, 3, or 4 would be considered significant under CEQA if the alternative would:

- GHG-1: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.
- GHG-2: Conflict with any applicable plan, policy or regulation of an agency for the purpose of reducing the emission of greenhouse gases.

5.3.3 Environmental Commitments

Implementation of the environmental commitments provided below would reduce, to the extent feasible, the air quality impacts associated with all alternatives (except for the no action alternative).

EC-AIR-1: All off-road diesel-powered equipment that is greater than 50 horsepower and utilized during construction and the operation and maintenance of the Proposed Action,

Alternative 3, and Alternative 4, will be registered with ARB and labelled detailing that the equipment meets Tier 4 Final emissions standards.

EC-AIR-2: All haul trucks utilized during construction and operation and maintenance of the Proposed Action, Alternative, 3 and Alternative 4 will be licensed in California and will meet the model year 2010 (Tier 4 Final) or newer emissions standards.

EC-AIR-3: These mitigation measures can reduce PM_{10} and $PM_{2.5}$ emissions up to 50 percent. BMPs for controlling fugitive dust and pollutant emissions include the following techniques:

- Water active construction sites to reduce fugitive dust, including locations where grading is to occur;
- All trucks hauling dirt, sand, soil, or other loose materials are to be covered or should maintain at least two feet of freeboard, according to the requirements of California Vehicle Code (CVC) 7 Section 23114;
- During construction, the off-road equipment, vehicles, and trucks shall not idle more than five minutes in any one hour;
- The off-road construction equipment drivers shall have proper training in operating the equipment 11 efficiently, taking into account ways to reduce the hours of equipment operation and/or operating 12 the equipment at a lower load factor;
- Pave construction access roads at least 100 feet onto the site from main road; and
- Reduce construction traffic speeds to 15 mph or less on unpaved surfaces.

Impact Methodology and Assumptions

This section provides an overview of the impact methodology and assumptions. The air impacts discussion provided below focuses on the total emissions for each alternative, rather than the impacts of individual measures, which are analyzed in the Air Quality Report (See Appendix H).

Construction Equipment

All off-road diesel-powered equipment that is greater than 50 horsepower and utilized during construction and operation of the project will be registered with ARB and labelled detailing that the equipment meets Tier 4 Final emissions standards.

All haul trucks utilized during construction and operation of the project will be licensed in California and will meet the model year 2010 (Tier 4 Final) or newer emissions standards.

CalEEMod Model

The regional criteria air pollution and GHG emissions impacts created by the proposed project's off-road equipment and on-road staff and haul truck have been analyzed through use of CalEEMod Version 2016.3.1. CalEEMod is a computer model published by the SCAQMD for estimating air pollutant emissions. The CalEEMod program uses the EMFAC2014 computer program to calculate the emission rates specific for the South Coast Air Basin for construction-related employee, vendor and haul truck vehicle trips and the OFFROAD2011 computer program to calculate emission rates for heavy equipment operations. EMFAC2014 and OFFROAD2011 are computer programs generated by CARB that calculates composite emission rates for vehicles. Emission rates are reported by the program in grams per trip and grams per mile or grams per running hour.

Off-Road Equipment

Since the proposed project consists of three alternatives that would utilize off-road equipment and the initial construction activities would occur over five years and periodic maintenance occurring for 45 years thereafter with several different combinations of off-road equipment, the CalEEMod model was utilized to calculate each piece of off-road equipment individually. For each piece of off-road equipment, the CalEEMod model was set to one acre of User Defined Industrial with a six-year grading period from 2021 to 2027. The grading phase construction equipment was set to the piece of off-road equipment being analyzed with the horsepower provided by the applicant and set to one hour of operation in order to calculate hourly emission rates for each piece of equipment. The application of water exposed areas three times per day was selected to account for the SCAQMD Rule 403 minimum requirements that requires watering of all exposed areas during earthmoving activities. The CalEEMod model runs were performed for each piece of off-road equipment with the use of Tier 4 engines incorporated into the project. The model runs are provided in Appendix A of the Air Quality Report.

The hourly CalEEMod model emission rates calculated for each piece of off-road equipment was then entered into a spreadsheet sheet, where daily and annual emissions were calculated for each Alternative through multiplying the maximum daily or annual hours by each piece of off-road equipment's emission rates for VOC, NOx, CO, SO_2, PM10, PM2.5, CO_2, CH_4, and CO_2e. The spreadsheet calculations for Alternative 2 is provided in Appendix B, for Alternative 3 is provided in Appendix C, and for Alternative 4 is provided in Appendix D of the Air Quality Report.

On-Road Staff and Haul Truck Trips

The on-road staff and haul truck trips criteria air pollution and GHG emissions impacts created by the proposed project have also been analyzed through use of the CalEEMod model and the EMFAC 2014 model. The CalEEMod model calculates on-road emissions from vehicle start-up, running and idling exhaust, tire and brake ware, and road dust, so it provides more comprehensive emission modeling than what would occur from utilizing the EMFAC2014 model directly.

The staff or worker trips were analyzed through use of the same CalEEMod model runs performed for the off-road equipment (see Appendices A and B) with the worker trips under the Construction tab set to one worker trip per day and the distance was set to 10 miles in length. The calculated worker trips emissions were multiplied by 1.5 in order to obtain the emissions from one worker trip that is an average length of 15 miles as detailed in the Traffic Impact Analysis (Kunzman Associates, 2018).

The haul truck trips were analyzed with separate CalEEMod model runs for years 2021 through 2026. The haul truck trip model runs utilized the same land use parameters at the off-road equipment model runs, with the operational mobile daily trips set to 1 trip per day and a trip length of 14.8 miles which is the shortest haul truck trip listed in the Traffic Impact Analysis (Kunzman Associates, 2018). The Fleet Mix was also changed to 100 percent Heavy-Heavy Duty (HHD) truck classification.

The CalEEMod model emission rates calculated for both the worker trips and haul truck trips was then entered into a spreadsheet sheet, where the unmitigated daily and annual emissions for VOC, NOx, CO, SO_2, PM10, PM2.5, CO_2, CH_4, and CO_2e were calculated for each Alternative through multiplying the emission rates by the maximum worker and haul truck miles driven for daily and annual conditions.

In order to calculate the haul truck trip emissions with the incorporation of Tier 4 engines, the EMFAC2014 model was run for Heavy-Heavy Duty (HHD) model trucks in Southern California traveling at 40 miles per hour, which are the same parameters utilized in the CalEEMod model. However, the EMFAC2014 model run was limited to the 2010 to 2021 HHD truck model years that were averaged together in order to calculate the emission rates in grams per second for HHD trucks with the incorporation of Tier 4 engines into the project. The EMFAC 2014 model run is provided in Appendix G of the Air Quality Report.

The emissions with the incorporation of Tier 4 Engines were then calculated through re-running the haul truck CalEEMod model runs with the summer and winter running emission factors for CH_4, CO, CO_2, NOx, PM10, PM2.5, ROG, and SO_2 revised to the calculated running emission rates from the EMFAC2014 model run. The CalEEMod model runs for the haul truck trips is provided in Appendix H of the Air Quality Report.

AERMOD Model

The TAC and criteria pollutant dispersion modeling utilized in this analysis has been based on the recommended methodology provided by the SCAQMD (2003) and OEHHA (2015). Since most of the proposed project's activities would occur greater than a quarter mile from sensitive receptors, the dispersion modeling has been limited to the SARM Upstream Focal Area from the River Road Bridge to the Sediment Trap. This area was chosen since it is the location where diesel equipment would operate in the closest proximity to residential uses that are located as near as 220 feet from the proposed diesel equipment operations.

TAC Emissions Assumptions

Construction of the proposed project would require the use of diesel-powered construction equipment, which is a known source of TAC emissions. The equipment operating in the local study area would include: (1) Sediment Management Channel Trap (SU-1A); (2) Invasive Plant Management (SU-2); Riparian Edge Habitat Management (SU-3); (3) Feral Pig Management (SU-4); (4) In Stream Habitat Management (SU-5); (5) Non-Native Aquatic Species Management (SU-6); and (6) Cow Bird Trapping (SU-7). The maximum daily and annual hourly emissions for each piece of equipment that would operate in the local study area is shown in Table 5-8 for the average of combined years 1 and 2 and the combined years 3 to 30 (the years were combined in order to calculated the cancer risks based on age-sensitivity factors).

Table 5-8: Local Study Area Off-Road Equipment Hours of Operation

Off-Road Equipment	Combined Years 1 and 2 Hours		Combined Years 3 to 30 Hours[1]	
	Maximum Daily	Annual Average	Maximum Daily	Annual Average
Pickup Truck	43.1	7,348.0	43.1	5,235.2
Water Truck	31.3	5,100.0	31.3	4,075.2
Backhoe Loader	9.0	2,136.0	9.0	1,077.6
Wheel Loader (5 yard)	21.3	4,272.0	25.2	5,707.1
All Terrain Forklift	7.4	160.0	7.4	309.3
Tub Grinder or Chipper	12.5	1,132.0	12.5	317.1
Tracked Skid Loader	23.2	3,156.0	23.2	2,225.7
Tracked Excavator	39.4	7,260.0	41.8	7,808.1
Bulldozer	24.3	4,368.0	24.3	3,057.5
Scraper (25 cubic yard)	58.1	7,577.2	58.1	4,781.9
Compactor (Pad Foot)	14.7	2,160.0	14.7	648.0
Motor Grader	7.4	1,920.0	7.4	1,920.0
Ag Tractor Mower	4.8	516.0	4.8	325.6
Welder/Service/Lube Truck	10.3	2,016.0	10.3	1,926.4
Crane	5.9	256.0	5.9	264.5
Dredges	3.1	101.9	17.9	1,237.5
Booster Pumps	40.3	1,313.6	53.7	3,779.6
Utility Boat (Gas Engine)	7.4	240.0	7.4	912.0
[1] Although the project duration is 50 years, the OEHHA Guidelines recommend the cancer risk at residential uses over a 30- year period, which was utilized in this analysis.				
The equipment hours were multiplied by the mitigated CalEEMod model off-road equipment rates provided in Appendix A. This resulted in average daily PM10 exhaust emission rates of 0.30 pounds per day for the combined years and 1 and 2 and 0.31 pounds per day for the combined years 3 to 30.				
The off-road equipment PM10 exhaust emissions were analyzed in the AERMOD model as a 1,420,758 square meter (351 acre) area source with a release height of 13 feet, and an initial vertical dimension of the plume of 39 feet. The emission rate was calculated by converting the 0.30 and 0.31 pound per day to grams per second based on a 9-hour workday (7 a.m. to 3 p.m.) and then dividing by 1,420,758 square meters, which results in emission rates of 2.94E-09 grams per second for years 1 and 2 and 3.06E-09 grams per second for years 3 to 30. Figure 3 shows the location of the area source.				

Localized Pollutant Criteria

Implementation of the proposed project would require the use of diesel-powered construction equipment, which emits NOx, CO PM10 and PM2.5. In addition, the moving of dirt and vehicles driving on dirt roads would create fugitive dust emissions that consist of PM10 and PM2.5. The maximum daily criteria pollutant emission rates were calculated for the worst-case year of the proposed project that were obtained through utilization of the same methodology detailed above for the TAC emissions calculations. This resulted in maximum daily emission rates of 33.28 pounds of NOx, 237.27 pounds of CO, 14.26 pounds of PM10 and 8.18 pounds of PM2.5.

The localized criteria pollutants were analyzed in the AERMOD model based on the same area source parameters detailed above the TAC emissions analysis that resulted in emission rates of 3.28E-07 grams per second for NOx, 2.34E-06 grams per second for CO, 1.41E-07 grams per second for PM10, and 8.07E-08 grams per second for PM2.5.

Diesel Particulate Matter

According to *The California Almanac of Emissions and Air Quality 2013 Edition*, the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important of which is diesel particulate matter (DPM). DPM is a subset of PM2.5 because the size of diesel particles are typically 2.5 microns and smaller. The identification of DPM as a TAC in 1998 led the California Air Resources Board (CARB) to adopt the Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-fueled Engines and Vehicles in September

2000. The plan's goals are a 75-percent reduction in DPM by 2010 and an 85-percent reduction by 2020 from the 2000 baseline. Diesel engines emit a complex mixture of air pollutants, composed of gaseous and solid material. The visible emissions in diesel exhaust are known as particulate matter or PM, which includes carbon particles or "soot." Diesel exhaust also contains a variety of harmful gases and over 40 other cancer-causing substances. California's identification of DPM as a toxic air contaminant was based on its potential to cause cancer, premature deaths, and other health problems. Exposure to DPM is a health hazard, particularly to children whose lungs are still developing and the elderly who may have other serious health problems. Overall, diesel engine emissions are responsible for the majority of California's potential airborne cancer risk from combustion sources. The various pollutants within DPM that also cause acute and chronic health impacts are detailed below.

Asbestos

Asbestos is listed as a TAC by CARB and as a Hazardous Air Pollutant by the EPA. Asbestos occurs naturally in mineral formations and crushing or breaking these rocks, through construction or other means, can release asbestiform fibers into the air. Asbestos emissions can result from the sale or use of asbestos-containing materials, road surfacing with such materials, grading activities, and surface mining. The risk of disease is dependent upon the intensity and duration of exposure. When inhaled, asbestos fibers may remain in the lungs and with time may be linked to such diseases as asbestosis, lung cancer, and mesothelioma. The nearest likely locations of naturally occurring asbestos, as identified in the *General Location Guide for Ultramafic Rocks in California*, prepared by the California Division of Mines and Geology, is located in Santa Barbara County. The nearest historic asbestos mine to the project site, as identified in the *Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in California*, prepared by U.S. Geological Survey, is located at Asbestos Mountain, which is approximately 70 miles southeast of the project study area in the San Jacinto Mountains. Due to the distance to the nearest natural occurrences of asbestos, the project site is not likely to contain asbestos.

Adaptive Management Assumptions

Monitoring and Adaptive Management Plan (MAMP) activities would be required for several of the ecosystem restoration measures under each alternative. The purpose of the MAMP is to provide a systematic approach for improving resource management outcomes and achieving success criteria, and to provide a structured process for recommending decisions. Specific actions in the MAMP that could result in impacts to air quality include adjustments to methods, quantities, locations and timing of sediment removal and re-entrainment activities; minor adjustments to gradient, channel dimensions and plantings at Chino Creek; the importation and placement of substrates or re-positioning of in-stream habitat features to correct in-stream deficiencies; the removal of invasive vegetation; adjustments to cowbird control and fish removal methods, level of effort, and/or trap locations; and the replanting and temporary irrigation of failed vegetation. For the purpose of this analysis, it is assumed that the types and number of construction equipment and support vehicles that would be required to carry out MAMP activities are adequately captured in the estimates generated for construction, operation and maintenance of all the proposed features.

5.3.4 Air Quality Impacts

5.3.4.1 **IMPACT AIR-1**: Project-related emissions exceed General Conformity de minimis levels as established in 40 CFR 93.153(b).

Air Quality Impacts NEPA

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative neither the Water Conservation Plan nor any ecosystem restoration measures would be implemented. There would be no construction or operation air emissions that could have the potential to exceed the Federal General Conformity Rule.

ALTERNATIVE 2: PROPOSED ACTION

Direct Impacts

For the purposes of this air quality analysis, direct impacts would be those that would occur at the Project site. On-site construction activities that would be associated with Alternative 2 would require the use of off-road construction equipment (such as backhoes, loaders, and excavators etc.) that would produce fuel combustion exhaust emissions. In addition, on-site demolition, excavation, and other construction activities would cause particulate matter in the form of wind-blown dust to be entrained into the atmosphere, also referred to as "fugitive dust." Fugitive dust includes not only PM10 and PM2.5, but also larger particles that can present or result in a nuisance impact.

Indirect Impacts

The proposed construction activities under Alternative 2 would generate off-site indirect emissions of VOC, NOx, CO, PM10, and PM2.5 from on-road vehicles associated with debris and material hauling as well as worker commute trips.

The worst-case summer or winter daily regional annual criteria pollutants for the Proposed Action are shown in Table 5-9. Results show that combined direct and indirect emissions would be within the General Conformity *de minimis* levels. Therefore, preparation of a General Conformity Determination would not be required for the implementation of the Proposed Action.

Table 5-9: Alternative 2 Regional Annual Criteria Pollutant Emissions

Pollutant Emissions (Tons/year)						
Activity	**VOC**	**NOx**	**CO**	**SO_2**	**PM10**	**PM2.5**
CONSTRUCTION						
Year 1 (2021)						
On-Site[1]	0.38	1.67	14.48	0.03	1.29	0.73
Off-Site[2]	0.23	1.91	1.85	0.01	0.59	0.16
Year 1 Total	0.62	3.57	16.33	0.04	1.87	0.89
Year 2 (2022)						
On-Site	0.51	2.46	19.47	0.04	1.68	0.95
Off-Site	0.61	4.10	4.88	0.03	1.65	0.45
Year 2 Total	1.12	6.56	24.35	0.07	3.33	1.40
Year 3 (2023)						
On-Site	0.57	4.06	22.33	0.05	1.98	1.13

Pollutant Emissions (Tons/year)						
Activity	**VOC**	**NOx**	**CO**	**SO_2**	**PM10**	**PM2.5**
Off-Site	0.19	1.92	1.48	0.01	0.57	0.16
Year 3 Total	0.75	5.97	23.81	0.06	2.56	1.28
Year 4 (2024)						
On-Site	0.45	3.53	17.79	0.04	1.50	0.85
Off-Site	0.32	2.14	2.56	0.02	0.99	0.27
Year 4 Total	0.77	5.66	20.35	0.05	2.50	1.13
Year 5 (2025)						
On-Site	0.44	3.49	17.50	0.04	1.56	0.89
Off-Site	0.25	2.18	1.97	0.02	0.83	0.23
Year 5 Total	0.69	5.67	19.47	0.05	2.39	1.11
OPERATION/MAINTENANCE						
Years 6 - 50 (2026+)						
On-Site	0.38	3.24	15.27	0.03	1.38	0.78
Off-Site	0.22	1.95	1.45	0.01	0.69	0.19
Years 6 - 50 Total	0.60	5.19	16.72	0.05	2.07	0.97
***De minimis level*[3]**	**10**	**10**	**100**	**100**	**100**	**100**
Significant?	No	No	No	No	No	No

Notes: Bold and Underlined represent a significant impact
[1] Onsite emissions from equipment not operated on public roads.
[2] Offsite emissions from vehicles operating on public roads.
[3] General conformity *de minimis levels*

Level of Impact for Alternative 2

Under NEPA Less than Significant impact. Construction, operation, maintenance, and adaptive management activities would not result in Project-related emissions exceed General Conformity de minimis levels as established in 40 CFR 93.153(b.)

ALTERNATIVE 3

The worst-case summer or winter daily regional annual onsite direct and offsite indirect criteria pollutants generated from Alternative 3 are shown in Table 5-10. Table 5-10 shows that no General Conformity *de minimis* thresholds would be exceeded for Alternative 3 and that the preparation of a General Conformity Determination would not be required.

Table 5-10: Alternative 3 Regional Annual Criteria Pollutant Emissions

Pollutant Emissions (Tons/year)						
Activity	**VOC**	**NOx**	**CO**	**SO_2**	**PM10**	**PM2.5**
CONSTRUCTION						
Year 1 (2021)						
On-Site[1]	0.53	4.80	3.00	0.01	1.61	0.96
Off-Site[2]	0.19	0.63	1.60	0.01	0.46	0.13
Year 1 Total	0.73	5.43	4.60	0.01	2.07	1.08
Year 2 (2022)						
On-Site	0.36	3.24	2.54	0.01	1.55	0.90
Off-Site	0.29	0.73	2.38	0.01	0.74	0.20
Total	0.65	3.98	4.92	0.02	2.29	1.10
Year 3 (2023)						
On-Site	0.43	3.86	3.14	0.01	3.22	1.83
Off-Site	0.33	1.16	2.80	0.01	0.93	0.25
Year 3 Total	0.77	5.02	5.94	0.02	4.15	2.08
Year 4 (2024)						
On-Site	0.24	1.95	1.77	0.01	1.19	0.68
Off-Site	0.27	0.56	2.22	0.01	0.79	0.22
Year 4 Total	0.51	2.51	3.99	0.01	1.99	0.90

Pollutant Emissions (Tons/year)						
Activity	**VOC**	**NOx**	**CO**	**SO_2**	**PM10**	**PM2.5**
Year 5 (2025)						
On-Site	0.08	0.34	3.01	0.01	0.26	0.15
Off-Site	0.20	0.77	1.65	0.01	0.62	0.17
Year 5 Total	0.28	1.10	4.66	0.01	0.88	0.31
OPERATIONMAINTENANCE						
Years 6 - 50 (2026+)						
On-Site	0.07	0.57	0.55	0.00	0.45	0.26
Off-Site	0.16	0.65	1.09	0.01	0.47	0.13
Years 6 - 50 Total	0.23	1.22	1.64	0.01	0.92	0.38
***De minimis level*[3]**	**10**	**10**	**100**	**100**	**100**	**100**
Significant?	No	No	No	No	No	No

Notes: Bold and Underlined represent a significant impact
[1] Onsite emissions from equipment not operated on public roads.
[2] Offsite emissions from vehicles operating on public roads.
[3] General conformity *de minimis levels*

Level of Impact for Alternative 3
Under NEPA Less than Significant impact. Construction and long-term operation and maintenance would not result in Project-related emissions exceed General Conformity de minimis levels as established in 40 CFR 93.153(b.)

ALTERNATIVE 4

The worst-case summer or winter daily regional annual onsite direct and offsite criteria pollutants generated from Alternative 4 are shown in Table 5-11. Table 5-11 shows that all emissions would be within the General Conformity *de minimis* levels. Therefore, preparation of a General Conformity Determination would not be required.

Table 5-11: Alternative 4 Daily Regional Criteria Pollutant Emissions

Pollutant Emissions (Tons/year)						
Activity	**VOC**	**NOx**	**CO**	**SO_2**	**PM10**	**PM2.5**
CONSTRUCTION						
Year 1 (2021)						
On-Site[1]	0.39	1.71	14.87	0.03	1.29	0.73
Off-Site[2]	0.24	1.92	1.86	0.01	0.59	0.16
Year 1 Total	0.63	3.63	16.73	0.04	1.88	0.89
Year 2 (2022)						
On-Site	0.55	2.64	21.36	0.05	1.80	1.02
Off-Site	0.58	6.33	4.50	0.04	1.60	0.44
Total	1.13	8.97	25.86	0.08	3.40	1.46
Year 3 (2023)						
On-Site	0.58	4.11	22.76	0.05	1.99	1.13
Off-Site	0.19	1.99	1.50	0.01	0.58	0.16
Year 3 Total	0.77	6.09	24.26	0.06	2.58	1.29
Year 4 (2024)						
On-Site	0.46	3.58	18.21	0.04	1.51	0.86
Off-Site	0.33	2.14	2.57	0.02	1.00	0.27
Year 4 Total	0.78	5.72	20.79	0.05	2.51	1.13
Year 5 (2025)						
On-Site	0.45	3.54	17.93	0.04	1.57	0.89
Off-Site	0.26	2.19	1.98	0.02	0.83	0.01
Year 5 Total	0.71	5.73	19.91	0.05	2.39	0.90
OPERATION/MAINTENANCE						

Pollutant Emissions (Tons/year)						
Activity	**VOC**	**NOx**	**CO**	**SO_2**	**PM10**	**PM2.5**
Years 6 - 50 (2026+)						
On-Site	0.39	3.27	15.48	0.03	1.39	0.79
Off-Site	0.22	1.99	1.46	0.01	0.70	0.19
Years 6 - 50 Total	0.60	5.26	16.94	0.05	2.08	0.98
***De minimis level*[3]**	**10**	**10**	**100**	**100**	**100**	**100**
Significant?	No	No	No	No	No	No

Notes: Bold and Underlined represent a significant impact
[1] Onsite emissions from equipment not operated on public roads.
[2] Offsite emissions from vehicles operating on public roads.
[3] General conformity *de minimis levels*

Level of Impact for Alternative 4
Under NEPA Less than Significant impact. Construction, operation, maintenance, and adaptive management activities would not result in Project-related emissions exceed General Conformity de minimis levels as established in 40 CFR 93.153(b.)

5.3.4.2 **IMPACT AIR-2**: Would the project conflict with or obstruct implementation of the applicable air quality plan?

Air Quality Impact Under CEQA

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative neither the Water Conservation Plan nor any ecosystem restoration measures would be implemented. No conflicts with air quality plans would occur.

ALTERNATIVE 2, ALTERNATIVE 3, AND ALTERNATIVE 4

CEQA requires a discussion of any inconsistencies between a project's activities and applicable local government General Plans and regional plans. The regional plan that would apply to Alternative 2, Alternative 3 and Alternative 4 would be the SCAQMD AQMP.

Direct Impacts
A direct significant air quality impact may occur if a project is not consistent with the applicable AQMP or would in some way obstruct the implementation of the policies or attainment of the goals of that plan. Therefore, this section discusses any potential inconsistencies of Alternative 2 with the AQMP and whether Alternative 2 would interfere with the region's ability to comply with Federal and State air quality standards.

The SCAQMD CEQA Handbook identifies two key indicators of consistency:
1. Whether the project will result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violation or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP. These are the same as the Federal consistency tests.
2. Whether the project will exceed the assumptions in the AQMP or increments based on the year of project buildout and phase.

Criterion 1: Increase in the Frequency or Severity of Violations
As shown in Table 5-9 and 5-11, regional onsite direct air emissions from Alternative 2 and Alternative 4 would not result in significant NOx, impacts based on SCAQMD regional thresholds of significance. However, when combined with offsite indirect emissions Alternatives 2 and 4 would exceed SCAQMD regional thresholds of significance for NOx. Since no additional feasible mitigation would be available to reduce NOx emissions to less than significant levels, implementation of Alternative 2 and Alternative 4 would have the potential to result in increasing the frequency or severity of air quality violations within the Air Basin. As shown in Table 5-10, implementation of Alternative 3 would not exceed SCAQMD's NOX emission construction thresholds. Therefore, Alternative 3 would be consistent with the first criterion and impacts on Alternative 2 and Alternative 4 would be significant.

Indirect Impacts
Under Alternative 2, Alternative 3 and Alternative 4, the offsite indirect emissions would not be high enough to result in an exceedance of SCAQMD's NOX emission construction thresholds.

Long-Term Operation and Maintenance Impacts
Under Alternative 2 and Alternative 4, the combined onsite direct emissions and offsite indirect emissions associated with long-term operation, maintenance, and adaptive management activities would not be high enough to result in an exceedance of SCAQMD's NOX emission operational thresholds. Therefore, long-term air quality impacts would be consistent with the first criterion.

Criterion 2: Exceed Assumptions in the AQMP
Consistency with the AQMP assumptions is determined by performing an analysis of a project activity with the assumptions in the AQMP. The emphasis of this criterion is to ensure the analyses conducted for project activities are based on the same forecasts as the AQMP. The AQMP is developed through use of the planning forecasts provided in regional transportation and land use planning documents. Local governments are required to use these plans as the basis of their plans for consistency with applicable regional plans under CEQA. The proposed project alternatives are located within areas designated as Open Space. Since, water conservation, sediment management, and ecosystem restoration measures are consistent with uses within lands designated as Open Space, the proposed project alternatives would be consistent with the current land use designations and would not require a General Plan Amendment or zone change. As such, the all of the proposed alternatives would not be anticipated to exceed the AQMP assumptions for the study area and would be found to be consistent with the AQMP for the second criterion. Based on the above criteria Alternative 3 would be consistent with the SCAQMD AQMP and Alternative 2 and Alternative 4 would result in an inconsistency with the SCAQMD AQMP.

Levels of Impact for Alternatives 2, 3 and 4
Significant Impact of Alternative 2 and Alternative 4. Under CEQA, Alternative 2 and Alternative 4 construction, operation, maintenance, and adaptive management activities would conflict with or obstruct implementation of the applicable air quality plan.
Less than Significant Impact of Alternative 3. Under CEQA, Alternative 3 construction, operation, maintenance, and adaptive management activities would not conflict with or obstruct implementation of the applicable air quality plan.

5.3.4.3 **IMPACT-AIR 3:** Would the project violate any air quality standard, increase frequency or severity of an existing or projected air quality violation, or delay timely attainment of any standard.

Air Quality Impact Under CEQA

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative none of the proposed ecosystem restoration measures would not be implemented. State or Federal regional air quality standards would not be exceeded.

ALTERNATIVE 2: PROPOSED PROJECT

Direct Impacts
PM10 and PM2.5 are among the pollutants of greatest localized concern with respect to on-site activities. Particulate emissions from restoration and construction activities can lead to adverse health effects and nuisance concerns, such as reduced visibility and soiling of exposed surfaces. Particulate emissions can result from a variety of activities, including restoration-related excavation, grading, vehicle travel on paved and unpaved surfaces, and vehicle and equipment exhaust.

Emissions of ozone precursors ROG and NO_X primarily are generated from mobile sources and vary as a function of vehicle trips per day associated with delivery of materials and worker commute trips, and the types and number of heavy-duty, off-road equipment used, and the intensity and frequency of their operation.

The worst-case summer or winter daily criteria pollution emissions that would be emitted from implementation of Alternative 2, for each year of activities is shown in Table 5-12. Table 5-12 shows that NOx emissions would exceed both the SCAQMD's construction thresholds for every year that Alternative 2 activities would occur.

Indirect Impacts
The proposed restoration activities under Alternative 2 would generate indirect emissions of VOC, NOx, CO, PM10, and PM2.5 associated with off-site debris and material hauling and worker commute trips. As shown in Table 5-12 off-site indirect emissions (i.e., indirect emissions) during construction years would not exceed the SCAQMD thresholds. However, when combined with onsite direct emissions, Alternative 2 would exceed the NOx threshold.

Long-Term Operation and Maintenance Impacts
As shown in Table 5-12 long-term operation, maintenance, and adaptive management activities would exceed the NOx threshold.

Table 5-12: Alternative 2 Daily Regional Criteria Pollutant Emissions

Pollutant Emissions (pounds/day)						
Activity	**VOC**	**NOx**	**CO**	**SO_2**	**PM10**	**PM2.5**
Construction						

Year 1 (2021)						
On-Site[1]	4.66	20.17	174.73	0.38	11.24	6.44
Off-Site[2]	2.64	19.44	21.00	0.12	6.60	1.81
Year 1 Total	7.29	39.60	195.74	0.50	17.84	8.26
Year 2 (2022)						
On-Site	7.74	41.33	300.75	0.63	21.68	12.36
Off-Site	7.26	56.28	57.80	0.36	19.75	5.42
Total	15.01	97.60	358.56	0.99	41.43	17.78
Year 3 (2023)						
On-Site	8.36	79.07	342.63	0.70	22.98	13.18
Off-Site	2.00	15.18	15.88	0.11	5.93	1.63
Year 3 Total	10.36	94.25	358.50	0.81	28.91	14.81
Year 4 (2024)						
On-Site	6.15	68.96	258.23	0.51	13.70	7.95
Off-Site	4.00	25.91	31.62	0.20	12.24	3.35
Year 4 Total	10.15	94.87	289.85	0.72	25.94	11.31
Year 5 (2025)						
On-Site	6.25	69.37	261.92	0.52	14.50	8.40
Off-Site	3.31	31.65	25.57	0.22	10.86	2.99
Year 5 Total	9.56	**101.03**	287.48	0.74	25.35	11.39
SCAQMD Construction Thresholds	**75**	**100**	**550**	**150**	**150**	**55**
Exceeds Construction Thresholds?	No	**Yes**	No	No	No	No
MAINTENANCE/OPERATION						
Years 6 - 50 (2026+)						
On-Site	5.44	65.90	231.06	0.46	11.71	6.82
Off-Site	2.38	28.50	16.24	0.18	7.84	2.17
Years 6 - 50 Total	7.83	**94.40**	247.30	0.64	19.55	8.99
SCAQMD Operational Thresholds	**55**	**55**	**550**	**150**	**150**	**55**
Exceeds Thresholds?	No	**Yes**	No	No	No	No

Notes: Bold and Underlined represent a significant impact
[1] Onsite emissions from equipment not operated on public roads.
[2] Offsite emissions from vehicles operating on public roads.

Level of Impact for Alternative 2

Significant impact. Under CEQA, construction and long-term operation and maintenance activities would violate air quality standards, increase frequency or severity of an existing or projected air quality violation, or delay timely attainment of standards.

ALTERNATIVE 3

Direct Impacts

The worst-case summer or winter daily criteria pollution onsite direct emissions that would be emitted from implementation of Alternative 3, for each year of activities are shown below in Table 5-13. Table 5-13 shows that, none of the onsite direct criteria pollutants would exceed the SCAQMD's daily construction emissions thresholds.

Indirect Impacts

Table 5-13 shows that, none of the offsite indirect criteria pollutants would exceed the SCAQMD's daily construction emissions thresholds.

Long-Term Operation and Maintenance Impacts

Table 5-13 shows that, none of the criteria pollutants generated from long-term operation, maintenance, and adaptive management activities would not exceed the SCAQMD's daily construction emissions thresholds.

Level of Impact for Alternative 3

Less than significant impact. Under CEQA, construction and long-term operation and maintenance activities would not violate air quality standards, increase frequency or severity of an existing or projected air quality violation, or delay timely attainment of standards.

Table 5-13: Alternative 3 Daily Regional Criteria Pollutant Emissions

Pollutant Emissions (pounds/day)						
Activity	**VOC**	**NOx**	**CO**	**SO_2**	**PM10**	**PM2.5**
Construction						
Year 1 (2021)						
On-Site[1]	2.46	10.64	92.70	0.20	8.77	4.96
Off-Site[2]	2.15	4.23	17.85	0.06	5.22	1.41
Year 1 Total	4.60	14.87	110.55	0.26	14.00	6.38
Year 2 (2022)						
On-Site	9.65	41.79	370.30	0.79	27.18	15.48
Off-Site	3.22	5.51	26.45	0.09	8.36	2.26
Total	12.87	47.30	396.76	0.88	35.53	17.74
Year 3 (2023)						
On-Site	11.02	47.73	425.98	0.90	59.17	33.14
Off-Site	3.88	10.01	31.35	0.13	10.90	2.96
Year 3 Total	14.90	57.74	457.34	1.03	70.07	36.10
Year 4 (2024)						
On-Site	5.28	22.88	203.86	0.43	19.22	10.86
Off-Site	3.46	9.90	27.61	0.12	10.25	2.79
Year 4 Total	8.74	32.78	231.47	0.56	29.47	13.64
Year 5 (2025)						
On-Site	6.42	27.81	246.87	0.52	25.13	14.17
Off-Site	2.73	16.49	21.27	0.14	8.73	2.39
Year 5 Total	9.16	44.30	268.14	0.67	33.86	16.56
SCAQMD Construction Thresholds	**75**	**100**	**550**	**150**	**150**	**55**
Exceeds Construction Thresholds?	No	No	No	No	No	No
MAINTENANCE/OPERATIONS						
Years 6 - 50 (2026+)						
On-Site	2.91	12.62	112.07	0.24	13.75	7.72
Off-Site	1.83	14.26	12.23	0.10	5.79	1.59
Years 6 - 50 Total	2.91	12.62	112.07	0.24	13.75	7.72
SCAQMD Operational Thresholds	**55**	**55**	**550**	**150**	**150**	**55**
Exceeds Operational Thresholds?	No	No	No	No	No	No

Notes: Bold and Underlined represent a significant impact
[1] Onsite emissions from equipment not operated on public roads.
[2] Offsite emissions from vehicles operating on public roads.

ALTERNATIVE 4

Direct Impacts

The worst-case summer or winter daily criteria pollution onsite direct emissions that would be emitted from implementation of Alternative 4, for each year of activities are shown in Table 5-14. Table 5-14 shows that onsite direct NOx emissions would exceed both the SCAQMD's daily

construction thresholds for every year that Alternative 4 activities would occur. Under CEQA this would be considered a significant impact.

Indirect Impacts

As shown in Table 5-14 off-site indirect emissions (i.e., indirect emissions) during construction years would not exceed the SCAQMD thresholds. However, when combined with onsite direct emissions, Alternative 4 would exceed the NOx threshold.

Long Term Operation and Maintenance Impacts

As shown in Table 5-14 long-term operation and maintenance activities would exceed the NOx threshold.

Table 5-14: Alternative 4 Daily Regional Criteria Pollutant Emissions

Pollutant Emissions (pounds/day)						
Activity	**VOC**	**NOx**	**CO**	**SO_2**	**PM10**	**PM2.5**
Construction						
Year 1 (2021)						
On-Site[1]	4.75	20.57	178.32	0.39	11.26	6.46
Off-Site[2]	2.55	16.04	20.50	0.11	6.35	1.74
Year 1 Total	7.30	36.62	198.81	0.49	17.61	8.20
Year 2 (2022)						
On-Site	8.63	45.16	341.92	0.71	25.26	14.38
Off-Site	7.18	92.07	55.59	0.48	20.28	5.61
Total	15.81	**137.23**	397.51	1.20	45.54	20.00
Year 3 (2023)						
On-Site	8.46	79.48	346.18	0.70	23.00	13.20
Off-Site	2.07	17.11	16.40	0.12	6.18	1.70
Year 3 Total	10.53	96.58	362.58	0.82	29.18	14.90
Year 4 (2024)						
On-Site	6.24	69.37	261.78	0.52	13.71	7.97
Off-Site	4.02	26.20	31.78	0.21	12.31	3.37
Year 4 Total	10.27	95.56	293.57	0.73	26.02	11.34
Year 5 (2025)						
On-Site	6.34	69.78	265.47	0.53	14.51	8.41
Off-Site	3.32	31.91	25.63	0.22	10.89	3.00
Year 5 Total	9.66	**101.69**	291.10	0.75	25.40	11.41
SCAQMD Construction Thresholds	**75**	**100**	**550**	**150**	**150**	**55**
Exceeds Construction Thresholds?	No	**Yes**	No	No	No	No
MAINTENANCE/OPERATION						
Years 6 - 50 (2026+)						
On-Site	5.57	66.43	235.75	0.47	12.02	7.00
Off-Site	2.47	28.69	16.81	0.18	8.10	2.24
Years 6 - 50 Total	8.04	**95.12**	252.56	0.65	20.12	9.24
SCAQMD Operational Thresholds	**55**	**55**	**550**	**150**	**150**	**55**
Exceeds Operational Thresholds?	No	**Yes**	No	No	No	No

Notes: Bold and Underlined represent a significant impact
[1] Onsite emissions from equipment not operated on public roads.
[2] Offsite emissions from vehicles operating on public roads.

Level of Impact for Alternative 4

Significant impact. Under CEQA, construction and long-term operation and maintenance activities would result in violation of an air quality standard, increase frequency or severity of an existing or projected air quality violation, or delay timely attainment of standards.

5.3.4.4 **IMPACT AIR-4**: Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable national or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

Air Quality Impact Under CEQA

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, none of the proposed ecosystem restoration measures would be implemented. There would be no construction or operation air emissions that could contribute cumulatively to exceed State or Federal air quality standards.

ALTERNATIVE 2, ALTERNATIVE 3 AND ALTERNATIVE 4

Alternative 2, Alternative 3, and Alternative 4, each, with other project activities occurring in the Air Basin could result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard. Cumulative projects include local development as well as general growth within the study area. However, as with most development, the greatest source of emissions would be from mobile sources, which travel throughout the local area. Therefore, from an air quality standpoint, the cumulative analysis would extend beyond any local projects and when wind patterns are considered would cover an even larger area. Accordingly, the cumulative analysis for the Proposed Action's air quality must be generic by nature. The study area is out of attainment for ozone and PM10 and PM2.5 particulate matter. In accordance with CEQA Guidelines Section 15130(b), this analysis of cumulative impacts incorporates a three-tiered approach to assess cumulative air quality impacts:

1. *Consistency with the SCAQMD project specific thresholds for construction and operations;*
2. *Project consistency with existing air quality plans; and*
3. *Assessment of the cumulative health effects of the pollutants.*

1. Consistency with Project Specific Thresholds:

Direct Impacts

The study area is located in the South Coast Air Basin, which is currently designated by the EPA as a non-attainment area for ozone and PM2.5 and designated by ARB as a non-attainment area for ozone, PM10, and PM2.5. The regional onsite ozone, PM10, and PM2.5 emissions associated with Alternative 2, Alternative 3 and Alternative 4 have been calculated above in Tables 5-10, 5-11, and 5-12. The analysis found that onsite direct emissions generated from Alternative 2 and Alternative 4 would not exceed the thresholds for ozone, PM10, and PM2.5. However, when combined with offsite indirect emissions, Alternative 2 and 4 would exceed the NOx (ozone precursor) regional emission threshold. Therefore, a significant unavoidable cumulative impact to the Air Basin would occur from implementation of Alternative 2 and Alternative 4 from the generation NOx emissions. Combined onsite direct emissions and offsite

indirect emissions generated from Alternative 3 would not exceed the NOx (ozone precursor) regional emission threshold.

Indirect Impacts
As shown in Tables 5-10, 5-11, and 5-12, indirect emissions (off-site emissions) for Alternative 2, Alternative 3 and Alternative 4 during construction years would not exceed the SCAQMD thresholds for NOx PM10, and PM2.5.

Long-Term Operation and Maintenance Impacts
As shown in Tables 5-10 and 5-12, emissions under Alternative 2 and Alternative 4 for long-term operation, maintenance, and adaptive management activities would exceed the NOx threshold. As shown in Table 5-10, emissions under Alternative 3 for long-term operation and maintenance activities would not exceed the NOx threshold.

2. Consistency with Existing Air Quality Plans:

As discussed previously Alternative 3 would be consistent with the SCAQMD AQMP and Alternative 2 and Alternative 4 would result in an inconsistency with the SCAQMD AQMP. Therefore, under CEQA Alternative 2 and Alternative 4 would result in a significant impact in relation to implementation of the AQMP.

3. Cumulative Health Impacts

The Air Basin is designated as nonattainment for ozone, PM10, and PM2.5, which means that the background levels of those pollutants are at times higher than the ambient air quality standards. The air quality standards were set to protect public health, including the health of sensitive individuals (elderly, children, and the sick). Therefore, when the concentrations of those pollutants exceed the standard, it is likely that some sensitive individuals in the population could experience health effects. The local analysis shown in Tables 5-10, 5-11, and 5-12 found that Alternative 2, Alternative 3 and Alternative 4 would not exceed the SCAQMD local significance thresholds for NOx (ozone precursor), PM10 and PM2.5. As such, Alternative 2, Alternative 3 and Alternative 4 would result in a less than significant cumulative health impact. However, Alternative 2 and Alternative 4 would result in a cumulative considerable net increase of NOx, which is designated as non-attainment for the Air Basin. Therefore, under CEQA Alternative 2 and Alternative 4 would result in a significant unavoidable cumulative impact in relation to a cumulative net increase from non-attainment pollutants.

Levels of Impact
Significant Impact. Under CEQA, Alternative 2 and Alternative 4 construction, operation, maintenance, and adaptive management activities would result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable national or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).

Less than Significant Impact. Under CEQA, Alternative 3 construction and maintenance activities would not result in a cumulatively considerable net increase of any criteria pollutant for

which the project region is nonattainment under an applicable national or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).

5.3.4.5 **IMPACT AIR-5**: Would the project expose sensitive receptors to substantial pollutant concentrations?

Air Quality Impact Under CEQA

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative none of the proposed ecosystem restoration measures would be implemented. There would be no construction or operation air emissions that could have the potential to expose sensitive receptors to substantial pollutant concentrations.

ALTERNATIVE 2, ALTERNATIVE 3, AND ALTERNATIVE 4

Direct Impacts/Indirect/Long-Term Operation and Maintenance Impacts
This analysis focuses on on-site direct localized air quality impacts occurring in the study area. Therefore, no offsite indirect air emission impacts are evaluated.

Since most of Alternative 2, Alternative 3, and Alternative 4 activities would occur greater than a quarter mile from the nearest sensitive receptors, the localized air quality impact analysis has been limited to the SARM Upstream Focal Area from the River Road Bridge to the Sediment Trap. This area was chosen since it is the location where diesel equipment would operate in the closest proximity to residential uses that are located as near as 220 feet from the proposed diesel equipment operations. The Alternative 2, Alternative 3, and Alternative 4 localized criteria pollutant concentrations at the representative nearby sensitive receptors were analyzed according to the methodology described in *Final Localized Significance Threshold Methodology,* prepared by SCAQMD, July 2008. The report identified NOx, CO, PM10, and PM2.5 as the criteria pollutants of concern due to the attainment status and the potential health impacts caused from elevated local concentrations of these pollutants. Each of these criteria pollutants have been analyzed separately below. Cancer risks associated with air emissions are also presented in this section.

Localized Nitrogen Dioxide Concentrations
The worst-case NO_2 concentrations from activities associated with Alternative 2, Alternative 3, and Alternative 4 are shown in Table5-16. The ambient NO_2 concentrations were obtained from the maximum concentrations over the last three years at the nearest Mira Loma Station, as shown in Table 5-15.

Table 5-15: Localized NOx Concentrations at Nearby Sensitive Receptors

Sensitive Receptor[1]	1-Hour NO_2			Annual NO_2		
	Project Only ($\mu g/m^3$)	Project Only[2] (ppb)	Project + Ambient[3] (ppb)	Project Only ($\mu g/m^3$)	Project Only[2] (ppb)	Project + Ambient[4] (ppb)
1	14.5	26.2	94.3	0.18	0.32	13.32
2	14.7	26.6	94.7	0.18	0.32	13.32
3	15.0	27.1	95.2	0.18	0.32	13.32
4	14.9	27.0	95.1	0.16	0.29	13.29
5	14.8	26.8	94.9	0.15	0.28	13.28
6	14.4	26.0	94.1	0.14	0.25	13.25
7	15.2	27.5	95.6	0.14	0.26	13.26
8	17.5	31.7	99.8	0.20	0.36	13.36
9	13.2	23.9	92.0	0.23	0.41	13.41
10	12.8	23.2	91.3	0.20	0.36	13.36
11	12.3	22.3	90.4	0.16	0.30	13.30
12	12.8	23.1	91.2	0.16	0.28	13.28
13	12.4	22.4	90.5	0.12	0.22	13.22
14	16.7	30.2	98.3	0.24	0.44	13.44
15	12.9	23.3	91.4	0.08	0.14	13.14
16	12.0	21.6	89.7	0.09	0.15	13.15
17	13.8	25.0	93.1	0.16	0.30	13.30
Federal Standard			100			53
State Standard			180			30
SCAQMD Threshold of Significance			180			30

Notes: $\mu g/m^3$ = micrograms per cubic meter; ppb = parts per billion
[1] Locations of Sensitive Receptors are provided in Figure 3 of Appendix H.
[2] A conversion factor of 1.808 was used to convert $\mu g/m^3$ to ppb and is based on a standard temperature of 25 degrees centigrade and a standard atmosphere pressure of 760 millibars.
[3] The 1-hour NO_2 ambient level of 68.1 ppb is the maximum hourly volume from the last three years and was obtained from
[4] The annual NO_2 ambient level of 13.0 ppb is the maximum annual volume from the last three years and was obtained from
Source: Calculated from ISC-AERMOD View Version 9.5.0.

Table 5-15 shows that the calculated ambient plus project levels of NO_2 would be as high as 99.8 ppb for 1-hour NO_2 concentrations. This would be within the SCAQMD 1-hour threshold for NO_2 of 180 ppb and within both the Federal and State Standards of 100 ppb and 180 ppb. Table 5-15 also shows that the calculated ambient plus project levels of NO_2 would be as high as 13.44 ppb for annual NO_2 concentrations. This would be within the SCAQMD annual threshold for NO_2 of 30 ppb and within both the Federal and State Standards of 53 ppb and 30 ppb, respectively. Under CEQA potential impacts from localized concentrations of NO_2 for Alternative 2, Alternative 3 and Alternative 4 would be less than significant.

Emissions from operations, maintenance, and adaptive management are likely to be substantially less than those associated with construction activities. Thus, emissions from operation, maintenance, and adaptive management activities for Alternative 2, Alternative 3 and Alternative 4 would be less than significant.

Localized Carbon Monoxide Concentrations

The worst-case CO concentrations from activities associated with Alternative 2, Alternative 3 and Alternative 4 are shown in Table 5-16. The ambient CO concentrations were obtained from year 2012 at the nearest Mira Loma Station, which was the last year CO concentrations were measured.

Table 5-16: CO Concentrations at Nearby Sensitive Receptors

Sensitive Receptor[1]	1-Hour CO			8-Hour CO		
	Project Only (µg/m³)	Project Only[2] (ppm)	Project + Ambient[3] (ppm)	Project Only (µg/m³)	Project Only[2] (ppm)	Project + Ambient[4] (ppm)
1	103.59	0.09	2.39	0.94	0.001	1.95
2	105.44	0.10	2.40	1.03	0.001	1.95
3	107.84	0.10	2.40	1.06	0.001	1.95
4	107.78	0.10	2.40	1.20	0.001	1.95
5	107.31	0.10	2.40	1.25	0.001	1.95
6	104.53	0.10	2.40	1.17	0.001	1.95
7	109.37	0.10	2.40	1.23	0.001	1.95
8	134.49	0.12	2.42	0.48	0.000	1.95
9	94.87	0.09	2.39	0.36	0.000	1.95
10	92.13	0.08	2.38	0.40	0.000	1.95
11	90.56	0.08	2.38	0.56	0.001	1.95
12	93.16	0.08	2.38	0.59	0.001	1.95
13	89.12	0.08	2.38	0.63	0.001	1.95
14	120.37	0.11	2.41	0.62	0.001	1.95
15	93.86	0.09	2.39	0.66	0.001	1.95
16	86.12	0.08	2.38	0.66	0.001	1.95
17	99.26	0.09	2.39	0.68	0.001	1.95
Federal Standard			20			9
State Standard			20			9
SCAQMD Threshold of Significance			20			9

Notes: µg/m³ = micrograms per cubic meter; ppb = parts per billion
[1] Locations of Sensitive Receptors shown in Figure 3.
[2] A conversion factor of 1,100 was used to convert µg/m³ to ppm and is based on a standard temperature of 25 degrees centigrade and a standard
atmospheric pressure of 760 millibars.
[3] The 1-hour CO ambient level of 2.3 ppm is the maximum hourly volume from the year 2012 at the Mira Loma Station.
[4] The annual CO ambient level of 1.95 ppm is the maximum annual volume from the year 2012 at the Mira Loma Station.
Source: Calculated from ISC-AERMOD View Version 9.5.0.

Table 5-16 shows that the calculated ambient plus project levels of CO would be as high as 2.42 ppm averaged over 1 hour. This would be within the SCAQMD 1-hour threshold for CO of 20 ppm and within the Federal and State Standard of 20 ppm. Table 5-16 also shows that the calculated ambient plus project levels of CO would be as high as 1.95 ppm averaged over 8 hours. This would be within the SCAQMD 8-hour threshold for CO of 9 ppm and within the Federal and State Standard of 9 ppm. Under CEQA potential impacts from concentrated levels of CO for Alternative 2, Alternative 3 and Alternative 4 would be less than significant.

Localized Particulate Matter (PM10 and PM2.5) Concentration

The worst-case PM10 and PM2.5 concentrations from activities associated with Alternative 2, Alternative 3 and Alternative 4 are shown in Table 5-17.

Table 5-17: Localized PM10 and PM2.5 Concentrations at Nearby Sensitive Receptors

Sensitive Receptor[1]	PM10		PM2.5
	Project Only 24-Hour ($\mu g/m^3$)	Project Only Annual ($\mu g/m^3$)	Project Only 24-Hour ($\mu g/m^3$)
1	0.67	0.076	0.38
2	0.68	0.076	0.39
3	0.71	0.077	0.41
4	0.69	0.070	0.40
5	0.69	0.066	0.39
6	0.65	0.059	0.37
7	0.67	0.061	0.38
8	0.63	0.086	0.36
9	0.45	0.098	0.26
10	0.44	0.085	0.25
11	0.41	0.070	0.24
12	0.40	0.067	0.23
13	0.30	0.052	0.17
14	0.53	0.105	0.30
15	0.43	0.034	0.24
16	0.41	0.037	0.24
17	0.56	0.070	0.32
SCAQMD Construction Threshold	10.4	1.0	10.4
SCAQMD Operational Threshold	2.5	1.0	2.5

Notes: $\mu g/m^3$ = micrograms per cubic meter
[1] Locations of Sensitive Receptors shown in Figure 3.
Source: Calculated from ISC-AERMOD View Version 9.5.0.

Table 5-17 shows that the calculated project levels of PM10 would be as high as 0.71 $\mu g/m^3$ for 24-hour PM10 and 0.11 $\mu g/m^3$ for annual PM10 concentrations. This would be within SCAQMD's PM10 24-hour average construction and operations-related increase thresholds of 10.4 $\mu g/m^3$ and 2.5 $\mu g/m^3$, respectively and would be within SCAQMD's PM10 annual average construction and operations-related increase threshold of 1.0 $\mu g/m^3$. Table 5-17 also shows that the calculated project levels of PM2.5 would be as high as 0.41 $\mu g/m^3$ for 24-hour PM2.5 concentrations. This would be within SCAQMD's PM2.5 24-hour average construction and operations-related increase thresholds of 10.4 $\mu g/m^3$ and 2.5 $\mu g/m^3$, respectively. Under CEQA potential impacts from concentrated levels of PM for Alternative 2, Alternative 3 and Alternative 4 would be less than significant.

Emissions from operations, maintenance, and adaptive management are likely to be substantially less than those associated with construction activities. Thus, emissions from operation, maintenance, and adaptive management activities for Alternative 2, Alternative 3 and Alternative 4 would be less than significant.

Cancer Risk Impacts

The proposed project would utilize diesel-powered equipment, whose diesel particulate matter (DPM) emission is a known source of toxic air contaminants (TAC). Health risks from TACs are twofold. First, TACs are carcinogens according to the State of California. Second, short-term acute and long-term chronic exposure to TACs can cause health effects to the respiratory system. Since most of the Proposed Action activities would occur greater than a quarter mile from sensitive receptors, the dispersion modeling has been limited to the SARM Upstream Focal Area from the River Road Bridge to the Sediment Trap. This area was chosen since it is the location where diesel equipment would operate in the closest proximity to residential uses that are located

as near as 220 feet from the proposed diesel equipment operations. Table 5-18 provides a summary of the calculated diesel emission concentrations at the nearest sensitive receptors.

Table 5-18: Toxic Air Contaminants Cancer Risks at Nearby Sensitive Receptors

Sensitive Receptor	Receptor Description[1]	Receptor Location		Annual PM10 Concentration (µg/m^3)			Cancer Risk Per Million People[2]
		X	Y	2021-2022	2023-2037	2038-2051	
1	SFH to northwest	445,087	3,754,800	0.0016	0.00164	0.00164	0.40
2	SFH to northwest	445,030	3,754,728	0.0016	0.00165	0.00165	0.40
3	SFH to northwest	444,990	3,754,679	0.0016	0.00167	0.00167	0.41
4	SFH to northwest	444,930	3,754,613	0.0015	0.00152	0.00152	0.38
5	SFH to west	444,877	3,754,543	0.0014	0.00143	0.00143	0.34
6	SFH to west	444,815	3,754,470	0.0012	0.00127	0.00127	0.31
7	SFH to west	444,772	3,754,356	0.0013	0.00133	0.00133	0.32
8	SFH to south	445,377	3,753,743	0.0018	0.00186	0.00186	0.45
9	SFH to southeast	445,621	3,753,969	0.0021	0.00213	0.00213	0.51
10	SFH to southeast	445,718	3,754,072	0.0018	0.00184	0.00184	0.44
11	SFH to southeast	445,850	3,754,156	0.0015	0.00152	0.00152	0.37
12	SFH to southeast	445,961	3,754,222	0.0014	0.00145	0.00145	0.35
13	SFH to southeast	446,113	3,754,259	0.0011	0.00113	0.00113	0.27
14	SFH to east	446,337	3,754,773	0.0022	0.00228	0.00228	0.55
15	SFH to north	445,368	3,755,444	0.0007	0.00074	0.00074	0.18
16	SFH to north	445,315	3,755,366	0.0008	0.00080	0.00080	0.19
17	SFH to north	445,275	3,755,078	0.0015	0.00153	0.00153	0.37
Threshold of Significance							**10**
Exceed Threshold?							**No**

[1] SFH = Single-Family Home.
[2] The residential cancer risk based on: C_{air} (2021-2022) * 250 + C_{air} (2023-2037) * 261 + C_{air} (2038-2051) *39.5.
Source: Calculated from ISC-AERMOD View Version 9.5.0.

Table 5-18 shows that the cancer risk from the Proposed Action TAC emissions would be as high as 0.55 per million persons at the most impacted homes. The project-related cancer risk from TAC emissions would be within the SCAQMD's threshold of 10 per million. Under CEQA potential cancer risk impacts for Alternative 2, Alternative 3 and Alternative 4 would be less than significant.

Emissions from operation, maintenance, and adaptive management are likely to be substantially less than those associated with construction activities. Thus, emissions from operation, maintenance, and adaptive management activities for Alternative 2, Alternative 3 and Alternative 4 would be less than significant.

Level of Impact
Less than Significant Impact. Under CEQA, Alternative 2, 3 and 4 construction and long-term operation and maintenance activities would not expose sensitive receptors to substantial pollutant concentrations.

5.3.4.6 **IMPACT AIR-6**: Would the project create objectionable odors affecting a substantial number of people?

Air Quality Impact Under CEQA

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative none of the proposed ecosystem restoration measures would be implemented. There would be no construction or operation air emissions that could have the potential to generate objectionable odors.

ALTERNATIVE 2, ALTERNATIVE 3, AND ALTERNATIVE 4

Direct Impacts
Individual responses to odors are highly variable and can result in a variety of effects. Generally, the impact of an odor results from a variety of factors such as frequency, duration, offensiveness, location, and sensory perception. The frequency is a measure of how often an individual is exposed to an odor in the ambient environment. The intensity refers to an individual's or group's perception of the odor strength or concentration. The duration of an odor refers to the elapsed time over which an odor is experienced. The offensiveness of the odor is the subjective rating of the pleasantness or unpleasantness of an odor. The location accounts for the type of area in which a potentially affected person lives, works, or visits; the type of activity in which he or she is engaged; and the sensitivity of the impacted receptor.

Sensory perception has four major components: detectability, intensity, character, and hedonic tone. The detection (or threshold) of an odor is based on a panel of responses to the odor. There are two types of thresholds: the odor detection threshold and the recognition threshold. The detection threshold is the lowest concentration of an odor that will elicit a response in a percentage of the people that live and work in the immediate vicinity of the project site and is typically presented as the mean (or 50 percent of the population). The recognition threshold is the minimum concentration that is recognized as having a characteristic odor quality, this is typically represented by recognition by 50 percent of the population. The intensity refers to the perceived strength of the odor. The odor character is what the substance smells like. The hedonic tone is a judgment of the pleasantness or unpleasantness of the odor. The hedonic tone varies in subjective experience, frequency, odor character, odor intensity, and duration.

Potential sources that may emit odors during implementation of the proposed project may include odor emissions from diesel equipment and disturbance of organic material. The diesel equipment is anticipated to operate as near as 220 feet from the nearest homes, however the majority of diesel equipment would operate at locations that are greater than a quarter mile from the nearest homes. The diesel equipment utilized onsite would be constantly moving around the

project site and would spend very brief durations in close proximity to the nearby homes. The odors from diesel equipment emissions would be temporary at any one location and would not likely be noticeable for extended periods of time at any of the nearby homes.

The potential odor impacts associated with excavation activities would be caused by release of material that contain even small amounts of sulfur or organic material. Sulfur compounds have very low odor threshold levels. For instance, hydrogen sulfide can be detected by humans at concentrations from 0.5 parts per billion (ppb) that is noticeable by 2 percent of the population, to 40 ppb that is qualified as annoying by 50 percent of the population. It should be noted that the project site has been utilized as a flood control facility since the 1940's and vegetation has been removed from the Prado Basin on regular intervals with no records of odor complaints from the nearby residents. Since most of the vegetation removal would occur greater than a quarter mile from the nearest homes and no odor complaints have previously been recorded, the vegetation removal activities are not anticipated to create odor impacts at the nearby homes. Furthermore, soil in the project vicinity is not known to contain high levels of sulfur so odor impacts from sulfur in the soil would be unlikely to occur. Therefore, a less than significant odor impact is anticipated to occur from implementation of the Proposed Action, Alternative 3 and Alternative 4.

Emissions from operation, and maintenance, and adaptive management are likely to be substantially less than those associated with construction activities. Thus, emissions from operation, maintenance, and adaptive management activities for Alternative 2, Alternative 3 and Alternative 4 would be less than significant.

Indirect Impacts

Construction activities associated with Alternative 2, 3, and Alternative 4 restoration would generate direct odor emissions from equipment diesel exhaust. The construction activities would not generate notable indirect odors. As such, indirect impact would be less than significant. Emissions from operation, maintenance, and adaptive management are likely to be substantially less than those associated with construction activities. Thus, operation, maintenance, and adaptive management activities would not generate notable indirect odors. As such, there would be no notable indirect impact.

Level of Impact

Less than Significant Impact. Under CEQA, Alternative 2, 3 and 4 construction and long-term operation and maintenance activities would not create objectionable odors affecting a substantial number of people.

5.3.5 Greenhouse Gas Impacts

5.3.5.1 **IMPACT GHG-1**: Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under Alternative 1 none of the proposed ecosystem restoration measures would be implemented. There would be no construction and operational maintenance activities that would generate greenhouse gas emissions.

ALTERNATIVE 2: PROPOSED ACTION

Direct Impacts/Indirect Impacts

Direct GHG construction emissions would be generated on-site by use of off-road equipment. Additionally, indirect emissions of CO2e from vehicle trips associated with debris and material hauling and worker trips. The data provided in Table 5-19 shows that Alternative 2 when combined construction related direct and indirect greenhouse gas emissions would be 909.88 create metric tons per year, which would below the 3,000 metric tons per year threshold. When combined with operation and maintenance direct and indirect greenhouse gas emissions, 5,483.18 metric tons per year would be generated. According to the SCAQMD CEQA threshold of significance, a cumulative global climate change impact would occur if the greenhouse gas emissions would exceed 3,000 metric tons per year. Alternative 2 would exceed the annual threshold. Therefore, a significant greenhouse gas emission impact would occur. No mitigation would be available to reduce greenhouse gas emissions to less than significant levels. Therefore, under CEQA implementation of Alternative 2 would result in a significant unavoidable cumulative greenhouse gas emissions impact.

Long-Term Operation and Maintenance Impacts

Under Alternative 2, long-term operation, maintenance, and adaptive management activities would be 4,539.07 metric tons per year, which would be above the CEQA threshold of 3,000 metric tons per year threshold.

Table 5-19: Alternative 2 Greenhouse Gas Annual Emissions (Tons Per Year)

Year	CO_2	CH_4	N_2O	CO_2e
CONSTRUCTION				
Year 1 (2021)				
On-Site	2,771.57	0.90	0.00	2,793.98
Off-Site	1,160.97	0.07	0.00	1,162.62
Year 1 Total	3,932.54	0.97	0.00	3,956.60
Year 2 (2022)				
On-Site	4,028.78	1.29	0.00	4,061.05
Off-Site	3,019.19	0.22	0.00	3,023.29
Year 2 Total	7,047.98	1.51	0.00	7,084.34
Year 3 (2023)				
On-Site	4,515.52	1.38	0.00	4,677.92
Off-Site	1,304.82	0.08	0.00	1,306.73
Year 3 Total	5,820.34	1.46	0.00	5,984.65

Year	CO_2	CH_4	N_2O	CO_2e
Year 4 (2024)				
On-Site	3,578.25	1.08	0.00	3,604.21
Off-Site	1,745.29	0.09	0.00	1,747.56
Year 4 Total	5,323.54	1.17	0.00	5,351.76
Year 5 (2025)				
On-Site	3,510.85	1.06	0.00	3,537.09
Off-Site	1,661.26	0.09	0.00	1,663.59
Year 5 Total	5,172.11	1.15	0.00	5,200.68
Amortized Years 1-5 Construction Emissions (30 years)[1]	909.88	0.21	0.00	919.27
MAINTENANCE/OPERATION Operational Years 6-50 (2026+)				
On-Site	3,054.64	0.91	0.00	3,077.33
Off-Site	1,484.44	0.09	0.00	1,486.59
Years 6 - 50 Total	4,539.07	1.00	0.00	4,563.92
Total Annual Emissions (Construction & Operations)	5,448.95	1.21	0.00	5,483.18
SCAQMD CEQA Threshold of Significance				3,000
Notes: Construction emissions amortized over 30 years as recommended in the SCAQMD GHG Working Group on November 19, 2009.				

Level of Impact for Alternative 2
Significant Impact. Under CEQA, Alternative 2 construction and long-term operation and maintenance activities would generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

ALTERNATIVE 3

Direct Impacts/Indirect Impacts
The data provided in Table 5-20 shows that direct and indirect construction activities for Alternative 3 would create 260.67 metric tons per year, which would below the 3,000 metric tons per year threshold. When combined with operation and maintenance direct and indirect greenhouse gas emissions, 1,040.40 metric tons per year would be generated. According to the SCAQMD CEQA threshold of significance, a cumulative global climate change impact would occur if the greenhouse gas emissions created would exceed 3,000 metric tons per year. Therefore, implementation of Alternative 3 would result in a less than significant cumulative greenhouse gas emissions impact.

Long-Term Operation and Maintenance Impacts
Under Alternative 3, long-term operation, maintenance and adaptive management activities would be 775.19 metric tons per year, which would below the CEQA threshold of 3,000 metric tons per year.

Table 5-20: Alternative 3 Greenhouse Gas Annual Emissions (Tons Per Year)

Year	CO_2	CH_4	N_2O	CO_2e
Construction				
Year 1 (2021)				
On-Site	802.62	0.26	0.00	809.11
Off-Site	578.86	0.02	0.00	579.44
Year 1 Total	1,381.48	0.28	0.00	1,388.55
Year 2 (2022)				
On-Site	722.31	0.23	0.00	728.15
Off-Site	849.76	0.04	0.00	850.53
Year 2 Total	1,572.07	0.27	0.00	1,578.67
Year 3 (2023)				

Year	CO_2	CH_4	N_2O	CO_2e
On-Site	844.03	0.27	0.00	894.15
Off-Site	1,220.85	0.05	0.00	1,222.11
Year 3 Total	2,064.88	0.32	0.00	2,116.25
Year 4 (2024)				
On-Site	537.37	0.17	0.00	541.69
Off-Site	863.31	0.03	0.00	864.03
Year 4 Total	1,400.68	0.20	0.00	1,405.72
Year 5 (2025)				
On-Site	617.53	0.20	0.00	622.51
Off-Site	783.51	0.03	0.00	784.31
Year 5 Total	1,401.04	0.23	0.00	1,406.83
Amortized Years 1-5 Construction Emissions (30 years)[1]	260.67	0.04	0.00	263.20
MAINTENANCE/OPERATION – Operational Years 6-50 (2026+)				
On-Site	169.38	0.05	0.00	170.75
Off-Site	605.81	0.03	0.00	606.45
Years 6 - 50 Total	775.19	0.08	0.00	777.20
Total Annual Emissions (Construction & Operations)	1,035.86	0.12	0.00	1,040.40
CEQA Threshold of Significance				3,000

Notes:[1] Construction emissions amortized over 30 years as recommended in the SCAQMD GHG Working Group on November 19, 2009.

Level of Impact for Alternative 3

Less than Significant Impact. Under CEQA, Alternative 3 construction and long-term operation and maintenance activities would generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

ALTERNATIVE 4

Direct Impacts/Indirect Impacts

The data provided in Table 5-21 shows that Alternative 4 would create 962.76 metric tons of greenhouse gas per year. When combined with operation and maintenance direct and indirect greenhouse gas emissions, 5,604.84 metric tons per year would be generated. According to the SCAQMD draft CEQA threshold of significance, a cumulative global climate change impact would occur if the GHG emissions created would exceed 3,000 metric tons per year. Implementation of Alternative 4 would exceed the annual threshold. Therefore, a significant greenhouse gas emission impact would occur. No mitigation would be available to reduce greenhouse gas emissions to less than significant levels. Therefore, under CEQA implementation of Alternative 4 would result in a significant unavoidable cumulative greenhouse gas emissions impact.

Long-Term Operation and Maintenance Impacts

Under Alternative 4, long-term operation, maintenance, adaptive management activities would be 4607.21 metric tons per year, which would be above the CEQA threshold of 3,000 metric tons per year threshold.

Table 5-21: Alternative 4 Greenhouse Gas Annual Emissions

	Greenhouse Gas Emissions (Metric Tons per Year)			
Year	CO_2	CH_4	N_2O	CO_2e
Construction				
Year 1 (2021)				
On-Site	2,852.49	0.92	0.00	2,875.56

	Greenhouse Gas Emissions (Metric Tons per Year)			
Year	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Off-Site	1,171.50	0.07	0.00	1,173.17
Year 1 Total	4,024.00	0.99	0.00	4,048.73
Year 2 (2022)				
On-Site	4,374.26	1.36	0.00	4,408.32
Off-Site	3,845.21	0.32	0.00	3,851.13
Year 2 Total	8,219.47	1.68	0.00	8,259.45
Year 3 (2023)				
On-Site	4,605.11	1.41	0.00	4,768.68
Off-Site	1,345.33	0.08	0.00	1,347.31
Year 3 Total	5,950.44	1.49	0.00	6,115.99
Year 4 (2024)				
On-Site	3,667.87	1.11	0.00	3,694.55
Off-Site	1,752.50	0.09	0.00	1,754.78
Year 4 Total	5,420.37	1.20	0.00	5,449.33
Year 5 (2025)				
On-Site	3,600.34	1.08	0.00	3,627.30
Off-Site	1,668.30	0.09	0.00	1,670.64
Year 5 Total	5,268.64	1.18	0.00	5,297.94
Amortized Years 1-5 Construction Emissions (30 years)[1]	962.76	0.22	0.00	972.38
OPERATION/MAINTENANCE – Operational Years 6 – 50 (2026+)				
On-Site	3,099.29	0.92	0.00	3,122.34
Off-Site	1,507.92	0.09	0.00	1,510.11
Years 6 - 50 Total	4,607.21	1.01	0.00	4,632.45
Total Annual Emissions (Construction & Operations)	5,569.97	1.23	0.00	5,604.84
CEQA Threshold of Significance				3,000

Notes: [1] Construction emissions amortized over 30 years as recommended in the SCAQMD GHG Working Group on November 19, 2009.

Level of Impact for Alternative 4
Significant Impact. Under CEQA, Alternative 4 construction, long-term operation, maintenance, and adaptive management activities would generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

5.3.5.2 **IMPACT GHG-2**: Would the project conflict with any applicable plan, policy or regulation of an agency for the purpose of reducing the emission of greenhouse gases?

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative none of the proposed ecosystem restoration measures would be implemented. There would be no construction or operational maintenance activities that emit greenhouse gases and there would be no potential for conflicts with applicable plans, policies or regulations that would reduce the emission of greenhouse gas emissions.

ALTERNATIVE 2, ALTERNATIVE 3 AND ALTERNATIVE 4

Direct Impacts/Indirect impacts/Long-Term Operation and Maintenance Impacts
As detailed under criterion GHG-1, construction, operation and maintenance activities for Alternative 2 would directly and indirectly generate 5,483.18 metric tons per year, Alternative 3 would generate 1,040.40 metric tons per year, and Alternative 4 would generate 5,604.84 metric tons per year. Both Alternative 2 and Alternative 4 would exceed the annual 3,000 metric tons

threshold and would result in a significant greenhouse gas emission impact. The greenhouse gas emissions would be primarily created from emissions associated with off-road equipment and on-road haul trucks.

Implementation of Alternative 2 and Alternative 4 would reduce greenhouse gas emissions by increasing water storage capacity within the Prado Basin that would increase the amount of local water supplies that could be stored in the local groundwater basin which would reduce the amount of water imported to Orange County. Alternative 2 and Alternative 4 would also increase the long-term carbon storage capacity of the Prado Basin by increasing the acreage of native wetland vegetation. However, the greenhouse gas emission reductions achieved by implementation of Alternative 2 and Alternative 4 would be nominal when compared to the greenhouse gases that would be created and that there would be no feasible mitigation available to reduce the greenhouse gas emissions to a less than significant level. Therefore, implementation of Alternative 2 and Alternative 4 would exceed the SCAQMD adopted threshold of 3,000 metric tons and would result in conflict with an applicable plan adopted for the purpose of reducing the emissions of greenhouse gases. Because Alternative 3 would not exceed 3,000 metric tons threshold, implementation of Alternative 3 would not result in conflicts with applicable plans adopted for the purpose of reducing the emissions of greenhouse gases.

Level of Impact
Significant Impact. Under CEQA, Alternative 2, 3 and 4 construction and long-term operation and maintenance activities would conflict with any applicable plan, policy or regulation of an agency for the purpose of reducing the emission of greenhouse gases.

5.4 LAND USE/RECREATION

5.4.1 Regulatory Framework

Land use in the study area is managed according to Federal, state, regional, and local policies. Because these policies create land use patterns in the study area, they are described in detail in the Affected Environment in Section 4.0.

5.4.2 Impact Significance Criteria

The impact criteria below were taken from Appendix G of the CEQA Guidelines and are also being adopted for NEPA. For purposes of this analysis, Alternatives 1, 2, 3, or 4 would have a significant impact related to Land Use or Recreation if it would:

- **IMPACT LU-1**: Physically divide an established community.
- **IMPACT LU-2**: Conflict with any applicable land use plan, policy or regulation of an agency with jurisdiction over the project adopted for avoiding or mitigating an environmental effect.
- **IMPACT REC-1**: Increase the use of existing neighborhood and regional parks or other recreation facilities such that substantial physical deterioration of the facility would occur or be accelerated.

5.4.3 Environmental Commitments

EC-LU-1: Notices of Construction will be provided to adjacent home owners, and business prior to initiating construction activities. Notices of construction will include a contact and telephone number that will information about construction activities.
EC-LU-2: To minimize disruption to adjacent businesses during construction, temporary signage will be provided indicating business are open.

None required or proposed for Recreation.

5.4.4 Land Use/Recreation Impacts

5.4.4.1 **IMPACT LU-1** Physically divide an established community.

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under No Federal Action/No Project Alternative, neither the Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. Water would continue to be stored up to elevation 498 ft. during the flood season and up to elevation 505 ft. during the non-flood season in accordance with the Water Control Plan for Prado Dam. Existing land use below 505 ft. would continue to be periodically inundated from water conservation activities and flood risk management activities at Prado Dam. Additionally, none of the measures from the Ecosystem Restoration Plan would be implemented, and no associated construction impacts to existing land uses would occur and no established community would be physically divided.

ALTERNATIVE 2: PROPOSED ACTION

Water Conservation Plan (Elevation 505 ft. Year-Round)

Direct Impacts
The Water Conservation Plan would store surface water in the buffer pool up to elevation 505 ft. during the flood season. The additional water stored would result in increased pooling and additional days of inundation in parts of the Prado Basin. As shown in Table 5-22 existing land uses below elevation 505 ft., if inundated due to water conservation or flood risk management operations, would experience 3 to 51 additional days of inundation. The additional days of inundation occurring at Prado Basin would not permanently displace any existing land uses for an extended period and would have a less than significant effect on physically dividing an established community.

Indirect Impacts
Potential additional days of inundation would only affect existing land uses within Prado Basin. Release rates from Prado Dam associated with the implementation of the Water Conservation Plan would not result in any flooding that would displace land uses or physically divide an established community downstream of Prado Dam. No significant indirect impacts would occur.

Long-Term Operation and Maintenance Impacts
There are no future operation and maintenance activities associated with Water Conservation Plan that would affect land use or physically divide an established community.

Table 5-22: Existing Days of Inundation and Additional Days of Inundation with Water Conservation Plan

Existing Land Use	Elevation	Existing Average Days Inundation	Additional Annual Average Days Inundation
Prado Regional Park	490 ft. to 560 ft.	110 to 2	51 to 3
Prado Recreation (Dog Training)	490 ft. to 566 ft.	110 to 2	51 to 3
Prado Basin Duck Club (OCWD lease)	480 ft. to 566 ft.	123 to 69	11 to 22
Splatter S Duck Hunting Club	490 ft. to 520 ft.	110 to 2	51 to 3
Prado Basin Park	525 ft. to 573 ft.	0	0
Prado Equestrian Center	Above 560 ft.	0	0
El Prado Golf Course	510 ft. to 567 ft.	1	0
Prado Olympic Shooting Park	510 ft. to 520 ft.	1	0
Oranco Bowmen Archery	520 ft. to 560 ft.	0	0
Butterfield Stage Trail Park	527 ft. to 550 ft.	0	0
Raahauges Hunting Club	510 ft. to 544 ft.	1	0
Pomona Valley Model Airplane Club	Above 520 ft.	0	0

Ecosystem Restoration Plan

Sediment Management Measure

Direct Impacts
The area upstream and downstream of Prado Dam where the Sediment Measure would be implemented is vacant and unimproved. The construction and implementation of the measure would not displace any existing land uses or impact any existing infrastructure in the Prado Basin. The construction of the Sediment Management Measure would not physically divide any established communities or displace individual land uses within Prado Basin or along Reach 9. However, existing residential land uses upstream and downstream of River Road Bridge and existing commercial and industrial land uses near the sediment storage site could be impacted by short term construction activities which may result in temporary increases in noise and traffic. The construction impacts would extend for a short period of time and measures would be implemented to minimize those impacts. Additionally, residential communities and businesses potentially impacted by construction operations would be notified of upcoming construction activities. With the implementation of Environmental Commitments EC-LU-1 and EC-LU-2, potential short-term construction related land use impacts would be less than significant.

Indirect Impacts
Implementation of the Sediment Management Measure would not result in significant indirect land use impacts.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities associated with the Sediment Management Measure would include sediment, debris and vegetation removal and recondition of access roads. The maintenance activities would occur in the same construction footprint and would not impact any existing land uses. Long term operation and maintenance activities for the Sediment Management Measure would not divide existing communities or displace existing land uses.

Chino Creek Channel Restoration Measure

Direct Impacts
The proposed restoration to Chino Creek would involve vegetation clearing, grading, excavation of a new channel, construction of diversion pipes, stabilizers, and grade control structures, and the re-routing of Chino Creek through a new channel. The improvements would be implemented on currently vacant and unimproved lands and the only land use adjacent to the restoration site is the El Prado Golf Course. Because construction activities would be confined to the restoration site, there would not be any displacement of or operational impacts to the adjacent golf course, and therefore no impact would occur.

Indirect Impacts
Implementation of the Chino Creek Restoration Measure would not result in indirect land use impacts or physically divide an established community.

Long-Term Operation and Maintenance Impacts
After construction, future operation and maintenance activities would be confined to the restoration site. Maintenance activities would include regular inspections along existing access roads; trimming and maintaining vegetation around and within the new Chino Creek Channel and maintenance roads; removing sediment from the new channel; and repairing wildlife fencing. Adaptive management may require the occasional presence of equipment to adjust gradient, channel dimensions or plantings to ensure that success criteria are met. Heavy equipment would be used temporarily and for a short period of time. When completed, the project would return to pre-construction condition. Operation, maintenance, and adaptive management activities would not displace existing land uses or interfere with the operation of the adjacent golf course, and therefore impact would be less than siginficant.

In-stream Habitat Features Measure Downstream

Direct Impacts
Under Alternative 2, In-Stream Habitat Features would be constructed within the SARM Downstream Focal Area and would not displace existing land uses and physically divide an established community within the study area. Any impacts to land use would be less than significant.

Indirect Impacts
Implementation of In-Stream Habitat Features Measure would not result in significant indirect impacts to existing land uses and physically divide an established community within the study area.

Long-Term Operation and Maintenance Impacts
Future operation and maintenance activities would involve regular inspections of the in-stream habitat rock structures to evaluate their performance and adaptive management may require occasional presence of equipment to reposition or bring in additional rocky material to ensure that success criteria are met. The temporary disruption would not involve any activities that would permanently displace existing land uses and physically divide an established community within the study area. Any land use impacts would be less than significant.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Treatment Measure

Direct Impacts
The areas where the above measures would be implemented are currently vacant and unimproved. No structures would be build and only existing vegetation would be removed during implementation of the above measures and therefore existing land uses would not be displaced and established communities would not be divided. Any land use impacts would be less than significant.

Indirect Impacts
Implementation of the above measures under the Ecosystem Restoration Plan would not result in indirect impacts to land uses and physically divide an established community. Any land use impacts would be less than significant.

Long-Term Operation and Maintenance Impacts
Long-term operation, maintenance, and adaptive management activities would involve regular inspections of the restoration areas and the removal of non-native vegetation by a combination of herbicide treatment and manual labor with hand-held tools along existing roads. These activities would be confined to specific areas for a short period of time. Supplemental watering may be included to support achievement of percent cover criteria and successful restoration of target vegetation communities as part of adaptive management. Any land use impacts would be less than significant.

Cowbird Trapping Measure, Non-Native Aquatic Species Management Measure

Direct Impacts
The proposed non-native wildlife management measures would be implemented in natural open space areas using existing maintenance roads and trails and no structures would be built. Implementation of the above non-native wildlife management measures would not physically divide an established community or displace existing land uses. Any land use impacts would be less than significant.

Indirect Impacts
Implementation of the above non-native wildlife management measures would not result in indirect adverse land use impacts or physically divide an established community. Any land use impacts would be less than significant.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities associated with the above non-native wildlife management measures would involve regular inspection of the focal areas and the removal of non-native wildlife. These activities would be confined to specific areas for a short period of time. Additional adaptive management may include adjustments to cowbird control and fish and removal methods, level of effort, and/or trap locations. Potential operation, maintenance, and adaptive management impacts would not result in adverse land use impacts or physically divide an established community. Any land use impacts would be less than significant.

Level of Impact for Alternative 2
Less than Significant Impact. Construction and future operation and maintenance activities would not result in adverse land use impacts or physically divide an established community.

ALTERNATIVE 3:

Water Conservation Plan (Elevation 505 ft. Year-Round with Incidental Sediment Removal)

Direct, Indirect and Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, the level of potential direct, indirect, and future operation and maintenance impacts on land use from the Water Conservation Plan would be similar. The land use impacts from the additional days of inundation would be less than significant.
Under Alternative 3, an incidental, smaller scale sediment removal program would be implemented in conjunction with the Water Conservation Plan. The area where the smaller scale sediment removal program would be implemented is currently vacant and unimproved and therefore would not impact any established community or displace any existing land uses. Additionally, compared to the Sediment Management Measure, the Incidental Sediment Removal would involve substantially less construction activity and would result in less construction impacts to existing land uses. Similar to Alternative 2, Environmental Commitments EC-LU-1 and EC-LU-2 would be implemented to reduce short term construction-related land use impacts to a less than significant level. Incidental Sediment Removal would be implemented every 25 years during the 50-year life of the project. During the interim period between each sediment removal, existing access roads would be maintained as part of future operation and maintenance, which would involve mostly vegetation removal and possibly some sediment removal. The maintenance activities would be confined to existing access roads and would not impact any existing land uses or physically divide an established community.

Ecosystem Restoration Plan

Direct, Indirect and Long-Term Operation and Maintenance Impacts

Chino Creek Channel Restoration Measure
This measure is the same as described for Alternative 2 and therefore the level of potential impacts to existing land uses and established communities would be the same. Existing, surrounding land uses would not be impacted.

Invasive Plant Management Measure, Native Plantings Measure
These measures are the same as described for Alternative 2 and therefore the level of impacts to existing land uses and established communities would be the same. Existing, surrounding land uses would not be impacted.

Cowbird Trapping Measure
This measure is the same as described for Alternative 2 and therefore the level of potential impacts to existing land uses and established community would be the same. Existing, surrounding land uses would not be impacted.

Level of Impact for Alternative 3
Less than Significant Impact. Construction and future operation and maintenance activities would not result in adverse land use impacts or physically divide an established community.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 Year-Round)

Direct Impacts
The Water Conservation Plan is the same as described for Alternative 2 and therefore, the level of potential impacts to the existing land uses from the additional days of inundation would be the same and would be less than significant.

Indirect Impacts
Compared to Alternative 2, indirect impacts would be the same and impacts would be less than significant.

Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, future operation and maintenance impacts would be the same and adverse impacts would be less than significant.

Ecosystem Restoration Plan

Direct Impacts

Sediment Management Measure
This measure is the same as described for Alternative 2 and therefore the level of potential impacts to existing land uses and established communities would be the same and would be less than significant with the implementation of Environmental Commitments EC-LU-1 and EC-LU-2.

Chino Creek Channel Restoration Measure
This measure is the same as described for Alternative 2 and therefore the level of potential impacts to existing land uses and established communities would be the same. Any land use impacts would be less than significant..

In-stream Habitat Features Measure Upstream
Under Alternative 4, In-Stream Habitat Features would also be constructed within the SARM Upstream Focal Area. The in-stream habitat features consist of rock structure placements within the wetted channel of the Santa Ana River. The rock structures would blend into the existing aesthetic environment and would not result in significant impacts to existing land uses and established communities.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure
These measures are the same as described for Alternative 2 and therefore impacts to existing land uses and established communities would be the same, less than significant.

Non-Native Aquatic Species Management Measure, Feral Pig Management Measure, Cowbird Management Measure
Implementation of the above non-native wildlife management measures would not involve any activities that would displace existing land uses or divide an established community. Any land use impacts would be less than significant.

Indirect Impacts
With exception of feral pig management, expanded non-native aquatics control to include downstream areas, and placement of instream habitat features in the upstream transition channel, all of other measures are the same as described for Alternative 2, and therefore indirect impacts would be the same and would be less than significant. None of the proposed activities would result in changes to existing land uses and dividing an established community.

Long-Term Operation and Maintenance Impacts
With exception of feral pig management, expanded non-native aquatics control to include downstream areas, and placement of instream habitat features in the upstream transition channel, all of other measures are the same as described for Alternative 2, and therefore impacts from long-term operation and maintenance would be the same and would be less than significant. None of the proposed activities would result in changes to existing land uses and dividing an established community.

Level of Impact for Alternative 4
Less than Significant Impact. Construction and future maintenance activities would not result in adverse land use impacts or physically divide an established community.

5.4.4.2 **IMPACT LU-2**: Conflict with any applicable land use plan, policy or regulation of an agency with jurisdiction over the project adopted for avoiding or mitigating an environmental effect?

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, neither the Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. Prado Dam would continue to operate under its current operation and no restoration activities would occur in the study area that would have the potential to conflict with planning programs and policies that would be applicable to the study area.

ALTERNATIVE 2: PROPOSED ACTION

Water Conservation Plan (Elevation 505 year-round)

Direct Impacts
The Riverside County General Plan designates the area where the Water Conservation Plan would be implemented as open space/conservation land uses. The Water Conservation Plan does not propose any activities that would conflict with the open space/conservation land use designation.

Indirect Impacts
There are no indirect impacts associated with the Water Conservation Plan that would conflict with the Riverside County General Plan.

Long-Term Operation and Maintenance Impacts
There are no future operation and maintenance activities associated with Water Conservation Plan that would conflict with the Riverside County General Plan.

Ecosystem Restoration Plan

Sediment Management Measure

Direct Impacts
The Riverside County General Plan designates the location of the sediment management measure as open space/conservation land uses. The intent of the Open Space Conservation land use designation is to provide protection of open space for natural hazard protection, and natural and scenic resource preservation. The sediment management measure would remove sediment from the Prado Basin and re-entrain it into the Santa Ana River. By removing sediment from Prado Basin, the current trend of sediment build-up and degradation of existing riparian habitat within the Prado Basin and along the banks of the Santa Ana River would be reversed. Additionally, the

measure could enhance native fish habitat in Prado basin. The sediment management measure would be consistent with the County of Riverside General Plan for the preservation of open space and scenic resources and therefore no land use planning, policies or regulations conflicts would occur.

Indirect Impacts
There are no indirect impacts associated with the Sediment Management Measure that would conflict with the Riverside County General Plan or other land use planning, policies or regulations.

Long-Term Operation and Maintenance Impacts
There are no future operation and maintenance activities associated with the Sediment Management Measure that would conflict with the Riverside County General Plan or other land use planning, policies or regulations.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Treatment Measure

Direct Impacts
The above ecosystem restoration measures would be implemented in areas that are designated as open space and conservation within the County of Riverside General Plan or City of Chino General Plan. The proposed restoration activities would enhance and conserve natural habitat and would not conflict with relevant planning program in the areas where they would be implemented. No adverse land use planning, policies or regulations conflicts would occur.

Indirect Impacts
There are no indirect impacts associated with the above measures that would conflict with the Riverside County General Plan, City of Chino General Plan, or other land use planning, policies or regulations.

Long-Term Operation and Maintenance Impacts
There are no future operation and maintenance activities associated with the above measures that would conflict with the Riverside County General Plan, City of Chino General Plan, or other land use planning, policies or regulations.

In-Stream Habitat Features Downstream Measure

Direct Impacts
The City of Anaheim and City of Yorba Linda General Plans designated the area where the In-Stream Habitat Features measure would be implemented as Water-Related Uses. One of the goals of the land use designation is the preservation of habitat in the river. The In-Stream Habitat Features Measure would enhance native fish habitat in the reach of the river where the measure would be implemented. The enhancement of native fish habitat would be consistent with the Water-Related Uses land use designation provided in the City of Yorba Linda and City of Anaheim General Plans. No adverse land use planning, policies or regulations conflicts would occur.

Indirect Impacts
There are no indirect impacts associated with the In-Stream Habitat Features that would conflict with the City of Anaheim and City of Yorba Linda General Plans, or other land use planning, policies or regulations

Long-Term Operation and Maintenance Impacts
There are no future operation, maintenance or adaptive management activities associated with the above ecosystem restoration measure that would conflict with the City of Anaheim and City of Yorba Linda General Plans.

Non-Native Aquatic Species Management Measure, Cowbird Trapping Measure

Direct Impacts
The above non-native wildlife management measures would be implemented in areas that are designated open space and conservation within the County of Riverside General Plan and City of Chino General Plan. Implementation of the measures would enhance habitat through the removal of non-native species and would not conflict with the open space and conservation land use designation.

Indirect Impacts
There are no indirect impacts associated with the above measures that would conflict with the Riverside County General Plan, City of Chino General Plan, or other land use planning, policies or regulations.

Long-Term Operation and Maintenance Impacts
There are no future operation, maintenance or adaptive management activities associated with the above ecosystem restoration measures that would conflict with the Riverside County General Plan, City of Chino General Plan, or other land use planning, policies or regulations.

Level of Impact for Alternative 2
No impact. Construction and future operation and maintenance activities under Alternative 2 would not conflict with any applicable land use plan, policies or regulations of an agency with jurisdiction over the project adopted for avoiding or mitigating an environmental effect.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 Feet Year-Round with Incidental Sediment Removal)

Direct Impacts
Compared to Alternative 2, the level of potential impacts to land use planning and policy from the Water Conservation Plan would be similar. No adverse impacts to land use planning, policies or regulations impacts would occur.

Under Alternative 3, an incidental, smaller scale sediment removal program would be implemented in conjunction with the Water Conservation Plan. Similar to the Sediment Management Measure as proposed in Alternative 2, the smaller scale sediment removal program

would help to reverse the current trend of sediment build-up and degradation of existing riparian habitat within the Prado Basin and along the banks of the Santa Ana River, and would help to enhance native fish habitat in Prado Basin. The Incidental Sediment Removal Measure would be consistent with the County of Riverside General Plan in that it would assist in the preservation of open space and scenic resources. Therefore, no adverse land use planning, policies or regulations conflicts would occur.

Indirect Impacts
There are no indirect impacts associated with the Water Conservation Plan and incidental sediment removal activities that would conflict with the Riverside County General Plan or other land use planning, policies or regulations.

Long-Term Operation and Maintenance Impacts
There are no future operation and maintenance activities associated with the Water Conservation Plan and incidental sediment removal activities that would conflict with the Riverside County General Plan or other land use planning, policies or regulations.

Ecosystem Restoration Plan

Direct, Indirect and Long-Term Operation and Maintenance Impacts

Chino Creek Channel Restoration Measure
This measure is the same as described for Alternative 2 and therefore the level of potential impacts to existing land use planning, policies or regulations would be the same and no adverse impacts would occur.

Invasive Plant Management Measure, Native Plantings Measure
This measure is the same as described for Alternative 2 and therefore the level of potential impacts to existing land use planning, policies or regulations would be the same and no adverse impacts would occur.

Cowbird Trapping Measure
This measure is the same as described for Alternative 2 and therefore the level of potential impacts to existing land use planning, policies or regulations would be the same and no adverse impacts would occur.

Level of Impact for Alternative 3
No impact. Construction and future operation and maintenance activities would not conflict with any applicable land use plan, policies or regulations of an agency with jurisdiction over the project adopted to avoiding or mitigating an environmental effect.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 year-round)

Direct Impacts
This plan is the same as described for Alternative 2 and therefore the level of potential impacts to existing land use planning, policies or regulations would be the same and no adverse impacts would occur.

Indirect Impacts
Compared to Alternative 2, indirect impacts would be the same.

Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, future operation and maintenance impacts would be the same.

Ecosystem Restoration Plan

Direct Impacts

Sediment Management Measures
This measure is the same as described for Alternative 2 and therefore the level of potential impacts to existing land use planning, policies or regulations would be the same and no adverse impacts would occur.

Chino Creek Channel Restoration Measure
This measure is the same as described for Alternative 2 and therefore the level of potential impacts to existing land use planning, policies or regulations would be the same and no adverse impacts would occur.

In-stream Habitat Features Measure Downstream
This measure is the same as described for Alternative 2 and therefore potential impacts to existing land use planning, policies or regulations would be the same and no adverse impacts would occur.

In-stream Habitat Features Measure Upstream
This measure is similar to the In-stream Habitat Features Downstream as described for Alternative 2, except that it would be implemented in the upstream area. As with the downstream measure, the purpose of the instream features would be to improve habitat conditions. This measure would not conflict with existing land use planning, policies or regulations, and therefore no adverse impacts under this criterion would occur.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure
These measures are the same as described for Alternative 2 and therefore the level of potential impacts to existing land use planning, policies or regulations would be the same and no adverse impacts would occur.

Feral Pig Management Measure, Non-Native Aquatic Species Control Measure (Upstream and Downstream), Cowbird Management Measure
Implementation of the above non-native wildlife management measures would not result in potential impacts to existing land use planning, policies or regulations would be the same and no adverse impacts would occur.

Indirect Impacts
With exception of feral pig management, expanded non-native aquatics control to include downstream areas, and placement of instream habitat features in the upstream transition channel, all of other measures are the same as described for Alternative 2, and therefore indirect impacts would be the same and no adverse impacts would occur. Feral pig management could indirectly benefit the conservation land use designations as identified in the jurisdictional Cities and Counties' General Plans in reducing damage to vegetation.

Long-Term Operation and Maintenance Impacts
With the exception of feral pig management, expanded non-native aquatics control to include downstream areas, and placement of instream habitat features in the upstream transition channel, all of the other measures are the same as described for Alternative 2, and therefore impacts from future operation and maintenance, including adaptive management, would be the same and no adverse impacts would occur. Continued implementation of feral pig management could indirectly benefit the conservation land use designation by reducing damage to vegetation. Continued implementation, operation and maintenance of the expanded aquatics control and instream habitat features in the transition channel would not have no impacts to existing land use planning, policies or regulations.

Level of Impact for Alternative 4
No impact. The proposed non-native wildlife management measures would be implemented in areas that are designated for open space and conservation. Implementation of the above non-native wildlife management measures would provide an overall beneficial effect to the habitat from the removal of non-native species. These measures, along with the water conservation plan, would not conflict with the open space and conservation land use designations as identified in the jurisdictional Cities and Counties' General Plans and therefore no adverse impacts to existing land use planning, policies or regulations conflicts would occur.

5.4.4.3 **IMPACT REC-1**: Increase the use of existing neighborhood and regional parks or other recreation facilities such that substantial physical deterioration of the facility would occur or be accelerated.

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under No Federal Action/No Project Alternative, neither the Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. Water would continue to be stored up to elevation 498 ft. during the flood season and up to elevation 505 ft. during the non-flood season in accordance with the Water Control Plan for Prado Dam. As shown in Table X, Prado Regional Park, El Prado Golf Course, Prado Olympic Shooting Park, Raahauge's Hunting Club, Splatter S

Duck Hunting Club, Prado Basin Duck Club, and the City of Corona Leases would continue to be inundated periodically from water conservation activities and flood risk management activities at Prado Dam.

ALTERNATIVE 2: PROPOSED ACTION

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts

The water conservation measure would store surface water in the buffer pool up to elevation 505 ft. during the flood season. The additional water stored would result in increased pooling and additional days of inundation in parts of the Prado Basin. Figure 5-23 identifies existing parks and recreational facilities within the study area could potentially impacted by additional days of inundation. As shown in Table 5-22, Prado Regional Park, Prado Recreation Dog Park, Splatter S Duck Hunting Club and Prado Basin Duck Club could all experience additional days of inundation.

Prado Regional Park: The Prado Regional Park is situated between elevation 490 ft. and 560 ft. The Prado Regional Park could experience up to 51 additional days of inundation at 490 ft. with most occurring during the months of January and February, outside of the peak months for park usage. The additional days of inundation between 498 ft. to 505 ft. would occur mostly on open space lands. The active recreation uses within the park are located at higher elevations, including the campground at 544 ft., the golf course at 518 ft. and the ball fields at 539 ft. The additional days of inundation occurring at Prado Regional Park would not permanently displace users to existing neighborhood and regional parks causing accelerated physical deterioration of their facilities. The additional days of inundation would be a less than significant impact.

Prado Recreation (Dog Training)*:* The Prado Recreation Dog Training Facility is situated between 490 ft. and 566 ft. The Prado Recreation Dog Training Facility could experience up to 51 additional days of inundation at 490 ft., with most occurring during the months of January and February. The dog boarding facilities are approximately at elevation 565 ft. and the access road to the dog boarding ranges from 515 ft. to 560 ft. Therefore, the dog boarding area would not be adversely affected. The dog training area near the ponds is approximately at elevation 500 ft. and the surrounding open space areas range from 500 ft. to 550 ft. The additional days of inundation occurring at the Prado Recreation Dog Training Facility would not permanently displace any uses of the property or temporarily displace existing land uses for extended periods of time where it would have a substantial adverse effect on the future operation of the property, or increase the use of existing neighborhood parks or recreation facilities to the extent that it causes accelerated physical deterioration of those facilities. The additional days of inundation would be a less than significant impact.

Spatter S Duck Club: The Spatter S Lease is located between 490 ft. and 520 ft. The Spatter S Duck Club could experience up to 51 additional days of inundation at 490 ft. with most occurring during the months of January and February, outside of the water fowl hunting season. An existing barn structure located at elevation 520 ft. would be outside of the inundation level. The additional days of inundation occurring at the Splatter S Duck Club would not permanently

displace any uses of the property or temporarily displace existing land uses for extended periods of time where it would have a substantial adverse effect on the long-term operation of the property, or increase the use of existing neighborhood parks or recreation facilities to the extent that it causes accelerated physical deterioration of those facilities. The additional days of inundation would be a less than significant impact.

Prado Duck Club: The Duck Lease Ponds are located between 480 ft. and 486 ft. The Duck Lease Ponds could experience up to 22 additional days of inundation at elevation 490 ft. with most occurring during the months of January and February, outside of the water fowl hunting season. The potential for additional days of inundation occurring at Duck Lease Ponds would not permanently displace any uses of the property or temporarily displace existing land uses for extended periods of time where it would have a substantial adverse effect on the future operation of the property. The additional days of inundation would not result in the increase use of existing neighborhood parks or recreation facilities to the extent that it causes accelerated physical deterioration of those facilities and therefore would be a less than significant impact.

Parks and Recreation Facilities Downstream Prado Dam

The storage and release of water associated with the implementation of the Water Conservation Plan would have no effect on Chino Hills State Park, Yorba Regional Park, or Featherly Regional Park. The Green River Golf Course would not be affected by the additional days of inundation. Additionally, implementation of the Water Conservation Plan would not increase the rate or frequency of water released from Prado Dam. Therefore, the project would not increase use of existing neighborhood parks or recreation facilities or cause accelerated physical deterioration of those facilities.

Indirect Impacts

Implementation of the plan would not indirectly increase the use of existing neighborhood and regional parks or other recreation facilities causing accelerated physical deterioration of other facilities within the study area.

Long-Term Operation and Maintenance Impacts

There are no future operation, maintenance or adaptive management activities that would increase use of existing neighborhood and regional parks or other recreation facilities causing accelerated physical deterioration of their facilities within the study area.

Ecosystem Restoration Plan

Direct Impacts

Sediment Management Measure

There are no existing parks and recreation facilities where the Sediment Management Measure would be implemented. Therefore, the construction of the Sediment Management Measure would not have any effect on any existing parks and recreation facilities located within and downstream of the Prado Basin.

Chino Creek Channel Restoration Measure
The Chino Creek restoration activities would occur near the El Prado Golf Course. The proposed restoration would be confined to the creek channel and therefore would have no effect on the golf course or displace users to existing neighborhood parks or recreation facilities or cause accelerated physical deterioration of facilities within the study area.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Treatment Measure, In-stream Habitat Features Measure Downstream
There are no existing park and recreation facilities where the proposed ecosystem restoration measures would be implemented. Therefore, no effects to existing neighborhood parks or recreation facilities, or accelerated physical deterioration of facilities within the study area would occur.

Non-Native Aquatic Species Management Measure, Cowbird Trapping Measure
Implementation of the above non-native wildlife management measures would not involve any activities that would affect existing neighborhood parks or recreation facilities or cause accelerated physical deterioration of facilities within the study area.

Indirect Impacts
There are no activities that would indirectly displace users to existing neighborhood parks or recreation facilities or cause accelerated physical deterioration of facilities within the study area.

Long-Term Operation and Maintenance Impacts
There are no future operation, maintenance or adaptive management activities that would indirectly displace users to existing neighborhood parks or recreation facilities or cause accelerated physical deterioration of facilities within the study area.

Level of Impact for Alternative 2
Less than Significant Impact. Construction and future operation and maintenance activities associated with the Ecosystem Restoration Plan would not displace users to existing neighborhood parks or recreation facilities or cause accelerated physical deterioration of facilities within the study area. The potential additional days of inundation from the Water Conservation Plan would be a less than significant impact as some of the existing parks and recreation facilities are located at higher elevations, and the additional days of inundation are expected to be short-term and would not displace users to existing neighborhood parks or recreation facilities or cause accelerated physical deterioration of facilities within the study area.

ALTERNATIVE 3:

Water Conservation Plan (Elevation 505 Feet Year-Round with Incidental Sediment Removal)

Direct Impacts
Compared to Alternative 2, the level of potential land use impacts would be similar. Potential impacts due to the additional days of inundation and displacing users to existing neighborhood parks or recreation facilities, would be less than significant. Water conservation would not cause

a substantial increase in usage or accelerated physical deterioration of existing recreation facilities.

Under Alternative 3, an incidental, smaller scale sediment removal program would be implemented in conjunction with the Water Conservation Plan. The sediment removal activities would be confined to a small area within the Prado Basin and would not impact use of existing neighborhood parks or recreation facilities and would not cause a substantial increase in usage or accelerated physical deterioration of those facilities. Therefore, similar, to Alternative 2, no adverse impacts would occur.

Indirect Impacts
Implementation of the incidental sediment removal activities would not result in any indirect impacts to the use of other existing neighborhood parks or recreation facilities and would not cause accelerated physical deterioration of those facilities.

Long-Term Operation and Maintenance Impacts
Future operation and maintenance activities would result in additional days of inundation of some parks and recreational facilities within the study area, but it would be short-term. Therefore, potential impacts to the use of other existing neighborhood parks or recreation facilities would be less than significant, and the project would not cause an accelerated physical deterioration of those facilities.

Ecosystem Restoration Plan

Direct, Indirect and Long-Term Operation and Maintenance Impacts

Chino Creek Channel Restoration Measure
This measure is the same as described for Alternative 2 and therefore, the level of potential impacts to the use of other existing neighborhood parks or recreation facilities would be less than significant. The project would not cause an accelerated physical deterioration of facilities within the area.

Invasive Plant Management Measure, Native Plantings Measure
These measures are the same as described for Alternative 2 and therefore the impacts would be the same. Implementation of the above measures would not result in the increased use of other existing neighborhood parks or recreation facilities or cause accelerated physical deterioration of those facilities.

Cowbird Trapping Measure
Implementation of the Cowbird Trapping Measure would not involve any construction or activities. Therefore, this measure would not result in an increased use of existing neighborhood parks or recreation facilities, or an accelerated physical deterioration of those facilities.

Indirect Impacts
There are no activities that would indirectly increase the use of existing neighborhood parks and regional parks or other recreation facilities within the study area.

Long-Term Operation and Maintenance Impacts
There are no future operation and maintenance activities that would increase the use of existing neighborhood parks and regional parks or other recreation facilities within the study area.

Level of Impact
Less than Significant Impact. Construction and the future operation and maintenance activities under Alternative 3 would not substantially increase the use of existing neighborhood parks and regional parks or other recreation facilities such that substantial physical deterioration of the facility would occur or be accelerated.

ALTERNATIVE 4:

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts
This measure is the same as described for Alternative 2 and therefore, the level of potential impacts would be the same, and would be less than significant. The project would not increase the use of existing neighborhood parks and regional parks or other recreation facilities to the extent that substantial physical deterioration of those facilities would occur.

Indirect Impacts
Compared to Alternative 2, indirect impacts would be the same and would be less than significant.

Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, long-term operation, maintenance, and adaptive management impacts would be the same and would be less than significant.

Ecosystem Restoration Plan

Direct Impacts

Sediment Management Measure
This measure is the same as described for Alternative 2 and therefore, there would be no adverse effects to the use of other existing neighborhood parks or recreation facilities or accelerated physical deterioration of those facilities.

Chino Creek Channel Restoration Measure
This measure is the same as described for Alternative 2 and therefore, there would be no adverse effects to the use of other existing neighborhood parks or recreation facilities or accelerated physical deterioration of those facilities.

In-stream Habitat Features Measure Downstream
This measure is the same as described for Alternative 2 and therefore, there would be no adverse effects to the use of other existing neighborhood parks or recreation facilities or accelerated physical deterioration of those facilities.

In-stream Habitat Features Measure Upstream
Under Alternative 4, In-Stream Habitat Features would also be constructed within the SARM Upstream Focal Area. The in-stream habitat features consist of rock structure placements within the wetted channel of the Santa Ana River. There would be no adverse effects to the use of existing neighborhood parks or recreation facilities or accelerated physical deterioration of those facilities.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure
These measures are the same as described for Alternative 2 and therefore, there would be no adverse effects to the use of existing neighborhood parks or recreation facilities or accelerated physical deterioration of those facilities.

Feral Pig Management Measure, Non-Native Aquatic Species Control Measure, Cowbird Trapping Measure
Implementation of the above non-native wildlife management measures would have no adverse effects to the use of other existing neighborhood parks or recreation facilities and would not cause accelerated physical deterioration of those facilities.

Indirect Impacts
With exception of feral pig management, expanded non-native aquatics control to include downstream areas, and placement of instream habitat features in the upstream transition channel, all other measures are the same as described for Alternative 2, and therefore indirect impacts would be the same and no adverse effects would occur. None of these activities would indirectly displace users to existing neighborhood parks or recreation facilities or cause accelerated physical deterioration of facilities within the study area.

Long-Term Operation and Maintenance Impacts
There are no future operation and maintenance activities that would increase the use of existing neighborhood parks and regional parks or other recreation facilities within the study area.

Level of Impact for Alternative 4
Less than Significant Impact. Construction and future operation and maintenance activities would not increase the use of existing neighborhood parks and regional parks or other recreation facilities such that substantial physical deterioration of the facility would occur or be accelerated.

5.5 WATER RESOURCES

5.5.1 Regulatory Framework

Clean Water Act

The objectives of the Clean Water Act are to restore and maintain the chemical, physical, and biological integrity of Waters of the United States. The Clean Water Act establishes basic guidelines for regulating discharges of pollutants into the Waters of the United States and requires states to adopt water quality standards to protect health, enhance the quality of water resources and to develop plans and programs to implement the Clean Water Act. Below is a discussion of sections of the Clean Water Act that are relevant to the proposed project.

Section 401

Section 401 of the Clean Water Act requires federal agencies and applicants for a federal permit proposing work that involves a discharge into Waters of the United States to obtain certification that the discharges would not result in adverse water quality impacts. This process is known as the Water Quality Certification. For activities in Orange County, Riverside County, San Bernardino County, the Santa Ana Regional Water Quality Control Board (RWQCB) issues Section 401 Water Quality Certifications. The recommended plan, once selected, will require 401 Certification prior to construction as each action alternative includes measures that would result in discharges to Waters of the U.S.

Section 402

Section 402 of the Clean Water Act established the National Pollution Discharge Elimination System (NPDES) to control water pollution by regulating point sources that discharge pollutants into Waters of the United States. In the State of California, the Environmental Protection Agency (EPA) has authorized the State Water Resources Control Board (SWRCB) the permitting authority to implement the NPDES program. The SWRCB requires storm water discharges from construction sites with a disturbed area of one or more acres to either obtain individual NPDES permits for storm water discharges or be covered by the Construction General Permit. Coverage under the Construction General Permit is accomplished by completing and filing a Notice of Intent with the SWRCB and preparing and implementing a Storm Water Pollution Prevention Plan (SWPPP) prior to grading and during construction. The primary objective of the SWPPP is to identify, construct, implement, and maintain Best Management Practices (BMPs) to reduce or eliminate pollutants in storm water discharges and authorized non-storm water discharges from the construction site during construction. BMPs include; programs, technologies, processes, practices, and devices that control, prevent, remove, or reduce pollution.

Section 404

Section 404 of the Clean Water Act established a permitting program to regulate the discharge of dredged or filled material into Waters of the United States. The permitting program is administered by the Corps of Engineers. The Corps does not issue itself permits for Corps Civil Works projects but must comply with the 404(b)(1) guidelines. A draft Section 404(b)(1) evaluation has been prepared and is found in Appendix B, *404(b)(1) Evaluation*.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act established the SWRCB, which has the ultimate authority over state water rights and water quality policy. It also established nine regional boards to oversee water quality on a day-to-day basis at the local or regional level. The regional boards develop and update their respective basin plans, which are used to address beneficial uses, water quality standards for both surface water and groundwater, and measures necessary to control point and nonpoint sources. The Impact Significance Criteria and analyses, below and in the Biological Resources and Land Use & Recreation sections, as well as the 404(b)(1) Evaluation in Appendix B have been used to evaluate and indicate whether an alternative would be consistent with the Santa Ana River Basin Plan or violate established water quality standards. Conclusions are provided under the "Level of Significance" section for Significance Criterion HWQ-1, below.

5.5.2 Impact Significance Criteria

The impact criteria below were taken from Appendix G of the CEQA guidelines and are also being adopted for NEPA. For purposes of this analysis Alternative 1, 2, 3, or 4 would have a significant impact related to Water Resources if it would:

IMPACT HWQ-1: Violate Regional Water Quality Control Board Water Quality standards or waste discharge standards, or otherwise degrade water quality.

IMPACT HWQ-2: Significantly deplete groundwater supplies or interfere with groundwater recharge, such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table.

IMPACT HWQ-3: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or off site.

IMPACT HWQ-4: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite.

IMPACT HWQ-5: Create or contribute runoff which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.

IMPACT HWQ-6: Place structures within a 100-year floodplain which would impede or redirect flood flows or would expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as result of the failure of a levee or dam.

Environmental Commitments

EC-HWQ-1: The Sediment Management Measure shall implement an ongoing Water Quality Monitoring Program that would monitor for organic chemicals, including pesticides, PCBs,

PAHs and hydrocarbons, metals, total dissolved solids, indicator bacteria and dissolved oxygen upstream in the Prado Basin reservoir pool and downstream within waters where sediment re-entrainment would occur. Sediment that is used for re-entrainment would be processed by using a washing and settlement process to remove the fine-grained sediment from the sediment prior to re-entrainment downstream to reduce any nutrient, organic chemicals, and potential bacteria/pathogen constituents. The monitoring program would be implemented before construction, during sediment re-entrainment and after sediment re-entrainment. If significant differences between upstream and downstream samples are observed during sediment re-entrainment activities, the rate of sediment re-entrainment would be adjusted per the adaptive management measures included in the Water Quality Monitoring Program to ensure they are within acceptable thresholds of the Regional Water Quality Control Board Basin Plan.

EC-HWQ-2: The Corps and OCWD will implement water quality monitoring as needed to fulfill permit requirements for measure construction and discharge of re-entrained sediment below the dam. In addition, the Corps and OCWD will process sediment for re-entrainment using washing and settlement to remove the fine-grained sediment fraction (less than 0.05 mm particle diameter) from the sediment prior to re-entrainment downstream. The sediment processing will be carried out at the stockpile areas located near the spillway (Areas A and B on the sediment measure map, Figure 5-2). Sediment processing will address potential turbidity associated with the re-entrainment, as sand-size sediment does not contribute to turbidity due to rapid settlement from the water column, along with pollutants that are preferentially adsorbed onto fine-grained sediment. The predominance of sand in the grain-size distribution of Santa Ana River sediments upstream of the dam is illustrated in Figure X, which shows sediment sampling results at upstream locations.

EC-HWQ-3: A Sediment Movement Monitoring Program would be implemented to determine sediment profile changes in the Prado Basin and along segments of the lower Santa Ana River and upstream of sediment removal channel. For additional sediment accumulation that would occur upstream of the Dam under Alternative 3 (Plan 9), OCWD would operate a small-scale sediment trap to accumulate and remove sediment deposited in Prado Basin under this alternative, which would implement Water Conservation, but would not include the Sediment Management System measure.

EC-HWQ-4: OCWD would coordinate with the Orange County Flood Control District on the fair share responsibility to remove sediment that builds up near the Santa Ana River outlet reach to the ocean. As part of the coordination, the timing, frequency and resource agency permitting requirements would be determined.

EC-GEO-1: Prior to the start of construction the applicant would obtain coverage under the General Construction Permit by the State Water Resources Control Board and in compliance with the permit would file a Notice of Intent with the Regional Water Quality Control Board and prepare and implement appropriate Best Management Practices within a Storm Water Pollution Prevention Plan.

EC-HAZ-1: During construction and operation of the project all local, state and federal regulations would be complied with regarding to the transportation, handling, and storage of hazardous substances.

EC-HAZ-2: At each work area involving the operation of heavy equipment and handling and storage of hazardous substances, a Hazardous Material Spill Prevention Plan would be prepared. The hazardous Material Spill Prevention Plan shall contain contingency plans in the event of an accidental release into the environment.

5.5.3 Water Resource Impacts

5.5.3.1 **IMPACT HWQ-1**: Would the project violate any water quality standards or waste discharge standards, or otherwise degrade water quality?

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, neither the Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. There would be no construction or ecosystem restoration activities occurring in the study area and there would be no potential that water quality standards in the Basin Plan could be violated. The study area would continue to be subject to the water quality standards established in the Basin Plan.

ALTERNATIVE 2: PROPOSED ACTION

Water Conservation Plan (Elevation 505 Year-Round)

Direct Impacts
The Water Conservation Plan would increase the level of pooling and days of inundation within the Prado Basin; however, this action would neither increase nor decrease any existing contamination that may be present in storm water that enters the Basin. Water conservation would not introduce new sources of pollution that would violate RWQCB water quality standards. Implementation of the Water Conservation Plan would not involve any activities subject to Section 401 or Section 404 of the Federal Clean Water Act. Direct impacts would be less than significant.

Indirect Impacts
As water conservation would not cause or contribute to water contamination, the proposed plan would not result in increased contamination or impaired water quality in the surrounding watershed, including downstream of the dam. Therefore, indirect impacts would be less than significant.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities that would have the potential to violate any water quality standards or degrade water quality. Therefore, impacts would be less than significant.

Ecosystem Restoration Plan

Sediment Management Measure

The proposed Sediment Management Measure would remove sediment from the Prado Basin by a combination of heavy construction equipment and floating hydraulic dredge within the wetted channel of the Santa Ana River. Some of the sediment removed from the basin would be re-entrained into the Santa Ana River below Prado Dam. The portion of the sediment not re-entrained into the Santa Ana River below the dam would be transported to locations in Prado Basin away from the Santa Ana River and stored. Small amounts of the stored sediment could be trucked off-site for beneficial reuse.

Direct Impacts

Construction Sediment Trap and Transition Channel

Implementation of the Sediment Management Measure would involve grading and excavation activities. The Measure would involve operation of heavy construction equipment in the Santa Ana River and in the Prado Basin and would involve the handling of incidental amounts of hazardous substances such as fuels and oil. In the event an accidental spill occurs, potential adverse water quality impacts could occur. To maintain water quality, the measure would implement Best Management Practices that require that all heavy equipment operations in the Prado Basin and the Santa Ana River prepare and implement a Hazardous Material Spill Prevention Plan in the event inadvertent release of hazardous substations during construction.

Construction activities would involve the removal and uncovering of soils which would increase the potential for erosion impacts. Additionally, heavy construction equipment could track soils and indirectly transport soil to offsite locations. Construction projects which disturb more than one acre are required to obtain a General Construction Permit and prepare a SWPPP. The Sediment Management Measure would disturb more than one acre of area and would be required to obtain coverage under a General Construction Permit by the State Water Resources Control Board and prepare a SWPPP to minimize potential erosion and degraded storm water runoff impacts in accordance with Section 402 of the Clean Water Act.

Sediment Removal Activities

The Sediment Management Measure would remove sediment from the Prado Basin that has been deposited in the basin over several decades. To insure sediment removed from Prado Basin does not contain contaminates or other constituents that would reduce water quality, boring samples have been taken along the alignment of the sediment transition channel to help characterize the chemical composition of the sediment. A chemical analysis of the sediments in the Prado Basin showed no detected organic chemicals. The water column contained some inorganic nitrogen, and small quantities of metals, which were within ranges expected for background soils in California. Since the chemistry of the sediments in the Prado Basin showed no detected organic chemicals, it would be unlikely that sediment extracted from the basin would have detectable levels of organic chemicals. The sediment sampling detected small quantities of metals in the general location where the sediment transition channel would be constructed. The quantities of metals were within the regional background ranges expected for soils in the area and would not be expected to result in significant adverse water quality impacts.

Prior to discharging the sediment into the river, a Water Quality Monitoring Program would be implemented to monitor the water quality within Prado Basin reservoir pool and downstream within waters where sediment re-entrainment would occur. At a minimum, the Water Quality Monitoring Program would include monitoring for the following constituents: nutrients, pathogens, indicator bacteria, copper, lead, and chemical oxygen demand. As part of the Water Quality Monitoring Program, sediment samples will be collected from the alignment along which the sediment removal is to occur. Samples from each test area will be composited to reflect the mixed state that sediments will be in after dredging, de-silting, and stockpiling. Aliquots from the compounded sediments will be analyzed for grain size distribution, metals including copper lead and boron, and pesticides. The sediment removed from the basin would be tested to determine whether the sediment contains elevated contaminants or other constituents that would reduce water quality or conflict with the Basin Plan water quality standards. In the event the sediment exhibits detected levels of organic substances or metals, the sediment would not be used for re-entrainment and would be hauled offsite and disposed at an appropriate landfill facility.

The sediment removal activities would involve the operation of heavy construction equipment and a floating dredge within transition channel and sediment trap along the Santa Ana River. The operation the heavy construction equipment and floating dredge could cause elevated levels of turbidity to occur in the pooled water. There would be the potential that incoming flows could mix with the turbid water and continue to flow downstream. To minimize turbid water from being conveyed downstream, a series of earthen plugs would be installed at the lower end of the sediment trap and throughout the outlet channel. The plugs would create stilling basins that would help reduce suspended sediment and turbid waters from being conveyed downstream and leaving the Prado Basin. With the implementation of Environmental Commitments EC-GEO-1, EC-HWQ-1, EC-HAZ-1 and EC-HAZ-2 potential adverse water quality impacts would be less than significant and conflicts with the Basin Plan would be avoided.

Sediment Re-Entrainment Activities

The sediment re-entrained into the lower Santa Ana River would be processed into a slurry mixture consisting of 1 percent sediment and 99 percent water. It would be unlikely that the proposed sediment re-entrainment activities would significantly reduce dissolved oxygen levels, especially since re-entrainment would occur under high flow conditions. A water quality monitoring plan would be implemented to monitor for dissolved oxygen in upstream waters and within the waters where sediment re-entrainment would occur. If significant differences between upstream and downstream samples are observed, sediment re-entrainment rates would be adjusted to ensure they are within acceptable dissolved oxygen threshold ranges provided in the Basin Plan.

The Sediment Management Measure would re-entrain sediment removed from the Prado Basin under high flow conditions when there would be a high level of natural turbidity occurring in the water column. The sediment re-entrainment activities would increase the levels of turbidity over the level of natural turbidity caused by the high release rates. The Basin Plan establishes thresholds for allowed levels of maximum turbidity for water bodies of in the Santa Ana River Watershed based natural levels of turbidity. As shown in Table 5-23 during high flows when natural turbidity levels are greater than 100 Nephelometric Turbidity Units (NTU), a 10%

increase in NTUs is allowed. Because the sediment would be re-entrained under high flows it is anticipated the natural turbidity levels would be greater than 100 NTU, it assumed that a maximum 10% increase would be required. To ensure compliance with the Basin Plan, a Water Quality Monitoring Program would be implemented to monitor for turbidity when sediment re-entrainment activities are being conducted. Depending on levels of turbidity, adjustments would be made to the concentration of solids in the sediment slurry to ensure turbidity levels in compliance with the Basin Plan and that water violation of the Clean Water Act does not occur. With the implementation of Environmental Commitment EC-HWQ-1 potential water quality impacts would be less than significant.

Table 5-23: Basin Plan Turbidity Thresholds

Natural Turbidity	Maximum Increase
0-50 NTU	20%
50-100 NTU	10 NTU
Greater than 100 NTU	10%

Indirect Impacts

There would be no indirect adverse impacts to water quality. Required construction Best Management Practices implemented as part of the NPDES Construction General Permit have been designed to isolate disturbed areas such that there would be no indirect impacts.

Long-Term Operation and Maintenance Impacts

Long-term operation and maintenance activities for the Sediment Management Measure would include removal of sediment accumulated in the transition channel and sediment trap. Channel slopes would be re-graded regularly to fix erosion and maintain the hydraulic capacity of the channel. Maintenance of the grade stabilizers and repair of structures as needed. Maintenance of the road would likely entail periodic grading. Earthen fill or decomposed granite would be discharged where voids are present as needed. Adaptive management would include adjustments to methods, quantities and possibly locations of material excavated and, or re-entrained to ensure that success criteria are met. Maintenance and adaptive management activities would involve the operation of heavy equipment in the Santa Ana River and the Prado Basin. Adaptive management would include monitoring of downstream sediment accumulation and adjustment of re-entrainment rates to ensure the measure provides the intended benefits. Any impacts of adaptive management on water quality would be less than significant. To avoid adverse impacts Best Management Practices would be incorporated into the maintenance activities. With the implementation of Environmental Commitments EC-GEO-1, EC-HWQ-1, EC-HAZ-1 and EC-HAZ-2 adverse water quality impacts would be less than significant.

Chino Creek Channel Restoration Measure

Direct Impacts

Implementation of the Chino Creek Channel Restoration Measure would involve vegetation removals and grading activities within Chino Creek and within the Chino Creek floodplain. The proposed improvements would not directly discharge any substances into Chino Creek that

would exceed water quality standards established in the Basin Plan. Construction activities would involve the removal and uncovering of soils which would increase the potential for erosion impacts. Additionally, heavy construction equipment could track soils and indirectly transport soil to offsite locations. Implementation of the Chino Creek Channel Restoration Measure would disturb more than one acre of area and would involve operation of heavy equipment in Chino Creek. Best Management Practices would be in accordance with EPA labeling and state requirements for any use of herbicides or other hazardous substances. With the implementation of Environmental Commitments EC-GEO-1, EC-HAZ-1 and EC-HAZ-2 potential water quality impacts would be less than significant.

The Chino Creek Channel Restoration Measure would enhance riparian habitat along Chino Creek and would help maintain Warm, Wild, Rare Beneficial uses. The proposed improvements would also not conflict with REC-1 and REC-2 Beneficial uses established for Chino Creek in the Basin Plan. Chino Creek has been identified as Section 303 (d) Impaired Water Body for nutrients, pathogens, chemical oxygen. The proposed improvements would not discharge or involve any activities that would increase for nutrients, pathogens, or chemical oxygen loads in Chino Creek.

Indirect Impacts
There would be no indirect adverse impacts to water quality. Required construction Best Management Practices as part of the NPDES Construction General Permit have been designed to isolate disturbed areas such that there would be no indirect impacts.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would involve sediment removal and debris removal from Chino Creek generated from storm flows. Additionally, vegetation would be trimmed and maintained around the new channel, maintenance road, berms and in-channel structures. Adaptive management may require the occasional presence of equipment to adjust gradient, channel dimensions or plantings to ensure that success criteria are met. To avoid adverse water quality impacts during maintenance or adaptive management activities Environmental Commitments EC-GEO-1, EC-HAZ-1 and EC-HAZ-2 would be implemented. Impacts to water quality from long-term operation, maintenance and adaptive management of the Chino Creek measure would be less than significant.

In-stream Habitat Features Measure Downstream

Direct Impacts
Implementation In-Stream Habitat Features Measure would involve construction activities within the Santa Ana River. The construction activities would increase the potential for erosion and degraded storm water runoff impacts. Additionally, heavy construction equipment could track soils and indirectly transport soil to offsite locations. Best Management Practices would be in accordance with EPA labeling and state requirements for any use of herbicides or other hazardous substances. With the implementation of Environmental Commitments EC-GEO-1, EC-HAZ-1 and EC-HAZ-2 potential adverse water quality impacts would be less than significant.

Indirect Impacts
There would be no indirect adverse impacts to water quality. Required construction Best Management Practices as part of the NPDES Construction General Permit have been designed to isolate disturbed areas such that there would be no indirect impacts.

Long-Term Operation and Maintenance Impacts
Maintenance activities would likely entail like-for-like structural repair of the groin as needed. Such repairs would require the operation of heavy equipment in the Santa Ana River. Adaptive management may require occasional presence of equipment to reposition or bring in additional rocky material to ensure that success criteria are met. With the implementation of Environmental Commitments EC-GEO-1, EC-HAZ-1 and EC-HAZ-2 potential adverse water quality impacts from long-term operation, maintenance and adaptive management of instream habitat features would be less than significant.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure

Direct Impacts
Implementation of the above ecosystem restoration measures would help maintain Warm, Wild, Rare Beneficial uses and would not involve any long-term activities that would conflict with water quality standards established in the Basin Plan.

Implementation of the ecosystem restoration measures could involve the operation of the heavy equipment and the handling of incidental amounts of hazardous substances such as fuels and oil. Best Management Practices would be in accordance with EPA labeling and state requirements for any use of herbicides or other hazardous substances.

Indirect Impacts
There would be no indirect adverse impacts to water quality. Required construction Best Management Practices as part of the NPDES Construction General Permit have been designed to isolate disturbed areas such that there would be no indirect impacts.

Long-Term Operation and Maintenance Impacts
Maintenance and adaptive management activities would entail regular monitoring/inspection of the native planting area and annual removal of invasive plants using hand tools and mechanized equipment as appropriate. With the implementation Environmental Commitments EC-GEO-1, EC-HAZ-1 and EC-HAZ -2 potential water quality impacts would be less than significant.

Upstream Non-Native Aquatic Species Management Measure, Cowbird Management Measure

Direct Impacts
Implementation of the above wildlife management measures would not discharge any substances into any water bodies in the study area that would conflict with water quality standards established in the Santa Ana Region Basin Plan. Potential impacts to water resources would be less than significant.

Indirect impacts
There are no activities associated with the above wildlife management measures that would conflict with water quality standards established in the Santa Ana Region Basin Plan.
Long-Term Operation and Maintenance Impacts

There are no long-term operation and maintenance activities associated with the above wildlife management measures that would conflict with water quality standards established in the Santa Ana Region Basin Plan.

Consistency with Basin Plan Beneficial Uses
Rare: Implementation of restoration measures, in particular sediment management and instream habitat features, would help to expose existing beds of cobbles and gravels along the Santa Ana River upstream of the study area, which would restore habitat for endangered fish species such as the Santa Ana Sucker.
Warm/Wild: Reintroduction of sediment downstream of Prado Dam would help to prevent further incising of the Santa Ana River which would help to expand habitat along the banks and increase habitat for aquatic life and water fowl along the Santa Ana River. Chino Creek restoration would have similar benefits along that waterway.

Groundwater Recharge and Municipal Water Supply: Implementation of the sediment management measure would restore sediment migration along the Santa Ana River. The re-entrained sediment would be transported to reaches of Santa Ana River where groundwater recharge occurs to help facilitate infiltration into the groundwater basin, which would increase Groundwater Recharge and Municipal Water Supply Beneficial Uses.

Agriculture: Implementation of the sediment management measure would restore sediment migration along the Santa Ana River. The re-entrained sediment would be transported to reaches of Santa Ana River where groundwater recharge occurs to help facilitate infiltration into the groundwater basin, which could help increase Agriculture Beneficial Uses. None of the ecosystem management measures nor the Water Conservation Plan would affect existing agriculture uses.

Recreation 2: Implementation of the sediment management measure would transport sediment to coastal areas to help replenish sand along beaches for beach users. Additionally, the sediment management activities would help to prevent further incising of the Santa Ana River, which would help to expand habitat along the banks, which would enhance the overall aesthetic appearance of the river for bicyclists and hikers along the Santa Ana River Trail and would expand Recreation 2 Beneficial Uses. Other restoration measures that will result in the expansion of native riparian habitat would have similar benefits.

Consistency with Basin Plan Water Quality Objectives and Standards

The sediment re-entrainment activities would occur in the Santa Ana River, downstream of Prado Dam, Santa Ana River Reach 2, Santa Ana River Reach 1 and the Santa Ana River Tidal Prism. According to the Basin Plan, Reach-1 of the Santa Ana River and the Santa Ana River Tidal Prism both do not have water quality objectives. However, Reach-2 of the Santa Ana River

where the re-entrainment activities would occur has a total dissolved solids water quality objective of 650 mg/L and the Orange County Groundwater Basin has a total dissolved solids water quality objective of 580 mg/L. Chemical analysis of the sediments in Prado Basin detected some levels of total dissolved solids. However, the levels were within expected background soils in California and would be expected to not conflict with water quality objectives established in the Basin Plan. None of the other restoration measures or the Water Conservation Plan would worsen water quality or exceed thresholds identified in the Basin Plan.

Level of Impact for Alternative 2
Less than Significant Impact. Construction and maintenance activities would not violate any water quality standards or waste discharge standards, or otherwise degrade water quality.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 Year-Round with Incidental Sediment Removal)

Direct Impacts
Compared to Alternative 2, the level of potential direct impacts from the Water Conservation Plan would be similar. No potential conflicts with the water quality standards in the Basin Plan would occur.

Under Alternative 3, an incidental, smaller scale sediment removal program would be implemented in conjunction with the Water Conservation Plan. Construction activities would involve the removal and uncovering of soils which would increase the potential for erosion impacts. Additionally, heavy construction equipment could track soils and indirectly transport soil to offsite locations. Alternative 3 would disturb over one acre of area and would involve the operation of heavy construction equipment in the Santa Ana River. To reduce potential construction related water quality impacts to a less than significant level, Environmental Commitments EC-GEO-1, EC-HAZ-1 and EC-HAZ-2 would be implemented.

The incidental sediment removal program would not re-entrain the sediment removed from the basin. The sediment removed from the basin would be stored and dried out and stored at the sediment storage site. The sediment stockpile sites would be monitored for elevated levels of contaminants. If elevated levels of contaminants are present, the sediment would be disposed at an appropriate hazardous waste landfill facility. With the implementation of Environmental Commitment EC-HWQ-1 the sediment removal, stockpiling and hauling activities would not conflict with water quality standards established in the Basin Plan. Because under Alternative 3, there would be no sediment re-entrained into the lower Santa Ana River, there would be no potential water quality impacts to the Santa Ana River, downstream of the Prado Basin. Compared to Alternative 2, there would be less potential for adverse water quality impacts.

Indirect Impacts
There would be no indirect adverse impacts to water quality. Required construction Best Management Practices as part of the NPDES Construction General Permit have been designed to isolate disturbed areas such that there would be no indirect impacts.

Long-Term Operation and Maintenance Impacts

The maintenance activities for the Incidental Sediment Removal Program would be the upkeep of access roads. Maintenance of the roads would likely entail periodic grading. Earthen fill or decomposed granite would be discharged where voids are present as needed. Discharges associated with repairs would likely be limited to the proposed footprints of the roads. To reduce potential maintenance related water quality impacts to a less than significant level, Environmental Commitments EC-GEO-1, EC-HAZ-1 and EC-HAZ-2 would be implemented.

Ecosystem Restoration Plan

Direct, Indirect and Long-Term Operation and Maintenance Impacts

Chino Creek Channel Restoration Measure

The Chino Creek Channel Restoration measure is the same measure proposed in Alternative 2. Compared to Alternative 2, the level for potential adverse water quality impacts would be the same. With the implementation of Environmental Commitments EC-GEO-1, EC-HAZ-1 and EC-HAZ-2 potential adverse impacts associated with conflicts with water quality standards established in the Basin Plan would be less than significant.

Invasive Plant Management Measure, Native Plantings Measure

The Invasive Plant Management Measure and Native Plantings Measure proposed in Alternative 2 would be implemented in the same location proposed in Alternative 2. Compared to Alternative 2, the level of water quality impacts would be the same. Similar, to Alternative 2, with the implementation of Environmental Commitments EC-GEO-1, EC-HAZ-1 and EC-HAZ - 2 potential adverse water quality impacts would be less than significant.

Cowbird Management Measure

Implementation of the Cowbird Management Measure would not discharge any substances into any water bodies in the study area that would conflict with water quality standards established in the Santa Ana River Basin Plan. No adverse water quality impacts would occur.

Level of Impact for Alternative 3

Less than Significant Impact. Construction and maintenance activities would not violate any water quality standards or waste discharge standards, or otherwise degrade water quality. While sediment management and related ecosystem restoration measures would not be implemented, the habitat benefits associated with Chino Creek restoration, invasives removal and native plantings would be consistent with Basin Plan objectives. None of the other restoration measures or the Water Conservation Plan would worsen water quality or exceed thresholds identified in the Basin Plan.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 Year-Round)

Direct Impacts

The Water Conservation Plan proposed in Alternative 4 is the same Water Conservation Plan proposed in Alternative 2. Therefore, the level of potential water quality impacts would be the same. No potential conflicts with the water quality standards in the Basin Plan would occur.

Indirect Impacts

Similarly, as described for Alternative 2, there would be no activities that would result in adverse indirect impacts that would have the potential violate any water quality standards or degrade water quality.

Long-Term Operation and Maintenance Impacts

There are no long-term operation and maintenance activities that would have the potential to violate any water quality standards or degrade water quality.

Ecosystem Restoration Plan

Direct Impacts

Sediment Management Measure

The Sediment Management Measure proposed in Alternative 4 is the same Sediment Management Measure proposed in Alternative 2. Therefore, the level of potential construction-related water quality impacts would be the same. With the implementation of Environmental Commitments EC-GEO-1, EC-HWQ-1, EC-HWQ-2, EC-HAZ-1 and EC-HAZ-2 potential adverse impacts associated with conflicts with water quality standards established in the Basin Plan would be less than significant.

Chino Creek Channel Restoration Measure

The Chino Creek Restoration Measure proposed in Alternative 4 is the same measure proposed in Alternative 2, and therefore, impacts would be the same. With the implementation of Environmental Commitments EC-GEO-1, EC-HAZ-1 and EC-HAZ-2 potential adverse impacts associated with conflicts with water quality standards established in the Basin Plan would be less than significant.

In-stream Habitat Features Measure Downstream

As described in Alternative 2, implementation of In-Stream Habitat Features Measure would involve construction activities within the Santa Ana River. The construction activities would increase the potential for erosion and degraded storm water runoff impacts. Best Management Practices would be in accordance with EPA labeling and state requirements for any use of herbicides or other hazardous substances. With the implementation of Environmental Commitments EC-GEO-1, EC-HAZ-1 and EC-HAZ-2 potential adverse water quality impacts would be less than significant.

In-stream Habitat Features Measure Upstream
Under Alternative 4, In-Stream Habitat Features would also be constructed within the SARM Upstream Focal Area. Construction effects to water quality would be similar to those described for downstream measures and would be less than significant. The same environmental commitments would be followed.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure
The above measures would be implemented in the same location proposed in Alternative 2. Compared to the Proposed Action, the level of water quality impacts would be similar. With the implementation of Environmental Commitments EC-GEO-1, EC-HAZ-1 and EC-HAZ-2 potential impacts associated with conflicts with water quality standards established in the Basin Plan would be less than significant.

Non-Native Aquatic Species Management Measure, Feral Pig Management Measure, Cowbird Management Measure
Implementation of the above wildlife management measure would not discharge any substances into any water bodies in the study area that would conflict with water quality standards established in the Santa Ana River Basin Plan. No adverse water quality impacts would occur.

Indirect impacts
With the exception of feral pig management, expanded non-native aquatics control to include downstream areas, and placement of instream habitat features in the upstream transition channel, all of the other measures are the same as described for Alternative 2, and therefore indirect impacts would be the same and would be less than significant. None of the added activities would result in adverse indirect impacts that would have the potential violate any water quality standards or degrade water quality.

Long-Term Operation and Maintenance Impacts
With the exception of feral pig management, expanded non-native aquatics control to include downstream areas, and placement of instream habitat features in the upstream transition channel, all of the other measures are the same as described for Alternative 2, and therefore impacts from long-term operation and maintenance would be the same and would be less than significant. Feral pig management would not occur within water bodies and therefore would not affect water quality. Non-native aquatics control and placement of instream habitat features would not result in the discharge of any substances into any water bodies that would conflict with water quality standards established in the Santa Ana Region Basin Plan. Therefore, impacts from operation and maintenance of these features, as with their construction (or initial implementation), would be less than significant. Environmental Commitments EC-GEO-1, EC-HAZ-1 and EC-HAZ-2 would be implemented to further minimize or avoid potential effects.

Level of Impact for Alternative 4
Less than Significant Impact. Construction and maintenance activities would not violate any water quality standards or waste discharge standards, or otherwise degrade water quality. Consistency with the Basin Plan would be similar to Alternative 2.

5.5.3.2 **IMPACT HWQ-2**: Would the project significantly deplete groundwater supplies or interfere with groundwater recharge, such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table?

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, none of the proposed ecosystem restoration activities would be implemented. There would be no change to the existing groundwater condition in the study area.

ALTERNATIVE 2: PROPOSED ACTION

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts
Since Prado Basin is an area of groundwater discharge to surface water, temporarily increasing the elevation of surface water behind Prado Dam from 498 feet to 505 feet in the flood season would not increase or decrease groundwater recharge in Prado Basin. Implementation of the Water Conservation Measure would not significantly change groundwater elevations or groundwater conditions in Prado Basin. The increase in the buffer pool could potentially store, on average up to 6,000-acre feet of additional water that could be used to replenish the Orange County Groundwater Basin. The Water Conservation Plan would therefore have an indirect beneficial impact on local groundwater supplies, as described below.

Indirect Impacts
There are no activities that would result in indirect impacts that would deplete groundwater supplies or interfere with groundwater recharge. Water conservation operations at Prado Basin would allow storm water to be held and released at a low enough rate to facilitate groundwater recharge at OCWD spreading basins in the lower Santa Ana River. Indirect impacts, therefore, would be beneficial.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities that would result in impacts that would deplete groundwater supplies or interfere with groundwater recharge.

Ecosystem Restoration Plan

Sediment Management Measure

Direct Impacts
Implementation of the Sediment Management Measure would not involve extraction of groundwater from the Prado Basin. Sediment removed from the basin would be re-entrained into the lower Santa Ana River which would be transported to downstream reaches along the river where groundwater recharge occurs. The re-entrained sediment would facilitate the infiltration of

river water into the groundwater basin and would have a beneficial impact on ground water supplies.

Excavation activities to construct Sediment Management Measure transition channel, sediment trap, outlet channel and the OCWD Wetlands Pilot Chanel would occur over the Prado Basin Groundwater Management Zone. Since the excavation activities could encounter the groundwater table in some areas, there would be the potential for discharge of groundwater to surface water and lowering of the groundwater elevation. The risk of lowering the groundwater elevation along the OCWD Wetlands Pilot Channel, the upper ½ of the transition channel and the lower ¼ of the sediment trap and the outlet channel would be low. The OCWD Wetlands Pilot Channel would be at approximately the same elevation as the existing Santa Ana River channel and therefore would not be expected to lower the groundwater elevation in this area. The upper ½ of the transition channel would have relatively shallow cut depth (less than 10 feet below ground surface (BGS)) and would also not expected to lower the groundwater elevation in this area. The lower ¼ of the sediment trap and the outlet channel would have a cut depth ranging from 18 feet to 0 feet BGS. However, the risk of lowering the groundwater elevation in this area would be low because a series of earthen plugs would be installed at the lower end of the sediment trap and throughout the outlet channel to limit sediment transport out of the sediment trap. The plugs would also create stilling basins which would act as hydraulic control and limit the drop-in groundwater adjacent to the trap and channel. The plugs would be removed temporarily each year to facilitate sediment removal and would then be re-installed. The plugs and stilling basins would also help to reduce the suspended sediment concentration and turbidity of the water leaving Prado Basin.

There would be an increased risk of lowering the groundwater elevation along the lower ½ of the transition channel and the upper ¾ of the sediment trap. The transition channel cut depth would be from 14 ft. to approximately 20 ft. BGS. There would be increased risk of lower groundwater along the lower ½ of the transition channel because the excavation would likely be deeper than existing groundwater and the cut would be within 50 ft. of the native riparian habitat. The sediment trap cut depth would range from 10 ft. to approximately 24 t. below ground surface. The risk of lower groundwater along the upper ¾ of the sediment trap would be less than that along the lower ½ of the transition channel because the lowest elevations of the sediment trap are in the approximate center of the overall trap alignment and there would be a lower floodplain (300’ to 400’ wide) extended along both sides of the sediment trap centerline that would help transition the groundwater levels from the deepest part of the sediment to the existing riparian vegetation outside of the sediment trap area. Also, the sediment trap floodplain areas are planned to be permanently cleared and “impacted” if needed. Groundwater levels along the lower ½ of the transition channel and the upper ¾ of the sediment trap could be adaptively managed by installing additional plugs and stilling basins similar, to those planned for the lower end of the sediment trap and throughout the outlet channel. The plugs and stilling basins would act as hydraulic grade control and their elevations could be adjusted to optimize the sediment collection and groundwater elevation control functions of the system. If the use of plugs and stilling basins fail to achieve the desired level of groundwater elevation protection, then additional measures could be used to sustain groundwater levels adjacent to the sediment management system. Some of the measures available include the use of gravity fed surface or subsurface irrigation fields to supply water to vegetation communities. Some more aggressive

measures include features such as subsurface sheet pile or grout cut-off walls to limit the lateral movement of groundwater into the transition channel or sediment trap.

Indirect Impacts
There are no activities that would result in indirect impacts that would deplete groundwater supplies or interfere with groundwater recharge at Prado Basin. Sediment re-entrainment would provide more coarse grained material downstream in the Santa Ana River that would help sustain recharge rates and have a beneficial indirect impact on groundwater resources in the Orange County groundwater basin.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities that would result in impacts that would deplete groundwater supplies or interfere with groundwater recharge.

Chino Creek Channel Restoration Measure

Direct Impacts
Implementation of the Chino Creek Channel Restoration Measure would not extract groundwater or interfere with groundwater recharge. No impacts to underground water supplies would occur.

Indirect Impacts
There are no activities that would result in indirect impacts that would deplete groundwater supplies or interfere with groundwater recharge.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would result in impacts that would deplete groundwater supplies or interfere with groundwater recharge.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure, In-stream Habitat Features Measure-Downstream

Direct Impacts
The above ecosystem restoration measures would not extract groundwater or interfere with groundwater recharge. Removal of some of the invasive plant material and replanting with native vegetation would have a beneficial impact because the non-native vegetation, e.g., *arundo donax* consumes more water than native vegetation. Minor beneficial to no impacts to underground water supplies would occur.

Indirect Impacts
There are no activities associated with these measures that would result in indirect impacts that would deplete groundwater supplies or interfere with groundwater recharge.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities associated with these measures that would result in impacts that would deplete groundwater supplies or interfere with groundwater recharge.

Non-Native Aquatic Species Management Measure, Cowbird Management Measure

Direct Impacts
Implementation of the above wildlife management measures would not extract groundwater or interfere with groundwater recharge. No impacts to underground water supplies would occur.

Indirect Impacts
There are no activities that would result in indirect impacts that would deplete groundwater supplies or interfere with groundwater recharge.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities that would result in impacts that would deplete groundwater supplies or interfere with groundwater recharge.

Level of Impact for Alternative 2
Beneficial Impact. Water Conservation would result in an indirect beneficial impact by increasing the amount of water that is available for recharge in the OCWD spreading basins in the Lower Santa Ana River. Construction, operation, maintenance and adaptive management activities associated with the Ecosystem Restoration Plan would not significantly deplete groundwater supplies or interfere with groundwater recharge, such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 Feet Year-Round with Incidental Sediment Removal)

Direct Impacts
Similar to Alternative 2, implementation of the Water Conservation Plan would have a beneficial impact on local groundwater supplies.

Under Alternative 3, an incidental, smaller scale sediment removal program would be implemented in-conjunction with the Water Conservation Plan. The sediment that would be removed would slightly increase water storage that could be used to replenish the Orange County Groundwater Basin. Under Alternative 3, there would be no sediment re-entrainment and no benefits from increasing groundwater infiltration rates at the spreading grounds would occur.

Indirect Impacts
There are no activities that would result in indirect impacts that would deplete groundwater supplies or interfere with groundwater recharge.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities that would result in impacts that would deplete groundwater supplies or interfere with groundwater recharge.

Ecosystem Restoration Plan

Direct, Indirect, and Long-Term Operation and Maintenance Impacts

Chino Creek Channel Restoration Measure
The Chino Creek Channel Restoration measure is the same measure proposed in Alternative 2, and therefore, the level of potential impacts would be the same. No impacts to underground water supplies would occur.

Invasive Plant Management Measure, Native Plantings Measure
The above ecosystem restoration measures would not extract groundwater or interfere with groundwater recharge. Minor beneficial to no impacts to underground water supplies would occur.

Cowbird Management Measure
Implementation of the Cowbird Management Measure would not extract groundwater or interfere with groundwater recharge. No impacts to underground water supplies would occur.

Level of Impact for Alternative 3
Beneficial Impact. Water Conservation would result in an indirect beneficialiImpact by increasing the amount of water that is available for recharge in the OCWD spreading basins in the Lower Santa Ana River. Construction, operation, maintenance and adaptive management of ecosystem restoration activities would not significantly deplete groundwater supplies or interfere with groundwater recharge, such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts
The Water Conservation Plan proposed in Alternative 4 is the same Water Conservation Plan proposed in Alternative 2. The level of potential impacts would be the same. Implementation the measure would have a beneficial impact on local groundwater supplies.

Indirect Impacts
There are no activities that would result in indirect impacts that would deplete groundwater supplies or interfere with groundwater recharge. Indirect benefits would occur, as described in Alternative 2.

Long-Term Operation and Maintenance Impacts
There are no long-term activities that would result in indirect impacts that would deplete groundwater supplies or interfere with groundwater recharge.

Ecosystem Restoration Plan

Direct Impacts

Sediment Management Measure
The Sediment Management Measure proposed in Alternative 4 is the same Sediment Management Measure proposed in Alternative 2. The level of potential impacts would be the same. Implementation the measure would have a beneficial impact on local groundwater supplies.

Chino Creek Channel Restoration Measure
The Chino Creek Restoration Measure proposed in Alternative 4 is the same Sediment Management Measure proposed in Alternative 2. Similar to Alternative 2, implementation of the Chino Creek Channel Restoration Measure would not extract groundwater or interfere with groundwater recharge. No adverse impacts on underground water supplies would occur.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure, Downstream In-Stream Habitat Features Measure
The above measures would be implemented in the same location proposed in Alternative 2. The level of potential impacts would be the same. Minor beneficial to no impacts to underground water supplies would occur.

In-stream Habitat Features Measure Upstream
Under Alternative 4, In-Stream Habitat Features would also be constructed within the SARM Upstream Focal Area. No impact to groundwater supplies or recharge would occur.

Non-Native Aquatic Species Management Measure, Feral Pig Management Measure, Cowbird Management Measure
Implementation of the above wildlife management measures would not extract groundwater or interfere with groundwater recharge. No impacts to underground water supplies would occur.

Indirect Impacts
There are no activities that would result in indirect impacts that would deplete groundwater supplies or interfere with groundwater recharge.

Long-Term Impacts
There are no long-term activities that would result in indirect impacts that would deplete groundwater supplies or interfere with groundwater recharge.

Level of Impact for Alternative 4
Beneficial Impact. Construction and maintenance activities would not significantly deplete groundwater supplies or interfere with groundwater recharge, such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table.

5.5.3.3 **IMPACT HWQ-3**: Would the project significantly alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or off site?

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, none of the proposed ecosystem restoration activities would be implemented. There would be no activities occurring in the Prado Basin that would alter existing drainage patterns or increase erosion in the Prado Basin.

ALTERNATIVE 2: PROPOSED ACTION

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts

There would be the potential that implementation of the Water Conservation Plan could increase sediment deposition within the Prado Basin and water releases from Prado Dam could result in downstream erosion impacts. The following analysis evaluates potential sediment deposition and erosion impacts associated with implementation of the Water Conservation Plan:
The additional water stored under the Water Conservation Plan would slightly increase sediment deposition within Prado Basin. To quantify the additional sediment deposition that could potentially occur in the Prado Basin from the Water Conservation Plan an analysis of potential deposition impacts was prepared by Scheevel Engineering (Santa Ana River Upstream Effects Due to Water Conservation, 2015). In Scheevel's analysis the following assumptions were considered.

All sand size particles would deposit in the Prado Basin irrespective of the proposed Water Conservation Plan seven-foot increase to the flood season water surface elevation, leaving a portion of the silt and clay fraction of the incoming sediment for deposition.

The additional 10,500-acre feet of water in the Prado Basin would be held for a duration that allows for all the silt and clay particles to settle out of the water column.

There would also be approximately 14,000 cubic yards of sand transported into Prado Basin as suspended sediment with each 10,500-acre feet of water. All suspended sand and sand transported into the Prado Basin as bed load would be heavy enough to be deposited in the Prado Basin regardless of water conservation operations. The greatest deposition in the Prado Basin occurs along the segment of the Santa Ana River between 505 ft. and 524 ft.

The TSS of the Prado storm water inflow is 2,000 mg/L. Historical data shows average Prado inflow storm water TSS to range between 500 to 2,000 mg/L.

The silt and clay portion of the TSS is 20%.

On average it would be expected that the Prado Basin water surface elevation would reach or exceed, elevation 505 ft. one time per year. An additional volume of 10,500-acre feet of water would be impounded under the Proposed Action. Considering the above assumptions, it was calculated that an additional 3,500 cubic yards of silt and clay sediments could deposit annually in Prado Basin. The estimated increase of 3,500 cubic yards would represent a 0.3% increase in the annual sedimentation volume. Once into the Prado Basin, the silt and clay sediments would disperse over large areas due to their ability to stay suspended more easily than sand, gravel and cobbles. The approximate surface area of the Prado Basin below the 505 ft. contour is 1,890 acres. Due to turbulence in the Prado Basin created by wind action and tributary inflow it would be anticipated that suspended clay and silt sediments would be distributed evenly over the entire 1,890-acre pool area below 505 ft. in the Prado Basin. If the silt and clay is distributed there would be an average of 0.001 ft. per year of sediment deposition. Under existing conditions there would be approximately 0.5 to 0.7 ft. of sediment deposition annually along the Santa Ana River in the Prado Basin. The amount of additional sedimentation from the Water Conservation Plan would be considered negligible compared to existing baseline sedimentation rate between 0.5 and 0.7 feet occurring each year. While annually, the 0.001 per year increase in sediment deposition would be considered negligible in time it would cumulatively build up and reduce water conservation storage in the Prado Basin. Under the Proposed Action a Sediment Management Measure would be implemented that would remove incoming sediment from the Prado Basin. The expected amount of sediment that would be removed would exceed the 3,500 cubic yards of sediment that would deposit annually from the Water Conservation Plan during the life of the Feasibility Study. Potential adverse sediment deposition impacts would be less than significant.

Indirect Impacts

To evaluate potential indirect downstream erosion impacts from the implementation of the Water Conservation Plan, an analysis of potential downstream erosion impacts was prepared by Scheevel Engineering (Santa Ana River Downstream Upstream Effects Due to Water Conservation, 2015). The report is presented in Appendix G.

Potential downstream erosion impacts from water release from Prado Dam would be dependent upon the flow rate and duration. The primary hydraulic variable which causes damaging erosion flows to a river system would be the velocity of the flowing water. The primary components which control the flow velocities are the cross-sectional area of the channel, the slope of the channel, the roughness of the channel and the total flow passing through a given cross sectional area. Water released from Prado Dam has the potential to affect the velocity of flows along the lower Santa Ana River. Ultimately the flow velocity's impacts on sediment transport characteristics determine how much erosion or deposition would occur in a given section of the lower Santa Ana River. Prado Dam and the lower Santa Ana River have been designed for controlled releases up to 30,000 cubic feet per second (cfs). However, at this time because of ongoing construction activities occurring along Reach 9 (Prado Dam to Weir Canyon), outside of extreme flood runoff scenarios where 10,000 cfs discharge would be necessary release rates would generally result in flows up to 5,000 cfs for flood risk management purpose. Several civil infrastructure assets exist along the lower Santa Ana River; multiple bridge crossings, bank stabilization features and utility crossings. The majority assets have not been affected by historical releases from Prado Dam.

IEBL/SARI Pipeline

Historically the SARI pipeline has been threatened by channel incision in Reach 9. The SARI pipeline carries brine discharge and raw sewage from Riverside and San Bernardino counties into Orange County. A project was completed in 2015 to protect and relocate the SARI pipeline/SAR crossing along Reach 9. A Reach 9 scour report was prepared by Tetra Tech and HDR in 2010 to provide analysis and recommendations for the new locations and depths of the SARI pipeline relocation. A sediment transport analysis was performed by Tetra Tech which utilized a 100- year flow series to estimate the total maximum scour at the SARI pipeline locations of interest. Included in the analysis were multiple 5,000 cfs release events and two 30,000 cfs release events. The report concluded that the pipeline should be relocated to depths greater than 9 feet in order to protect it from future channel incision and bank erosion. Water releases outside of extreme flood runoff scenarios where 10,000 cfs discharge would be necessary would generally result in flows up to 5,000 cfs for flood risk management purposes, which would produce negligible channel incision at the SARI pipeline locations. Based on the SARI pipeline's new protective cover depths, no long-term adverse impacts to the SARI pipeline would be expected to occur from waster released associated with implementation of the Water Conservation Plan.

BNSF Bridge

The BNSF Railroad Bridge consists of 3 separate bridges with each bridge carrying one set of tracks. The first bridge was constructed in 1938 as a relocation of an existing bridge and was done as a part of the original Prado Dam construction. The other 2 bridges (immediately downstream of the 1938 bridge) were constructed in 1995. The bridges were designed for Prado Dam release flows (up to 30,000 cfs) but were not originally designed for the rate of scour occurring in Reach 9. Currently, the BNSF Bridge could handle flood risk management discharge up to 10,000 cfs from Prado Dam as necessary.

Improvements to the BNSF Bridge are currently being designed and would be under construction in 2017 – 2020. In general, the common historic flood risk management releases from Prado Dam have been up to 5,000 cfs. The Planned Deviation outside of extreme flood runoff events that would require a discharge of 10,000 cfs from Prado Dam, the flood risk management discharge would be up to 5,000 cfs. Therefore, it is not expected to increase the risk of damaging flows in the lower Santa Ana River where the BNSF Bridge improvements would occur.

Green River Housing Estates, Mobile Home Park and Golf Course

The Green River Housing Estates, Mobile Home Park and Golf Course projects include various forms of channel geometry modification and bank stabilization. The majority of these improvements have been completed within the areas potentially affected by a 5,000 cfs (or less) releases. The Planned Deviation outside of extreme flood runoff events that would require a discharge of 10,000 cfs from Prado Dam, the flood risk management discharge would be up to 5,000 cfs. Therefore, it is not expected to increase the risk of damaging flows in the lower Santa Ana River where the Green River Housing Estates, Mobile Home Park and Golf Course improvements would occur.

SR-91 Freeway

The SR-91 Freeway parallels the lower Santa Ana River at several locations along Reach 9. The lower Santa Ana River embankments nearest to the SR-91 Freeway have been improved by modifying the channel geometry, adding rip rap, sheet pile, grouted stone and derrick stone to with stand flows up to 30,000 cfs. The release rates proposed by the Planned Deviation would be well below the design flows (of the SR-91 improvements. Potential impacts to the SR-91 would be less than significant. .

Long-Term Operation and Maintenance Impacts

There are no long-term operation and maintenance activities would result in substantial erosion or siltation on or off site.

Ecosystem Restoration Plan

Sediment Management Measure

Direct Impacts

The construction of the sediment trap, sediment storage site, and transition channel would uncover approximately 559 acres of soil in the study area. The sediment management activities would be required to obtain coverage under a General Construction Permit by the State Water Resources Control Board and prepare a SWPPP to minimize potential erosion impacts. With the implementation of the Environmental Commitment EC-GEO-1 potential erosion impacts would be less than significant.

Indirect Impacts

Upstream Erosion Impacts

The regular removal of sediment from Prado Basin as a part of a long-term sediment management program would increase the probability of channel incision upstream of the study area and possibly increase the gradient of the river which could encourage fine to medium grained sediment (clay, silt and sand) to migrate into the study area for future removal, while uncovering existing upstream deposits of gravel and cobbles where they exist. In fact, that is the purpose and expected outcome of this measure. The proposed measure includes the construction of a sediment trap to capture incoming sediment into the Basin. The sediment trap would be connected to the Santa Ana River Channel by a transition channel. The primary purpose of the transition channel would be to control the horizontal and vertical movement of the Santa Ana River as sediment migrates into the trap area. The transition channel would be regularly maintained and re-graded, thereby providing the opportunity to control the rate of incision and prevent excessive erosion of the river bed.

A sediment transport model has been developed for the sediment trap, transition channel and the Santa Ana River upstream to the Riverside/San Bernardino County line (County Line). The initial 10 years of model results indicate that between 5 feet and 10 feet of additional incision could occur between the trap alignment and the Hamner Avenue crossing, and that lesser amounts (< 5 feet) of additional incision could occur between Hamner Avenue crossing and the

County Line. Current model estimates predict that approximately 5 to 7 feet of incision could occur near the River Road Bridge crossing.

As the channel grade steepens due to channel incision some coarsening of the Santa Ana River bed would be expected to occur. From the trap alignment to an area upstream of the Interstate 15 crossing the river bed is expected to shift from fine/medium sand to medium/coarse sand with intermittent gravel beds. The section of the river bed from downstream of the Van Buren Boulevard crossing upstream to the County Line would vary between coarse sands to fine/medium gravels.

Due to the planned regular maintenance of the transition channel, substantial incision of the river bed would be unlikely. Dredging and/or grading operations at the upper end of the trap alignment could be adaptively managed to control the initial elevation of the river bed incision. If the channel incision starts to approach concerning levels, there would be the ability to re-grade and manage the River bed slope to control the rate of degradation. To help measure changes to the gradient of the river, a Sediment Movement Monitoring Program would be implemented at selected locations. The monitoring program would provide data and insights on erosion occurring from variations in flow rates. Depending on levels of deposition and erosion measurements from the Sediment Movement Monitoring Program, adjustments would be made to sediment re-entrainment activities to minimize adverse incision impacts. With the implementation of Environmental Commitment EC-HWQ-2, potential adverse erosion impacts would be less than significant.

Downstream Sediment Deposition Impacts

Currently, sediment accumulates near the tidal prism of the Santa River, periodically requiring the Orange County Flood Control District to remove the sediment to maintain flood control capacity along the river. Excessive deposition along Reach 9 of the Santa Ana River would be avoided by reducing or temporarily halting re-entrainment operations and allowing flushing flows to re-distribute the sediment downstream. Excessive sedimentation in OCWD's recharge reach of the river would be mechanically dispersed or removed from the channel by OCWD as a part of their regular operation and maintenance activities for the River channel. Excessive sedimentation in the concrete lined section of the lower Santa Ana River would be exported off site by trucking. As part of the ongoing maintenance for the Sediment Management Measure, OCWD would coordinate with Orange County Flood Control District on the fair share responsibility for the removal of sediment from the Santa Ana River near the tidal prism. With the implementation of Environmental Commitment EC-HWQ-5 potential indirect adverse impacts associated with the contribution to the buildup of sediment near the tidal prism would be reduced to a less than significant level. This impact analysis is based on an updated sediment transport analysis that included changes in sediment re-entrainment rates to avoid impacts that were projected in a study previously conducted by Golder Associates that is included in Appendix G.

Long-Term Operation and Maintenance Impacts

Maintenance activities for the Sediment Management Measure would include removal of sediment accumulated in the transition channel and sediment trap. Channel slopes would be re-graded regularly to fix erosion and maintain the hydraulic capacity of the channel. Maintenance

of the grade stabilizers and repair of structures would occur as needed. Maintenance of the road would likely entail periodic grading. Earthen fill or decomposed granite would be discharged where voids are present as needed. Maintenance activities would involve the operation of heavy equipment in the Santa Ana River and the Prado Basin which would uncover soils and increase the potential for erosion impacts. To avoid adverse erosion impacts Best Management Practices would be incorporated into the maintenance activities. With the implementation of Environmental Commitments EC-GEO-1, EC-HWQ-1, EC-HAZ-1 and EC-HAZ-2, impacts related to alteration of drainage patterns, erosion and siltation would be less than significant.

Chino Creek Channel Restoration Measure

Direct Impacts
Implementation of the Chino Creek Channel Restoration Measure would remove vegetation and uncover soils in the study area. The grading activities for the Chino Creek Channel Restoration Measure would be required to obtain coverage under a General Construction Permit by the State Water Resources Control Board and prepare a SWPPP to minimize potential erosion impacts. With the implementation of the Environmental Commitment EC-GEO-1 potential erosion impacts would be less than significant.

Indirect Impacts
Required construction Best Management Practices implemented as part of the NPDES Construction General Permit have been designed to isolate disturbed areas such that there would be no indirect impacts.

Long Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would involve sediment removal and debris removal from Chino Creek generated from storm flows. To avoid potential erosions impacts from the sediment removal activities during maintenance activities Environmental Commitment EC-GEO-1 would be implemented.

In-stream Habitat Features Measure-Downstream

Direct Impacts
Implementation In-Stream Habitat Features Measure would involve construction activities near and within the Santa Ana River. The construction activities would expose soils and increase the potential for erosion impacts. With the implementation of Environmental Commitment EC-GEO-1, potential erosion impacts would be less than significant.

Indirect Impacts
Required construction Best Management Practices implemented as part of the NPDES Construction General Permit have been designed to isolate disturbed areas such that there would be no indirect impacts.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities that would result in substantial erosion or siltation on or off site.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure

Implementation of the above measures would uncover soils in the study area, potentially exposing uncovered soils to erosion impacts. The amount soils disturbed would exceed one acre and would be required to obtain coverage under a General Construction Permit by the State Regional Water Quality Control Board and prepare a SWPPP. With the implementation of Environmental Commitment EC-GEO-1 potential adverse erosion impacts would be less than significant.

Indirect Impacts

Required construction Best Management Practices implemented as part of the NPDES Construction General Permit have been designed to isolate disturbed areas such that there would be no indirect impacts.

Long-Term Operation and Maintenance Impacts

Maintenance activities would entail regular monitoring/inspection of the native planting area and annual removal of invasive plants using hand tools and mechanized equipment as appropriate. There would be the potential that the operation of the mechanized equipment could result in local erosion impacts. With the implementation Environmental Commitment EC-GEO-1 potential erosion impacts would be less than significant.

Non-Native Aquatic Species Management Measure, Cowbird Management Measure

Direct Impacts

Implementation of the above wildlife management measures would not involve any activities that would result in substantial erosion or siltation on or off site.

Indirect Impacts

There are no activities associated with the above wildlife management measures that would indirectly result in substantial erosion or siltation on or off site.

Level of Impact for Alternative 2

Less than Significant Impact. Construction and long-term operation and maintenance activities would not significantly alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or off site.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 Feet Year-Round with Incidental Sediment Removal)

Direct Impacts

Potential sediment deposition and erosion impacts would be similar to those described in Alternative 2 and would be less than significant.

Under Alternative 3, an incidental, smaller scale sediment removal program would be implemented in-conjunction with the Water Conservation Plan. Under Alternative 3, approximately 40 acres of soil would be uncovered, which would increase the potential for erosion impacts. Uncovered sediment stockpiled at the sediment storage site could be subject to erosion impacts caused by water and wind. Additionally, heavy construction equipment could track soils and indirectly transport soil to offsite locations. Grading activities would be subject to coverage under a General Construction Permit by the Regional Water Quality Control Board, and a Storm Water Pollution Prevention Plan (SWPPP) would be prepared. Compared to the Sediment Management measure in Alternative 2, there would less grading activity and less potential for erosion impacts. With the implementation of Environmental Commitment EC-GEO-1 potential adverse erosion impacts would be less than significant.

Indirect Impacts
Required construction Best Management Practices implemented as part of the NPDES Construction General Permit have been designed to isolate disturbed areas such that there would be no indirect impacts.

Long-Term Operation and Maintenance Impacts
The maintenance activities for the Incidental Sediment Removal Program would be the upkeep of access roads. Maintenance of the roads would likely entail periodic grading. There would be the potential grading activities could increase the potential for erosion impacts. To reduce potential maintenance erosion impacts to a less than significant level, Environmental Commitment EC-GEO-1would be implemented.

Ecosystem Restoration Plan

Direct, Indirect and Long-Term Operation and Maintenance Impacts

Chino Creek Channel Restoration Measure
The Chino Creek Restoration Measure proposed in Alterative 4 is the same measure proposed in Alternative 2, and therefore the impacts would be the same. As with Alternative 2, the measure would be required to obtain coverage under a General Construction Permit by the State Water Resources Control. With the implementation of Environmental Commitment EC-GEO-1 potential adverse erosion impacts would be less than significant.

Invasive Plant Management Measure, Native Plantings Measure
These are the same measures proposed in Alternative 2, and therefore the impacts would be the same. As with Alternative 2, implementation of the ecosystem restoration measures would be required to obtain coverage under a General Construction Permit by the Regional Water Quality Control Board and prepare a SWPPP. With the implementation of Environmental Commitment EC-GEO-1 potential adverse erosion impacts would be less than significant.

Cowbird Management Measure
Implementation of the Cowbird Management Measure would not involve any activities that would uncover soils and generate erosion impacts.

Level of Impact for Alternative 3
Less than Significant Impact. Construction and long-term operation and maintenance activities would not significantly alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or off site.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 Feet-Year-Round)

Direct Impacts
The Water Conservation Plan proposed in Alternative 4 is the same Water Conservation Plan proposed in Alternative 2. Therefore, the level of potential sediment deposition and erosion impacts would be the same and would be less than significant.

Indirect Impacts
Compared to Alternative 2 the level of indirect impacts would be the same and would be less than significant.

Long-Term Operation and Maintenance Impacts
As with Alternative 2, there are no long-term operation and maintenance activities would result in substantial erosion or siltation on or off site.

Ecosystem Restoration Plan

Direct Impacts

Sediment Management Measure
The Sediment Management Program proposed in Alternative 2 is the same Sediment Management program proposed in Alternative 2 and therefore, the level of potential sediment deposition and erosion impacts would be the same. As with Alternative 2, with the implementation of Environmental Commitments EC-HWQ-3 and EC-GEO-1 potential adverse erosion impacts would be less than significant.

Chino Creek Channel Restoration Measure
Implementation of the Chino Creek Channel Restoration Measure under Alternative 4 would result in the same impacts as under the Proposed Action. It would require coverage under a General Construction Permit by the State Water Resources Control Board and a SWPPP to minimize potential erosion impacts. With the implementation of Environmental Commitment EC-GEO-1, potential erosion impacts would be less than significant.

In-Stream Habitat Features Measure- Downstream
The In-Stream Habitat Feature in the downstream focal area proposed under Alternative 4 is the same as proposed in Alternative 2. The level of construction-related and operational impacts would be the same as for Alternative 2. With the implementation of Environmental Commitment EC-GEO-1, potential erosion impacts would be less than significant.

In-stream Habitat Features Measure Upstream

Under Alternative 4, In-Stream Habitat Features would also be constructed within the SARM Upstream Focal Area. Construction effects associated with erosion, siltation and alteration of drainage patterns would be similar to those described for downstream measures and would be less than significant. The same environmental commitments would be followed.

Invasive Plant Management Measure, Native Planting Measure, Riparian Edge Management Measure

As described for Alternative 2, implementation of the above ecosystem restoration measures would be subject to coverage under a General Construction Permit by the Regional Water Quality Control Board, and a SWPPP would be prepared. With the implementation of Environmental Commitment EC-GEO-1 potential adverse erosion impacts would be less than significant.

Non-Native Aquatic Species Management Measure, Feral Pig Management Measure, Cowbird Management Measure

Implementation of the above wildlife management measures would not involve any activities that would uncover soils and generate erosion impacts.

Indirect Impacts

With the exception of feral pig management, expanded non-native aquatics control to include downstream areas, and placement of instream habitat features in the upstream transition channel, all of the other measures are the same as described for Alternative 2, and therefore indirect impacts would be the same and would be less than significant. None of the measures added for Alternative 4 would result in substantial or significant erosion impacts. As with Alternative 2, construction Best Management Practices would be implemented as part of the NPDES Construction General Permit.

Long-Term Operation and Maintenance Impacts

With exception of feral pig management, expanded non-native aquatics control to include downstream areas, and placement of instream habitat features in the upstream transition channel, all other measures are the same as described for Alternative 2, and therefore impacts from long-term operation and maintenance would be the same and would be less than significant. Feral pig management would not occur within water bodies and therefore would not affect drainage patterns or cause erosion or siltation. Non-native aquatics control and placement of instream habitat features could disturb streambeds and banks resulting in minor erosion, but this would be localized and minimized through best management practices including EC-GEO-1. Impacts from operation and maintenance of these features, as with their construction (or initial implementation), would be less than significant.

Level of Impact for Alternative 4

Less than Significant Impact. Construction and long-term operation and maintenance activities would not significantly alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or off site.

5.5.3.4 **IMPACT HWQ-4**: Would the project significantly alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite?

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, neither the Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented and there would be no change to the study area condition. Existing rates of surface water runoff and flood risks within the study and flood risks would remain the same.

ALTERNATIVE 2: PROPOSED ACTION

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts

Implementation of Water Conservation Plan would result in increased pooling in the buffer pool at the Prado Basin. There may be a need to rapidly evacuate the buffer pool occurs when there is a forecasted storm event of significant intensity that has the potential to exceed flood risk management operational water surface elevations. In some previous planning and feasibility studies the allotted time to drain the buffer pool was 24 hours. This time allotment was partially based on forecast model capabilities at the time the water control manual was written. Storm system forecasting has improved significantly with the development of advance weather forecast modeling, and in practice the available time to drain the buffer pool is more than 24 hours. Construction activities along Reach 9 are expected to occur when the Feasibility Report ecosystem restoration measures are being implemented. During these construction periods the Corps target release rate would be up to 5,000 cfs if necessary to drain the pool quicker.

The duration required to drain the buffer pool is based on the beginning storage volume, Prado Basin inflow and Prado Basin outflow. Each storm event is different, but in general the Prado Basin inflow after the storm system has passed (and after the peak of the inflow hydrograph occurs) inflow would settle back down to the normal baseflow which can range between 200 to 400 cfs. In order to calculate the average time to evacuate the buffer pool an inflow of 300 cfs has been used as the Basin inflow rate. Two Basin outflow release rates have been analyzed to provide a range of buffer pool evacuation durations, 2,500 cfs and 5,000 cfs. The two release rates scenarios are shown in Table 5-24 and Table 5-25. The analysis shows that at 2,500 cfs and 5,000 cfs the buffer pool could be drained in a matter of days to avoid potential flood risks, in the event a significant storm is pending.

Table 5-24: Buffer Pool Evacuation Durations at 2,500 cfs Outflow

	Annual Sedimentation Rate Between Elev. 490.0 to 505.0	Available Water Storage Volume Between Elev. 490.0 to 505.0	Basin Inflow	Basin Outflow	Days to Drain Water Conservation Volume from Elev. 505.0 to 490.0
Year	**(af/yr)**	**(af)**	**(cfs)**	**(cfs)**	**(days)**
1988	200	21,066	300	2,500	4.8
2008	200	17,326	300	2,500	4.0
2015	200	15,926	300	2,500	3.7
2020	200	14,926	300	2,500	3.4
2025	200	13,926	300	2,500	3.2
2030	200	12,926	300	2,500	3.0
2035	200	11,926	300	2,500	2.7
2040	200	10,926	300	2,500	2.5
2045	200	9,926	300	2,500	2.3
2050	200	8,926	300	2,500	2.0
2055	200	7,926	300	2,500	1.8
2060	200	6,926	300	2,500	1.6
2065	200	5,926	300	2,500	1.4
2070	200	4,926	300	2,500	1.1
2075	200	3,926	300	2,500	0.9
2080	200	2,926	300	2,500	0.7

Table 5-25: Buffer Pool Evacuation Durations at 5,000 cfs Outflow

	Annual Sedimentation Rate Between Elev. 490.0 to 505.0	Available Water Storage Volume Between Elev. 490.0 to 505.0	Basin Inflow	Basin Outflow	Days to Drain Water Conservation Volume from Elev. 505.0 to 490.0
Year	**(af/yr)**	**(af)**	**(cfs)**	**(cfs)**	**(days)**
1988	200	21,066	300	5,000	2.3
2008	200	17,326	300	5,000	1.9
2015	200	15,926	300	5,000	1.7
2020	200	14,926	300	5,000	1.6
2025	200	13,926	300	5,000	1.5
2030	200	12,926	300	5,000	1.4
2035	200	11,926	300	5,000	1.3
2040	200	10,926	300	5,000	1.2
2045	200	9,926	300	5,000	1.1
2050	200	8,926	300	5,000	1.0
2055	200	7,926	300	5,000	0.9
2060	200	6,926	300	5,000	0.7
2065	200	5,926	300	5,000	0.6
2070	200	4,926	300	5,000	0.5
2075	200	3,926	300	5,000	0.4
2080	200	2,926	300	5,000	0.3

Indirect Impacts
Draining the buffer pool in advance of a pending storm may result in increased flows along the lower Santa Ana River, downstream of Prado Dam. The lower Santa Ana River extends from Prado Dam to the Pacific Ocean. The design capacity of the LSAR provides protection for a storm event with a 190-year recurrence interval. Prado Dam has been designed for a maximum controlled release rate of 30,000 cfs. The lower Santa Ana River channel has also been designed to provide protection from a 190-year event and the channel capacity increases downstream to provide capacity for local inflow. Table 5-26 provides a summary of the channel capacity at various locations along the lower Santa Ana River.

Table 5-26: LSAR Channel Design Capacity

Crossing Location	Design Flow Rate (cfs)
Prado Dam Outflow	30,000
Imperial Highway	38,000
Carbon Canyon Diversion Channel	40,000
Santiago Creek	46,000
Pacific Ocean	47,000

The lower Santa Ana River from the Weir Canyon crossing downstream to the Pacific Ocean has improved channel walls (rip-rap, grouted stone or concrete), invert grade stabilizers, drop structures and concrete lined inverts at some locations. This section of the lower Santa Ana River has experienced flows in excess of 10,000 cfs on one occasion and flows of 2,500 to 5,000 cfs on multiple occasions with little to no damage. Because the design capacity in this section of the lower Santa Ana River is greater than 37,000 cfs, and the maximum proposed discharge resulting from the Planned Deviation would 5,000 cfs or less, it can reasonably be expected that potential impacts due to flood risks along lower Santa Ana River would be less than significant.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities associated with the Water Conservation Plan that would substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite.

Ecosystem Restoration Plan

Sediment Management Measure

Direct Impacts
The Sediment Management Measure would remove sediment from Prado Basin, which would result in a net increase in reservoir storage capacity. The increased reservoir capacity would not increase flood elevation levels and would not adversely impact the frequency, duration or severity of flooding.

Indirect Impacts
The Sediment Management Measure would re-entrain sediment downstream of Prado Dam. A HEC-RAS Sediment Transport Analysis concluded that with the implementation of the Sediment Management Measure there would be an increase in sediment deposition in several reaches of

the river between Prado Dam and the ocean. The Sediment Management Measures have been adjusted to reduce the risk of excessive sedimentation, which includes some sediment removal to deal with smaller amounts of deposition within these reaches. As part of the ongoing maintenance for the Proposed Action, OCWD would coordinate with Orange County Flood Control District on the fair share responsibility for the removal of sediment from the outlet reach of the river. As part of the coordination, the timing, frequency and resource agency permitting requirements would be determined. With implementation of Environmental Commitment EC-HWQ-4, the potential impact of sediment accumulation near the Santa Ana River outlet reach to increase flood risks would be less than significant.

Long-Term Operation and Maintenance Impacts
Effects of long-term operation, maintenance and adaptive management would be similar, to the direct and indirect impacts associated with construction and would be less than significant.

Chino Creek Channel Restoration Measure

Direct Impacts
Implementation of the Chino Creek Channel Restoration Measure would introduce 0.23 acres of new impervious surfaces into the project area. This amount of new impervious surface would minimally increase the rate of surface water runoff over the current condition and would minimally decrease the flood risks by increasing the floodplain.

Indirect Impacts
There are no activities associated with Chino Creek Restoration Measure that would indirectly increase the rate or amount of surface runoff in a manner which would result in flooding offsite.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities associated with the Chino Creek Restoration Measure that would substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite.

In-stream Habitat Features Measure-Downstream

Direct Impacts
Implementation of the In-Stream Habitat Features Measure would not be expected to adversely affect flood control capacity. A portion of the in-stream habitat features would be excavated into the invert of the low flow channel which would further reduce the risk of any impacts to the flood control function of the lower Santa Ana River.

Indirect Impacts
There are no activities associated with In-Stream Habitat Features Measure that would indirectly increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities associated with the Chino Creek Restoration Measure that would substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure

Direct Impacts
Implementation of the above ecosystem restoration measures would not involve the construction of additional amounts of impervious surfaces within the study area. There would be no increases to existing rates of surface water runoff and no potential increase for flood risks.

Indirect Impacts
There are no activities associated with the above ecosystem restoration measures that would indirectly increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities associated with the above ecosystem restoration measures that would substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite.

Non-Native Aquatic Species Management Measure, Cowbird Management Measure

Direct Impacts
Implementation of the above wildlife management measures would not involve the construction of additional amounts of impervious surfaces within the study area. There would be no increases to existing rates of surface water runoff and no potential increase for flood risks.

Indirect Impacts
There are no activities associated with the above wildlife management measures that would indirectly increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities associated with the above wildlife management measures that would substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite.

Level of Impact for Alternative 2
Less than Significant impact. Construction and maintenance activities would not significantly alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 Feet Year-Round with Incidental Sediment Removal)

Direct Impacts

The level of potential flood impacts from the Water Conservation Plan would be similar to Alternative 2. Potential flood impacts would be less than significant.
Under Alternative 3, an incidental, smaller scale sediment removal program would be implemented in-conjunction with the Water Conservation Plan. The proposed sediment removal and hauling activities would not increase the amounts of impervious surfaces within the study area. There would be no changes to existing rates of surface water runoff and no increased flood risks.

Indirect Impacts

Implementation of the sediment removal and hauling program would not involve re-entrainment of sediment into the Santa Ana River. There would not be any potential that the sediment could aggregate downstream reducing flood risk capacity along downstream segments of the Santa Ana River.

Long-Term Operation and Maintenance Impacts

There are no long-term operation and maintenance activities associated with the Water Conservation Plan with incidental sediment removal activities that would substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite.

Ecosystem Restoration Plan

Direct, Indirect and Long-Term Operation and Maintenance Impacts

Chino Creek Channel Restoration Measure

The Chino Creek Restoration Measure proposed in Alternative 3 is the same measure proposed in Alternative 2 and therefore, impacts would be the same. As with Alternative 2, implementation of the Chino Creek Channel Restoration Measure would minimally increase existing rates of surface water runoff and would not increase flood risks.

Invasive Plant Management Measure, Native Plantings Measure

Implementation of the above ecosystem restoration measures would not involve the construction of additional amounts of impervious surfaces within the study area. There would be no increases in existing rates of surface water runoff and no potential increase flood risks.

Cowbird Management Measure

Implementation of the Cowbird Management Measure would not involve the construction of additional amounts of impervious surfaces within the study area. There would be no increases in existing rates of surface water runoff and no potential increase flood risks.

Level of Impact for Alternative 3
Less than Significant Impact. Construction and maintenance activities would not significantly alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 Feet-Year-Round)

Direct Impacts
The Water Conservation Plan proposed in Alternative 4 is the same Water Conservation Plan proposed in Alternative 2. Compared to Alternative 2, the level of potential flood impacts would be the same. There would be no increased flood risks.

Indirect Impacts
Compared to Alternative 2, the level of potential offsite flood impacts would be the same. There would be no increased offsite flood risks.

Long-Term Operation and Maintenance Impacts
Similar, to Alternative 2 there are no long-term operation and maintenance activities associated with the Water Conservation Plan that would substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite.

Ecosystem Restoration Plan

Direct Impacts

Sediment Management Measure
The Sediment Management Measure proposed in Alternative 4 is the same Sediment Management Measure proposed in Alternative 2. Compared to Alternative 2, the level of potential flood impacts would be the same. With implementation of Environmental Commitment EC-HWQ-4 potential adverse flood impacts would be less than significant.

Chino Creek Channel Restoration Measure
Compared to the Proposed Action, the level of potential flood impacts would be the same. There would be no increased flood risks.

In-Stream Habitat Features Measure-Upstream and Downstream
Compared to the Proposed Action, the level of potential flood risks associated with the downstream In-Stream Habitat Features would be the same. There would be no increased flood risks.

In-stream Habitat Features Measure Upstream
Under Alternative 4, In-Stream Habitat Features would also be constructed within the SARM Upstream Focal Area. As with the downstream features, there would be no increased flood risk.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure
Compared to the Proposed Action, the level of potential flooding risks associated with implementation of the above ecosystem restoration measures would be the same. There would be no increased flood risks.

Non-Native Aquatic Species Management Measure, Feral Pig Management Measure, Cowbird Management Measure
Implementation of the above wildlife management measures would not involve the construction of additional amounts of impervious surfaces within the study area. There would be no increases in existing rates of surface water runoff and no potential increase flood risks.

Indirect Impacts
With the exception of feral pig management, expanded non-native aquatics control to include downstream areas, and placement of instream habitat features in the upstream transition channel, all of the other measures are the same as described for Alternative 2, and therefore indirect impacts would be the same and would be less than significant. None of the measures added under Alternative 4 would increase surface water runoff or cause flooding. There are no activities associated with the proposed Ecosystem Restoration Plan measures that would indirectly increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities associated with the above Ecosystem Restoration Plan measures that would substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite.

Level of Impact for Alternative 4
Less than Significant impact. Construction and maintenance activities would not significantly alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite.

5.5.3.5 **IMPACT HWQ-5**: Would the project create or contribute runoff which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, neither the Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. There would be no change to the study area condition. There would be no activities in the Prado Basin that would increase the rate of surface water flows where they would exceed the capacity of existing or planned drainage systems.

ALTERNATIVE 2: PROPOSED ACTION

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts
Implementation of the Water Conservation Plan would increase the water surface elevation in the buffer pool from 498 ft. to 505 ft. during the flood season. The Water Conservation Plan would not generate increases in storm water runoff that would exceed the existing or planned drainage systems or provide substantial additional sources of polluted runoff.

Indirect Impacts
There are no activities associated with the Water Conservation Plan would generate increases in offsite storm water runoff that would exceed the existing or planned drainage systems or provide substantial additional sources of polluted runoff.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities that would generate increases in storm water runoff that would exceed the existing or planned drainage systems or provide substantial additional sources of polluted runoff.

Ecosystem Restoration Plan

Sediment Management Measure

Direct Impacts
The Sediment Management Measure would restore rivers and ecosystems and increase groundwater recharge. The long-term operation of the Sediment Management Measure would not increase the rate of surface water runoff where it would exceed the capacity of existing or planned drainage facilities within the study area.

Construction and operation of the Sediment Management Measure could potentially generate degraded surface runoff which could reduce water quality in the study area. With the implementation of Environmental Commitment EC-GEO-1 potential adverse surface water runoff water quality impacts would be less than significant.

Indirect Impacts
There are no activities associated with the Sediment Management Measure that would indirectly generate increases in offsite storm water runoff. Required construction Best Management Practices implemented as part of the NPDES Construction General Permit have been designed to isolate disturbed areas such that there would be no adverse indirect water quality impacts.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities associated with the Sediment Management Measure that would generate increases in offsite storm water runoff. With the implementation of Environmental Commitment EC-GEO-1 potential adverse surface water runoff water quality impacts would be less than significant.

Chino Creek Channel Restoration Measure

Direct Impacts
The Chino Creek Channel Restoration Measure would expand and restore the floodplain, allowing for increased infiltration and improved water quality. This measure, once fully constructed, would not generate surface water runoff that would exceed the capacity of existing or planned drainage facilities within the study area.

Construction of Chino Creek Channel Restoration Measure, however, could potentially generate degraded surface runoff which could reduce water quality in the study area. With the implementation of Environmental Commitment EC-GEO-1 potential adverse surface water runoff water quality impacts would be less than significant.

Indirect Impacts
There are no activities associated with the Chino Creek Measure that would generate increases in offsite storm water runoff. Required construction Best Management Practices implemented as part of the NPDES Construction General Permit have been designed to isolate disturbed areas such that there would be no adverse indirect water quality impacts.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities associated with the Chino Creek Restoration Measure that would generate increases in offsite storm water runoff. With the implementation of Environmental Commitment EC-GEO-1 potential adverse surface water runoff water quality impacts would be less than significant.

In-stream Habitat Features Measures-Downstream

Direct Impacts
The operation of the In-Stream Habitat Features Measure would not generate long-term surface water runoff impacts that would exceed the capacity of existing or planned drainage facilities within the study area. With the implementation of Environmental Commitment EC-GEO-1 potential adverse water quality impacts would be less than significant.

Indirect Impacts
There are no activities associated with the In-Stream Habitat Features Measure that would generate increases in offsite storm water runoff. Required construction Best Management Practices implemented as part of the NPDES Construction General Permit have been designed to isolate disturbed areas such that there would be no adverse indirect water quality impacts.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities associated with the In-Stream Habitat Features Measure that would generate increases in offsite storm water runoff. With the implementation of Environmental Commitment EC-GEO-1 potential adverse surface water runoff water quality impacts would be less than significant.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure

Direct Impacts
Implementation of the above ecosystem restoration measure would not generate long-term surface water runoff impacts that would exceed the capacity of existing or planned drainage facilities within the study area. With the implementation of Environmental Commitment EC-GEO-1 potential adverse surface water runoff water quality impacts would be less than significant.

Indirect impacts
There are no activities associated with the above ecosystem restoration measures that would generate increases in offsite storm water runoff. Required construction Best Management Practices implemented as part of the NPDES Construction General Permit have been designed to isolate disturbed areas such that there would be no adverse indirect water quality impacts.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities associated with the above ecosystem restoration measures that would generate increases in offsite storm water runoff. With the implementation of Environmental Commitment EC-GEO-1 potential adverse surface water runoff water quality impacts would be less than significant.

Non-Native Aquatic Species Management Measure, Cowbird Management Measure

Direct Impacts
Implementation of the above wildlife management measure would not generate long term increases in storm water runoff that would exceed the capacity of existing or planned drainage systems or involve any construction activity and would not provide new sources of polluted surface water runoff.

Indirect Impacts
Implementation of the above ecosystem restoration measures would not generate offsite increases in storm water runoff that would exceed the existing or planned drainage systems or provide substantial additional sources of polluted runoff.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and management activities that would generate offsite increases in storm water runoff that would exceed the existing or planned drainage systems or provide substantial additional sources of polluted runoff.

Level of Impact for Alternative 2
Less than Significant Impact. Construction and long-term operation and maintenance activities would not create or contribute runoff which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 Feet Year-Round with Incidental Sediment Removal)

Direct Impacts

The level of potential surface water runoff impacts from the Water Conservation Plan would be similar to Alternative 2. With the implementation of Environmental Commitment EC-GEO-1 potential adverse surface water runoff water quality impacts would be less than significant. There would not be any significant long term increases in storm water runoff that would exceed the capacity of existing or planned drainage systems.

The sediment removal activities would require grading and the operation of heavy equipment near the Santa Ana River. There is the potential that degraded surface water impacts could occur from the construction activity. With the implementation of Environmental Commitment EC-GEO-1 potential adverse surface water runoff water quality impacts would be less than significant.

Indirect Impacts

There are no activities associated with the Water Conservation Plan with incidental sediment removal activities that would generate increases in offsite storm water runoff that would exceed the existing or planned drainage systems. Required construction Best Management Practices implemented as part of the NPDES Construction General Permit have been designed to isolate disturbed areas such that there would be no adverse indirect water quality impacts.

Long-Term Operation and Maintenance Impacts

There are no long-term operation and maintenance activities that would generate increases in storm water runoff that would exceed the existing or planned drainage systems. During maintenance activities Environmental Commitment EC-GEO-1 would implemented to maintain water quality.

Ecosystem Restoration Plan

Direct, Indirect and Long-Term Operation and Maintenance Impacts

Chino Creek Channel Restoration Measure

The Chino Creek Restoration Measure proposed in Alternative 3 is the same measure proposed in Alternative 2 and therefore, impacts would be the same. As with Alternative 2, there would not be any significant long term increases in storm water runoff that would exceed the capacity of existing or planned drainage systems or result in adverse surface water runoff water quality impacts. To minimize potential construction related degraded surface water runoff impacts Environmental Commitment EC-GEO-1 would be implemented.

Invasive Plant Management Measure, Native Plantings Measure

These measures are the same as proposed in Alternative 2 and therefore, impacts would be the same. There would not be any significant long term increases in storm water runoff that would

exceed the capacity of existing or planned drainage systems or provide adverse surface water runoff water quality impacts. With the implementation of Environmental Commitment EC-GEO-1 potential adverse construction related storm water runoff water quality impacts would be less than significant.

Cowbird Management Measure
Implementation of the Cowbird Management Measure would not generate long term in storm water runoff that would exceed the capacity of existing or planned drainage systems or involve any construction activity and would not provide new sources of polluted surface water runoff.

Level of Impact for Alternative 3
Less than Significant Impact. Construction and long-term operation and maintenance activities would not create or contribute runoff which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impact
The Water Conservation Plan would not generate increases in storm water runoff that would exceed the existing or planned drainage systems or provide substantial additional sources of polluted runoff.

Indirect Impacts
There are no activities associated with the Water Conservation Plan that would generate increases in offsite storm water runoff that would exceed the existing or planned drainage systems or provide substantial additional sources of polluted runoff.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities associated with the Water Conservation Plan that would generate increases in storm water runoff that would exceed the existing or planned drainage systems or provide substantial additional sources of polluted runoff.

Ecosystem Restoration Plan

Direct Impacts

Sediment Management Measure
The Sediment Management Measure proposed in Alternative 4 is the same Sediment Management program proposed in Alternative 2 and therefore, the level of potential surface water runoff impacts on existing drainage facilities would be same. With the implementation of Environmental Commitment EC-GEO-1 potential adverse construction related degraded storm water quality impacts would be less than significant.

Chino Creek Channel Restoration Measure

The Chino Creek Restoration Measure proposed in Alternative 4 is the same Chino Creek Measure proposed in Alternative 2 and therefore, the level of potential surface water runoff impacts would be the same. With the implementation of Environmental Commitment EC-GEO-1 potential adverse surface water runoff water quality impacts would be less than significant.

In-Stream Habitat Features Measure- Downstream

Implementation of the In-Stream Habitat Features Measure would not generate storm water runoff that would exceed the capacity of existing or planned drainage systems. With the implementation of Environmental Commitment EC-GEO-1 potential adverse water quality impacts would be less than significant.

In-stream Habitat Features Measure Upstream

Under Alternative 4, In-Stream Habitat Features would also be constructed within the SARM Upstream Focal Area. As with the downstream features, this measure would not generate storm water runoff that would exceed the capacity of existing or planned drainage systems.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure

Similar, to Alternative 2, implementation of these measures would not generate long term in storm water runoff that would exceed the capacity of existing or planned drainage systems. With the implementation of Environmental Commitment EC-GEO-1 potential adverse water quality impacts would be less than significant.

Non-Native Aquatic Species Management Measure, Feral Pig Management Measure, Cowbird Management Measure

Implementation of the above wildlife management measures would not generate long term in storm water runoff that would exceed the capacity of existing or planned drainage systems or would not involve any construction activity that would provide new sources of polluted surface water runoff. No degraded surface water runoff impacts would occur.

Indirect Impacts

With exception of feral pig management, expanded non-native aquatics control to include downstream areas, and placement of instream habitat features in the upstream transition channel, all other measures are the same as described for Alternative 2, and therefore indirect impacts would be the same and would be less than significant. There are no activities associated with the above Ecosystem Restoration Plan measures, including the measures added for Alternative 4,that would generate increases in offsite storm water runoff that would exceed the existing or planned drainage systems. Required construction Best Management Practices implemented as part of the NPDES Construction General Permit have been designed to isolate disturbed areas such that there would be no adverse indirect water quality impacts.

Long-Term Operation and Maintenance Impacts

There are no long-term operation and management activities associated with the above Ecosystem Restoration Plan measures that would generate increases in storm water runoff that would exceed the existing or planned drainage systems. During maintenance activities those

activities which have the potential to degrade water quality will be required to implement Best Management Practices to maintain water quality.

Level of Impact for Alternative 4
Less than Significant Impact. Construction and long-term operation and maintenance activities would not create or contribute runoff which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.

5.5.3.6 **IMPACT HWQ-6:** Would the project place structures within a 100-year floodplain which would impede or redirect flood flows, or expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, none of the proposed ecosystem restoration measures would be implemented. Prado Dam would continue to operate has a flood risk management facility providing flood protection for downstream land uses.

ALTERNATIVE 2 PROPOSED ACTION

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts
The Water Conservation Plan would raise the water surface elevation in the buffer pool from 498 ft. to 505 ft. during the flood season. The additional water impounded in the buffer pool during the flood season would inundate portions of the Prado Basin for longer periods of time. However, the additional days of inundation would not adversely affect Prado Dam or increase onsite flood risks. No new structures would be built.

The requirements for flood operations at Prado Dam would not change with the Water Conservation Plan. The duration required to drain the buffer pool is based on the beginning storage volume, Prado Basin inflow and Prado Basin outflow. Each storm event is different, but in general the Prado Basin inflow after the storm system has passed (and after the peak of the inflow hydrograph occurs) inflow would settle back down to the normal baseflow which can range between 200 to 400 cfs. Two Basin outflow release rates of 2,500 cfs and 5,000 cfs could be used to drain water held for water conservation in a matter of days to avoid potential flood risks, in the event a significant storm is pending.

Indirect Impacts
Dam operations at Prado Dam would be conducted in accordance with the Water Control Plan for Prado Dam. In the event of a significant storm and flood control capacity is needed, the impounded water in the buffer pool would be released in accordance with the Prado Dam Water Control Plan to prevent offsite downstream flooding impacts.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and management activities that expose people or structures to a significant risk of flooding.

Ecosystem Restoration Plan

Sediment Management Measure

Direct Impacts
The Sediment Management Measure has been designed to avoid impacts to Prado Dam and the outlet works and would not increase risks for damage to the dam that might cause flooding. The measure would operate under the regulations provided in the Prado Dam Water Control Manual and would not increase the risk of flooding in the study area.

Indirect Impacts
Implementation of the Sediment Management Measure would not involve any activities that would adversely affect Prado Dam or increase or impede downstream flood flows.

Long-Term Operation and Maintenance impacts
There are no long-term operation and maintenance activities that would adversely affect Prado Dam or increase or impede onsite and offsite downstream flood flows.

Chino Creek Channel Restoration Measure

Direct Impacts
The measure would have no effect on Prado dam that would increase flooding. Implementation of the Chino Creek Channel Restoration Measure would involve the construction of a diversion pipe, grade control structure, bio-engineered invert stabilizer, concrete stream crossing, perimeter berms, new channel excavation and site grading. The measure would re-route Chino Creek flows through a new channel along the west side of Chino Creek between Euclid Avenue and Pine Avenue. A portion of the west side of Chino Creek would be diverted back into the existing Chino Creek channel. The improvements would redirect low flows but would not impede or redirect 100-year flood flows where they would cause flooding.

Indirect Impacts
Implementation of the Chino Creek Restoration Measure would not involve any activities that would affect Prado Dam or increase or impede downstream flood flows.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities associated with the Chino Creel Restoration Measure that would affect Prado Dam or increase and impede onsite and offsite downstream flood flows.

In-stream Habitat Features Measure-Downstream

Direct Impacts
The measure would not increase flooding. Implementation of the In-Stream Habitat Feature would not impede or redirect 100-year flood flows or reduce flood capacity of the river that would threaten the safety of people or property. The In-stream habitat features would be constructed within the existing incised low flow channel of the river. The height of the In-Stream Features would be less than the channel incision and would occupy flow area not critical to flood risk management objectives. Additionally, a portion of the in-stream habitat features would be excavated into the invert of the low flow channel which would further reduce the risk of any impacts to the flood control function of the lower Santa Ana River.

Indirect Impacts
Implementation of the In-Stream Habitat Feature would not involve any activities that would affect Prado Dam or increase and impede downstream flood flows.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities associated with the In-Stream Habitat Feature that would affect Prado Dam or increase and impede onsite and offsite downstream flood flows.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure

Direct Impacts
The measures would have no effect on Prado dam that would increase flooding. Implementation of the above ecosystem restoration measures would not involve the construction of structures or facilities that would impede or redirect 100-year flood flows.

Indirect Impacts
Implementation of the above ecosystem restoration measures would not involve any activities that would affect Prado Dam or increase and impede downstream flood flows.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities associated with the above ecosystem restoration measures that would affect Prado Dam or increase and impede onsite and offsite downstream flood flows.

Non-Native Aquatic Species Management Measure, Cowbird Management Measure
Implementation of the above wildlife management measures would not involve the construction of structures or facilities that would affect Prado Dam or increase and redirect 100-year flood flows.

Indirect Impacts
Implementation of the above wildlife management measures would not involve any activities that would affect Prado Dam or increase and impede downstream flood flows.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities associated with the above wildlife management measures that would affect Prado Dam or increase and impede onsite and offsite downstream flood flows.

Level of Impact for Alternative 2
Less than Significant Impact. Construction and long-term operation and maintenance activities would not place structures within a 100-year floodplain which would impede or redirect flood flows or expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 Feet Year-Round with Incidental Sediment Removal)

Direct Impacts
Compared to the Proposed Action the level of adverse flood risk impacts from the Water Conservation Plan would be similar. Potential flood risk impacts would be less than significant. Under Alternative 3, an incidental, smaller scale sediment removal program would be implemented in-conjunction with the Water Conservation Plan. The incidental sediment removal activities would not occur near Prado Dam and would have no effect on the operation of the dam. As with Alternative 2, the measure would operate under the regulations provided in the Prado Dam Water Control Manual and would not increase the risk of flooding in the study area.

Indirect Impacts
Dam operations at Prado Dam would be conducted in accordance with the Water Control Plan for Prado Dam. In the event of a significant storm and flood control capacity is needed, the impounded water in the buffer pool would be released in accordance with the Prado Dam Water Control Plan to prevent offsite downstream flooding impacts.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities that expose people or structures to a significant risk of flooding.

Ecosystem Restoration Plan

Direct, Indirect and Long-Term Operation and Maintenance Impacts

Chino Creek Channel Restoration Measure
The Chino Creek Restoration Measure proposed in Alternative 2 is the same measure proposed for Alternative 2, and therefore, flood risk impacts would be the same and less than significant.

Invasive Plant Management Measure, Native Plantings Measure
These measures are the same as proposed for Alternative 2 and therefore, potential flood risk impacts would be the same and would be less than significant.

Cowbird Management Measure
Implementation of the Cowbird Trapping Measure would not involve the construction of structures or facilities that would impede or redirect 100-year flood flows.

Level of Impact for Alternative 3
Less than Significant Impact. Construction and long-term operation and maintenance activities would not place structures within a 100-year floodplain which would impede or redirect flood flows or expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of failure of a levee or dam.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts
The Water Conservation Plan proposed in Alternative 4 is the same Water Conservation Plan proposed in Alternative 2 and therefore, the level of adverse flood impacts would be the same. Potential flood risk impacts would be less than significant.

Indirect Impacts
As described in Alternative 2, dam operations at Prado Dam would be conducted in accordance with the Water Control Plan for Prado Dam. In the event of a significant storm and flood control capacity is needed, the impounded water in the buffer pool would be released in accordance with the Prado Dam Water Control Plan to prevent offsite downstream flooding impacts.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities associated with the Water Conservation Plan that would adversely affect Prado Dam or expose people or structures to a significant risk of flooding.

Ecosystem Restoration Plan

Direct Impacts

Sediment Management Measure
The Sediment Management Measure proposed in Alternative 4 is the same Sediment Management Measure proposed in Alternative 2 and therefore, potential flood risk impacts would be the same and less than significant.

Chino Creek Channel Restoration Measure
The Chino Creek Measure proposed in Alternative 4 is the same Chino Creek Measure proposed in Alternative 2 and therefore, potential flood risk impacts would be the same and less than significant.

In-Stream Habitat Features Measure- Downstream
Implementation of the In-Stream Habitat Feature would not impede or redirect 100-year flood flows or reduce flood capacity of the river to an extent that would threaten the safety of people or property.

In-stream Habitat Features Measure Upstream
Under Alternative 4, In-Stream Habitat Features would also be constructed within the SARM Upstream Focal Area. As with the downstream features, this measure would not impede or redirect 100-year flood flows or reduce flood capacity of the river to an extent that would threaten the safety of people or property.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure
The above restoration measures are the same as those proposed in Alternative 2 and therefore, potential flood risk impacts would be the same and would be less than significant.

Non-Native Aquatic Species Management Measure, Feral Pig Management Measure, Cowbird Management Measure
As with Alternative 2, implementation of the above wildlife management measures would not involve the construction of structures or facilities that would impede or redirect 100-year flood flows.

Indirect Impacts
With exception of feral pig management, expanded non-native aquatics control to include downstream areas, and placement of instream habitat features in the upstream transition channel, all of the other measures are the same as described for Alternative 2, and therefore indirect impacts would be the same and would be less than significant. None of the additional measures included in Alternative 4 would involve any activities that would affect Prado Dam or increase and impede downstream flood flows.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities associated with the above ecosystem restoration measures that would affect Prado Dam or increase and impede onsite and offsite downstream flood flows.

Level of Impact for Alternative 4
Less than Significant Impact. Construction and long-term operation and maintenance activities would not place structures within a 100-year floodplain which would impede or redirect flood flows or expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as result of failure of a levee or dam.

5.6 BIOLOGICAL RESOURCES

5.6.1 Regulatory Framework

5.6.1.1 Federal Regulations

Federal Endangered Species Act

The Federal Endangered Species Act (FESA) designates threatened and endangered animals and plants and provides measures for their protection and recovery. The Take of listed animal and plant species in areas under the federal jurisdiction is prohibited without obtaining a federal permit. A Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or attempt to engage in any such conduct. Harm includes any act which kills or injures fish or wildlife, including significant habitat modification or degradation that significantly impairs essential behavioral patterns of fish or wildlife. Activities that damage the habitat of listed species require approval from U.S. Fish and Wildlife Service (USFWS) for terrestrial species or from National Marine Fisheries Service (NMFS) for marine species.

Under Section 7 of FESA, a federal agency that authorizes, funds or carries out a project that may affect a listed species or its critical habitat must consult with USFWS or NMFS to ensure that their actions do not jeopardize the continued existence of endangered or threatened species or result in the destruction or modification of the critical habitat of these species. As part of consultation the USFWS or NMFS prepare a Biological Opinion (BO) to determine if the activity would jeopardize the continued existence of the listed species. If the BO determines that the activity would not threaten the existence of the listed species and a no jeopardy opinion is provided, then the project may proceed. If the BO finds that the project would result in jeopardy to the listed species (jeopardy opinion), then reasonable and prudent measures would need to be incorporated into the project to reduce potential effects to a level that would not be likely to jeopardize the continued existence of the species.

Federal Clean Water Act

The Clean Water Act has provisions for protecting biological resources within the aquatic environment through identification of beneficial uses and prohibitions on fill of wetlands or other Waters of the U.S. The primary functions of the Clean Water Act in protecting biological resources in this instance are to ensure that impacts to wetlands or Waters of the U.S. are avoided, minimized, and mitigation if necessary, and to provide a framework for ensuring that water quality is maintained or improved.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act implements international treaties between the United States and other nations that protect migratory birds, including their nests and eggs, from killing, hunting, pursuing, capturing, selling and shipping unless expressly authorized or permitted.

5.6.1.2 State Regulations

California Environmental Quality Act

The California Environmental Quality Act (CEQA) was enacted in 1970 to provide for full disclosure of environmental impacts before issuance of a permit by a state or local public agency.

In addition to state and federally listed species, sensitive plants and animals receive consideration under CEQA. Sensitive species include Wildlife Species of Special Concern listed by CDFW and plant species on the California Native Plant Society list 1A, 1B or 2.

California Endangered Species Act
The California Endangered Species Act (CESA) provides protection and prohibits the take of plant, fish and wildlife species listed by the State of California. Unlike FESA, state-listed plants have the same degree of protection as wildlife. A Take is defined similarly to FESA and it is prohibited for both listed and candidate species. Take authorization could be obtained from the California Department of Fish and Wildlife (CDFW) under Section 2091 and 2081 of CESA. Section 2091 of CESA, similar, to Section 7 of FESA provides for consultation between a state lead agency under the CEQA and CDFW, with issuance of take authorization if the project does not jeopardize the listed species.

California Fish and Game Code Section 1600
The State of California defines Waters of the State as any surface water or groundwater, including saline waters within the boundaries of the State. In accordance with Section 1600 of the Fish and Game Code, CDFW must be notified prior to beginning any activity that would obstruct or divert the natural flow of, use material from or deposit or dispose of material into a river, stream, or lake, whether permanent, intermittent or ephemeral water bodies. The notification occurs through the issuance of a Streambed Alteration Agreement.

California Fish and Game Code Fully Protected Species
The legislature of the State of California designated species as fully protected prior to the creation of the California Endangered Species Act. Most fully protected species have since been listed as threatened or endangered under CESA and/or the FESA. These species could not be taken or possessed at any time, with the only exception being permits issued for limited scientific study.

California Fish and Game Code Sections 3503, 2505, 3513, 3800, 3801
These California Fish and Game Code Sections protect all birds, birds of prey and all non-game birds, as well as their eggs and nests, for species that are not already listed as fully protected and that occur naturally within the State. Specifically, it is unlawful to take any raptors or their nests and eggs.

5.6.2 Impact Significance Criteria

The impact criteria below were taken from Appendix G of the CEQA guidelines and are also being adopted for NEPA. For purposes of this analysis, Alternatives 1, 2, 3, or 4 would have a significant impact related to Biological Resources if it would:

IMPACT BIO-1: Have a substantial adverse effect either directly or through habitat modifications on any species identified as candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.

IMPACT BIO-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.

IMPACT BIO-3: Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.
IMPACT BIO-4: Interfere substantially with movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites.
IMPACT BIO-5: Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

5.6.3 Environmental Commitments

EC-BIO-1: If the Habitat Monitoring Program indicates substantial and prolonged degradation of vegetation between 498 ft. and 505 ft., the degraded habitat would be replaced at a 1:1 ratio on OCWD property (Water Conservation Measure only).

EC-BIO-2: All vegetation removing and clearing activities and the operation of heavy construction equipment will be conducted between September 16 and February 28, outside of bird nesting season. Vegetation removal and the operation of heavy equipment may begin in the month of August provided the area is surveyed by a qualified biologist in advance of vegetation removals and the qualified biologist determines that no nesting birds are present within 500 feet of the activities.

EC-BIO-3: To minimize noise impacts the following measures will be implemented.

- Construction of an earthen berm around the sediment storage site.
- During the nesting season portable acoustical panels will be placed along perimeter of the sediment removal channel where the floating dredge and/or heavy equipment is operating to minimize construction noise levels.
- If needed during the nesting season portable acoustical panels will be placed along the earthen berm around the perimeter of the sediment storage site and around the sediment re-entrainment work area to reduce construction noise levels.
- All construction equipment will be equipped with noise reduction features, such as mufflers and engine shrouds.
- Onsite generators and booster pumps will be enclosed entirely.

EC-BIO-4: Prior to the start of grading activities at the Sediment Storage Site, focused gnatcatcher surveys will be conducted beginning to determine the presence of California Gnatcatcher territories.

- Surveys will include the identification of nearby habitat that gnatcatchers may move to or utilize once construction activities start. The qualified biologist will report on whether this nearby habitat is already occupied by gnatcatchers.
- Surveys shall also be conducted three days before the start of grading to determine if individual foraging gnatcatchers are present.
- Additional nesting season surveys will be conducted annually through the duration of sediment removal activities.

- Results of pre-construction, nesting, and pre-grading surveys will be reported to USFWS in a quarterly report.

EC-BIO-5: To minimize impacts to wildlife species, a biologist that meets USFWS standard qualifications will conduct a biological resource sweep of the work area prior to any ground disturbing activities, during project operation and during demobilization of construction equipment. The biological resource sweep will include the following activities:

- Inspect the work area, including along access roads, for any wildlife species and prepare a list of species observed and record their activity during construction and operation of the project.
- Implement exclusionary or avoidance measures and, or relocate sensitive species if possible, and ensure that the quality of adjacent habitat outside of the construction zone is maintained.
- In the event that sensitive (protected) wildlife species are present, determine if the activity would cause adverse impacts that have not been previously considered and evaluated. If it is determined that the activity could have the potential to adversely affect wildlife species in a manner not authorized by Federal or State permits, the activity will cease until the species is no longer in harm's way or is relocated outside of the construction activity impact area.

EC-BIO-6: During vegetation removal activities, vegetation planned for removal will be inspected to determine if nests are present. If active nests are present, the biologist will evaluate the nest site for activity, and if possible, determine species, and will propose avoidance measures and/or buffers as appropriate.

EC-BIO-7: Sediment management activities and ecosystem restoration activities conducted within wetted portions of the Santa Ana River, Chino Creek and Mill Creek will occur between August 1 and January 15, outside of the spawning season.

EC-BIO-8: During construction and operation of the sediment removal channel a qualified biologist will be present to monitor the activities. A qualified biologist is defined as an individual that holds a current 10(a)(1)(A) recovery permit for the Santa Ana Sucker. This individual or any other project biologist can stop dredging activities at any time if impacts to native aquatic species are observed. If impacts to Santa Ana Sucker occur, the Service will be contacted immediately to determine if additional measures to further minimize project impacts are needed or if re-initiation of consultation is necessary. Suction dredging will not proceed until the Service is contacted and a determination is made on how to proceed. The qualified biologist will prepare weekly reports describing the sediment removal activities. These reports will:

- Document any sucker that is observed in the sediment removal channel.
- Document behavior of any fish observed in the project area, not only sucker, before and during sediment removal activities.
- Record the circumstances and numbers of any fish observed to be wounded or killed during sediment removal activities. Any sucker killed or found dead will be preserved in 95 percent ethanol and submitted to an approved depository.

EC-BIO-9: Floating dredge equipment and heavy construction equipment operating in the wetted channel shall warm up (run idle) for a minimum of 10 minutes before initiating the suction dredge to begin removing sediment from the river. During this time the qualified biologist will record observations of any fish in the work area and when complete, but not less than 10 minutes after initiating startup noise, will signal the dredge operator to initiate suction dredging activities.

EC-BIO-10: Prior to and during operation of floating dredge equipment and heavy construction equipment, a spill prevention and contingency plan will be prepared and implemented. The plan will include measures to prevent or avoid and incidental leak or spill, including identification of materials necessary for containment and clean up.

EC-BIO-11: Vehicles and other equipment will be fueled, cleaned and maintained in designated areas, located away from the Santa Ana River, Chino Creek and Mill Creek to eliminate risk of pollution from spills and contamination.

EC-BIO-12: Construction personnel will utilize designated access roads or previously disturbed areas for vehicle access and staging of construction equipment.

EC-BIO-13: Prior to removal of vegetation access routes in and out of the project area will be flagged.

EC-BIO-14: Unpaved areas will be watered as needed to control dust on a continual basis.

EC-BIO-15: All construction, site disturbance and vegetation removal will be located within the delineated construction boundaries. The storage of equipment and materials, temporary stockpiling of soil would be located within designated areas outside of habitat areas.

EC-BIO-16: Areas to remain undisturbed will be clearly flagged or otherwise delineated prior to construction activities and would be monitored to ensure that all activities do not encroach into the delineated protected areas. Onsite biologist will have the authority to halt the Sediment Management Project activities if occurring inside delineated areas.

EC-BIO-17: The configuration of the work area of the sediment trap, conveyance channels and the sediment storage site will be designed so when it is not in operation it will allow for wildlife movement.

EC-BIO-18: A litter control program will be implemented during construction to eliminate the accumulation of trash. Trash will be removed from trash receptacles at the end of each work day to discourage wildlife movement into work areas.

EC-BIO-19: Speed limits of 15 miles per hour or less will be required at all times to avoid potential injury to wildlife in the area.

EC-BIO-20: A qualified biologist approved by the USACE will monitor access roads to ensure wildlife is not impacted by construction equipment.

EC-BIO-21: Construction lighting at the sediment re-entrainment area will be directed onto the work site to prevent spill-over lighting impacts to wildlife. Construction lighting fixtures will be shielded by providing a side flap on the lights or providing temporary drape/wall so that illumination is confined to the work area.

EC-HWQ-1: The Sediment Management Measure will be implement an ongoing water quality monitoring program that would monitor for organic chemicals, including pesticides, PCBs, PAHs hydrocarbons, metals, total dissolved solids, indicator bacteria and dissolved oxygen upstream in the Prado Basin reservoir pool and downstream within waters where sediment re-entrainment would occur. The monitoring program would be implemented before construction, during sediment re-entrainment and after sediment re-entrainment. If significant differences between upstream and downstream samples are observed during sediment re-entrainment, the rate of sediment re-entrainment will be adjusted to ensure that they are within acceptable thresholds of the Regional Water Control Board Basin Plan.

5.6.4 Biological Resource Impacts

5.6.4.1 **IMPACT BIO-1**: Have a substantial adverse effect either directly or through habitat modifications on any species identified as candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, neither the Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. There would be no changes to the existing condition within the area and no potential direct, indirect, or long-term substantial adverse effects to sensitive or special status plant or wildlife species would occur.

ALTERNATIVE 2: PROPOSED ACTION

Water Conservation Plan (Elevation 505 Feet Year-Round)

Special Status Plant Species

Direct, Indirect, and Long-Term Operations and Maintenance Impacts

As shown in Table 13 (Section 4.5), there would be low potential for special status plant species to occur within the study area, except for Coulter's Matilija poppy which was identified to occur in upland areas along Reach 9. Implementation of measures proposed under the Proposed Action would not affect any upland areas along Reach 9 where Coulter's Matilija poppy has been identified. Therefore, the implementation of the Water Conservation Plan would not result in adverse direct effects to special status plant species and would not involve any activities that would result in indirect offsite adverse effects to special status plant species. Continued operation of water conservation would also have no effect on special status plant species.

Special Status Wildlife Species

A database search of special status wildlife species listed in the U.S. Department of Interior Information Planning and Conservation System Database and the California Department of Fish and Game Natural Diversity Data Base for the Prado Dam, Black Star Canyon and Corona North U.S.G.S. Quadrangles was conducted to determine the potential for special status plant species to occur within the study area. A complete listing of special status plant species identified within the three quadrangle areas and the potential for the plant species to occur within the study area is shown in Table 4-13. Table 5-27 and Table 5-28 identifies those Federal Listed Species and State Listed Species that have moderate or higher potential to occur within the study area.

Table 5-27: Federal and State Listed Species

Birds	**Fish**
Least Bell's Vireo	Santa Ana Sucker
Southwestern Willow Flycatcher	
Western Yellow-Billed Cuckoo	
Coastal California Gnatcatcher	

Table 5-28: State Listed/Species of Concern

Birds	**Reptiles**
Tri-Colored Black Bird	Coast Horned lizard
Long-eared Owl	California Red-Sided Garter Snake
Yellow Warbler	Western Pond Turtle
Yellow-Breasted Chat	Orange-Throated Whip tail
Great Blue Heron	Red Diamond Rattle Snake
Vaux's Swift	
Northern Harrier	
Loggerhead Shrike	
California Horned Lark	
Merlin Falcon	
Sharp-Shinned Hawk	
Coopers hawk	
Double crested Cormorant	
White Tail Kite	
Long Ear Owl	

The following evaluations apply to impacts to special status animal species and critical habitat and apply to both initial implementation as well as Long-Term Operation and Maintenance (continued operation of the proposed Water Conservation Plan).

- Potential Inundation of Occupied Nests or Spawning Grounds
- Effects from Increased Days of Inundation During Nesting Season
- Effects to Critical Habitat from Increased days of Inundation (for Federally-listed species)
- Effects to Critical Habitat from Increased Sedimentation Due to Water Conservation Plan (for Federally-listed species)
    - Potential Effects to Santa Ana River Gradient (relative to Santa Ana sucker critical habitat)
    - Effects to Sucker Critical Habitat Downstream of Prado Basin
- Changes in Reach 9 Wetted Area from Reducing Release Flow from 500 cfs to 350 cfs (primarily related to Santa Ana sucker)
- Turbidity Effects

- Reduction in Reach 9 Wetted Area After Storm Events from Reducing Release Flow from 5,000 to 350 cfs (potential for isolated pools, primarily related to Santa Ana sucker)
- Other Potential Effects

Direct Impacts - Potential Inundation of Occupied Nests or Spawning Grounds

Vireo, Flycatcher, Cuckoo and Gnatcatcher
As summarized in Appendix G: Biological Assessment (Table 11), several hundred vireo territories occur within the Prado Basin and along the Santa Ana River Reach 9. There would be high probability for vireos to occur within the study area. Because the Water Conservation Plan would be limited to the non-nesting season, implementation of the Water Conservation Measure would not affect active or occupied nests.

Gnatcatchers occur in higher upland areas that contain coastal sage habitat. The species would not be expected to be affected by any pooled water, additional days of inundation or release rates from Prado Dam associated with the Water Conservation Plan. Therefore, the Water Conservation Plan would not be expected to have any direct effects or indirect effects to the gnatcatcher.

Santa Ana Sucker
No suckers have been reported in the Prado Basin and only a few individuals have been reported in the Santa Ana River Reach 9 area since 2008. Given the lack of presence of this species within the study area in recent history along with the marginal habitat conditions and high populations of exotic predatory fish, the potential for populations of suckers to occur in the study area would be low. Additionally, as discussed later in this section, the amount of sediment that would drop-out from the pooled water would be minimal and would have no effect on suckers. Because there is not any suitable sucker habitat or designated critical habitat where the water would be pooled, the presence of additional water within the buffer pool zone would not improve or worsen conditions for sucker, and there would be no effect.

There is the potential that spawning fish could occur in the Prado Basin reservoir pool and within the Santa Ana River upstream and downstream of Prado Dam. Because the Water Conservation Plan would be implemented outside of spawning season, no effects would occur to spawning fish and no effects to the sucker would occur.

State Listed and Sensitive Bird Species
Because the Water Conservation Plan would be implemented outside of nesting season, no impacts to active or inactive nests for any of the state listed or sensitive species summarized in Table 5-28 would occur.

Direct Impacts - Effects from Increased Days of Inundation During Nesting Season

Vireo
Over the last 17 years, water elevations have exceeded 498 ft. seven times during the nesting season. In the event of a wet year and the water is stored between elevation 498 ft. and elevation 505 ft. the study area would likely already be inundated before the nesting season begins, with or

without the proposed Water Conservation Plan. Implementation of the Water Conservation Plan would increase the level of pooling and number of days of inundation at the Prado Basin. There could be the potential that pooled water could overlap into the beginning of nesting season inundating previous year's nesting territories, which could discourage or prevent vireos from nesting in those same areas. However, as shown in Table 11 of Appendix G (Biological Assessment), previous surveys conducted in the Prado Basin during wet years where a buffer pool was present have shown no substantial overall reduction in the number of vireo territories reported. During years of above average rainfall in 2004, 2005, 2010 and 2017, the amount of vireo territories reported were the four highest reporting years since 2000.

The data in Table 12 of Appendix G suggests that the presence of a buffer pool did not deter vireos from nesting within the Prado Basin, which indicates they were nesting in areas outside of where inundation would be occurring. This data shows that an overwhelming majority of vireo territories occur above elevation 505 ft, and when the buffer pool was present vireos tended to re-distribute to higher elevations. In 2003 when the buffer pool was up to elevation 494 ft. for most of March, there was increase in the amounts of vireos reported between elevations 498 ft. and 505 ft. compared to 2001 and 2002 when the buffer pool was not present. Additionally, from 2003 to 2006 during periods of above average rainfall there was decrease amount of nesting territories in the lower elevations and increase in nesting territories above 505 ft. In March of 2010 when the buffer pool was as high elevation 498 ft. there was an increase in the number of vireos reported between elevation 498 ft. and elevation 505 ft. and above elevation 505 ft. In 2017 there was an increase in nesting territories above 505 ft. compared to the previous five years when there was no buffer pool. These results indicate that when a buffer pool was present it did not discourage vireos from nesting within the Prado Basin, but did cause them to re-distribute to higher elevations. The potential for the pooled water to overlap and cause vireos to redistribute into higher elevations would be considered a temporary adverse effect. However, because the re-distribution of vireos to higher elevations would not cause a substantial reduction in the overall numbers of territories occurring in the Prado Basin, the temporary adverse effect would not be considered substantial.

Flycatcher, Cuckoo, and Gnatcatcher

There would be the potential for the pooled water to persist into the nesting season and cause flycatchers and cuckoos to redistribute into higher elevations. Because of the infrequency of flycatchers and cuckoos occurring between elevation 498 ft. and 505 ft., the Water Conservation Plan would not have a substantial adverse effect on either the flycatcher or cuckoo. There is very limited suitable nesting habitat for gnatcatcher below 505 ft. Implementation of the Water Conservation Plan would not have a substantial adverse effect on the gnatcatcher.

State Listed and Sensitive Bird Species (Table 5-28)

There is the potential that water stored in the buffer pool could overlap into the beginning of nesting season and could submerge some trees that are used by migratory birds for nesting, causing them to relocate to higher elevations for nesting sites. The potential that nesting migratory birds could need to relocate to higher elevations would be an adverse impact. However, because the number of tress that could be potentially submerged would be relatively small compared to the overall amounts of trees that would be available in the Prado Basin and

that the distribution of birds to higher elevations would not reduce populations of migratory birds nesting in the Prado Basin, these adverse effects are not considered to be substantial.

Direct Impacts - Effects to Critical Habitat from Increased Days of Inundation

The following analysis evaluates potential impacts to Critical Habitat for the vireo, flycatcher, cuckoo, gnatcatcher, and sucker associated with implementation of the Water Conservation Plan.

Vireo Critical Habitat

The Water Conservation Plan would allow water to be stored up to 505 ft. during the flood season, which means there could be higher elevation pooling and additional days of inundation in the Prado Basin over the current condition. Between 470 ft. and 505 ft. there are approximately 1,469 acres of vireo critical habitat within the Prado Basin, of which 1,384 acres contain the Primary Constituent Elements (PCEs) of vireo critical habitat (Refer to Table 13 in Appendix G, *Biological Assessment*). Presently, the vireo critical habitat areas between elevation 470 ft. and elevation 505 ft. are periodically inundated during the non-flood season as part of the existing water conservation activities at Prado Dam, and have the potential to be inundated year-round for flood control operations. Therefore, the implementation of the Water Conservation Plan would not increase the amount of critical habitat lands that could be potentially inundated.

The growing season within Prado Basin for the most part begins in March and extends through the summer. Presently, water can be stored up to 505 ft. during the non-flood season, which overlaps into the growing season. The Water Conservation Plan would not substantially increase the average number of days that the habitat is currently inundated during the growing season (see Table 14 in Appendix G).

The most common PCE of critical habitat for the vireo within the Prado Basin are mulefat and black willow. Mulefat is a perennial evergreen that would not defoliate unless under stress. Willow species are known to have high inundation tolerances and black willows are known to have especially high inundation tolerances when they are in a period of dormancy, which correlates with winter or the flood season. An existing habitat monitoring program from current water conservation practices has shown that after the habitat has been completely submerged, by early in the following year it begins to recover from the inundation and becomes healthier each subsequent year. Habitat monitoring has shown that periodic inundation from water conservation has not resulted in permanent damage to the habitat.

Another measurement to determine the health and biological values of habitat areas would be wildlife usage. In 2003 to 2006 after back to back wet years, there was an increase in nesting territories at the higher elevations. The reduced wildlife usage in the lower elevations suggests that the habitat in that area experienced reduced biological values, most likely from the wetted conditions occurring in the Prado Basin after back to back wet years. However, in subsequent years during drier periods a steady increase in the amount of vireo territories was reported at lower elevations in the Prado Basin. These increases in wildlife usage at the lower elevations suggest that the biological values of the habitat recovered with the dryer conditions. These reporting levels indicate that the increased pooling and additional days of inundation occurring

during the flood season did not result in long term damage to the habitat where it was no longer considered suitable habitat for wildlife usage.

The increased pooling and additional days of inundation may affect critical habitat areas. However, because previous surveys have shown no long-term damage to habitat or substantial reductions in wildlife usage of the habitat when the buffer pool has extended into the growing season, the temporary effect to critical habitat would not be considered adverse. To ensure that the Water Conservation Plan would not substantially degrade the value of PCEs within critical habitat areas, OCWD would continue to monitor the health of critical PCEs between 498 ft. and 505 ft. before and after inundation occurs. A quantitative analysis would be done twice annually during inundation and following leaf out. Dramatic changes in understory such as vegetation die back would be discussed with the Corps and USFWS and habitat would be restored, if determined necessary. The habitat would be given a minimum of 2 years to recover on its own, prior to active planting**.** To determine if habitat needs to be replaced, a 30% loss of cover over a two-season period without any signs of recovery would be the threshold to replace the vegetation. If it is determined that the degraded habitat is no longer suitable for supporting riparian habitat, then the habitat would be replaced at a 1:1 ratio on OCWD property. With the implementation of Environmental Commitment EC-BIO-1 there would be no potential loss of vireo critical habitat.

Flycatcher Critical Habitat

There is a total 1,502 acres of area in the Prado Basin that are designated as critical habitat for the flycatcher. There are approximately 0.77 acres of flycatcher critical habitat between 498 ft. and 505 ft., all of which contains the PCEs of flycatcher critical habitat. Presently, the flycatcher critical habitat in areas between elevation 498 ft. and 505 ft. elevation would be subject to inundation year-round as necessary for flood control operations, and during the non-flood season as part of the existing water conservation activities at Prado Dam. Because previous surveys in habitat supporting similar elements as the flycatcher PCEs have shown no long-term reductions in wildlife usage of the habitat when the buffer pool has overlapped into the growing season, it is reasonable to conclude that the potential effects to flycatcher critical habitat associated with additional days of inundation due to the Water Conservation Plan would not be adverse. No long-term or permanent degradation to flycatcher critical habitat would occur. To ensure that the Water Conservation Plan would not substantially degrade the value of PCEs within critical habitat areas, OCWD would continue to monitor the health of the riparian habitat between elevation 498 ft. and elevation 505 ft. before and after inundation occurs. If it is determined that the degraded habitat is no longer suitable for supporting riparian habitat, the habitat would be replaced at a 1:1 ratio on OCWD property. With the implementation of EC-BIO-1 there would be no potential loss of critical habitat.

Proposed Cuckoo Critical Habitat

Critical habitat for the Western yellow-billed cuckoo was proposed in 2014. Presently, the current ruling is being revised by USFWS. The final ruling is expected sometime in 2018. Based on the proposed critical habitat area within the Prado Basin, there is approximately 614 acres of proposed cuckoo critical habitat between 498 ft. and 505 ft. of which 579 acres contain the PCEs of proposed cuckoo critical habitat. Similar to critical habitat for the vireo and flycatcher, the increased pooling may affect, but not adversely affect critical habitat. OCWD would continue to

monitor the health of the riparian habitat between elevation 498 ft. and elevation 505 ft. before and after inundation occurs. If it is determined that the degraded habitat is no longer suitable for supporting riparian habitat, the habitat would be replaced at a 1:1 ratio on OCWD property. With the implementation of EC-BIO-1 there would be no potential loss of proposed critical habitat.

Gnatcatcher Critical Habitat

The gnatcatcher critical habitat occurs on the terraces along Reach 9. The increased pooling within the Prado Basin would have no effect on critical habitat for the gnatcatcher along Reach 9.

Sucker Critical Habitat

Upstream

As shown in in Table 5 in Appendix G, *Biological Assessment*, there is no designated sucker critical habitat between elevations 470 ft. to 505 ft. within Prado Basin. The increased pooling would have no effect on sucker critical habitat.

Downstream

Critical habitat in Reach 9 would not be affected by the increased days of inundation directly, as this increase in inundation would occur upstream of Prado Dam. The potential for indirect effects resulting from associated changes to release patterns and rates are described in a separate section below specific to the change in releases.

Indirect Impacts - Effects to Critical Habitat from Increased Sedimentation Due to Water Conservation Plan

Vireo and Flycatcher Critical Habitat and Cuckoo Proposed Critical Habitat

The following analysis is based on the *Prado Dam Planned Deviation, Santa Ana River Upstream Effects Due to Water Conservation,* a report prepared by Scheevel Engineering in June of 2015. The report is presented in Appendix G, *Biological Assessment*.

To quantify the additional sediment deposition that could potentially occur in the Prado Basin from the Water Conservation Plan, and the resulting effects to critical habitat, the following facts or assumptions were considered.

- Under existing conditions, there is approximately 0.5 to 0.7 ft. of sediment deposition annually along the Santa Ana River in the Prado Basin from approximately 2,000 feet upstream of Prado Dam to 15,000 feet upstream of the dam. (Note: This is an average roughly based on calculating changes in topographic data over several decades. In dry years, very little deposition would occur, whereas rare large storm events or very wet seasons may bring a large influx of sediment.)
- Currently, nearly all of the sediment that enters into the Prado Basin deposits and settles in the Prado Basin regardless of water conservation water surface elevations.
- The additional 10,500-acre feet of water in the Prado Basin will be held for a duration that allows silt and clay particles to settle out of the water column.
- Assumed that the TSS of the Prado storm water inflow is 2,000 mg/L. Historical data shows average Prado inflow storm water TSS to range between 500 to 2,000 mg/L.

- Assume that the silt and clay portion of the TSS is 20%.
- The silt and clay will deposit across a 1,890 acre area below 505 ft.

On average it is expected that the Prado Basin water surface elevation would reach or exceed, 505 ft. one time per year. An additional volume of 10,500-acre feet of water could be impounded by the Water Conservation Plan. Taking into the account the above assumptions it was calculated that, on average an additional 3,500 cubic yards of silt and clay sediments could deposit in Prado Basin each year due to the Water Conservation Plan. The estimated annual increase of 3,500 cubic yards resulting from the Water Conservation Plan represents a 0.3 percent increase in the annual sedimentation volume. Once into the Prado Basin, the silt and clay sediments would disperse over large areas due to their ability to stay suspended more easily than sand, gravel and cobbles. The approximate surface area of the Prado Basin below the 505 ft. contour is 1,890 acres. Due to turbulence in the Prado Basin created by wind action and tributary inflow it is anticipated that suspended clay and silt sediments would distribute evenly over the 1,890-acre pool area below 505 ft. If the silt and clay was distributed evenly across the 1,890 acres, there would be an average of 0.001 ft. per year of sediment deposition. The 0.001 ft. per year additional silt and clay sedimentation from the Water Conservation Plan would be considered negligible compared to existing baseline sedimentation rate between 0.5 and 0.7 feet occurring per year. The additional 0.001 of sediment would not reduce biological values of critical habitat. Therefore, no effects to vireo, flycatcher or proposed cuckoo critical habitat would occur.

Alternative 2 includes a large-scale sediment management measure as part of the Ecosystem Restoration Plan component. This measure is not intended as mitigation for the minor amount of sedimentation that would occur due to the proposed Water Conservation, and does not serve that purpose, but it will result in the annual removal of a larger quantities of sediment including any changes in the distribution of sediment accumulation that would occur as a result of holding water at a higher elevation. In essence, whatever minor or negligible effect that would have occurred is eliminated with implementation of the proposed ecosystem restoration measure. Alternative 3 does not include the large-scale measure. To resolve concerns expressed by the USFWS during consultation for a recently approved 5-year Deviation to the Water Control Plan regarding the minor amount of sediment deposition that could occur as a result of water conservation, and to further reduce or eliminate any potential for effects to listed species, a smaller-scale sediment removal measure was added to the Water Conservation Plan for Alternative 3. That smaller scale measure could also be implemented for Alternative 2 in any interim period between initiating Water Conservation and Ecosystem Restoration Plans under Alternative 2, assuming that Water Conservation may be implemented in advance of large-scale sediment management or other ecosystem restoration measures. See Alternative 3 for a discussion of impacts related to the small-scale sediment removal measure.

To further ensure that the Water Conservation Plan would not substantially degrade the value of PCEs within vireo and flycatcher critical habitat areas, OCWD would continue to monitor the health of the riparian habitat between 498 ft. and 505 ft. before and after inundation occurs (see EC-BIO-1). In the event the monitoring program indicates that the PCEs were substantially degraded, it is proposed that the degraded habitat would be replaced at a 1:1 ratio on OCWD property.

Gnatcatcher Critical Habitat

The gnatcatcher critical habitat occurs on the terraces along Reach 9. The potential increased sedimentation occurring within the Prado Basin would have no effect on critical habitat for the gnatcatcher along Reach 9.

Sucker Critical Habitat

The following analysis is based on a report that evaluates Prado Basin and Upstream Santa Ana River morphology trends between 498 ft. and 505 ft. The report is presented in Appendix G, *Biological Assessment*. The analysis evaluates potential effects to existing riparian and native fish habitats along the Santa Ana River between Prado Dam and the Hamner Avenue crossing associated with the implementation of the Water Conservation Plan. A combination of historical topographic surveys, aerial imagery, recent sediment transport models, and historical data was used to estimate long-term changes to river morphology and habitats along the Santa Ana River and in the Prado Basin between Prado Dam and the Santa Ana River/Hamner Avenue crossing.

The potential effect to habitat along the Santa Ana River from the sedimentation would be limited to a 4,000-foot long stretch of the river below elevation 505 ft. There is not any designated critical habitat for the sucker along the reach of the Santa Ana River in Prado Basin below elevation 505 ft. therefore, no effect to critical habitat would occur. This reach of the river area consists primary of sandy bottom braided streams with adjacent and overhanging riparian habitat. The primary grain size of the additional clays and silts would be fine grained which would disperse over large areas, causing no measurable increase to backwater or marsh habitat along the Santa Ana River

Moreover, with implementation of the Sediment Management Measure, which is also an element of the Proposed Action, there would not be any net increase in sediment deposition from the Water Conservation Measure.

Over the 50-year period it is estimated that approximately 175,000 cubic yards (3,500 cubic yards per year) of additional sediment would deposit in the Prado Basin. Under Alternative 2, the Sediment Management Measure would be implemented which would remove between 325,000 to 750,000 cubic yards of sediment per year from the Prado Basin. With the implementation of the Sediment Management Measure there would be no net increase in sediment from the Water Conservation Plan.

Indirect Impacts to Santa Ana Sucker Critical Habitat - Potential Effects to Santa Ana River Gradient

The potential upstream effects to the Santa Ana River gradient due to increases in water surface elevation were evaluated in a one-dimensional sediment transport analysis conducted by Golder Associates, Inc. The Technical Report, *Prado Feasibility Study Project-Prado Water Level Analysis Sediment Transport Modeling Results,* is presented in Appendix G.

The sediment transport model extended from the Riverside/San Bernardino County line, downstream, to the discernible end of the Santa Ana River in the Prado Basin. Two scenarios were modeled to compare the effects of increasing the flood season water surface elevation from 498 ft. to 505 ft., an increase of seven feet. The two scenarios are the current operating condition

of maintaining the buffer pool at 498 ft. during the flood season and 505 ft. during the non-flood season and under the Water Conservation Measure of maintaining the buffer pool at 505 ft. during flood seasons, which then eliminates the variation in operation for a seasonal buffer pool.

The model for the increased water surface elevation scenario (flood season water surface elevation of 505. ft.) exhibits nearly identical aggradation trends as the existing condition model. The only expected difference in the sediment deposition trends between the two scenarios would be a slight increase in deposition within Prado Basin between the 498 ft. and 505 ft. elevation contours. If the flood season water surface elevation is increased to elevation 505 ft., then transient periods of increased aggradation could occur between elevation 498 ft. and 505 ft., as high flow events coincide with periods of increased water surface elevation. During periods where high flow events coincide with relatively low water surface elevation, the aggradation trends would tend to revert back to historically observed conditions. A portion of the sediment deposited between elevations 498 ft. and 505 ft. would be transported below elevation 498 ft. when high flow events coincide with relatively low water surface elevation. It is important to note that once the water conservation pool is filled to the maximum water surface elevation it is then drained as quickly as possible to create storage volume for subsequent storms. This mode of operation reduces the frequency of occurrence when the maximum water conservation water surface elevation coincides with high flow events.

The sediment transport model results also show that there would be no appreciable change to the river bed gradation due to the increased water surface elevation. The general trend for both scenarios is that there would be deposition of primarily fine to medium sand from above the I-15 Freeway crossing, extending downstream into Prado Basin. The overall quantity of sediment and sediment particle size distribution entering Prado Basin would be the same for both water surface elevation scenarios. The alteration to the Santa Ana River morphology caused by the proposed flood season increase to the water surface would likely be limited to the spatial distribution sediments between elevations 498 ft. and 505 ft. and would have little no effect on the gradient of the river upstream of 505 ft. and no effect to Santa Ana sucker critical habitat upstream of the water conservation limits.

Indirect Impacts - Effects to Sucker Critical Habitat Downstream of Prado Basin
The following analysis is based on information provided in Prado Dam Planned Deviation, Santa Ana River-Downstream Effects Due to Planned Deviation prepared by Scheevel Engineering, June of 2015. The report is presented in Appendix G, *Biological Assessment*.

Downstream of Prado Dam designated critical habitat for the sucker extends along Reach 9 of the Santa Ana River from Prado Dam to Imperial Highway. At the Prado Dam outlet structure to the Green River Golf Course the river has a relatively flat slope. Within this reach the river flow is perennial and the floodplain is covered with riparian vegetation. The banks are moderately incised with vegetated islands that dot the main channel. Near the Green River Golf Course, the slope increases, and the river becomes more incised. The Corps Santa Ana Sucker Perennial Stream Restoration Project is in this reach.

Between the Green River Golf Course and Imperial Highway, the flood plain becomes much more expansive with several flow splits forming natural islands. Riparian vegetation is mostly

concentrated near the river bank. The bed material along Reach 9 is much coarser consisting of gravels and cobbles compared to the sandy bed material of the river above Prado Dam. The dominant bed form in this reach is pool-riffle, where high gradient high velocity riffles flow into low gradient low velocity pools. Additionally, there are several stretches where the river has a plane bed, where the gradient and velocity are approximately constant, and the river bottom material is dominated by gravel and cobble. This reach contains some PCEs defined for critical habitat for suckers.

The implementation of the Water Conservation Plan could increase pooling within the Prado Dam during the flood season. Flood risk management operations would dictate the release rate from the Prado Dam. In general, the Corps uses forecasting to determine the resultant water surface elevation of a given storm/storm system, then adjusts the release rate from Prado Dam as needed, before during and after a given storm event (see Scheevel report in Appendix G, *Biological Assessment*). Once the Prado Basin water surface elevations are within the buffer pool elevations, the release rates are typically reduced to help facilitate groundwater recharge operations downstream. The exception to this mode of operations is when a significant storm event is forecasted the Corps may release water at higher rates to evacuate the buffer pool to create storage volume for forecasted inflows. In general, the Corps uses forecast inflow data provided by the NWS River Forecast Center to determine the resultant water surface elevation of a given storm/storm system, then adjusts the release rate from Prado Dam, as needed, to achieve certain water surface elevation before, during and after a given storm event. The Corps would be able to determine the anticipated pool impoundment at Prado Dam a few days prior to the start of the storm event and to determine the discharge rate required to adequately drain the buffer pool at rates up to 5,000 cfs. The duration required to drain the buffer pool is based on the beginning storage volume, Prado Basin inflow and Prado Basin outflow. Each storm event is different, but in general the Prado Basin inflow after the storm system has passed (and after the peak of the inflow hydrograph occurs) inflow would settle back down to the normal base flow which could range between 200 to 400 cfs. In order to calculate the average time to evacuate the buffer pool an inflow of 300 cfs has been used as the Prado Basin inflow rate. Two Basin outflow release rates have been analyzed to provide a range of buffer pool evacuation durations, at 2,500 cfs and 5,000 cfs. The analysis showed at both release rates the pool could be drained in a few days and the additional water that could be stored under the Water Conservation Plan would not require significantly higher water release rates to adequately drain the pool in advance of pending storm events.

Downstream erosion effects along the lower Santa Ana River have been analyzed and modeled multiple times for various studies and projects. This analysis utilizes past efforts to estimate the effects that the water release rates from the Water Conservation Measure could have on the sucker habitat along the lower Santa Ana River (See Scheevel, 2016 report in Appendix G *Biological Assessment*). Two independent studies have been identified that evaluated how flow velocities can create erosion of coarse sediments (gravel and cobbles), and potential damage to fish habitat along the Santa Ana River Reach 9 between Prado Dam and Weir Canyon.

In a 2001 Biological Opinion (FWS-SB-909.6) prepared for the Prado Mainstem and Santa Ana River Reach 9 Project, it was noted that the Corps determined through fixed bed modeling that flow velocities greater than 6 feet per second (ft./sec) along Reach 9 could have a damaging

effect on riparian and fish habitat. Furthermore, it was determined that flow releases from Prado Dam of 5,000 cfs or less were generally not capable of creating velocities greater than 6 ft./sec in Reach 9 (USFWS BO 2001).

In 2014 a sediment transport model was conducted for the lower Santa Ana River in conjunction with the Prado Basin Sediment Management Demonstration Project. The Reach 9 portion of the analysis revealed that flow velocities greater than 4 ft./sec could cause gravel to mobilize and flows greater than 10 ft./sec may cause cobbles to mobilize (See Scheevel, 2016 report in Appendix G *Biological Assessment*).

Given the above analysis it has been assumed that any flow velocities greater than 5 ft./sec could cause erosion and habitat damage through Reach 9. A HEC-RAS hydraulic model was developed for the Planned Deviation to determine the worst-case scenarios for a Prado Dam release rate of 2,500 cfs and 5,000 cfs. The average velocity in Reach 9 at a flow rate of 2,500 cfs would be 3.7 ft./sec and the average velocity in Reach 9 at a flow rate of 5,000 cfs would be 4.2 ft./sec.

Figure 5-1 shows the model-estimated velocities in Reach 9 at various release rate scenarios. As shown in Figure 5-1, the velocities are 4.2 feet per second or lower throughout most of SAR Reach 9. At the most up gradient point in the model, just below the dam outlet, the estimated velocity is 2.8 feet per second. There are isolated areas near the bridge to the golf course clubhouse and in narrower portions of the channel where the velocities range up to 5.27 feet per second. The calculated velocities are not anticipated to effect sucker critical habitat.

At 5,000 cfs existing sands and silt would mobilize and would be conveyed to downstream reaches of the river and existing rocks and gravel would redeposit within the Santa Ana Canyon (See Scheevel, 2016 report in Appendix G: *Biological Assessment*). Given the current coarse gradation of the Reach 9 riverbed, the recent Reach 9 improvements, the recurrence interval of rapid buffer pool evacuation events, and the anticipated current and future release rates and durations required to evacuate the buffer pool elevation, no substantial changes to Santa Ana sucker critical habitat PCEs are expected to occur from the Water Conservation Plan. Additionally, the Corps Santa Ana Sucker Perennial Stream has been designed to withstand flows up to 6,000 cfs. Therefore, Santa Ana sucker perennial stream habitat would not be expected to sustain damage in the event of a release rate of 5,000 cfs occurs. Water conservation activities would not result in increased sediment deposition above the 505 ft. elevation, no increased deposition would occur in designated critical habitat upstream of Prado Basin, and no increased erosion or large erosive discharges would occur in designated critical habitat downstream of Prado Basin. Therefore, no effects to sucker critical habitat would occur from release rates associated with the Water Conservation Plan.

Indirect Impacts - Changes in Reach 9 Wetted Area from Reducing Release Flow from 500 cfs to 350 cfs

Santa Ana Sucker and Critical Habitat

Suckers utilize different substrate types as they develop through each life stage. The presence of coarse substrate with a mixture of gravel or cobble with sand and a combination of shallow

riffles and deeper runs and pools provides optimal stream conditions for adults. The species also prefers habitat containing in-stream or bank site riparian vegetation that provides shade and cover especially for larva and juveniles. The shallow waters along the margin of the river also provides refuge for larvae and fry larger predatory fish, and also acts as a refuge for juvenile and adult suckers during storms.

The change in wetted area and change in water depth associated with reducing the release rate from 500 cfs to 350 cfs would be relatively small. Both flow rates would result in sufficient hydrologic connectivity and depth to support suckers. An existing HEC-RAS model of SAR Reach 9 was updated by Scheevel Engineering by incorporating more recent (2015) topographic data along Reach 9. Figure 5-2 shows the wetted areas for 350, 500 cfs and 5,000 cfs release. For both the 500 cfs and 350 cfs release, the flow remains in the low flow channel and does not flow into the overbank area, except in very isolated areas. To show the change at selected reaches, three cross section views were identified. The location of the three sample cross sections from the model is shown in Figure 5-7 and cross section views at each location is shown in Figures 5-4 to 5-6. These cross sections illustrate the water depth for 350, 500 and 5,000 cfs release rates. These cross sections illustrate that the low flow channel is deeply incised in Reach 9.

Figure 5-7 shows maximum water depths for 500 cfs and 350 cfs releases based on the HEC-RAS model. The water depths are shown at each point where there is a cross section in the model. Water depths vary along each cross section and the value plotted is the maximum (deepest) water depth. Along the model in Reach 9, the deepest or maximum model-estimated water depth in Reach 9 range from a minimum of 1.2 feet to a maximum 7.7 feet for a 500 cfs release from Prado Dam. The model estimated deepest or maximum water depth in Reach 9 from a minimum of 1.1 feet to a maximum 7.0 feet for a 350 cfs release from Prado Dam. The wetted area in SAR Reach 9 with a 500 cfs release is 132 acres based on the updated HEC-RAS model. The wetted area in SAR Reach 9 with a 350 cfs release is 104 acres, or a decrease of 28 acres. However, the model does not predict the formation of isolated pools within the smaller wetted area. The number of days to drain 10,000 acre-feet from Prado, which is the maximum amount of increased storm water capture for the proposed action, is 14 days for a 500 cfs release rate and 25 days for a 350 cfs release rate (assuming an inflow rate of 150 cfs). The longer duration of the 350 cfs release provides additional days of sustained outflow even after the storm passes and inflow is reduced. Under a 350 cfs or 500 cfs release rate bank to bank hydrological connectivity would be maintained in the low flow channel. Because the low flow channel is deeply incised a reduction in the release rate from 500 cfs to 350 cfs would slightly reduce the depth of the water along the margins of the river but would still maintain bank to bank connectivity. The slightly reduced depth of the water along the margins of the river would still provide adequate refuge for larvae and fry. No effect to sucker critical habitat would occur from reducing the release rate from 500 cfs to 350 cfs. Critical habitat in Reach 9 would not be affected as the Water Conservation Plan would not trigger large erosive discharges. Modeling demonstrates that reducing the running average release rate from 500 cfs to 350 cfs would slightly reduce the depth of the low flow channel but would still maintain bank to bank connectivity. Furthermore, discharge rates fluctuate greatly depending on flood stage, inflow, water surface elevation, downstream construction activities, and other factors. There is not a steady state flow of 500 cfs

that creates sustained habitat conditions in the margins for larvae or fry. Moreover, the release rate (whether it is 350 cfs or 500 cfs average) would further decrease as the pool is emptied.

Direct and Indirect Impacts - Turbidity Effects

Santa Ana Sucker
The additional days of temporary storage of storm water at Prado Dam associated with the Water Conservation Plan could reduce the total suspended solids (TSS) and the turbidity of the water released from Prado Dam, since the greater days of storage allows additional sediment deposition to occur in Prado Basin. However, it is unlikely that there would be a measurable difference that would affect critical habitat in Reach 9. The change in release rate from 500 cfs to 350 cfs would not significantly change the velocity of the water in the channel in Reach 9 and therefore no effect would be anticipated to occur to sucker or sucker critical habitat from minimal changes in turbidity levels in Reach 9.

Vireo, Flycatcher, Cuckoo, and Gnatcatcher
Changes in turbidity associated with the Water Conservation Plan will generally have very little influence outside of the aquatic system, and are not anticipated to have any direct, indirect, or long-term impacts on federally listed bird species in the project area.

State Listed and Sensitive Species (Table 5-28)
Changes in turbidity associated with the Water Conservation Plan will generally have very little influence outside of the aquatic system, and are not anticipated to have direct or indirect impacts on the sensitive and state listed bird species contained in Table 5-28, with the exception of those species that sight-feed on aquatic organisms, such as the great blue heron and double crested cormorant, and those aquatic organisms that may be present such as the southwestern pond turtle and arroyo chub. Since the Water Conservation Plan could potentially reduce the TSS and turbidity of the water released from Prado Dam, this does not represent a substantial adverse effect for those species.

Indirect Impact - Reduction in Reach 9 Wetted Area After Storm Events from Reducing Release Flow from 5,000 to 350 cfs, and Potential to Create Isolated Pools

Santa Ana Sucker
It is very unlikely that Santa Ana Sucker would be trapped in isolated puddles when a 5,000 cfs release rate is reduced to a lower flow rate, because the Corps follows a release rate change guideline to avoid sudden changes in flow. As flow is reduced, suckers have the ability to detect and react to changes in depth and velocity and swim back to the low flow channel. The Corps uses the information in Table 5-29 as a guide when changing the rate of release from Prado Dam. As shown in Table 5-30, there is a 5½ hour transition period to decrease the flow from 5,000 cfs to 350 cfs. This information illustrates the Corps' existing protocols to avoid sudden and drastic changes in flow rates that could strand fish. As the water flow rate decreases and depths decrease, water flows back to the low flow channel since the low flow channel is deeply incised. This reduces the likelihood that fish would be stranded, since fish can move back to the low flow channel as the wetted area declines. Since suckers are not anticipated to be trapped due to the

slow rate of change and because of their ability to detect and react to changing conditions, no effects to sucker would occur. Effects to critical habitat in Reach 9 as the result of releases up to 5,000 cfs are described in the previous section on indirect effects to sucker critical habitat, and no effects are anticipated.

Table 5-29: Maximum Rate of Release Change

Current Rate of Release (cfs)	Maximum Rate of Change per ½ hour(cfs)
0-300	100
300-1,000	250
1,000-2,500	400
2,500-5,000	625

Table 5-30: Flow Rate/Cumulative Time

Flow Rate (cfs)	Cumulative Time (min)
5,000	0
4,375	30
3,750	60
3,125	90
2,500	120
2,100	150
1,700	180
1,300	210
900	240
650	270
400	300
350	330 minutes (5 ½ hours)

Other Potential Effects

Special Status Reptiles and Amphibians State Listed Species (Table 5-28)
The Southwestern Pond Turtle, California Red-Sided Garter Snake and Western Spadefoot were identified has having moderate or higher potential to occur within the study area. These species are found in wetland, aquatic, and riparian habitats. The occasional increased pooling would temporarily expand habitat conditions for the species. The additional sediment from the increased pooling would be minimal and would have no effect on the species.
The Orange Throated Whip Tail and Coast Horned Lizard occur in upland areas that typically contains grasslands and shrubby vegetation. The grasslands and shrub vegetation communities in the Prado Basin are located above 505 ft. Therefore, the species would not be directly affected by the increased pooling. There are no activities associated with Water Conservation Plan that would result in indirect adverse impacts to the Orange Throated Whiptail or Coast Horned Lizard.

State Listed and Sensitive Bird Species (Table 5-28)

Direct Impacts
As summarized in Table 5-28, many sensitive and state listed bird species would have a moderate or higher potential for occurring within the study area. The Water Conservation Plan would allow water to be stored to elevation 505 ft. during the flood season. In the event of a wet

year the study area would already be inundated before the nesting season begins, thereby avoiding the potential that existing nests could be inundated.

Indirect Impacts
If the buffer pool extends into nesting season, it is anticipated the species would seek nesting sites at higher elevations. The potential that the Water Conservation Measure could cause nesting birds to re-distribute to higher elevations would be a temporary indirect adverse effect. However, because there would be a substantial amount of suitable habitat available elsewhere in the Prado Basin, the potential temporary adverse effect would not be significant.

Ecosystem Restoration Plan (Alternative 2)

Special Status Plant Species (Direct, Indirect, and Long-Term Operation and Maintenance Impacts)
As summarized in Table 5-28 there is a low potential for special status plant species to occur within the study area. Implementation of the Ecosystem Restoration Plan measures included in Alternative 2 would not result in adverse direct or indirect effects to special status plant species. Long-term operation and maintenance activities associated with the Ecosystem Restoration Plan measures would not result in any direct impacts, nor involve any activities that would result in indirect offsite impacts, to special status plant species. As a result, impacts due to implementation of the Ecosystem Restoration Plan, including any of the measures contained within the plan for Alternative 2, would be less than significant with regards to impacts to special status plant species.

Special Status Wildlife Species
The following section describes direct, indirect, and long-term impacts to the list of special status wildlife species found in Table 5-28. For ease of interpretation, this section is broken down by the measures contained within the Ecosystem Restoration Plan, and further separated according to species.

Sediment Management Measure

The following analysis evaluates potential impacts to special status species and their critical habitat associated with construction of the sediment trap and transition channel, construction of the sediment storage site, and sediment removal and re-entrainment of the sediment into the Santa Ana River.

Vireo, Flycatcher, and Cuckoo

Direct Impacts from Construction of Sediment Trap, Transition Channel Removal Channel and Access Road
The vireo, flycatcher, and cuckoo all occur in riparian habitats along watercourses where dense growth of willow trees, cottonwood trees, mulefat and other riparian plants are present. Even though there is low potential for flycatcher and cuckoos to occur, the study area contains suitable habitat for all three species. The construction of the sediment trap, transition channel and access

road would require the removal of all vegetation within these areas and these areas would be kept clear of vegetation for the 50-year duration of the Sediment Management Measure. To avoid direct effects to nesting birds, all of the vegetation removal activities would occur outside of the nesting season. With the implementation of EC-BIO-2 no direct effects to nesting birds would occur.

Indirect Impacts from Construction of Sediment Trap, Transition Channel Removal Channel and Access Road

As shown in Figure 5-8 there are existing vireo territories and at least one historic flycatcher territory within the construction footprint of the sediment trap, transition channel and project access roads. The construction, operation and maintenance activities occurring in the sediment trap and transition channel would prohibit the vireos, flycatchers and potentially cuckoos from using the existing territories, requiring them to seek alternative nesting locations within the Prado Basin for the life of the project. The loss of the nesting territories during the non-breeding season would be an indirect, adverse effect.

The construction of the sediment trap, transition channel and project access roads would require the removal of approximately 116 acres of riparian vegetation that would be suitable nesting riparian habitat for the vireo, flycatcher, and cuckoo. Under the Proposed Action implementation, the proposed ecosystem restoration measures would provide approximately 620 acres of additional native habitat within the study area, which would substantially increase habitat for the vireo, flycatcher and cuckoo. Given the large quantity of suitable habitat available in the area combined with the addition of 620 acres of habitat resulting from the restoration efforts, the adverse effect due to the temporary loss of 116 acres of habitat is not substantial.

Indirect Noise Impacts from Sediment Removal Activities

The sediment would be removed from the sediment trap by a combination of dry excavation and floating dredge. The sediment removal operations would begin in late winter and would extend into the nesting season. The sediment removal operations would be confined to the sediment trap. Therefore, direct impacts to nesting birds would be avoided. The noise emitted from the dredging operations could discourage individual species from nesting within the vicinity of the sediment trap during nesting season. The USFWS has previously recommended a noise level of 60 dBA as a threshold to ensure no effects to nesting birds. The 60 dBA construction noise level generated from the sediment removal activities would extend approximately 600 feet from around the sediment trap and transition channel. To reduce potential construction noise levels to an acceptable level, a construction noise mitigation program would be implemented that would include the construction of earthen berms, the use of acoustical panels around the work areas, the use of heavy equipment with noise reducing mufflers and the operation of generators and booster pumps enclosed in sound proof enclosures. There would be potential that small numbers of birds could nest within the construction activity noise impact area during periods when heavy equipment would not be in operation, such as over a weekend. Even though there would be low potential for small numbers of birds to nest within the construction activity noise impact area when sediment removal activities are occurring, the potential that the construction noise impacts could disrupt breeding patterns of nesting birds would be an adverse effect. With the implementation of EC-BIO-2 and EC-BIO-3 potential adverse construction noise effects would be minimized and are not considered substantial.

Direct Impacts from Construction of Green Waste and Sediment at Sediment Storage Site
To create suitable conditions for processing and storing of the sediment, the sediment storage site location would be graded and re-contoured. The grading activities would occur outside of nesting season. Therefore, no direct or indirect noise effects to nesting birds would occur.

The sediment handling and processing activities at the sediment storage site would occur during nesting season. Sediment removed from the sediment trap would be hauled to the sediment storage site. The hauling activities would be confined to a project access road that would be constructed before nesting season. No direct impacts would occur.

Indirect Impacts from Construction and Operation at Green Waste and Sediment at Sediment Storage Site
The grading activities and vegetation removal activities associated with construction at the site would remove 2.1 acres of suitable nesting habitat for the vireo, flycatcher and cuckoo and displace 1 known vireo territory. While this would occur during the offseason, the loss of habitat and displacement of 1 known vireo territory represent an indirect adverse effect. Given the large quantity of available habitat in the area, and the long-term increase in habitat as a result of the restoration, this adverse effect is not considered substantial.

Noise emitted from the hauling activity could disrupt breeding patterns of nesting birds, if they occur near the project access road. To minimize noise effects at the sediment storage site an earthen berm would be constructed around the sediment storage site and if required temporary noise panels would be installed around areas where heavy construction equipment would be operating to further minimize noise levels. Because sediment hauling activities could potentially disrupt nesting birds, the sediment processing activities may affect the vireo, flycatcher and or cuckoo. Because EC-BIO-2 and EC-BIO-3 would be implemented to minimize potential construction noise effects, the adverse effect would not be substantial.

Direct Impacts from Sediment Re-entrainment
The sediment re-entrainment activities would occur along the levee of the Prado Dam outlet structure. Along the Prado Dam outlet channel there is no suitable nesting habitat. However, downstream of the re-entrainment area there is riparian vegetation which could provide suitable nesting habitat. The re-entrainment activities would be confined to the levee and would not result in any direct effects to the riparian vegetation in the river. Additionally, the sediment re-entrainment activities would occur outside of nesting season. Therefore, no direct adverse effects to vireos, and no effects to flycatchers or cuckoos, would occur.
The vireo is known to occur along Reach 9. The proposed sediment re-entrainment activities are expected to reduce degradation of the river bed along Reach 9. The reversing of the incision trend would be expected to reconnect the river to its floodplain and consequently enable the widening of the riparian corridor, which would increase habitat for the vireo. The increased habitat resulting from the sediment re-entrainment activities would have a beneficial effect on the vireo.

Long-Term Operation and Maintenance Impacts
In general, maintenance activities would occur outside of the nesting season for vireo, flycatcher, and cuckoo with exception of trap removal operations. Sediment removal from the trap area could occur during nesting season, but with the use of sound attenuation devices and/or under the supervision of a biologist. The maintenance activities would be performed under the direction and supervision of a biologist to ensure that no birds are affected, and that adjacent habitat is not diminished. With the implementation of Environmental Commitments EC-BIO-2 and EC-BIO-3, potential adverse effects from maintenance activities would not be substantial, and therefore be less than significant.

Gnatcatcher and Gnatcatcher Critical Habitat

Direct Impacts from Construction and Operation of Sediment Trap, Transition Channel
The location where the sediment trap and transition channel would be constructed does not contain suitable habitat for the gnatcatcher. No effects to the gnatcatcher would occur at this location. The construction, operation, and maintenance of Sediment Management Measure would not occur on lands designated critical habitat for the gnatcatcher. Therefore, no effects to critical habitat for the gnatcatcher would occur.

Direct Impacts from Construction of Green Waste and Sediment at Sediment Storage Site
The coastal sage scrub vegetation and to a lesser extent the mixed coastal sage vegetation at the sediment storage site provides suitable habitat for the gnatcatcher. As shown in Figure 5-9 one pair of gnatcatchers was identified at Sediment Storage Site B by SAWA in November 2017 and an individual gnatcatcher was detected along the northern edge of the site. Another gnatcatcher was detected approximately 150 meters to the east. However, the SAWA survey was unable to verify that the gnatcatchers were two different individuals and not one individual gnatcatcher dispersing through the area.

The grading activities to create the sediment storage site would temporarily impact 2.3 acres of coastal sage scrub and 43.8 acres of mixed coastal sage scrub/non-native weeds. The construction of the sediment storage site would occur outside of the nesting season. Therefore, direct impacts and indirect construction noise effects to nesting gnatcatchers would be avoided. There would still be the potential that gnatcatchers could be dispersing through the area outside of nesting season and the construction noise could cause them to flush and relocate. The potential that gnatcatchers could relocate because of construction activities would be an adverse effect. The loss of coastal sage scrub and the potential that construction activity could cause gnatcatchers to relocate would be an adverse effect. Implementation of EC-BIO-2, EC-BIO-3, and EC-BIO-4 would minimize effects to the gnatcatcher, and therefore adverse effects would not be substantial.

Indirect Noise Impacts from Processing of Green Waste and Sediment at Sediment Storage Site
Sediment processing activities would occur during nesting season. Because all of the vegetation would be removed from the site, it would be unlikely that gnatcatchers would nest at the sediment storage site when sediment processing activities are occurring. As part of the

construction activities, sound attenuation berm would be constructed around the perimeter of the sediment storage site to reduce noise impacts to a less than significant level.

Direct Impacts from Sediment Re-Entrainment Activities
The sediment re-entrainment activities would occur along the levee of the Prado Dam outlet structure. Along the Prado Dam outlet channel there is no suitable nesting habitat for gnatcatcher. Additionally, the sediment re-entrainment activities would occur outside of nesting season. No direct effects to the gnatcatcher would occur.

The gnatcatcher is known to occur along Reach 9. The proposed sediment re-entrainment activities are expected to reduce the incision of the Santa Ana River downstream of Prado Dam. A reduction in the incision would be expected to help reconnect the river to its floodplain. Overbank would then be expected to occur with more frequency. This would be expected to create sandy wash situations within Reach 9 over a greater area than currently occurs, Alluvial fan sage scrub habitats are typically associated with these sand wash situations. This effect would increase the amount of and quality of habitat considered suitable for the gnatcatcher. The increased habitat for the gnatcatcher would be a beneficial effect.

Long-Term Operation and Maintenance Impacts
In general, maintenance activities would occur outside of the gnatcatcher nesting season with exception of trap removal operations. Sediment removal from the trap area could occur during nesting season, but with the use of sound attenuation devices and/or under the supervision of a biologist. The maintenance activities would be performed under the direction and supervision of a biologist to ensure gnatcatcher are not affected, and that adjacent gnatcatcher habitat is not diminished. With the implementation of Environmental Commitments EC-BIO-2 and BIO-3, potential adverse effects from maintenance activities would not be substantial, and therefore be less than significant.

Long-term operation and maintenance activities would occur within the construction footprint of the Sediment Management Measure and would not impact any additional critical habitat for gnatcatcher other than what is described in direct and indirect impacts above. To avoid potential adverse indirect construction effects to adjacent critical habitat areas not directly impacted by maintenance activities, EC-BIO-12, EC-BIO-13, EC-BIO-14, EC-BIO-15, and EC-BIO-16 would continue to be implemented during long-term operation and maintenance. Long-term operation and maintenance would not result in any substantial adverse effect to critical habitat for gnatcatcher.

Sucker

Direct Impacts from Construction and Operation of Sediment Removal Trap and Transition Channel
The construction and operation of the sediment removal trap and transition channel would occur within the wetted channel of the Santa Ana River. Based on the lack of occurrence of suckers in the Prado Basin, poor habitat conditions within and upstream of Prado Basin and high populations of exotic predatory fish, the potential for populations of suckers to occur at the location where the sediment trap or transition channel would be constructed would be very low.

In the event isolated suckers wash or swim into the sediment trap or transition channel it would be likely they would swim away from where the construction and sediment removal activities are occurring. Therefore, any direct impacts are considered less than substantial.

Indirect Impacts from Construction and Operation of Sediment Removal Trap and Transition Channel

There would be the potential that isolated suckers could wash or swim into the sediment trap or transition channel. The potential that individual isolated suckers could find their way into the sediment trap and transition channel where turbidity levels would be higher and the potential they could be harmed by sediment removal activities would be considered an adverse effect. To minimize adverse effects to the sucker environmental commitments would be implemented when sediment removal activities are occurring. Additionally, to prevent even the slightest chance of affecting spawning fish, sediment removal activities would be conducted outside of the spawning season. With the implementation of EC-BIO-7, EC-BIO-8, EC-BIO-9, EC-BIO-10, EC-BIO-11 and EC-BIO-12 potential adverse effects to suckers from sediment removal activities would not be substantial.

Direct Impacts from Sediment Re-Entrainment Activities

The sediment re-entrainment activities may affect but would not adversely affect sucker. These activities will occur at the terminus of the Prado Dam outlet channel, downstream of the Highway 71 crossing. This segment of the river contains some of the PCEs associated with sucker critical habitat. However, because of frequent high turbidity and high populations of predatory fish species the habitat is considered marginal. Surveys conducted along the Santa Ana River within the last five years identified a single male sucker near the Green River Golf Course. Therefore, it is assumed that it is possible that individual fish could swim their way through the outlet channel to downstream areas. If suckers are present in the segment of the river where sediment re-entrainment would occur, it is more than likely that the fish would swim away from where re-entrainment activity is occurring and would not be adversely affected.

Indirect Water Quality Impacts from Sediment Re-Entrainment Activities

Additionally, the sediment would be re-entrained during high flows. During these periods of high flow, the river would experience higher levels of turbidity. The re-entrained sediment would consist of 1 percent solids and should dilute quickly under high flows where it would not be adverse, to aquatic life.

In the event elevated levels of turbidity occur beyond background levels, adaptive management practices could be implemented such as spacing the re-entrainment in a manner to recreate natural conditions to the extent practicable. This would be done by pulsing re-entrainment of sediments to reflect a typical storm cycle. Typical storm cycles in California occur over a 24 to 72- hour periods with 24 hours or greater periods between storm systems. Sediment re-entrainment would take place in a 72-hour entrainment cycle, assuming adequate flows are available, with 24 hours of no re-entrainment cycle to recreate a natural storm driven sediment suspension cycles as close possible. By pulsing sediment re-entrainment, it allows for dilution of the sediment in the water column which would help minimize turbidity impacts. Additionally, the sediment would be re-entrained outside of spawning season. Therefore, the re-entrained

sediment would not be expected to significantly increase the levels of turbidly at downstream areas.

As part of environmental planning for the project boring samples were taken along the sediment transition channel to characterize sediment in the project area that would be re-entrained. A chemical analysis of the sediments in the Prado Basin showed no detected organic chemicals, pesticides, PCbs, PAhs, or hydrocarbons. It would be unlikely that sediment extracted from the basin and re-entrained into the river would cause increased concentrations of organic chemicals, pesticides, PCbs, PAhs, or hydrocarbons in the Santa Ana River due to sediment-re-entrainment. Prior to discharging the sediment into the river, a water quality monitoring program would be implemented to monitor the sediment material dredged from the sediment removal channel for a wide range of constituents, including; organic chemicals, pesticides, PCbs, PAhs, and hydrocarbons. In the event the sediment exhibits detectable levels of organic substances, pesticides, PCbs, PAhs, or hydrocarbons that would cause an exceedance of the water quality objectives in the RWQCB Basin Plan, the sediment would not be used for re-entrainment.

The re-entrained sediment would be transported to segments of the lower Santa Ana River that are sediment starved and armored which help to restore habitat for the sucker. Additionally, the re-entrained sediment which would help to fill deeper pools and reduce predation and would also to help reverse the current incising of the river to create more shallow water habitat along the banks and to allow more riparian growth along the banks of the river to provide shade and refuge. Therefore, a long-term benefit to the species is anticipated.

Long-Term Operation and Maintenance Impacts

The primary maintenance activity associated with sediment management would be the removal of sediment and debris from the sediment trap and transition channel. Because of the ongoing sediment removal activities, it is unlikely that any sucker would be present. In the event isolated suckers wash or swim into the sediment trap or transition channel it would be likely they would swim away from where the construction and sediment removal activities are occurring. The potential that individual isolated suckers could find their way into the sediment trap and transition channel where turbidity levels would be higher and the potential they could be harmed by sediment removal activities would be considered an adverse effect. To minimize adverse effects to the sucker environmental commitments would be implemented when maintenance activities are occurring. Additionally, to prevent even the slightest chance of affecting spawning fish, maintenance activities would be conducted outside of the spawning season. With the implementation of EC-BIO-7, EC-BIO-8, EC-BIO-9, EC-BIO-10, EC-BIO-11 and EC-BIO-12 potential adverse effects to suckers from maintenance would not be substantial.

Impacts to Critical Habitat for Vireo, Flycatcher, and Proposed Critical Habitat for Cuckoo

Direct Impacts

The construction and operation of the Sediment Management Measure would directly impact 220.0 acres of designated critical habitat for the vireo, 93.0 acres designated acres critical habitat for the flycatcher and 338.7 acres of designated critical habitat for the cuckoo. The construction of the sediment trap and transition channel would remove PCEs associated with critical habitat for these species. Therefore, the sediment removal activities occurring in the sediment trap and

transition channel would have an adverse effect on designated or proposed critical habitat for all three species. However, given the large quantity of available habitat in the area, and the long-term increase in habitat within and downstream of the Basin that would occur as a result of the restoration, this adverse effect is not considered significant or substantial in terms of NEPA and CEQA compliance.

Indirect Impacts
During construction there would be the potential that adjacent habitat would be indirectly affected by heavy construction equipment. To avoid potential adverse indirect construction effects to adjacent critical habitat areas not directly impacted by the Sediment Management Measure, EC-BIO-12, EC-BIO-13, EC-BIO-14, EC-BIO-15, and EC-BIO-16 would be implemented. However, this management measure also includes sediment re-entrainment and provides an opportunity for associated measures such as riparian plantings and edge management that would result in overall positive effects to critical habitat in the long-term.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would occur within the construction footprint of the Sediment Management Measure and would not impact any additional critical habitat for vireo, flycatcher, or cuckoo other than those described in direct and indirect impacts above. To avoid potential adverse indirect construction effects to adjacent critical habitat areas not directly impacted by maintenance activities, EC-BIO-12, EC-BIO-13, EC-BIO-14, EC-BIO-15, and EC-BIO-16 would continue to be implemented during long-term operation and maintenance. Long-term operation and maintenance would not result in any substantial adverse effect to critical habitat for vireo, flycatcher, or cuckoo.

Impacts to Santa Ana Sucker Critical Habitat Upstream of Prado Dam

Direct Impact
Designated Sucker critical habitat is located along the segment of the Santa Ana River where the sediment transition channel would be constructed. This reach of the river lacks PCEs of sucker critical habitat. Therefore, there would be no reduction or modification of the PCEs associated with sucker critical habitat. Construction activities may affect but would not adversely affect sucker critical habitat.

Indirect Impacts
The construction and operation of the sediment removal channel could increase bed shear stress and velocity within the reservoir area when sediment removal activities are occurring. An increase in flow velocity and sediment transport capacity at the upstream end of the dredged channel would have the potential to create change the gradient of the river to encourage sediments to migrate into the Prado Basin and expose more existing gravel and cobble deposits along the upper reaches of the river. The exposing of more gravel and cobbles along the river would have an indirect beneficial effect on critical habitat for the sucker.

The construction and operation of the sediment trap and transition channel would increase turbidity and suspended sediments in the sediment trap and transition channel pool of water. There could be the potential that the turbid water and suspended sediments could be conveyed downstream through Prado Dam into Reach 9. To avoid the downstream conveyance of turbid

waters, a series of earthen plugs would be installed at the lower end of the sediment trap and throughout the outlet channel. The plugs would also create stilling basins which would help to reduce the suspended sediment concentration and turbidity of the water leaving Prado Basin. The potential increased in turbidity may affect but would not adversely affect critical habitat downstream of Prado Dam.

The objective of the Sediment Management Measure is to move sediment around Prado Dam and re-entrain it into the lower Santa Anan River, downstream of Prado Dam. To naturally disperse the sediments downstream, re-entrainment activities would be targeted during high flows (flows greater than 500 cfs) in the lower Santa Ana River. A sediment transport model was developed to help predict the movement of the re-entrained sediments. As shown in Figure 5-10 there would be no significant deposition of clays or silts that would adversely affect the existing substrate of the Santa Ana Canyon Reach where more favorable habitat conditions for native fish exist. Only pebbles and gravels would be likely to deposit in the Santa Ana Canyon Reach, which would help enhance sucker critical habitat in this reach of the river. The increase in pebbles and gravels would have a beneficial effect on sucker critical habitat downstream of Prado Dam.

Operation of the sediment trap and transition channel, may affect, but is not likely to adversely affect sucker critical habitat upstream and downstream of Prado Dam. No impacts to critical habitat would occur. In the long-term, operation of the sediment trap and re-entrainment activities would have a beneficial effect on critical habitat for this species.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would occur within the construction footprint of the Sediment Management Measure. No additional impacts to critical habitat would occur. To avoid potential adverse indirect construction effects to adjacent critical habitat areas not directly impacted by maintenance activities EC-BIO-12, EC-BIO-13, EC-BIO-14, EC-BIO-15, and EC-BIO-16 would be implemented.

Impacts to Special Status Reptiles and Amphibians (Table 5-28)

Direct Impacts
The Southwestern Pond Turtle, California Red-Sided Garter Snake and the Western Spadefoot occur in streams, creeks and marshes and have the potential to occur within the area where the sediment removal activities would occur. If these species were present, construction operations could result in direct adverse effects to individuals. To avoid potential direct adverse effects, a special status species monitoring program would be implemented that would focus on onsite biological monitoring prior to construction, during construction and during sediment removal activities. A biologist would monitor the construction activity area to determine if any species were present. If needed, construction activity would be halted to allow species to move out of harm's way or be relocated outside of the work area of impact, minimizing direct effects to the species. With the implementation of Environmental Commitment EC-BIO-5, potential adverse impacts to reptile species would be less than significant.

The sediment storage site contains bare ground and non-native grasslands which could provide suitable habitat for the Orange Throated Whip Tail, Coast Horned Lizard, and Red Diamond

Rattle Snake. If these species are present during grading activities there would be the potential that they could be inadvertently be trampled. Prior to grading activities occurring at the sediment storage site and during the sediment storage operations a biologist would monitor the construction activity area to determine if any species were present. If needed, construction activity would be halted to allow species to move out of harm's way or be relocated outside of the work area of impact, minimizing direct effects to the species. With the implementation of EC-BIO-5 potential adverse impacts to reptile species would be less than significant.

Indirect Impacts
During construction there would be the potential that habitat for the previously described reptile and amphibian species could be indirectly affected by heavy construction equipment. To avoid potential adverse indirect construction effects to adjacent habitat areas not directly impacted by the Sediment Management Measure, Environmental Commitments EC-BIO-12, EC-BIO-13, EC-BIO-14, EC-BIO-15, and EC-BIO-16 would be implemented.

Long-Term Operation and Maintenance Impacts
The primary maintenance activities associated with sediment management would include vegetation/debris and sediment removal from all of sediment management features. The maintenance roads around the features would be used to provide access to remove sediment and debris. Annual trimming and mowing of vegetation would provide access to the areas in need of maintenance. Existing maintenance roads around each of the features would provide access for equipment to perform maintenance activities. The maintenance activities would be performed under the direction and supervision of a biologist to ensure sensitive and special status reptiles and amphibians are not affected, and that adjacent habitat for such species is not diminished. With the implementation of EC-BIO-5 potential adverse effects from maintenance activities would not be substantial, and therefore be less than significant.

Impacts to State Listed and Sensitive Bird Species (Table 5-28)

Direct Impacts
The Yellow Breasted Chat, Yellow Warbler, and Tri Colored Black Bird are known to occupy freshwater marsh wetland areas, along the edges of ponds and marshes, and in dense riparian thickets near water. The construction of the sediment trap and transition channel would remove all vegetation within the trap and channel alignments. Vegetation removal would occur outside of nesting season. Both direct impacts and indirect construction noise effects to nesting birds would be avoided.

Construction of the sediment trap and transition channel would remove riparian vegetation that could be utilized as habitat by all of the above species. However, under the proposed Action, implementation of the ecosystem restoration measures would restore approximately 620 acres of native vegetation, which would increase the amount of habitat for all of the above species.

The White-Tailed Kite, Coopers Hawk, Long-Eared Owl, Sharp-Shinned Hawk, Vaux's Swift, Double-Crested Cormorant, Great Blue Heron all occupy and/or nest in trees. The vegetation clearing operations would occur outside of the nesting season minimizing the potential for the presence of active nests. Additionally, trees that are removed from the area would be inspected to

confirm if any nests are present. If nests are encountered, the biologist will evaluate the nest site for activity, and if possible, determine species, and will propose avoidance measures and/or buffers as appropriate. With the implementation of EC-BIO-2, EC-BIO-3, and EC-BIO-6 potential adverse impacts would be less than significant.

Construction of the sediment removal channel would temporarily remove habitat for the above species. However, under the Proposed Action, implementation of the ecosystem restoration measures would restore approximately 620 acres of native vegetation, which would increase the amount of habitat for all the above species.

Dredging and sediment handling operations would begin in late winter and extend into nesting season. The dredging operations would be confined to the wetted sediment removal channel. Therefore, no direct adverse impacts to individuals would occur. The sediment re-entrainment activities would be confined to the levee and would not impact any offsite habitat areas. Therefore, potential adverse direct and indirect impacts to nesting birds would be avoided.

The primary maintenance activities would include vegetation/debris and sediment removal from all of features. The maintenance roads around the features would be used to provide access to remove sediment and debris. Annual trimming and mowing of vegetation would provide access to the areas in need of maintenance. Existing maintenance roads around each of the features would provide access for equipment to perform maintenance activities. In general, maintenance activities would occur nesting season with exception of trap removal operations. Sediment removal from the trap area could occur during nesting season with the use of sound attenuation devices and/or under the supervision of a biologist. The maintenance activities would be performed under the direction and supervision of a biologist to insure wildlife is not affected habitat is not diminished. With the implementation of EC-BIO-2 and EC-BIO-3 potential adverse effects from maintenance activities would be less than significant.
The Northern Harrier, California Horned Lark, Loggerhead Shrike, Merlin, and Grasshopper Sparrow are known to occupy and/or forage in grassland areas and shrub areas and known to feed on small mammals and insects. The area where the sediment trap and transition channel alignments would be located does not support suitable grassland habitat. Therefore, it is very unlikely that any of the above species would be nesting or forging in the area where the sediment trap and transition channel would be located.

The sediment storage site contains non-native grasslands which could provide foraging habitat for the above species. The grading operations at the storage site would result in the loss of foraging area. However, the amount of habitat that would be removed would be minimal compared to the overall habitat and potential foraging range that would be available within Prado Basin and the prey that would be temporarily displaced would represent a very small amount of available prey occurring throughout the area and would not result in significant adverse impacts in regards to the loss foraging opportunities for these species.

Sediment handing activities at the sediment storage site would occur during nesting season. To reduce construction noise impacts an earthen berm would be constructed around the sediment storage site. With the implementation of EC-BIO-2 and EC-BIO-3 potential adverse impacts would be less than significant.

The sediment re-entrainment activities would occur along the levee of the Prado Dam outlet structure. Along the outlet channel there is no suitable nesting habitat. Chino Hills located approximately 300 feet north of the sediment re-entrainment area and does contain suitable habitat. The sediment re-entrainment activities would be confined to the levee and would not impact any offsite habitat areas.

Indirect Impacts
The dredging operations would generate noise levels that could discourage birds from nesting within the construction activity noise impact area. The relocation of the nesting birds to other locations within the basin would be an adverse effect, but because there would be other suitable nesting locations within the Prado Basin, the adverse effect would not be significant. To minimize construction noise impacts, noise mitigation program would be implemented. With the implementation of EC-BIO-2 and EC-BIO-3 potential adverse impacts would be less than significant.

The sediment re-entrainment activities would occur along the levee of the Prado Dam outlet structure. Along the outlet channel there is no suitable nesting habitat. Therefore, potential adverse direct impacts to nesting birds would be avoided. Downstream of the re-entrainment area is riparian vegetation which could provide suitable habitat. The re-entrainment activities would be confined to the levee and would not result in any direct impacts to riparian vegetation. Additionally, the sediment re-entrainment activities would occur outside of nesting season. Potential adverse direct impacts and adverse indirect construction noise impacts to nesting birds would be avoided.

Long-Term Operation and Maintenance Impacts
The primary maintenance activities associated with sediment management would include vegetation/debris and sediment removal from all of sediment management features. The maintenance roads around the features would be used to provide access to remove sediment and debris. Annual trimming and mowing of vegetation would provide access to the areas in need of maintenance. Existing maintenance roads around each of the features would provide access for equipment to perform maintenance activities. In general, maintenance activities would occur outside of the bird nesting season with exception of trap removal operations. Sediment removal from the trap area could occur during nesting season with the use of sound attenuation devices and/or under the supervision of a biologist. The maintenance activities would be performed under the direction and supervision of a biologist to ensure sensitive and special status birds are not affected, and that adjacent habitat is not diminished. With the implementation of EC-BIO-2 and EC-BIO-3 potential adverse effects from maintenance activities would not be substantial, and therefore be less than significant.

Chino Creek Channel Restoration Measure
Direct and indirect effects to sensitive species and critical habitat are provided for each species or group of species, followed by a discussion of potential Long-Term Operation and Maintenance Effects that could occur from implementation of this measure.

Vireo and Vireo Critical Habitat

Direct Impacts
As shown in Figure 5-11, where the Chino Creek Channel Restoration Measure would be implemented 12 existing vireo territories have been identified. To avoid direct impacts to nesting birds, vegetation clearing, grading operations involving the use of heavy construction equipment would occur outside of the nesting season. With the implementation of EC-BIO-2, potential direct adverse effects would be avoided.
There are no lands designated as critical habitat within area where Chino Creek Channel Restoration Measure would be implemented, and therefore there would be no direct adverse effects to vireo critical habitat.

Indirect Impacts
The operation of heavy construction equipment could generate noise impacts that could potentially discourage bird from nesting in the area. To avoid indirect adverse noise impacts to nesting birds, vegetation clearing, grading operations involving the use of heavy construction equipment would occur outside of the nesting season. With the implementation of EC-BIO-2 potential indirect adverse noise effects would be avoided.

Construction activities would temporarily remove 5.3 acres of suitable habitat for the vireo. The temporary removal of habitat may adversely affect the vireo. Once the ecosystem restoration measure is completed, approximately 112 acres of additional habitat would be provided. While the short-term loss of habitat is an adverse effect, the long-term increase in habitat would be a beneficial effect that outweighs the short-term loss. As a result, no substantial adverse impacts would occur.

There are no activities associated with the Chino Creek Restoration Measure that would indirectly affect critical habitat outside of where the measure would be implemented.

Cuckoos, Flycatchers, and Gnatcatchers and Associated Critical Habitats

Direct Impacts
There would be low potential for the cuckoo, flycatcher, or gnatcatcher to occur where the Chino Creek Channel Restoration Measure would be implemented. No known cuckoo, flycatcher, or gnatcatcher territories would be affected. Once the restoration activities are completed, approximately 112 acres of additional riparian habitat suitable for cuckoo and flycatcher would be restored. The proposed restoration activities would include the planting of transitional native habitat which would be suitable habitat for the gnatcatcher. The additional habitat would be a long term beneficial effect.

Implementation of the Chino Creek Channel Restoration Measure would temporarily remove 0.22 acres of flycatcher critical habitat, of which approximately 0.20 acres contain PCEs associated with flycatcher critical habitat. 17.9 acres of proposed cuckoo critical habitat, of which 5.2 acres contain PCEs, would also be removed. The temporary loss of critical habitat may affect but is not likely to adversely affect critical habitat for either species. Once the ecosystem restoration measure is completed approximately 112 acres containing additional PCEs would be

provided for both species. The increase in primary constituent elements would be a long term beneficial effect.

There is not designated gnatcatcher critical habitat where the Chino Creek Channel Restoration Measure would be implemented, and therefore no effects to gnatcatcher critical habitat would occur.

Indirect Impacts
The operation of heavy construction equipment could generate noise impacts that could potentially discourage birds from nesting in the vicinity of where the measure would be implemented. To avoid indirect adverse noise impacts to nesting birds, vegetation clearing, grading operations involving the use of heavy construction equipment would occur outside of the nesting season. With the implementation of EC-BIO-2 potential indirect adverse noise effects to cuckoo and flycatcher would be avoided. There are no activities associated with Chino Creek Restoration Measure that would result in indirect adverse impacts to gnatcatchers.

To avoid potential adverse indirect construction effects to adjacent critical habitat areas for cuckoo and flycatcher, Environmental Commitments EC-BIO-12, EC-BIO-13, EC-BIO-14, EC-BIO-15 and EC-BIO-16 would be implemented. There are no activities associated with the Chino Creek restoration that would result in indirect impacts to gnatcatcher critical habitat.

Sucker and Sucker Critical Habitat

Direct Impacts
The species is not known to occur in the area. However, some segments of the creek do contain some of the required PCEs to support suckers and the creek provides hydrologic connectivity to the Santa Ana River that would allow suckers to have upstream and downstream movement between the creek and the Santa Ana. With the implementation of Environmental Commitment EC-BIO-7 construction activities would occur outside of spawning season. No effects to spawning fish would occur. The construction activities would temporarily disrupt the habitat in the creek. Because of the low potential of the sucker occurring, the construction activities at Chino Creek may affect, but is not likely to adversely affect suckers. Once the ecosystem restoration measure is completed approximately 2.8 acres of additional open water habitat would be provided. The increase in open water habitat would a beneficial effect.

There is not any designated sucker critical habitat where the Chino Creek Channel Restoration Measure would be implemented, and therefore no direct effects critical habitat would occur.
Indirect Impacts
There are no activities associated with Chino Creek Restoration Measure that would result in indirect adverse impacts to suckers or sucker critical habitat.

Special Status Reptiles and Amphibians (Table 5-28)

Direct Impacts
As summarized in Table 5-28, several special status reptile and amphibian species have the potential to occur within the Chino Creek study area. To avoid potential direct adverse impacts to

these species a biological monitoring program would be implemented that would focus on onsite biological monitoring during construction and maintenance activities. With implementation of EC-BIO-5 potential adverse direct impacts to the above species would be less than significant.

Indirect Impacts
Construction activity occur within the area could cause the above species to flee from the vicinity where the measure would be implemented and seek suitable habitat elsewhere. Because there would be substantial amounts of suitable habitat in the surrounding area, the potential indirect effect would be less than significant.

State Listed and Sensitive Bird Species (Table 5-28)

Direct Impacts
Several bird species of concern were identified in Table 5-28 as having moderate or higher potential for occurring in the area where the Chino Creek Channel Restoration Measure would be implemented. With the implementation of Environmental Commitment EC-BIO-2 potential direct effects to these bird species would be avoided.

Indirect Impacts
Construction activity occurring within the area could cause the bird species to flee from the vicinity where the measure would be implemented and seek suitable habitat elsewhere. Because there would be substantial amounts of suitable habitat in the surrounding area, the potential indirect effect would be less than significant.

Long-Term Operation and Maintenance Impacts
Biomass and debris generated form storm flows would be removed from the channel annually, if needed. The maintenance road and seasonal/temporary trails through the braided channel area would be used to provide access to remove sediment and debris. To avoid impacts to spawning fish, sediment and debris removal within Chino Creek would require maintenance activities to occur outside of spawning season per EC-BIO-7.

Additionally, trimming and maintaining vegetation around the channel, maintenance road, berms and in-channel structures would occur. Invasive plants would also be removed from the area on an annual basis. The maintenance activities would occur within the construction footprint of the Chino Creek Measure. No impacts to critical habitat would occur. These vegetation maintenance activities would be performed at various times throughout the year as conditions allow and the work would be done under the direction and supervision of a biologists to insure no wildlife and habitat are disturbed. Overall, the long-term operation and maintenance associated with Chino Creek is not expected to result in substantial adverse impacts to any of the special status or sensitive species, including those protected under FESA, that occur within or adjacent to the project area.

In-Stream Habitat Features Measure (Downstream)
Direct and indirect effects to sensitive species and critical habitat are provided for each species or group of species, followed by a discussion of potential Long-Term Operation and Maintenance Effects that could occur from implementation of this measure.

Vireo and Vireo Critical Habitat

Direct Impacts
The vireo is known to occur in the Reach 9 area. Implementation of the In-Stream Habitat Features Measure would occur in the wetted channel of the Santa Ana River and outside of nesting season. Therefore, no direct impacts to vireo would occur. The In-Stream Habitat Features Measure would not be implemented on lands designated critical habitat for the vireo and therefore no direct effects to designated critical habitat for vireo would occur.

Indirect Impacts
As shown in Figure 5-12, there several known vireo territories scattered throughout Reach 9. While most of the access would occur along existing roads avoiding vireo territories, it is estimated that construction of staging areas and additional access would temporarily remove 3.1 acres of riparian vegetation and could potentially displace up to 9 known vireo territories, which would be an indirect adverse effect.

The amount of riparian vegetation temporarily removed would be minimal compared to the overall amount of riparian vegetation in the Reach 9 area. Disturbed areas would be restored with native habitat at the completion of construction. Additionally, to avoid indirect construction impacts to adjacent riparian vegetation Environmental Commitments EC-BIO-12, EC-BIO-13, EC-BIO-14, EC-BIO-15 and EC-BIO-16 would be implemented.

The presence of the In-Stream Habitat Features Measure would contribute to reversing the incision trend along the river and would be expected to reconnect the river to its floodplain, at least in localized areas where the in-stream features would occur, which would enable the widening of riparian habitat for the vireo. The long- term increase in habitat would be an indirect beneficial effect. There is no designated critical habitat within the vicinity of where the In-Stream Habitat Features Measure would be implemented, and therefore no indirect impacts to critical habitat would occur. Overall, while short-term adverse effects are anticipated, the long-term benefits to vireo outweigh short term impacts, and no substantial adverse impacts are anticipated.

Flycatcher and Cuckoo and Associated Critical Habitat

Direct Impacts
Neither the flycatcher nor cuckoo are known to occur, nor does either species have critical habitat, in Reach 9. Therefore, no direct effects to either species or their critical habitat would occur.

Indirect Impacts
In-Stream Habitat Features Measure would be constructed in the Santa Ana River and would not be near any critical or suitable habitat for the flycatcher or cuckoo. Therefore, neither the flycatcher nor the cuckoo would be indirectly affect, and no indirect effects to critical habitat for either species would occur.

Gnatcatcher and Gnatcatcher Critical Habitat

Direct Impacts
The species is known to occur, and has critical habitat, along the terraces above Reach 9. Implementation of the In-Stream Habitat Features Measure would occur in the wetted channel of the Santa Ana River and outside of nesting season. Therefore, no direct impacts to nesting birds would occur. Construction of the access roads and construction staging areas would temporarily remove 0.19 acres of critical habitat which contains the PCEs of gnatcatcher critical habitat. The amount of upland habitat temporarily removed would be minimal compared to the overall amount of upland habitat in the Reach 9 area. Disturbed areas would be restored with native habitat at the completion of construction, and as a result this temporary loss of habitat would not result in a substantial adverse effect to the gnatcatcher. The temporary removal of PCEs may affect but is not likely to adversely critical habitat for the gnatcatcher, and this adverse effect to critical habitat is not considered substantial.

Indirect Impacts
To avoid indirect construction impacts to adjacent upland areas of critical habitat, EC-BIO-12, EC-BIO-13, EC-BIO-14, EC-BIO-15 and EC-BIO-16 would be implemented. The presence of the In-Stream Habitat Feature Measure would assist in reducing the incision of the Santa Ana River downstream of Prado Dam and would be expected to help reconnect the river to its floodplain. Overbank flooding would then be expected to occur with more frequency. This would be expected to create sandy wash habitat within Reach 9 over a greater area than currently occurs. Alluvial fan sage scrub habitats are typically associated with sand wash habitat in Reach 9. This effect would increase the amount and quality of critical habitat, and associated PCEs within the Reach 9 area. The long-term increase in PCEs would be a beneficial effect.

Sucker and Sucker Critical Habitat

Direct Impacts
Based on the lack of known occurrence of sucker at the site, marginal habitat conditions, and high populations of exotic predatory fish, there would be low potential for suckers to occur in the area of the In-Stream Habitat Features Measure. Due to the low potential for suckers to be present during construction, implementation of the In-Stream Habitat Features Measure may affect but is not likely to adversely affect the sucker. As a result, direct impacts to sucker are not considered substantial.

The construction of the In-Stream Habitat Features Measure would require the operation of heavy construction equipment in designated critical habitat for the sucker. Implementation of the measure would not modify or reduce the PCEs of the critical habitat. The construction activity may affect but would not adversely affect critical habitat for the sucker, and the resulting feature would improve habitat conditions. Therefore, direct impacts to critical habitat are not considered substantial.

Indirect Impacts
The presence of the In-Stream Habitat Features Measure would create localized erosion around the feature helping to uncover existing gravel beds and cobbles which would enhance habitat for

the sucker. The long-term enhancement of habitat for the sucker would be an indirect beneficial effect to both sucker, and sucker critical habitat.

Special Status Reptiles and Amphibians (Table 5-28)

Direct Impacts
In-Stream Habitat Features would be implemented in the wetted channel of the Santa Ana River. It would be unlikely that any of the species listed in Table 5-28 would be present in the river when the construction activity would be occurring. There would be the potential that these species could occur along the access roads and construction staging areas and that they could be trampled by heavy construction equipment. To minimize potential direct adverse effects a special status species monitoring program would be implemented that would focus on onsite biological monitoring and, if needed, relocation of species outside of the work area. With the implementation of EC-BIO-5 potential direct impacts would not be substantial, and therefore would be less than significant.

Indirect Impacts
Construction activity occurring within the area could cause wildlife to avoid the immediate vicinity and seek suitable habitat. Because there would be substantial amounts of suitable habitat in the surrounding area, the potential indirect effect to any of the reptile and amphibian species listed in Table 5-28 would not be substantial, and therefore would be less than significant.

State Listed and Sensitive Bird Species (Table 5-28)

Direct Impacts
The construction and operation of the In-Stream Habitat Features Measure would occur in the wetted channel of the Santa Ana River. To avoid adverse indirect construction noise impacts to nesting birds, the construction activities would occur outside of nesting season. With the implementation of EC-BIO-2, substantial adverse impacts would not occur, and therefore potential direct impacts would be less than significant.

Indirect Impacts
Construction activity occurring within the area could cause bird species to avoid the immediate vicinity and seek suitable habitat. Because there would be substantial amounts of suitable habitat in the surrounding area, the potential indirect effect to any of the bird species listed in Table 14 would not be substantial, and therefore would be less than significant.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities for the In-Stream Habitat Feature Measure would involve periodic performance monitoring to evaluate the effectiveness of the measure. No additional maintenance activities would occur. Long-term operation and maintenance would have no adverse effect on any special status or sensitive species, including species and habitats projected under FESA.

Invasive Plant Management Measure
Direct and indirect effects to sensitive species and critical habitat are provided for each species or group of species, followed by a discussion of potential Long-Term Operation and Maintenance Effects that could occur from implementation of this measure.

Vireo and Flycatcher and Associated Critical Habitat

Direct Impacts
As shown in Figure 5-13 vireos have been reported, and flycatchers have been intermittently reported, in all four focal areas where invasive plant management activities would be implemented. All focal areas where invasive plant removals would occur are scattered with several known vireo territories and a few known (historic) flycatcher territories. To avoid direct effects to nesting birds, invasive vegetation removal activities would occur outside of nesting season. Therefore, no direct adverse effects to vireo or flycatcher would occur.

Implementation of the Invasive Plant Management Measure would remove 390 acres of non-native vegetation from areas within or adjacent to critical habitat for vireo and flycatcher. This invasive vegetation would be replaced with 390 acres of native vegetation, including habitat providing PCEs associated with vireo and flycatcher critical habitat, and increasing habitat for the vireo and flycatcher. The area would be managed to ensure establishment of native vegetation and habitat within the same area. The increase in habitat for the vireo and flycatcher would be a beneficial effect.

Indirect Impacts
The Invasive Plant Management Measure would focus on the removal of invasive vegetation. There is the potential that vegetation containing nesting territories could be displaced or affected so that it may not be suitable for nesting until habitat is restored. The displacement of the vireo and flycatcher territories would be an indirect adverse effect, as the vegetation removal would occur during the non-breeding season. There would also be the potential that the vegetation removal activities could indirectly affect adjacent native habitat making it less suitable for nesting. EC-BIO-12, EC-BIO-13, EC-BIO-14, EC-BIO-15 and EC-BIO-16 would be implemented to minimize construction effects to adjacent habitat. Given the temporary nature of potential indirect impacts to vireo and flycatcher, and the ultimate restoration of 390 acres, indirect impacts are not considered substantially adverse, and therefore are not significant. There is the potential that during the removal of invasive vegetation, adjacent critical habitat could be damaged, making it less suitable for nesting and/or foraging. EC-BIO-12, EC-BIO-13, EC-BIO-14, EC-BIO-15, and EC-BIO-16 would be implemented to minimize indirect construction effects to critical habitat. The potential degradation of critical habitat may affect but would not likely adversely affect critical habitat.

Gnatcatcher and Cuckoo and Associated Critical Habitat

Direct Impacts
There would be low potential for the gnatcatcher and cuckoo to occur where invasive plant management activities would occur. Given the low probability of occurrence, no effects to the gnatcatcher and flycatcher would occur, and impacts would be less than significant.

Implementation of the Invasive Plant Management Measure would remove 390 acres of non-native vegetation from areas within or adjacent critical habitat for cuckoo and gnatcatcher. This invasive vegetation would be replaced with 390 acres of native vegetation, including habitat providing PCEs associated with cuckoo and gnatcatcher critical habitat, increasing habitat for both. The increase in PCEs would be a beneficial effect.

Indirect Impacts
There is the potential that during the removal invasive vegetation adjacent native critical habitat for cuckoo could be damaged, making it less suitable for nesting and/or foraging. EC-BIO-12, EC-BIO-13, EC-BIO-14, EC-BIO-15 and EC-BIO-16 would be implemented to reduce construction effects to adjacent critical habitat. The potential degradation of critical habitat would be minor and may affect but would not adversely affect critical habitat. Cuckoo could benefit from restoration of riparian habitat. As a result, indirect impacts to cuckoo and cuckoo critical habitat are not considered to be substantially adverse, and therefore are less than significant.

Sucker Direct Impacts
The Invasive Plant Management Measure would not occur within aquatic habitat that could support suckers, nor would it occur within sucker critical habitat. Therefore, the measure would not have any direct effect on the sucker or its critical habitat.

Indirect Impacts
There are no activities associated with Invasive Plant Management Measure that would result in indirect adverse impacts to the sucker or sucker critical habitat.

Special Status Reptiles and Amphibians (Table 5-28)

Direct Impact
Several of the reptile and amphibian species from Table 5-28 could occur where invasive plant management activities would be implemented. To minimize potential adverse direct effects, a special status species monitoring program would be implemented that would focus on onsite biological monitoring, and if needed, relocation of species outside of the work area. With the implementation of EC-BIO-5 potential adverse impacts would not be substantial, and therefore would be less than significant.

Indirect Impacts
Construction activity occurring within the area could cause wildlife to flee and seek suitable habitat. Because there would be substantial amounts of suitable habitat in the surrounding area, the potential indirect effect to any of the reptile and amphibian species from Table 5-28 would not be substantial, and therefore would be less than significant.

State Listed and Sensitive Bird Species (Table 5-28)

Direct Impacts
Most of the bird species listed in Table 5-28 would have the potential to nest in areas where the invasive vegetation management activities would be implemented. To avoid adverse direct

impacts birds, vegetation removal activities would be required to operate outside of the nesting season. With the implementation of EC-BIO-2 potential adverse impacts would not be substantial, and therefore would be less than significant.

Indirect Impacts
There is the potential that removal of invasive vegetation could indirectly affect adjacent native habitat that might support the above species, making it less suitable for nesting and causing them to relocate. Because there would be substantial amounts of suitable habitat in the surrounding area, the potential indirect effect would not be substantial. Since invasive vegetation management would occur outside of the nesting season, no indirect impacts due to construction noise would occur. EC-BIO-12, EC-BIO-13, EC-BIO-14, EC-BIO-15 and EC-BIO-16 would be implemented to reduce construction effects to adjacent habitat. Overall, indirect impacts to special status birds would not be substantial, and therefore would be less than significant.

Long-Term Operation and Maintenance Impacts
Ongoing maintenance activities would include regular inspections and maintenance, involving targeted herbicide treatments to ensure invasive plant vegetation communities do not re-establish. No adverse impacts to any special status or sensitive wildlife, or species or habitat protected under the FESA, would occur.

Native Plantings Measure

Direct and indirect effects to sensitive species and critical habitat are provided for each species or group of species, followed by a discussion of potential Long-Term Operation and Maintenance Effects that could occur from implementation of this measure.

Vireo and Vireo Critical Habitat

Direct Effects
As shown in Figure 5-14, vireos have been reported in the locations where Native Plantings Measure would be implemented occur. Implementation of the measure would temporarily displace 9 known vireo territories, which would be an adverse effect. To avoid direct impacts to vireo, vegetation to removal activities would occur outside of nesting season. With the implementation of EC-BIO-2 potential direct effects would not occur, and therefore direct impacts to vireo would be less than significant.

Implementation of the Native Plantings Measure would temporarily remove 25 acres of native vegetation, but this loss of habitat would occur when vireo is not present. Therefore, no direct impacts would result from this loss of vegetation.

Implementation of the Native Plantings Measure would remove vegetation within approximately 58.1 acres of vireo critical habitat (25 acres of which contain vireo PCEs). The removed critical habitat would be replaced with native vegetation ensuring that no net loss of critical habitat would occur. The temporary removal of critical habitat may affect but is not likely to adversely affect designated critical habitat for the vireo.

Indirect Impacts
Implementation of the Native Plantings Measure would temporarily remove 25 acres of native vegetation. The temporary loss of native habitat would occur when vireo are not present, resulting in indirect adverse effects. Implementation of the Native Planting Measure would provide an additional 76 acres of native habitat for vireo upon completion, offsetting the temporary indirect impacts and resulting in long-term beneficial effects. Indirect impacts to vireo would be less than significant.

To avoid potential indirect noise impacts from affecting nesting birds the operation of heavy construction equipment would only occur outside of nesting season. With the implementation of EC-BIO- 2 indirect noise effects would not occur. Additionally, there could be the potential that adjacent native vegetation could be indirectly affected by construction activities. EC-BIO-12, EC-BIO-13, EC-BIO-14, EC-BIO-15 and EC-BIO-16, would be implemented to minimize indirect construction effects to adjacent native habitat.

During the removal of vegetation adjacent to vireo critical habitat, temporary indirect impacts could make adjacent habitat less suitable for nesting. EC-BIO-13, EC-BIO-14, EC-BIO-15 and EC-BIO-16 would be implemented to minimize indirect construction effects to adjacent critical habitat. The potential that critical habitat could be indirectly affected by construction activities may affect but would not likely adversely affect critical habitat.

Flycatcher and Cuckoo and Associated Critical Habitat

Direct Impacts
As shown in Figure 5-14 no known flycatchers or cuckoo territories have been reported in the locations where Native Plantings Measure would be implemented occur. Implementation of the measure would temporarily remove 25 acres of suitable habitat. To avoid direct effects to active nests vegetation removal activities would occur outside of the nesting season. With the implementation of EC-BIO-2 potential direct effects would not occur. Implementation of the Native Plantings Measure would provide an additional 83 acres of native habitat for both species. The additional habitat would be a beneficial effect. Due to the low probability of cuckoo and flycatcher occurrence, and the ultimate addition of native habitat, no substantial adverse impacts to either species would occur, and therefore impacts are less than significant.

Implementation of the Native Plantings Measure would remove vegetation within approximately 18.18 acres of flycatcher critical habitat (all non-native vegetation), and 73 acres of proposed cuckoo critical habitat (of which 42.2 acres are non-native habitat). This temporary loss of habitat would occur when migratory birds are not present. Therefore, no direct impacts to the flycatcher or cuckoo would result from this loss of vegetation. The removed critical habitat would be replaced with native vegetation, ensuring that no net loss of critical habitat would occur. The temporary removal critical habitat is not likely to adversely affect critical habitat for the flycatcher or cuckoo.

Indirect Impacts
To avoid indirect construction noise impacts vegetation removals involving the operation of heavy construction equipment would be required to occur outside of nesting season. With the implementation of EC-BIO-2 indirect noise effects would not occur. Additionally, there could be

the potential that adjacent native vegetation could be indirectly affected by construction activities. EC-BIO-12, EC-BIO-13, EC-BIO-14, EC-BIO-15 and EC-BIO-16, would be implemented to minimize indirect construction effects to adjacent native habitat. The removal of native habitat and the potential that native habitat could be indirectly affected by native plantings construction activities may affect but would not likely would adversely affect the flycatcher and cuckoo.

During the removal of vegetation adjacent to flycatcher and cuckoo critical habitat, temporary indirect impacts could make adjacent habitat less suitable for nesting. EC-BIO-13, EC-BIO-14, EC-BIO-15 and EC-BIO-16 would be implemented to minimize indirect construction effects to adjacent critical habitat. The potential that critical habitat could be indirectly affected by construction activities may affect but would not likely adversely affect critical habitat.

Gnatcatcher and Gnatcatcher Critical Habitat

Direct Impacts
There would be low potential for the gnatcatcher to occur where the Native Plantings Measure would occur. Given the low probability of gnatcatcher occurring, no direct affects to the gnatcatcher would occur. The Native Plantings Measure would not occur within any critical habitat for gnatcatcher, and therefore no direct impacts to gnatcatcher critical habitat would occur.

Indirect Impacts
There would be low potential for the gnatcatcher to occur where the Native Plantings Measure would occur. Given the low probability of occurrence, no indirect affects to the gnatcatcher would occur. The Native Plantings Measure would not occur adjacent to any critical habitat for gnatcatcher, and therefore no indirect impacts to gnatcatcher critical habitat would occur.

Sucker and Sucker Critical Habitat

Direct Impacts
Implementation of the Native Plantings Measure would be implemented outside of aquatic habitats suitable for sucker, and therefore would have no direct effects on the sucker. No sucker critical habitat occurs within the Native Plantings Measure footprint, and therefore no direct impacts to sucker critical habitat would occur.

Indirect Impacts
Implementation of the Native Plantings Measure would be implemented outside of aquatic habitats suitable for sucker and would have no indirect impacts on adjacent aquatic habitat. No sucker critical habitat occurs near or adjacent to the Native Plantings Measure area. As a result, no indirect impacts to sucker or sucker critical habitat would occur.

Special Status Reptiles and Amphibians (Table 5-28)

Direct Impacts
Several reptile and amphibian species displayed in Table 5-28 could occur where the Native Plantings Measure would be implemented. With the implementation of Environmental Commitment EC-BIO-5 potential adverse direct impacts would not be substantial, and therefore would be less than significant.

Indirect Impacts
Construction activity occurring within the area could cause wildlife to flee the area and seek suitable habitat. Because there would be substantial amounts of suitable habitat in the surrounding area, the potential indirect effect would not be substantial, and therefore would be less than significant.

State Listed and Sensitive Bird Species (Table 5-28)

Direct Impacts
Many of the bird species summarized in Table 5-28 would have the potential to nest in areas where the Native Plantings Measure would be implemented. With the implementation of Environmental Commitment EC-BIO-2, potential adverse direct impacts would not occur.

Indirect Impacts
There is the potential that removal of invasive vegetation could indirectly affect adjacent native habitat that might support special status bird species, making it less suitable for nesting and causing them to relocate. Because there would be substantial amounts of suitable habitat in the surrounding area, the potential indirect effect would not be substantial, and therefore would be less than significant. EC-BIO-2, EC-BIO-12, EC-BIO-13, EC-BIO-14, EC-BIO-15 and EC-BIO-16 would be implemented to reduce construction effects to adjacent habitat and indirect noise impacts. Overall, adverse impacts would not be substantial, and therefore would be less than significant.

Long-Term Operation and Maintenance Impacts
Ongoing maintenance activities would involve the removal of non-native vegetation by herbicide treatment or hand labor. No adverse impacts to special status species, including species and habitat protected under the FESA, would occur outside of those described in the preceding section. As such, long-term impacts would not be substantial, and therefore less than significant.

Riparian Edge Management Measure

Direct and indirect effects to sensitive species and critical habitat are provided for each species or group of species, followed by a discussion of potential Long-Term Operation and Maintenance Effects that could occur from implementation of this measure.

Vireo, Flycatcher, Cuckoo, Gnatcatcher, and Associated Critical Habitat

Direct Effects
To implement the Riparian Edge Management Measure, native vegetation would be removed as part of the construction of the sediment trap, transition channel and project access roads. Implementation of the measure would not remove any additional vegetation. Additionally, ongoing maintenance activities would occur outside of nesting season. No additional direct effects to the vireo, flycatcher or cuckoo would occur beyond those associated with the sediment management measure. Locations where the Riparian Edge Management Measure would be implemented do not contain suitable habitat for the gnatcatcher and therefore no direct affects to the gnatcatcher would occur.

Once the Riparian Edge Management Measure is completed over 30 acres of additional native habitat would be provided for the vireo, flycatcher and cuckoo. The additional native habitat would be a beneficial effect.

To implement Riparian Edge Management Measure, PCEs of critical habitat for vireo, flycatcher, and cuckoo would be removed as part of the construction of the sediment trap, transition channel and project access roads. Implementation of the measure would not remove any PCEs. Implementation of the measure would have no effect on critical habitat for vireo, flycatcher or cuckoo, beyond those associated with the Sediment Management Measure previously discussed. No gnatcatcher critical habitat is present and therefore no direct impacts to gnatcatcher critical habitat would occur.

Once the Riparian Edge Management Measure is completed over 30 acres of additional critical habitat primary constituent elements would be provided for the vireo, flycatcher and cuckoo. The additional critical habitat primary constituent elements would be a beneficial effect.

Indirect Effects
No additional indirect effects to the vireo, flycatcher, cuckoo, or gnatcatcher, or their associated critical habitats, would occur beyond those associated with the Sediment Management Measure.

Sucker and Sucker Critical Habitat

Direct Impacts
The Riparian Edge Management Measure would occur on the edges of the sediment trap, transition channel, diversion berms and project access roads. Since no sucker would be present in this area, no direct effects to the sucker would occur. No direct effects to the PCEs of sucker critical habitat would occur.

Indirect Impacts
No indirect effects to the sucker or sucker critical habitat would occur as a result of the Riparian Edge Management Measure.

Special Status Wildlife (Table 5-28)

Direct and Indirect Impacts
No additional direct or indirect effects to any of wildlife species from Table 14, including birds, reptiles, or amphibians, would occur beyond those associated with the Sediment Management Measure.

Long-Term Operation and Maintenance Impacts
Ongoing maintenance activities would involve the removal of non-native vegetation by herbicide treatment or hand labor. No adverse impacts to special status species, including species and habitat protected under the FESA, would occur outside of those described in the preceding section and those described under the Sediment Management Measure. As such, long-term impacts would not be substantial, and therefore less than significant.

Non-Native Aquatic Species Management Measure

Direct and indirect effects to sensitive species and critical habitat are provided for each species or group of species, followed by a discussion of potential Long-Term Operation and Maintenance Effects that could occur from implementation of this measure.

Vireo, Flycatcher, Cuckoo, Gnatcatcher, and Associated Critical Habitats

Direct Impacts
The Non-Native Aquatic Species Management Measure would be conducted in the wetted channel of the Santa Ana River, Chino Creek and Mill Creek. Since none of the federally protected bird species are aquatic or utilize aquatic habitat, no direct effects to vireos, flycatchers, cuckoos or gnatcatcher would occur. The Non-Native Aquatic Species Management Measure would not occur on lands designated or proposed as critical habitat for the vireo, flycatcher, cuckoo or gnatcatcher and therefore no direct effects to critical habitat would occur.

Indirect Impacts
The Non-Native Aquatic Species Management Measure would not involve the use of high noise emitting equipment, and therefore, no indirect effects to adjacent nesting birds would occur. No indirect effects to critical habitat would occur.
Sucker and Sucker Critical Habitat

Direct Impacts
The Non-Native Aquatic Species Management Measure would target species that prey upon suckers. Approved removal methods would be utilized by qualified biologists to ensure that no adverse effects to suckers would occur. The act of seining, electroshocking or otherwise capturing non-native aquatics could result in inadvertent impacts to native species including sucker that may be captured in the process, although these would be immediately released upon discovery. The removal of competitors and predators could allow native populations to increase. With the implementation of Environmental Commitment EC-BIO-7, no direct effects to spawning fish would occur. Implementation of the Non-Native Aquatic Species Management Measure would focus on species that prey upon suckers and would result in beneficial effects to

the sucker. The Non-Native Aquatic Species Management Measure would be implemented in critical habitat areas and would reduce predation and increase species populations, and would not adversely alter any habitat components or PCEs. Implementation of the measure would have a beneficial effect on sucker critical habitat.

Indirect Impacts
No indirect impacts to suckers or sucker critical habitat would occur.

Special Status Wildlife (Table 5-28)

Direct Impacts
The Non-Native Aquatic Species Management Measure would be conducted in the wetted channel of the Santa Ana River, Chino Creek and Mill Creek and would only target non-native aquatic species that prey upon native fish. Implementation of the Non-Native Aquatic Species Management Measure would have no direct effects on any of the species covered in Table 5-28, including birds, reptiles, and amphibians.

Indirect Impacts
Some of the non-native aquatic species targeted for removal provide prey for predatory species covered in Table 5-28. While the Non-Native Aquatic Species Management Measure would reduce and control populations of non-native fish, it would not eradicate all non-native species, and would not remove native species, although some individuals may be inadvertently caught in nets or otherwise harmed by control measures. Removal of competitors and predators would potentially allow the population of native aquatic species that also provide a prey base to expand. Since there would still be an adequate prey base, no substantial adverse impacts would occur.

Long-Term Operation and Maintenance Impacts
Once the initial populations of non-native species have been removed, regular inspections would occur to ensure that non-native species do not re-populate. In the event re-population occurs, additional treatment may occur which would involve the same techniques and avoidance measures included in the initial implementation. Long-term operation and maintenance would not have substantial adverse effects, and therefore impacts would be less than significant.

Cowbird Management Measure
Direct and indirect effects to sensitive species and critical habitat are provided for each species or group of species, followed by a discussion of potential Long-Term Operation and Maintenance Effects that could occur from implementation of this measure.

Vireo, Flycatcher, Cuckoo, Gnatcatchers, and Associated Critical Habitat

Direct Impacts
Implementation of the Cowbird Management Measure would focus on control of cowbird populations which is an obligate brood parasite which negatively impacts all four federally listed bird species. Control of the cowbird will have no direct impact vireo, flycatcher, cuckoo, gnatcatcher, or their associated critical habitats.

Indirect Impacts
The Cowbird Management Measure will reduce cowbird brood parasitism on the vireo, flycatcher, cuckoo, and gnatcatcher, resulting in indirect beneficial effects to all four species. Since cowbird management does not impact habitat or habitat components, no indirect impacts to critical habitat would occur.

Sucker and Sucker Critical Habitat

Direct Impact
The Cowbird Management Measure would be implemented outside of aquatic habitats suitable for the sucker and will not occur within sucker critical habitat. As a result, no direct impacts to sucker or associated critical habitat would occur.

Indirect Impacts
No indirect impacts to suckers or associated critical habitat would occur.

State Special Status Wildlife (Table 5-28)

Direct Impact
Implementation of the Cowbird Management Measure would not have any direct effect of the non-avian wildlife species contained in Table 5-28. In addition, cowbird management would not involve any activities that would result in adverse direct effects to any of the bird species listed in Table 5-28. As result, no direct adverse impacts to any special status wildlife species would occur as the result of implementing the Cowbird Management Measure.

Indirect Impact
No indirect impacts to any of the non-avian wildlife species contained in Table 5-28 would occur. Implementation of the Cowbird Management Measure would remove cowbirds, a species that parasitizes nests of many bird species in Table 5-28, including the Tri-Colored Blackbird, Yellow Breasted Chat, and Yellow Warbler. Any bird species targeted by cowbirds will experience indirect benefits as the result of the Cowbird Management Measure.

Long-Term Operation and Maintenance Impacts
Once the initial populations of cowbirds have been removed, regular inspections would occur to ensure that cowbirds do not re-populate. In the event re-population occurs, additional treatment may occur which would involve the same techniques and avoidance measures. Since the same actions would occur under long-term operation and maintenance as those that occurred under initial implementation, no substantial adverse impacts would result.

Implementation of the Monitoring and Adaptive Management Plan (MAMP)

The purpose of the Monitoring and Adaptive Management Plan (MAMP) is to provide a systematic approach for improving resource management outcomes and achieving success criteria, and to provide structured process for recommending decisions. Generally, the long-term impacts of implementing the MAMP are expected to be beneficial for all biological resources. Specific actions in the MAMP that could result in impacts to biological resources include

adjustments to methods, quantities, locations and timing of sediment removal and re-entrainment activities; minor adjustments to gradient, channel dimensions and plantings at Chino Creek; the importation and placement of substrates or re-positioning of in-stream habitat features to correct in-stream deficiencies; the removal of invasive vegetation; adjustments to cowbird control and fish removal methods, level of effort, and/or trap locations; and the replanting and temporary irrigation of failed vegetation. Any of these actions could potentially have short-term, site-specific impacts to any sensitive or protected species or habitat present. However, given the overall purpose of the MAMP is to improve long-term outcomes associated with the ecosystem restoration project, no actions would be implemented that did not have an overall beneficial effect. As a result, no substantial adverse effects to any sensitive or protected biological resources would occur.

Level of Impact for Alternative 2

Less than Significant Impact. Construction and long-term operation and maintenance activities would not result in substantial adverse effects, either directly or through habitat modifications, on any species identified as candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service. Indirect impacts were evaluated and are also not substantial, and therefore less than significant.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 Feet Year-Round with Incidental Sediment Removal)

Special Status Plant Species

Direct, Indirect, and Long-Term Operation and Maintenance Impacts
There would be low potential for special status plant species to occur within the study area. Compared to Alternative 2, the level of potential impacts to special status plant species would be the same. No direct, indirect, or long-term effects to special status plant species would occur.

Special Status Wildlife Species

The following section describes direct, indirect, and long-term impacts to the list of special status wildlife species found in Table 5-27 and 5-28.

Vireos, Flycatcher, Cuckoo, and Associated Critical Habitats

Direct Impacts
As shown below in Table 5-31, since the effects to FESA listed species resulting from the Water Conservation Plan would be the same as those described in Alternative 2, potential direct effects to the vireo, flycatcher and cuckoo from the Water Conservation Measure would be the same as described earlier.

Table 5-31: Alternative 3 Summary of Effects from Water Conservation
(NLAA = may affect but not likely to adversely affect)

Impact	Species	Effect
Inundation of occupied nests or spawning grounds	Vireo	No Effect
	Flycatcher	No Effect
	Cuckoo	No Effect
Increased days of inundation during the nesting/spawning season resulting in re-distribution of individuals or territories	Vireo	May Affect
	Flycatcher	NLAA
Effects to critical habitat from increased pooling	Vireo	NLAA
	Flycatcher	NLAA
	Cuckoo	NLAA
Effects to critical habitat from increased sedimentation due to water conservation.	Vireo	No Effect
	Flycatcher	No Effect
	Cuckoo	No Effect
	Gnatcatcher	No Effect
	Sucker	No Effect

Under Alternative 3, a smaller sediment removal program without sediment re-entrainment would be implemented in conjunction with the Water Conservation Plan. Sediment removed from the basin would be stored at the sediment storage site for future use. Similar to the Proposed Action, the construction of the sediment removal trap, storage site and project access road would require the removal of all vegetation from these areas. As shown in Figure 5-15 one existing vireo territory and one historic flycatcher territory have been reported near the project access road. Additionally, the area contains suitable habitat for the cuckoo. To avoid direct impacts nesting birds the vegetation removal, sediment removal and sediment storage activities would occur outside of nesting season. The access road alignment was designed to avoid direct effects to known/historic vireo and flycatcher territories. With the implementation of Environmental Commitment EC-BIO-2 potential adverse direct effects would not occur.

As shown in Table 5-33 implementation of the incidental sediment removal program would remove 1.6 acres of cottonwood/willow vegetation. The cottonwood/willow vegetation would be suitable nesting riparian habitat for the vireo, flycatcher and cuckoo. The amount of riparian habitat that would be removed would be minimal compared to the overall amount of suitable riparian nesting habitat that currently exists within the Prado Basin. The removal of the vegetation would affect, but would not likely to adversely affect the vireo, flycatcher or cuckoo. Under Alternative 3, implementation of the proposed ecosystem restoration measures would provide an additional 588 acres of native habitat within the study area, which would substantially increase potential nesting habitat for all species. Compared to the Proposed Action, Alternative 3 would have a smaller footprint and therefore would have less potential to affect the vireo, flycatcher or cuckoo.

As described in Alternative 2, effects from increased pooling associated with implementation of the Water Conservation Plan may affect, but is not likely to adversely affect critical habitat, and effects from increased sedimentation would have no effect on critical habitat. With the implementation of Environmental Commitment EC-BIO-1 no direct effects to critical habitat would occur. The sediment removal activities would remove a total of 19.0 acres of vireo and proposed cuckoo critical habitat, of which 1.67 acres contain designated PCEs. A total 4.2 acres

of flycatcher critical habitat would be removed, of which 1.3 acres contain the PCEs of flycatcher critical habitat.

The amount of critical habitat supporting PCEs that would be removed would be minimal compared to the overall amount of existing vireo and flycatcher critical habitat in the Prado Basin. Under Alternative 3, implementation of the ecosystem restoration measures would provide an additional 588 acres of native habitat within the study area, offsetting the temporary removal of critical habitat, which would increase the amount of critical habitat and associated PCEs for all species.

Indirect Impacts
To avoid indirect noise from the operation of heavy construction equipment vegetation removal, sediment removal and sediment storage activities would occur outside of the nesting season. There would be the potential that sediment removal activities could impact adjacent critical habitat that supports the above species. To avoid potential adverse indirect construction effects to adjacent critical habitat areas, EC-BIO-12, EC-BIO-13, EC-BIO-14, EC-BIO-15, and EC-BIO-16 would be implemented.

Gnatcatcher and Gnatcatcher Critical Habitat

Direct Impacts
As described in Alternative 2, inundation and sediment accumulation associated with implementation of the Water Conservation Plan would not affect the gnatcatcher. The sediment removal program, however, may affect but is not likely to adversely affect the species. Surveys conducted at the sediment storage site identified the presence of gnatcatchers. As shown in Figure 5-16 the gnatcatcher locations are outside of the limits of grading. Construction and operation of the sediment storage site would occur outside of the nesting season. Therefore, direct impacts to nesting gnatcatchers would be avoided. There would be the potential that gnatcatchers could be present outside of the nesting season. Prior to sediment storage and hauling activities occurring additional surveys would be conducted and would be repeated annually until sediment removal is complete. In the event that gnatcatchers are identified, and it is determined that sediment storage operations could affect gnatcatchers, adjustments to the sediment storage operations and access road would occur to the extent practicable to avoid direct effects to the gnatcatcher. With implementation of Environmental Commitments EC-BIO-3 and EC-BIO-4 impacts to gnatcatchers would not be substantial, and therefore would be less than significant.

Grading activities to implement the incidental sediment removal program would temporarily remove 0.54 acres of mixed coastal sage scrub/non-native weeds. The amount that would be temporarily removed would be minimal compared to the amount that is available in the Prado Basin. The temporary removal of the mixed coastal sage scrub would not be an adverse effect, and because it would be replaced with native habitat after the sediment removal activities are completed, the effect would not be substantial.

As described under Alternative 2, gnatcatcher critical habitat occurs on the terraces along Reach 9. Neither the increased pooling within the Prado Basin nor the proposed release rates would have an effect on critical habitat for the gnatcatcher along Reach 9.

Indirect Impacts
The operation of heavy equipment during the nesting could generate noise impacts that might discourage gnatcatchers from nesting and/or foraging in vicinity of the sediment storage site, causing them to seek alternative areas to nest and forage. Because there would be substantial amount of alternative habitat, the potential impact would not be substantial. There would be no indirect impacts to gnatcatcher critical habitat.

Sucker and Sucker Critical Habitat

Direct Impact
Impacts to sucker as the result of implementing the Water Conservation Plan of Alternative 3 would be similar, to the impacts described for Alternative 2. The proposed buffer pool elevation (up to 505'), the timing (year-round), the expected frequencies and proposed release rates would all be the same, and effects related to those factors were fully described for Alternative 2. No effect to sucker is anticipated from holding and releasing water as proposed for Alternative 2, or for Alternative 3. Alternative 3, however, also includes a small-scale or incidental sediment removal measure that could result in adverse effects to any suckers that may be entrained in the dredge.

The sediment removal activities would occur within the wetted channel of the Santa Ana River. Based on the expected limited occurrence of suckers in the Prado Basin, poor habitat conditions within and immediately upstream of Prado Basin and high populations of exotic predatory fish, the potential suckers to occur at the sediment removal channel would be very low. To prevent even the slightest chance of affecting spawning fish, sediment removal activities would be conducted outside of the spawning season. With the implementation of EC-BIO-7 thru EC-BIO-11, direct effects to spawning fish would be avoided.

Sucker critical habitat is designated over the 14.35-acre footprint of the proposed sediment removal channel. As described in Alternative 2, this segment of the Santa Ana River lacks several PCEs of sucker critical habitat, and implementation of the sediment removal program would not adversely affect critical habitat for the sucker.

Indirect Impacts
In the event isolated suckers wash or swim into the sediment removal channel, it would be likely they would swim away from where the sediment removal activities due to elevated levels of suspended sediment and other factors. The potential that individual isolated suckers could find their way into the sediment removal channel where turbidity levels would be higher, the potential they could be harmed by sediment removal activities would be considered an adverse indirect effect. Under Alternative 3, there would not be any downstream sediment re-entrainment. Therefore, no indirect potential effects from re-entrainment would occur.

While the Water Conservation Plan for Alternative 3 would be implemented within and adjacent to critical habitat, this area currently does not support the PCEs of sucker critical habitat. No indirect impacts to sucker habitat would occur.

State Special Status Reptiles and Amphibians (Table 5-28)

Direct Impacts
As described in Alternative 2, implementation of the Water Conservation Plan would have no direct effect on any of the reptile or amphibian species listed in Table 5-28.
The Southwestern Pond Turtle, California Red-Sided Garter Snake and Western Spade foot occur in streams, creeks and marshes and would have the potential to occur within the location where the sediment removal activities would occur. Similar, to the Proposed Action, with the implementation of Environmental Commitment EC-BIO-5 potential adverse impacts would be less than significant. Compared to Alternative 2, Alternative 3 would involve less sediment removal activities and would have less potential to adversely affect the above species.
The sediment storage site contains bare ground and non-native grasslands which could provide suitable habitat for the Coastal Whip Tail, Orange Throated Whip Tail, and Coast Horned Lizard. Similar, to Alternative 2, with the implementation of EC-BIO-5 potential adverse impacts would be less than significant. Compared to Alternative 2, Alternative 3 would involve less sediment removal activities and would have less potential to adversely affect these three species.

Indirect Impacts
Similar, to Alternative 2, sediment removal activities could cause wildlife species to relocate from the vicinity where sediment removal activities are occurring, including those reptiles and amphibian species covered in Table 5-28. Because there would be substantial amounts of alternative habitat that would be suitable, the potential indirect effect would be less than significant.

State Listed and Sensitive Bird Species (Table 5-28)

Direct Impacts
Many of the bird species listed in Table 5-28 have a moderate or higher potential for occurring where the sediment removal activities would occur. Similar, to Alternative 2, the Water Conservation Plan would be implemented outside of nesting season. Therefore, no active nests would be directly impacted by the pooled water.
Implementation of the sediment removal activities would remove vegetation. To minimize direct impacts to nesting birds the vegetation removal and sediment hauling activities would occur outside of nesting season. With the implementation of EC-BIO-2 potential impacts would not be substantial, and therefore would be less than significant. Because under Alternative 3, all sediment removal and sediment hauling activities would occur outside of nesting season, there would be less potential for adverse direct impacts to occur.

Indirect Impacts
As described in Alternative 2, implementation of the Water Conservation Plan could bird species to temporarily relocate and nest at higher elevations. Because there would be suitable alternative

native nesting areas in proximity, the temporary adverse indirect effect would not be substantial, and therefore not significant. To avoid indirect construction noise impacts, the vegetation removal and sediment hauling activities would occur outside of nesting season. Because under Alternative 3, all sediment removal and sediment hauling activities would occur outside of nesting, season, there would be less potential for adverse indirect direct noise impacts to occur.

Long-Term Operation and Maintenance Impacts

Ongoing maintenance activities would include continued implementation of the proposed water conservation and would involve maintaining the access road between the sediment removal site and the sediment storage site. This would involve vegetation removal and removal of sediment accumulated from storms. To avoid impacts to nesting birds and terrestrial wildlife EC-BIO-2 and EC-BIO-5 would be implemented. Maintenance activities would not remove native vegetation. To avoid indirect impacts to native vegetation when maintenance activities are occurring EC-BIO-12 thru BIO-16 would be implemented. Overall, impacts from long-term operation and maintenance would not be substantial, and therefore less than significant.

Ecosystem Restoration Plan

The Ecosystem Restoration Plan for Alternative 3 includes four measures: Chino Creek Channel Restoration Measure, the Invasive Plant Management Measure, the Native Plantings Measure, and the Cowbird Management Measure. These four measures under Alternative 3 are identical to four measures of the same name as described under Alternative 2. As a result, potential direct, indirect and long-term impacts associated with implementation, operation and maintenance of these four measures under Alternative 3 would be identical to the impacts described in detail under Alternative 2. The impacts and level of significance for each measure is summarized below.

Chino Creek Channel Restoration Measure

The Chino Creek Channel Restoration Measure under Alternative 3 is identical to the Chino Creek measure as previously described under Alternative 2. As a result, the direct, indirect, and long-term impacts to any special status plant and wildlife species associated with implementation of this measure under Alternative 3 would be identical to those described under Alternative 2. Temporary impacts to habitat, and potential temporary displacement of sensitive species, would be offset by long-term increases in habitat quality and quantity as a result of the restoration efforts. As a result, adverse effects to sensitive and special status species would not be substantial, and therefore impacts of this measure are less than significant.

Invasive Plant Management Measure

The Invasive Plant Management Measure under Alternative 3 is identical to the measure of the same name as previously described under Alternative 2. As a result, the direct, indirect, and long-term impacts to any special status plant and wildlife species associated with implementation of this measure under Alternative 3 would be identical to those described under Alternative 2. Temporary impacts to habitat, and potential temporary displacement of sensitive species, would be offset by long-term increases in habitat quality and quantity as a result of the invasive plant management efforts. As a result, adverse effects to sensitive and special status species would not be substantial, and therefore impacts of this measure are less than significant.

Native Plantings Measure

The Native Plantings Measure under Alternative 3 is identical to the measure of the same name as previously described under Alternative 2. As a result, the direct, indirect, and long-term impacts to any special status plant and wildlife species associated with implementation of this measure under Alternative 3 would be identical to those described under Alternative 2. Temporary impacts to habitat, and potential temporary displacement of sensitive species, would be offset by long-term increases in habitat quality and quantity as a result of the native planting efforts. As a result, adverse effects to sensitive and special status species would not be substantial, and therefore impacts of this measure are less than significant.

Cowbird Management Measure

The Cowbird Management Measure under Alternative 3 is identical to the measure of the same name as previously described under Alternative 2. As a result, the direct, indirect, and long-term impacts to any special status plant and wildlife species associated with implementation of this measure under Alternative 3 would be identical to those described under Alternative 2. Generally, the Cowbird Management Measure will not result in any substantial adverse effects of any type, including direct, indirect, or long-term. After initial reduction of cowbird populations, many special status-species are expected to experience beneficial effects due to a reduction in brood parasitism rates. As a result, impacts of this measure are less than significant.

Implementation of the MAMP

The purpose of the Monitoring and Adaptive Management Plan (MAMP) is to provide a systematic approach for improving resource management outcomes and achieving success criteria, and to provide structured process for recommending decisions. Generally, the long-term impacts of implementing the MAMP are expected to be beneficial for all biological resources. Specific actions in the MAMP that could result in impacts to biological resources include adjustments to methods, quantities, locations and timing of sediment removal and re-entrainment activities; minor adjustments to gradient, channel dimensions and plantings at Chino Creek; the importation and placement of substrates or re-positioning of in-stream habitat features to correct in-stream deficiencies; the removal of invasive vegetation; adjustments to cowbird control and fish removal methods, level of effort, and/or trap locations; and the replanting and temporary irrigation of failed vegetation. Any of these actions could potentially have short-term, site-specific impacts to any sensitive or protected species or habitat present. However, given the overall purpose of the MAMP is to improve long-term outcomes associated with the ecosystem restoration project, no actions would be implemented that did not have an overall beneficial effect. As a result, no substantial adverse effects to any sensitive or protected biological resources (as summarized in Chapter 4.5) would occur.

Level of Impact for Alternative 3

Less than Significant Impact. Construction and long-term operation and maintenance activities would not result in substantial adverse effects, either directly or through habitat modifications, on any species identified as candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service. Indirect impacts were evaluated and are also not substantial, and therefore less than significant.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 Feet Year-Round)

The Water Conservation Plan for Alternative 4 is identical to the plan of the same name as described under Alternative 2. The direct, indirect, and long-term impacts to special status plant and wildlife species associated with implementation of the plan under Alternative 4 would be identical to the impacts described in detail under Alternative 2. Implementation of the Water Conservation Plan under Alternative 4 would not result in any substantial, adverse effects to special status plant or wildlife species, and therefore impacts are less than significant.

Ecosystem Restoration Plan

The Ecosystem Restoration Plan for Alternative 4 includes ten measures: the Sediment Management Measure, the Chino Creek Channel Restoration Measure, the Invasive Plant Management Measure, the Native Plantings Measure, the Riparian Edge Management Measure, the In-Stream Habitat Features Measure in the same downstream location described in Alternative 2, an additional In-Stream Habitat Features Measure in an upstream location (within the transition channel that would be constructed under the Sediment Management Measure), the Feral Pig Management Measure, the Non-Native Aquatic Species Management Measure (expanded to include downstream areas), and the Cowbird Management Measure. Seven of these measures are identical to measures of the same name as described under Alternative 2, while three of the measures are different (In-Stream Habitat Features Upstream, Feral Pig Management and expanded Non-Native Aquatic Species Management). Impacts associated with implementation of the seven identical measures under Alternative 4 would be identical to the impacts described in detail under Alternative 2. The impacts and level of significance for each measure, including new or modified measures, is summarized below.

Sediment Management Measure

The Sediment Management Measure under Alternative 4 is identical to the measure of the same name as previously described under Alternative 2. As a result, the direct, indirect, and long-term impacts to any special status plant and wildlife species associated with implementation of this measure under Alternative 4 would be identical to those described under Alternative 2.
The Sediment Management Measure includes construction of the sediment trap and transition channel, construction of the sediment storage site, and sediment removal and re-entrainment of the sediment into the Santa Ana River. Temporary impacts to habitat, and potential temporary displacement of sensitive species, would occur as result of construction, but these impacts are considered temporary and not substantially adverse. Long-term increases in habitat quality and quantity within the Santa Ana River as a result of sediment management are expected to be beneficial, particularly to Santa Ana sucker. Therefore, impacts of this measure are less than significant.

Chino Creek Channel Restoration Measure

The Chino Creek Channel Restoration Measure under Alternative 4 is identical to the Chino Creek measure as previously described under Alternative 2. As a result, the direct, indirect, and long-term impacts to any special status plant and wildlife species associated with implementation of this measure under Alternative 4 would be identical to those described under Alternative 2.

Temporary impacts to habitat, and potential temporary displacement of sensitive species, would be offset by long-term increases in habitat quality and quantity as a result of the restoration efforts. As a result, adverse effects to sensitive and special status species would not be substantial, and therefore impacts of this measure are less than significant.

Invasive Plant Management Measure

The Invasive Plant Management Measure under Alternative 4 is identical to the measure of the same name as previously described under Alternative 2. As a result, the direct, indirect, and long-term impacts to any special status plant and wildlife species associated with implementation of this measure under Alternative 4 would be identical to those described under Alternative 2. Temporary impacts to habitat, and potential temporary displacement of sensitive species, would be offset by long-term increases in habitat quality and quantity as a result of the invasive plant management efforts. As a result, adverse effects to sensitive and special status species would not be substantial, and therefore impacts of this measure are less than significant.

Native Plantings Measure

The Native Plantings Measure under Alternative 4 is identical to the measure of the same name as previously described under Alternative 2. As a result, the direct, indirect, and long-term impacts to any special status plant and wildlife species associated with implementation of this measure under Alternative 4 would be identical to those described under Alternative 2. Temporary impacts to habitat, and potential temporary displacement of sensitive species, would be offset by long-term increases in habitat quality and quantity as a result of the native planting efforts. As a result, adverse effects to sensitive and special status species would not be substantial, and therefore impacts of this measure are less than significant.

Riparian Edge Management Measure

The Riparian Edge Management Measure under Alternative 4 is identical to the measure of the same name as previously described under Alternative 2. As a result, the direct, indirect, and long-term impacts to any special status plant and wildlife species associated with implementation of this measure under Alternative 4 would be identical to those described under Alternative 2. Temporary impacts to habitat, and potential temporary displacement of sensitive species, would be offset by long-term increases in habitat quality and quantity as a result of the riparian edge management efforts. As a result, adverse effects to sensitive and special status species would not be substantial, and therefore impacts of this measure are less than significant.

Non-Native Aquatic Species Management Measure (Expanded)

The Non-Native Aquatic Species Management Measure under Alternative 4 is similar, to the measure of the same name as previously described under Alternative 2. The primary difference is that, under Alternative 4, non-native aquatic species management would occur in additional areas downstream of Prado Dam. The addition of new areas does not substantially alter the impacts associated with this measure, although the benefits would increase. The act of seining, electroshocking or otherwise capturing non-native aquatics could result in inadvertent impacts to native species within the expanded control area that may be captured in the process, although these would be immediately released upon discovery. The removal of competitors and predators would allow native populations to increase. As a result, the direct, indirect, and long-term

impacts to any special status plant and wildlife species associated with implementation of this measure under Alternative 4 would be similar to those described under Alternative 2.

Generally, this measure would be conducted in the wetted channel of the Santa Ana River, Chino Creek and Mill Creek. Therefore, adverse effects would be predominantly limited to aquatic species and habitats. Adverse direct, indirect, and temporary effects to special status plant and wildlife species would be temporary, and not substantial. As a result, impacts of this measure are less than significant.

Cowbird Management Measure
The Cowbird Management Measure under Alternative 4 is identical to the measure of the same name as previously described under Alternative 2. As a result, the direct, indirect, and long-term impacts to any special status plant and wildlife species associated with implementation of this measure under Alternative 4 would be identical to those described under Alternative 2.

Generally, the Cowbird Management Measure will not result in any substantial adverse effects of any type, including direct, indirect, or long-term. After initial reduction of cowbird populations, many special status-species are expected to experience beneficial effects due to a reduction in brood parasitism rates. As a result, impacts of this measure are less than significant.

In-Stream Habitat Features Measure (Upstream and Downstream)
The In-Stream Habitat Features Measure for Alternative 4 includes all of the same features that are included in the similar measure under Alternative 2. However, in addition, the version in Alternative 4 also contains upstream habitat features in the form of 15 rock groins for construction within the transition channel. The impacts to special status and sensitive species as a result of the downstream features are identical for Alternatives 2 and Alternatives 4. Therefore, the discussions below will focus on the additional impacts and benefits associated with the upstream habitat features included in Alternative 4 that were not present in Alternative 2.

Vireo, Flycatcher, Cuckoo and Gnatcatcher and Associated Critical Habitat

Direct Impacts
Impacts associated with construction of the transition channel are addressed in Alternative 2. No additional effects would occur from placement of rock groins within this area.

Indirect Impacts
The same as Alternative 2, to avoid indirect construction impacts to adjacent riparian vegetation Environmental Commitments EC-BIO-12, EC-BIO-13, EC-BIO-14, EC-BIO-15 and EC-BIO-16 would be implemented.

Flycatcher, Cuckoo

Direct Impacts
Potential effects would be the same as Alternative 2, No effects to either species would occur.

Indirect Impacts
The same as Alternative 2, no indirect impacts would occur.

Gnatcatcher

Direct Impacts
As described in Alternative 2, no direct impacts to nesting birds would occur. Construction of the access roads and construction staging areas would temporarily remove .20 acres of suitable upland habitat for the gnatcatcher. The temporary removal of habitat may affect but is not likely to adversely affect the gnatcatcher.

Indirect Impacts
The same as Alternative 2, to avoid indirect construction impacts to adjacent upland habitat EC-BIO-12 thru EC-BIO-16 would be implemented.

Santa Ana Sucker
As described in Alternative 2, due to the potential that suckers could be present where the construction activity would occur the measure may affect but is not likely to adversely affect the sucker.

Indirect Impacts
The presence of the In-Stream Habitat Features would create localized erosion around the feature helping to uncover existing gravel beds and cobles which would enhance habitat for the sucker. The long-term enhancement of habitat for the sucker would be an indirect beneficial effect.

Special Status Reptiles and Amphibians (Table 5-28)

Direct Impacts
The same as Alternative 2, with the implementation of Environmental Commitments EC-BIO-5 potential impacts would be less than significant.

Indirect Impacts
Compared to Alternative 2, indirect impacts would be the same and would be less than significant.

State Listed and Sensitive Bird Species (Table 5-28)

Direct Impacts
The In-Stream Habitat Features Measure would be implemented in the wetted channel. No effects would occur to the above species.

Indirect Impacts
Compared to Alternative 2, indirect impacts would be the same and would be less than significant.

Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, long-term operation, maintenance, and adaptive management impacts would be the same and would be less than significant.

Feral Pig Management Measure

Vireo, Flycatcher, Cuckoo, Gnatcatcher, Sucker, and Associated Critical Habitats

Direct Impacts
Implementation of the Feral Pig Management Measure would not involve vegetation removal. Therefore, no direct impacts to nesting birds would occur. In addition, there would be no reduction or modification of any critical habitat or associated PCEs for any species. Feral pig management would not occur within aquatic habitat that supports suckers, and therefore would have no direct effect on sucker, nor would it have any effect on sucker critical habitat. Feral pigs are known to destroy riparian habitat. The management of feral pigs would reduce the amount of riparian habitat destroyed which would benefit all species and any associated critical habitats.

Indirect Impacts
To avoid indirect construction noise impacts, the use of heavy equipment would be required to occur outside of nesting season. Within the implementation of EC-BIO-2 potential indirect construction noise impacts would be avoided. Feral pig management would have no other indirect impacts, other than beneficial impacts, to any species or habitats protected under FESA.

Special Status Wildlife (Table 5-28)

Direct Impacts
Implementation of the Feral Pig Management Measure would occur along existing roads. It would be unlikely that any special status reptile and amphibian species would be adversely affected. Since there would be no direct vegetation removal, no direct impacts to special status or sensitive nesting birds would occur. No substantial adverse effects would occur as the result of direct impacts, and therefore the overall impacts are less than significant.

Indirect Impacts
With implementation of EC-BIO-2, potential indirect impacts to nesting birds associated with construction noise would be avoided. No indirect impacts to any of the special status species summarized in Table 5-28 would occur.

Long-Term Operation and Maintenance Impacts
Once the initial population of feral pigs have been removed, regular inspection would occur to ensure feral pigs do not re-populate. If needed, additional treatments with same techniques and avoidance measures would be implemented. Since any long-term operation and maintenance efforts would utilized the same methods as the original implementation, the associated impacts would be the same as well. Therefore, impacts associated with long-term operation and maintenance would not result in substantial adverse effects to any sensitive or special status plant of wildlife species and are therefore less than significant.

Implementation of the MAMP

As described under both Alternative 2 and Alternative 3, the purpose of the MAMP is to provide a systematic approach for improving resource management outcomes and to provide structured process for recommending decisions. As such, no actions would be implemented that did not have an overall beneficial effect. As a result, no substantial adverse effects to any sensitive or protected biological resources would occur.

Level of Impact for Alternative 4

Less than Significant Impact. Construction and long-term operation and maintenance activities would not result in substantial adverse effects, either directly or through habitat modifications, on any species identified as candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service. Indirect impacts were evaluated and are also not substantial, and therefore less than significant.

Summary of Effects to Sensitive and Special Status Species

A comprehensive summary of effects determinations for species and habitats protected under FESA can be found in Appendix G: Biological Assessment (Table 18). A brief summary of this information, broken down by measures and regardless of the alternative in which they occur, can also be found in Table 5-32 below. Note that the sediment management measure described in this table refers to the larger-scale restoration and not the smaller scale version that would be implemented under Alternative 3 as part of the water conservation plan. The smaller scale restoration has reduced impact, reduced benefits, and no sediment re-entrainment, although it still could result in adverse effects to Santa Ana sucker, and may affect but would not likely adversely affect vireo, flycatcher, cuckoo and gnatcatcher.

For other state listed and sensitive species (Table 5-28), as described in preceding sections for each alternative, overall adverse effects are not substantial to any single species.

Table 5-32: Summary of Effects Determinations to Federally Listed Species and Critical Habitat (CH) by Measure (NLAA = not likely to adversely affect)

Species & Habitat	Effect
Water Conservation Measure	
Vireo	May Effect
Vireo CH	NLAA
Flycatcher & Flycatcher CH	NLAA
Cuckoo & Cuckoo CH	NLAA
Gnatcatcher & Gnatcatcher CH	No Effect
Sucker & Sucker CH	No Effect
Sediment Management Measure	
Vireo & Vireo CH	May Effect
Flycatcher & Flycatcher CH	May Effect
Cuckoo & Cuckoo CH	May Effect
Gnatcatcher	May Effect
Gnatcatcher CH	NLAA
Sucker	May Effect
Sucker CH	NLAA
Chino Creek Channel Restoration Measure	
Vireo	May Effect
Vireo CH	No Effect

Species & Habitat	Effect
Flycatcher & Flycatcher CH	NLAA
Cuckoo & Cuckoo CH	NLAA
Gnatcatcher	NLAA
Gnatcatcher CH	No Effect
Sucker	NLAA
Sucker CH	No Effect
Invasive Plant Management Measure	
Vireo	May Effect
Vireo CH	NLAA
Flycatcher	May Effect
Flycatcher CH	NLAA
Cuckoo & Cuckoo CH	NLAA
Gnatcatcher	No Effect
Gnatcatcher CH	NLAA
Sucker & Sucker CH	No Effect
Native Plantings Measure	
Vireo	May Effect
Vireo CH	NLAA
Flycatcher & Flycatcher CH	NLAA
Cuckoo & Cuckoo CH	NLAA
Gnatcatcher & Gnatcatcher CH	No Effect
Sucker & Sucker CH	No Effect
Riparian Edge Management Measure	
Vireo & Vireo CH	NLAA
Flycatcher & Flycatcher CH	NLAA
Cuckoo & Cuckoo CH	NLAA
Gnatcatcher & Gnatcatcher CH	No Effect
Sucker & Sucker CH	No Effect
In-Stream Habitat Features Downstream Measure	
Vireo	May Effect
Vireo CH	No Effect
Flycatcher & Flycatcher CH	No Effect
Cuckoo & Cuckoo CH	No Effect
Gnatcatcher & Gnatcatcher CH	NLAA
Sucker & Sucker CH	NLAA
Cowbird Management Measure	
Vireo & Vireo CH	NLAA
Flycatcher & Flycatcher CH	NLAA
Cuckoo & Cuckoo CH	NLAA
Gnatcatcher & Gnatcatcher CH	NLAA
Sucker and Sucker CH	No Effect
Non-Native Aquatic Species Management Measure	
Vireo & Vireo CH	No Effect
Flycatcher & Flycatcher CH	No Effect
Cuckoo & Cuckoo CH	No Effect
Gnatcatcher & Gnatcatcher CH	No Effect
Sucker and Sucker CH	NLAA

5.6.4.2 **IMPACT BIO-2**: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, neither the Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. There would not be any construction activity and no substantial adverse effects to riparian habitats or sensitive natural communities would occur. The study area would continue to support sensitive natural communities. However, no ecosystem restoration measures would be implemented and there would be no increase in native habitat in the Action Area. Overall, the No Federal Action Alternative would not result in direct, indirect, or long-term substantial adverse effects to any riparian or other sensitive natural communities due to implementation of water conservation or ecosystem restoration. Continued degradation of habitat would likely occur through the spread of invasive species.

ALTERNATIVE 2: PROPOSED ACTION

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts and Long-Term Operation and Maintenance Impacts

There are approximately 1,641.8 acres of habitat between 470 ft. and 505 ft. that are considered sensitive natural communities. Presently, this area is inundated during the non-flood season and during the flood season for flood control purposes. Therefore, there would not be an overall increase in the amount of sensitive natural communities that would be inundated over the current condition.

Implementation of the Water Conservation Plan would allow water to be stored up to 505 ft. during the flood season, which would result in additional days of inundation during the flood season. The increased pooling and additional days of inundation would be considered a temporary direct effect. The amount of sensitive natural communities that would be inundated would be minimal compared to the total amount of sensitive natural communities in the Prado Basin. Additionally, previous habitat monitoring efforts and wildlife usage studies have shown that the increased pooling and additional days of inundation occurring during the flood season did not degrade the biological value of existing riparian vegetation communities. To ensure the Water Conservation Plan would not significantly degrade or destroy existing sensitive natural communities, a habitat monitoring program would be implemented between elevations 498 ft. and 505 ft. The monitoring program would document the condition of riparian vegetation between elevation 498 ft. and 505 ft. before and after inundation occurs. In the event the monitoring program indicates that sensitive natural communities are significantly degraded, the degraded areas would be replaced on OCWD property at a 1:1 ratio. Additional details of the habitat monitoring activities and habitat replacement program are provided under IMPACT-BIO-1. With the implementation of EC-BIO-1, no direct substantial adverse effects to riparian habitat or sensitive natural communities would occur, and therefore impacts would be less than significant.

Indirect Impacts

No indirect impacts to any riparian or other sensitive natural communities would occur.

Ecosystem Restoration Plan

Sediment Management Measure

Direct Impacts
As shown in Table 5-33, implementation of Alternative 2 would result in the removal of sensitive riparian vegetation communities and sensitive upland vegetation communities for construction and operation of the sediment trap, transition channel, sediment storage site and associated features. Approximately 163.0 acres of sensitive riparian vegetation communities would be removed, of which 102.0 acres are willow/cottonwood communities and 16.0 are mixed riparian communities, which are considered sensitive vegetation communities. Additionally, a total of 46 acres of sensitive upland vegetation communities would be removed of which 2.3 acres are coastal sage scrub and 43.0 acres are a mix of coastal sage scrub and non-native weeds. The removal of the sensitive vegetation communities would be an adverse effect. However, because the amount of sensitive vegetation communities removed would be minimal compared to the amount of sensitive vegetation communities within the Prado Basin, the adverse effect would not be substantial. Implementation of the Sediment Management Measure including re-entrainment, as well as associated Native Plantings Measure and Riparian Edge Management Measure that included in Alternative 2, would result in an increase in the amount of riparian and other riverine habitats in Prado Basin and Reach 9. The overall increase in the amount of sensitive vegetation communities would be considered a beneficial effect.

Indirect Impacts
Construction activities could result in indirect adverse effects to existing adjacent or nearby sensitive vegetation communities from construction debris, colonization of invasive weeds, fugitive dust, increased human presence, and from increased vehicle traffic occurring within the study area. With the implementation of EC-BIO-12 thru EC-BIO-16 potential adverse indirect construction effects to riparian and sensitive natural vegetation communities would not be substantial and are therefore less than significant.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would include vegetation and debris and sediment removal from all features. The long-term operation and maintenance activities would occur with the construction footprint where the Sediment Management Measure would be implemented. No additional sensitive vegetation communities would be directly affected.

Table 5-33: Vegetation Communities within Sediment Management Measure Construction Footprint (Acres)

	Alternative 2 and Alternative 4	**Alternative 3**
Aquatic	46.5	1.8
Willow/Cottonwood	102.7	1.6
Mixed Riparian	16.0	0.0
Coastal Sage Scrub	2.37	0.0
Coastal sage Scrub/Non-native Weeds	43.8	0.54
Non-Native Weeds	207.0	20.2

Eucalyptus	27.9	0.57
Arundo	110.1	15.0
Disturbed	2.11	0.0
Urban	0.37	0.0
Total	559.20	39.70

Chino Creek Channel Restoration

Direct Impacts

As shown in Table 5-34, implementation of the Chino Creek Channel Restoration Measure would require the temporary removal of 5.27 acres of willow/cottonwood vegetation communities and .07 acres of mixed riparian vegetation communities. The removal of the sensitive vegetation communities would be a temporary effect. Because, the amount of sensitive vegetation communities removed would be temporary and would be minimal compared to the overall of amount of riparian vegetation communities within the study area, the effect would not be substantial. Once the reconfiguration of Chino Creek channel is completed, the footprint of the Chino Creek Chanel Restoration Measure would be planted with native vegetation which would provide an additional 112 acres of native sensitive vegetation communities. The overall increase in the amount of sensitive vegetation communities would be considered a beneficial effect.

Indirect Impacts

Construction and maintenance activities could result in indirect adverse effects to existing adjacent or nearby sensitive vegetation communities. With the implementation of EC-BIO-12 thru BIO-16 potential adverse indirect construction effects to sensitive vegetation communities would be reduced to a less than substantial level.

Long-Term Operation and Maintenance Impacts

Long-term operation and maintenance activities would include removal of biomass and debris from the channel generated from storms and the maintenance of vegetation around the channel, maintenance road, and in-channel structures. The long-term operation and maintenance activities would occur within the construction footprint where the measure would be implemented. No additional sensitive vegetation communities would be directly affected.

Table 5-34: Chino Creek Channel Restoration Measure Vegetation Communities

Vegetation Community	Acres
Aquatic	1.66
Willow/Cottonwood	5.27
Mixed Riparian	0.07
Non-Native Weeds	111.49
Eucalyptus	0.37
Urban	1.47
Total	120.29

Invasive Plant Management Measure

Direct Impacts

Implementation of the Invasive Plant Management Measures would remove approximately 390 acres of non-native vegetation within the study area and replace it with 390 acres of native vegetation communities. Invasive plants act as a stressor on native vegetation communities, taking up nutrients and moisture within the soils while also outcompeting native plants. Non-native species can alter the hydrology and sedimentation rates in riparian systems degrading the flood system effectiveness. Implementation of the Invasive Plant Management Measure would remove 390 acres of non-native vegetation and replace it with 390 acres of native vegetation, increasing habitat for vireo, flycatcher, and cuckoo. While OCWD currently intends to monitor and manage this habitat for the life of the project, WRDA 2016 provides that management of non-structural and non-mechanical measures such as native plant establishment would not be required beyond 10 years after success criteria have been met. It is currently anticipated that up to 5 years of active management will be required before success is achieved; therefore, up to 15 years of monitoring and maintenance is anticipated. By this time, it is expected that the native habitat will have matured to a point that it is resilient and self-sustaining. The overall increase in the amount of sensitive vegetation communities would be considered a beneficial effect.

Indirect Impacts

Construction and maintenance activities could result in indirect adverse effects to existing adjacent or nearby sensitive vegetation communities. With the implementation of EC-BIO-12 thru EC-BIO-16 potential adverse indirect construction effects to sensitive vegetation communities would be reduced to a less than substantial level.

Long-Term Operation and Maintenance Impacts

Long-term operation and maintenance activities would involve removal of invasive vegetation that re-establishes trimming and management of vegetation along maintenance roads and removal debris from storm events. No additional sensitive vegetation communities would be directly affected outside of those impacted during construction. Maintenance activities could result in indirect adverse effects to existing adjacent or nearby sensitive vegetation communities. However, these indirect adverse effects from long-term operation and maintenance would be minimal and are not considered substantial.

Native Plantings Measure

Direct Impacts

As shown in Table 5-35, approximately 7.1 acres of mixed riparian vegetation communities and 17.17 acres of wetland would be temporarily removed and replanted with native vegetation communities. The removal of the sensitive vegetation communities would be a temporary effect. Because the amount of sensitive vegetation communities removed would be temporary and would be minimal compared to the overall of amount of willow/cottonwood vegetation communities within the study area, the effect would not be substantial. Once the Native Plantings Measure is implemented there would be a net increase of 83 acres of native vegetation within the footprint of the Native Planting Measure. While OCWD currently intends to monitor and manage this habitat for the life of the project, WRDA 2016 provides that management of non-structural

and non-mechanical measures such as native plant establishment would not be required beyond 10 years after success criteria have been met. It is currently anticipated that up to 5 years of active management will be required before success is achieved; therefore, up to 15 years of monitoring and maintenance is anticipated. By this time, it is expected that the native habitat will have matured to a point that it is resilient and self-sustaining. The overall increase in the amount of native sensitive vegetation communities would be considered a beneficial effect.

Indirect Impacts

Construction and maintenance activities could result in indirect adverse effects to existing adjacent or nearby sensitive vegetation communities from construction debris, colonization of invasive weeds, fugitive dust, increased human presence, and from increased vehicle traffic occurring within the study area. With the implementation of EC-BIO-12 thru EC-BIO-16 potential adverse indirect construction effects to sensitive vegetation communities would be reduced to a less than substantial level.

Long-Term Operation and Maintenance Impacts

Long-term operation and maintenance would include activities to encourage the growth of native vegetation. Invasive vegetation would be removed and/or treated with herbicide. No additional sensitive vegetation communities would be directly affected outside of those impacted during construction. Maintenance activities could result in indirect adverse effects to existing adjacent or nearby sensitive vegetation communities. However, these indirect adverse effects from long-term operation and maintenance would be minimal and are not considered substantial.

Table 5-35: Native Plantings Vegetation Communities

Vegetation Communities	Acres
Aquatic	0.00
Willow/Cottonwood	0.00
Wetland	17.17
Mixed Riparian	7.10
Coastal Sage Scrub	0.00
Coastal sage Scrub/Non-native Weeds	0.00
Non-Native Weeds	76.32
Eucalyptus	0.00
Arundo	0.87
Disturbed	0.00
Urban	0.00
Total	101.46

Riparian Edge Management Measure

Direct Impacts

To implement the Riparian Edge Management Measure, native vegetation would be removed as part of the implementation of the Sediment Management Measure. The Sediment Management Measure was designed in areas where the sensitive vegetation communities are intermixed with Arundo and other non-native species. Removal of the vegetation alongside the channel and the removal of Arundo would be a beneficial effect to the habitat because it would remove invasive and non-native species. Vegetation regrowth alongside the channel where the sediment trap and transition channels occur, would provide sapling stands alongside the channel and a variety of

young woody habitat Once the Riparian Edge Management Measure is implemented there would be a net increase of 30.3 acres of native vegetation within the footprint of the Riparian Edge Management Measure. The overall increase in the amount of native sensitive vegetation communities would be considered a beneficial effect.

Indirect Impacts
Construction and maintenance activities could result in indirect adverse effects to existing adjacent or nearby sensitive vegetation communities. With the implementation of EC-BIO-12 thru EC-BIO-16 potential adverse indirect construction effects to sensitive vegetation communities would be reduced to a less than substantial level.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance would include activities to encourage the growth of native vegetation. Invasive vegetation would be removed and/or treated with herbicide. No additional sensitive vegetation communities would be directly affected outside of those impacted during construction. Maintenance activities could result in indirect adverse effects to existing adjacent or nearby sensitive vegetation communities. However, these indirect adverse effects from long-term operation and maintenance would be minimal and are not considered substantial.

In-Stream Habitat Features Measure (Downstream)

Direct Impacts
The In-Stream Habitat Features Measure would be implemented in the wetted channel of the Santa Ana River. However, construction of the access and staging areas would temporarily remove 3.1 acres of riparian habitat. Implementation of the proposed ecosystem restoration measures would provide 620 acres of additional native vegetation within the study area which would ensure there would be no net loss of sensitive riparian vegetation communities. Therefore, these temporary impacts are not considered substantial.

Indirect Impacts
To ensure that no indirect impacts occur to sensitive vegetation communities that are adjacent to construction activities, EC-BIO-12 thru EC-BIO-16would be implemented, and as a result indirect impacts would not be substantial.

Long-Term Operation and Maintenance Impacts
Long-term operation, maintenance, and adaptive management activities would involve regular inspections to evaluate the performance of the measure. No long-term operation and maintenance impacts to sensitive vegetation communities would occur.

Non-Native Aquatic Species Management Measure and Cowbird Management Measure

Direct Impacts
Implementation of the Non-Native Aquatic Species Management Measure and Cowbird Management Measure would not require the removal of any riparian or sensitive vegetation communities, and therefore direct impacts would not be substantial.

Indirect Impacts
No indirect adverse impacts would occur, although riparian and sensitive natural communities are anticipated to receive indirect benefits from the management of non-native and detrimental species as a result of these measures.

Long-Term Operation and Maintenance Impacts
No long-term operation, maintenance impacts to sensitive vegetation communities would occur.

Implementation of the MAMP
The purpose of the MAMP is to provide a systematic approach for improving resource management outcomes and to provide structured process for recommending decisions. The MAMP provides a structured process for ensuring restoration efforts achieve desired outcomes. As such, no actions would be implemented that did not have an overall beneficial effect and help to ensure the successful restoration of habitats. As a result, no substantial adverse effects to any riparian or sensitive natural communities, whether direct, indirect, or long-term, would occur as a result implementing the MAMP.

Level of Impact for Alternative 2
Less than Significant Impact. Construction, long-term operation, maintenance and adaptive management activities would not have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 Feet with Incidental Sediment Removal)

Direct Impacts and Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, the level of potential impacts to sensitive vegetation communities would be the same. With the implementation of EC-BIO-1 potential effects to sensitive vegetation communities would not be adverse.

Implementation of the incidental sediment management measure would temporarily remove sensitive riparian and upland vegetation communities. As shown in Table 31, approximately 1.6 acres of willow/cottonwood and 0.54 acres of mixed coastal sage scrub/non-native weeds would be removed. Compared to Alternative 2, a substantially lower amount of sensitive vegetation communities would be removed for a substantially short period of time.

Long-term operation and maintenance activities associated with Incidental Sediment Removal would involve maintenance of vegetation around the access roads. No additional impacts to sensitive vegetation communities would occur.

Indirect Impacts
Similar, to Alternative 2, implementation of Alternative 3 could also result in indirect adverse effects to sensitive vegetation communities from construction activities. With the implementation of EC-BIO-12 thru EC-BIO-16, potential adverse indirect construction and

maintenance effects to sensitive vegetation communities would be reduced to a less than substantial level.

Ecosystem Restoration Plan

Chino Creek Channel Restoration Measure, Invasive Plant Management Measure, Native Plantings Measure, and Cowbird Management Measure

Direct Impacts
Implementation of the Chino Creek, Invasive Plant, Native Plantings and Cowbird Management Measures under Alternative 3 are identical to implementation of the same measures under Alternative 2. As a result, the impacts associated with implementing these measures under Alternative 3 are also identical to those described under Alternative 2.

While direct, indirect, and long-term impacts to riparian and sensitive natural communities could occur as a result of implementing these measures, such impacts are minimal and temporary in nature, and would be offset by long-term beneficial impacts as a result of the restoration process. Therefore, direct, indirect, and long-term impacts under these four measures would not result in substantial, adverse effects to riparian or sensitive natural communities.

Implementation of the MAMP
As described under Alternative 2, the MAMP provides a structured process for ensuring restoration efforts achieve desired outcomes. As such, no actions would be implemented that did not have an overall beneficial effect and help to ensure the successful restoration of habitats. As a result, no substantial adverse effects to any riparian or sensitive natural communities, whether direct, indirect, or long-term, would occur as a result implementing the MAMP.

Level of Impact for Alternative 3
Less than Significant Impact. Construction and long-term operation and maintenance activities would not have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts and Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, the level of potential impacts to sensitive vegetation communities would be the same. With the implementation of EC-BIO-1 potential adverse impacts to sensitive vegetation communities would not be substantial.

Indirect Impacts
The same as Alternative 2, no indirect impacts would occur.

Ecosystem Restoration Plan

Sediment Management Measure

Direct Impacts
As shown in Table 5-33 compared to Alternative 2, the level of impacts to sensitive vegetation communities would be the same. Similar, to Alternative 2, implementation of the proposed ecosystem restoration measures would provide 620 acres of additional native vegetation within the study area. The overall increase in the amount of sensitive vegetation communities would be considered a beneficial effect.

Indirect Impacts
Similar, to Alternative 2, implementation of Alternative 4 could also result in indirect adverse effects to sensitive vegetation communities from construction activities. With the implementation of EC-BIO-12 thru ECO-BIO-16, potential adverse indirect construction and maintenance effects to sensitive vegetation communities would not be substantial.

Long-Term Operation and Maintenance Impacts
The long-term operation and maintenance activities would occur with the construction footprint where the measure would be implemented. No additional sensitive vegetation communities would be directly affected.

In-Stream Habitat Features Measure (Upstream and Downstream)

Direct, Indirect and Long-Term Operation and Maintenance Impacts
Effects from construction, operation and maintenance of the In-Stream Habitat Features Measure in the downstream location were described in Alternative 2. Since vegetation would be removed for construction of the transition channel, no additional impacts to sensitive vegetation communities would occur due to placement, operation or maintenance of the upstream location of this measure.

Chino Creek Channel Restoration Measure, Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure, Non-Native Aquatic Species Management Measure, and Cowbird Management Measure

Direct, Indirect and Long-Term Operation and Maintenance Impacts
Implementation of the Chino Creek, Invasive Plant, Native Plantings, Riparian Edge Management, Non-Native Aquatic Species Control, and Cowbird Management Measures under Alternative 4 are identical to implementation of the same measures under Alternative 2 with exception of the non-native aquatic species management, as under Alternative 4, non-native aquatic species management would occur in additional areas. The addition of new areas does not alter the impacts associated with this measure. As a result, the impacts associated with implementing these measures under Alternative 4 are also identical to those described under Alternative 2.

While direct, indirect, and long-term impacts to riparian and sensitive natural communities could occur as result of implementing these measures, such impacts are minimal and temporary in nature, and would be offset by long-term beneficial impacts as result of the restoration process. Therefore, direct, indirect, and long-term impacts under these measures would not result in substantial, adverse effects to riparian or sensitive natural communities.

Feral Pig Management

Direct Impacts
Implementation of feral pig management would not require the removal of any riparian or sensitive natural communities. As a result, there would be no substantial adverse effects.

Indirect Impacts
No indirect impacts would occur to riparian or sensitive natural communities.

Long-Term Operation and Maintenance Impacts
Long-maintenance activities associated with feral pig management would not result in any adverse effects to riparian or sensitive vegetation communities.

Implementation of the MAMP
As described under Alternative 2 and 3, the MAMP provides a structured process for ensuring restoration efforts achieve desired outcomes. As such, no actions would be implemented that did not have an overall beneficial effect and help to ensure the successful restoration of habitats. As a result, no substantial adverse effects to any riparian or sensitive natural communities, whether direct, indirect, or long-term, would occur as a result of implementing the MAMP.

Level of Impact for Alternative 4
Less than Significant Impact. Construction and long-term operation and maintenance activities would not have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.

5.6.4.3 **IMPACT BIO-3**: Threshold of Significance: Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means

The following is a preliminary analysis to identify wetland habitat and potential impacts to wetland habitat associated with implementation of the Proposed Action and the Action Alternatives. The analysis is consistent with the 404(b)(1) Analysis provided in Appendix B.

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, neither the Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. There would be no potential impacts to

wetland habitat or to non-vegetated waters due to construction or operation of Water Conservation or Ecosystem Restoration measures. There would be no beneficial change to the baseline conditions within the Action Area, including no increase in native wetland riparian habitat in the Action Area. Continued degradation would be expected to occur due to the prevalence of non-native vegetation and wildlife.

ALTERNATIVE 2 PROPOSED ACTION

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts

There are approximately 3,150.6 acres of wetland habitat located between elevations 470 ft. and 505 ft. Implementation of the Water Conservation Plan would not involve any activities that would remove wetland habitat. Implementation of the Water Conservation Plan would increase the level of pooling and days of inundation. The predominant wetland vegetation is willow. Willow species are known to have high inundation tolerances and black willows are known to have especially high inundation tolerances when they are in a period of dormancy, which correlates with winter or the flood season (Effects of Reduced Outflow from Prado Dam Water Conservation, OCWD). Previous habitat monitoring activities and wildlife usage studies have shown after periods of prolonged inundation that no permanent loss of wetland habitat occurred. During periods of wetness and immediately thereafter the wetland habitat did experience reduced biological values. However, in subsequent years during periods of dryness the biological values of the wetland habitat recovered. The potential for increased pooling and additional days of inundation to occur to wetland habitat would be a temporary effect. However, because there would be no permanent loss of wetland habitat, the temporary effect to wetland habitat would not be adverse. To ensure that the Proposed Action would not significantly degrade the value of wetland habitat, a habitat monitoring program would be implemented between elevation 498 ft. and elevation 505 ft. The habitat monitoring program would document the condition of wetland habitat between elevations 498 ft. and 505 ft. before and during implementation to monitor the health of the wetland habitat after inundation occurs. In the event the monitoring program indicates that the wetland habitat is significantly degraded, the degraded wetland habitat would be replaced on OCWD property at 1:1 ratio. With the implementation of EC-BIO-1 potential temporary effects to wetland habitat would not be substantial.

Indirect Impacts

No indirect impacts to federally protected wetlands would occur.

Long-Term Operation and Maintenance Impacts

There are no long-term operation and maintenance activities that would affect federally protected wetlands.

Ecosystem Restoration Plan

Sediment Management Measure

Direct Impact
As shown in Table 5-36, under Alternative 2 there would be approximately 145 acres of permanent impacts to wetland habitat and 64.87 acres of permanent impacts to un-vegetated waters. In addition, during construction there would be 123 acres of temporary impacts to wetland habitats. The removal of the wetland habitat and un-vegetated waters would be an adverse effect. Because the amount of wetland habitat removed would be minimal compared to the existing amount of wetland habitat within the study area, the adverse effect would not be substantial. The removal of the wetland habitat would be offset by the implementation of a series of ecosystem restoration measures that would provide 620 acres of addition native vegetation within the study area, the majority of which would be riparian vegetation. The overall increase in the amount of wetland vegetation would be considered a beneficial effect.

Table 5-36: Sediment Management Measure Impacts Waters U.S./State

Permanent Impact Wetlands	Temporary Impacts Wetlands	Permanent Impacts Un-Vegetated Waters	Temporary Impacts Un-Vegetated Waters
145.0	123.0	64.87	0

Indirect Impacts
To minimize indirect adverse effects to adjacent wetland from construction disturbances, EC-BIO-12 thru EC-BIO-16 would be implemented.

The proposed Sediment Management Measure would re-entrain sediment into the lower Santa Ana River to facilitate sediment migration along the river. It is expected that material that settles in Reach 9 will reduce or even reverse the bed degradation that has been occurring in that area, reconnecting the river to the floodplain and resulting in an increase in native floodplain habitat, which would include wetland habitat. It is anticipated that some sediment would accumulate near the river's outlet reach to the ocean. Presently, sediment accumulates near the ocean outlet reach of the Santa Ana River, periodically requiring the Orange County Flood Control District to remove the sediment to maintain flood control capacity along the river. As part of the ongoing maintenance for the Proposed Action, OCWD would coordinate with Orange County Flood Control District on the fair share responsibility for the removal of sediment from the outlet reach of the river. It is anticipated that the sediment would be removed by heavy construction equipment, loaded onto a truck and hauled to the Bowerman Landfill. The operation of heavy equipment in the river and the removal of sediment would be a temporary impact to federally protected wetlands. As part of ongoing coordination with the Orange County, it would be determined what the fair share removal quantity would be, the timing and frequency when the sediment would be removed and how the removal activities would be permitted with the resource agencies. With implementation of EC-HWQ-3, the potential impacts associated with the removal sediment from the outlet reach would be less than substantial.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would include vegetation and debris and sediment removal from all features. The long-term operation and maintenance activities would

occur within the construction footprint where the Sediment Management Measure would be implemented. No additional wetland habitat would be affected.

Chino Creek Channel Restoration Measure

Direct Impacts
As shown in Table 5-37, under Alternative 2 there would be 5.1 acres of permanent effects to wetland habitat and 2.01 acres of permanent impacts to un-vegetated waters. The permanent effects to wetland habitat and un-vegetated waters would be an adverse effect. Because they would be minimal compared to the overall amount of un-vegetated waters in the study area, the adverse effect would not be substantial. The proposed measure would increase the overall open water habitat area by 2.84 acres. Additionally, the measure would provide an additional 122 acres of native riparian vegetation, which would ensure there would be no net loss of wetland vegetation. The overall increase in open water habitat and native riparian vegetation would be a beneficial effect, and no substantial adverse impacts to federally protected wetlands would occur.

Indirect Impacts
To minimize indirect adverse effects to adjacent wetland from construction and maintenance disturbances, EC-BIO-12 thru EC-BIO-16 would be implemented.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would include removal of biomass and debris from the channel generated from storms and the maintenance of vegetation around the channel, maintenance road, and in-channel structures. The long-term operation and maintenance activities would occur within the construction footprint where the measure would be implemented. No additional wetland habitat would be affected.

Table 5-37: Chino Creek Channel Restoration Measure Impacts Waters U.S./State

Permanent Impact Wetlands	Temporary Impacts Wetlands	Permanent Impacts Un-Vegetated Waters	Temporary Impacts Un-Vegetated Waters
5.10	0.08	2.01	0.17

Invasive Plant Management Measure

Direct Impacts
Implementation of the Invasive Plant Management Measure would remove 390 acres of wetland habitat, of which all would be non-native wetland vegetation. The non-native riparian vegetation removed would be replaced native riparian wetland vegetation, ensuring there would be no net loss of riparian wetland habitat. As a result, no substantial adverse impacts to federally protected wetlands would occur.

Indirect Impacts
Long-term operation and maintenance would include activities to encourage the growth of native vegetation. Invasive vegetation would be removed and/or treated with herbicide. No additional wetland habitat would be directly affected.

Long-Term Operation and Maintenance Impacts
To minimize indirect adverse effects to adjacent wetland from construction disturbances, EC-BIO-12 thru EC-BIO-16 would be implemented.

Native Plantings Measure

Direct Impacts
Implementation of the Native Planning Measure would remove 24.27 acres of freshwater marsh wetland habitat and replace it with riparian woodland wetland habitat, ensuring there would be no net loss of wetland habitat. As a result, no substantial adverse impacts to federally protected wetlands would occur.

Indirect Impacts
To minimize indirect adverse effects to adjacent wetland from construction disturbances, EC-BIO-12 thru EC-BIO-16 would be implemented.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance would include activities to encourage the growth of native vegetation. Invasive vegetation would be removed and/or treated with herbicide. No additional wetland habitat would be directly affected.

Riparian Edge Management Measure

Direct Impacts
To implement the Riparian Edge Management Measure, riparian wetland vegetation would be removed as part of the implementation of the Sediment Management Measure. Once the Riparian Edge Management Measure is implemented there would be a net increase of 30.3 acres of riparian wetland vegetation. As a result, no substantial adverse impacts to federally protected wetlands would occur.

Indirect Impacts
No additional indirect impacts would occur beyond what was identified for Sediment Management Measure.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance would include activities to encourage the growth of native vegetation. Invasive vegetation would be removed and/or treated with herbicide. No additional wetland habitat would be directly affected. The overall increase in the amount of riparian wetland vegetation would be considered a beneficial effect.

In-Stream Habitat Features (Downstream Only)
Implementation of the downstream In-Stream Habitat Features Measure would result in 3.1 acres of impacts to riparian habitat and 1.92 acres impacts to un-vegetated waters of the U.S./State. The area that would be impacted would be minimal compared to the overall amount of existing open water habitat within the SARM Downstream Focal Area. The presence of the in-stream habitat features would have a beneficial impact on helping to restore native fish habitat within

SARM Downstream Focal Area. As a result, no substantial adverse impacts to federally protected wetlands would occur.

Indirect Impacts
To ensure that no indirect impacts occur to wetland habitat that are adjacent to where construction activities are occurring, EC-BIO-12 thru EC-BIO-16 would be implemented.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would involve regular inspections to evaluate the performance of the measure. No long-term operation and maintenance impacts to wetland habitat would occur.

Cowbird Management Measure and Non-Native Aquatic Species Control Measure

Direct, Indirect, and Long-Term Operation and Maintenance Impacts
Implementation of the above wildlife management measures would not result in any temporary or permanent impacts to wetlands or un-vegetated waters of the U.S./State, directly, indirectly or due to long-term operation and maintenance. As a result, no substantial adverse impacts to federally protected wetlands would occur.

Implementation of the MAMP
The MAMP provides a structured process for ensuring restoration efforts achieve desired outcomes. Specific actions in the MAMP that could result in impacts to federally protected wetlands include the importation and placement of substrates to correct in-stream deficiencies, re-positioning or augmenting in-stream features, the removal of invasive vegetation, and the replanting of failed vegetation. Any actions taken would occur within the existing footprint of the original construction effects. Given the purpose of the MAMP is to ensure success of habitat restoration efforts, no actions would be implemented that did not have an overall beneficial effect and help to ensure the successful restoration of habitats. As a result, no substantial adverse effects to federally protected wetlands, whether direct, indirect, or long-term, would occur as a result of implementing the MAMP.

Level of Impact for Alternative 2
Less than Significant Impact. Construction and long-term operation and maintenance activities would not have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 Feet Year-Round with Incidental Sediment Removal)

Direct Impacts and Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, the level of potential impacts to wetland habitat and non-vegetated waters would be the same. With the implementation of EC-BIO-1 potential temporary effects to wetland habitat and non-vegetated waters would not be substantial.

As shown in Table 5-38, implementation of the incidental sediment removal program would result in 13.78 acres of temporary effects to potential wetland habitat and 1.77 acres of temporary impacts to un-vegetated waters of the U.S./State. Because the amount of wetland habitat temporarily removed would be minimal compared the overall amount of wetland habitat in the Prado Basin, the temporary effect would not be substantial. Compared to the Proposed Action, there would be no permanent impacts to potential wetland habitat.

Once the incidental sediment management activities are completed the areas temporarily removed by the measure would be planted with native vegetation which would increase the amount of native vegetation within the footprint of the incidental sediment management measure by approximately 35.7 acres, of which the majority would also be riparian vegetation. The overall increase in the amount of wetland vegetation would be considered a beneficial effect.

Table 5-38: Incidental Sediment Removal Program Impacts Waters U.S./State

Permanent Impact Wetlands	Temporary Impacts Wetlands	Permanent Impacts Un-Vegetated Waters	Temporary Impacts Un-Vegetated Waters
13.78	3.6	1.77	0.07

Long-term operation and maintenance activities of the Incidental Sediment Removal measure would involve maintaining the access road between the sediment removal trap and the sediment storage site. No additional wetland habitat would be directly impacted. To avoid indirect construction impacts to adjacent wetland habitat that might be present EC-BIO-12 thru EC-BIO17 would be implemented.

Indirect Impacts
Similar, to Alternative 2, construction and operation activities could indirectly result in the temporary degradation of the value of adjacent wetland habitat. With the implementation of EC-BIO-12 thru EC-BIO17, potential indirect construction adverse effects to sensitive vegetation communities would not be substantial.

Ecosystem Restoration Plan

Chino Creek Channel Restoration Measure, Invasive Plant Management Measure, Native Plantings Measure, and Cowbird Management Measure

Direct Indirect, and Long-Term Operation and Maintenance Impacts
The measures contained within the Ecosystem Restoration Plan of Alternative 3 are identical to measures of the same name included in Alternative 2. As a result, the potential impacts to

federally protected wetlands are also the same. While direct, indirect, and long-term impacts to wetlands could result from implementation of these measures, these impacts would be minor and temporary in nature. Long-term, these impacts will be offset by the overall increase in wetland habitats through restoration. In addition, implementation of EC-BIO-12 thru EC-BIO-16 will ensure impacts are minimized. As a result, impacts to federally protected wetlands are not considered substantial.

Implementation of the MAMP
As described under Alternative 2, the MAMP provides a structured process for ensuring restoration efforts achieve desired outcomes. Specific actions in the MAMP that could result in impacts to federally protected wetlands include the importation and placement of substrates to correct in-stream deficiencies, re-positioning or augmenting in-stream features, removal of invasive vegetation, and replanting of failed vegetation. Any actions taken would occur within the existing footprint of the original construction effects. Given the purpose of the MAMP is to ensure success of habitat restoration efforts, no actions would be implemented that did not have an overall beneficial effect and help to ensure the successful restoration of habitats. As a result, no substantial adverse effects to federally protected wetlands, whether direct, indirect, or long-term, would occur as a result of implementing the MAMP.

Level of Impact for Alternative 3
Less than Significant Impact. Construction and long-term operation and maintenance activities would not have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct, Indirect, and Long-Term Operation and Maintenance Impacts
The Water Conservation Plan for Alternative 4 is identical to the Water Conservation Plan for Alternative 2, and therefore the direct, indirect, and long-term impacts to wetlands are also identical. With the implementation of EC-BIO-1, potential temporary direct effects to wetland habitat and non-vegetated waters would not be adverse, and no indirect impacts or long-term operation and maintenance impacts to wetlands would occur. As a result, impacts to federally protected wetlands are not considered substantial.

Ecosystem Restoration Plan

Sediment Management Measure, Chino Creek Channel Restoration Measure, Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure, Non-Native Aquatic Species Management and Cowbird Management Measure

Direct, Indirect and Long-Term Operation and Maintenance Impacts
Implementation of the Chino Creek, Invasive Plant, Native Plantings, Riparian Edge Management, Non-Native Aquatic Species Control, and Cowbird Management Measures under

Alternative 4 are identical to implementation of the same measures under Alternative 2 with exception of the non-native aquatic species management. The primary difference is that, under Alternative 4, non-native aquatic species management would occur in additional areas. The addition of new areas does not alter the impacts associated with this measure. As a result, the impacts associated with implementing these measures under Alternative 4 are also identical to those described under Alternative 2.

As described under Alternative 2, while direct, indirect, and long-term impacts to federally protected wetlands could occur as result of implementing these measures, such impacts are minimal and temporary in nature, and would be offset by long-term beneficial impacts as result of the restoration process. Implementation of EC-BIO-12 thru EC-BIO-16, as well as EC-HWQ-3, would further reduce potentially adverse indirect effects. Therefore, direct, indirect, and long-term impacts under these measures would not result in substantial, adverse effects to federally protected wetlands.

In-Stream Habitat Features Measure (Upstream and Downstream)

Direct, Indirect and Long-Term Operation and Maintenance Impacts
Effects from construction, operation and maintenance of the In-Stream Habitat Features Measure in the downstream location were described in Alternative 2. Since the footprint would already have been disturbed for construction of the transition channel, no additional impacts to wetlands would occur due to placement of the upstream location of this measure. The presence of the in-stream habitat features at both locations would have a beneficial impact on helping to restore native fish habitat.

Feral Pig Management Measure

Direct Impact
Implementation of the Feral Pig Management Measure would not involve any activities that would result in permanent or temporary impacts wetlands or un-vegetated waters. The Feral Pig Management Measure would improve wetland and aquatic habitat as it would reduce the ecological damage from feral pig rooting habits that turn over the soil and damage plant communities. Feral Pig Management Measure would be considered a benefit to sensitive vegetation communities. No substantial adverse impacts to federally protected wetlands would occur.

Indirect Impacts
No indirect impacts to wetland habitat would occur

Long-Term Operation and Maintenance Impacts
No long-term operation and maintenance impacts to wetland habitat would occur.

Implementation of the MAMP
Similar to Alternatives 2 and 3, specific actions in the MAMP that could result in impacts to federally protected wetlands include the importation and placement of substrates to correct in-stream deficiencies, re-positioning or augmenting in-stream features, removal of invasive

vegetation, and replanting of failed vegetation. Any actions taken would occur within the existing footprint of the original construction effects. Given the purpose of the MAMP is to ensure success of habitat restoration efforts, no actions would be implemented that did not have an overall beneficial effect and help to ensure the successful restoration of habitats. As a result, no substantial adverse effects to federally protected wetlands, whether direct, indirect, or long-term, would occur as result of implementing the MAMP.

Level of Impact for Alternative 4
Less than Significant Impact. Construction and long-term operation and maintenance activities would not have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

5.6.4.4 **IMPACT BIO-4**: Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory corridors, or impede the use of native wildlife nursery sites

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the no Federal Action/No Project Alternative, neither the Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. No potential impacts to wildlife movement or impacts to migratory birds within the Prado Basin would occur. Wildlife movement would continue throughout the interior of Prado Basin and high numbers of migratory birds would continue to nest in Prado Basin. However, none of the proposed ecosystem restoration measures would be implemented and there would be no increase in nesting habitat for migratory birds.

ALTERNATIVE 2: PROPOSED ACTION

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts and Long-Term Operation and Maintenance Impacts

Migratory Birds
The Water Conservation Plan would be implemented outside of nesting season. No active nests would be directly affected by the additional stored water.

Wildlife Movement

Effects from Increased Pooling and Additional Days of Inundation
The Water Conservation Plan would store water up between elevations 498 ft. and 505 ft. during the flood season, which would temporarily inundate up to an additional 698 acres of area within the Prado Basin, which could temporarily restrict wildlife movement at the south end of the Prado Basin. In the event the pooled water does occur there would over 2,600 acres of area of above elevation 505 ft., that would not be inundated, that would allow wildlife movement to occur until the water level drops below elevation 505 ft. to allow wildlife movement back into

the southern end of Prado Basin. As a result, impacts to wildlife movement would be temporary, and not substantial.

Effects from Reduced Flow Release Rate from 500 cfs to 350 cfs

The wetted areas of the Santa Ana River Channel are shown in Figure 5-17 in relation to existing wildlife movement crossings located along SR-91. Under a release rate of 500 cfs, the wetted area of the Santa Ana River channel would be approximately 132 acres. With a release rate of 350 cfs, the wetted area of the channel would be approximately 104 acres. An additional 28 acres of non-wetted floodplain along the river would be available for wildlife movement. The number of days to drain 10,000 acre-feet of water (505 feet to 498 feet) from Prado Dam, which is the maximum amount of increased storm water capture for the proposed Water Conservation Plan, would be 14 days at a 500 cfs release rate and 25 days at a 350 cfs release rate (assuming an inflow rate of 150 cfs). The longer duration of the 350 cfs release rate would provide additional days of non-wetted floodplain along the river which would benefit wildlife movement.

As shown in Figure 5-18, the deepest or maximum water depth in Reach 9 ranges from a minimum of 1.2 feet to a maximum of 7.7 feet under a 500 cfs release rate. At this flow rate several existing wildlife movement crossings along SR-91 (91-13, 91-12, 91-11, 91-10, 91-04, 91-03) would likely experience some restriction of wildlife movement across the low flow channel but would not be at a depth that would prohibit wildlife movement completely. Also, once the pool is drained, outflows would be further reduced and water depths in the Reach 9 channel would decrease. Under a 350 cfs release rate, the maximum water depth would range from 1.1 feet to 7.0 feet. Similar to the 500 cfs release rate, Wildlife Movement Crossings 91-13, 91-12, 91-11, 91-10, 91-04, and 91-03 could potentially experience some restriction of wildlife movement across the channel while the flood/water conservation pool is drained, but the slight decrease in water depth compared to a 500 cfs release could better facilitate wildlife movement. The three critical wildlife movement crossings along SR-9, including Crossing 91-09 Coal Canyon, Crossing-91-17, near the BNSF Railroad Bridge and Crossing 71-28, near the confluence of SR-91 and SR-71 would not be affected from either the 500 cfs or 350 cfs release rate. As a result, impacts to wildlife movement would be temporary, and not substantial.

Effects from 5,000 cfs Release Rate

In the event of a pending significant storm event up to a 5,000 cfs release rate could potentially occur to maintain flood risk management capacity behind Prado Dam. This release rate could occur with or without the proposed Water Conservation Plan and would not be expected to occur more frequently. As shown in Figure 5-19, under a 5,000 cfs release rate the wetted channel of the river would be approximately 530 acres. Compared to the 500 cfs and 350 cfs release rates there would be less available non-wetted floodplain for wildlife movement while the pool is being drained. Additionally, a higher number of wildlife crossings under SR-91 could potentially experience inundation, most likely at a depth and velocity that would restrict wildlife movement for the duration of that flow. However, the three critical wildlife movement crossings along SR-91, including Crossing 91-09 Coal Canyon, Crossing-91-17 near the BNSF Railroad Bridge and Crossing 71-28 near the confluence of SR-91 and SR-71 would not be affected. As a result, impacts to wildlife movement would be temporary, and not substantial.

Indirect Impacts

Migratory Birds

There is the potential that water stored in the buffer pool could overlap into the beginning of nesting season and could submerge some trees that are used by migratory birds for nesting, causing them to relocate to higher elevations for nesting sites. However, because the number of tress that could be potentially submerged would be relatively small compared to the overall amounts of trees that would be available in the Prado Basin and that the distribution of birds to higher elevations would not reduce populations of migratory birds nesting in the Prado Basin, potential adverse effects to migratory birds would be less than substantial.

Wildlife Movement

Implementation of the Water Conservation Plan would not inundate existing wildlife corridors where they are no longer usable. However, some species may need to relocate to higher upland areas to avoid some that wetted areas. The relocation of the wildlife would be indirect effect. However, because there would be a substantial area are available for wildlife movement the effect would not be significant.

Long-Term Operation and Maintenance Impacts

There are no long-term operation and maintenance activities that affect migratory bird or wildlife movement.

Ecosystem Restoration Plan

Sediment Management Measure

Migratory Birds

Direct Impacts

To avoid direct impacts to nesting birds, the excavation of the sediment trap and transition channel and the grading activities at the sediment storage site would occur outside of nesting season. With the implementation of EC-BIO-2 potential adverse direct effects to migratory birds would be less than substantial.

Sediment removal dredging/heavy equipment excavation operations would begin in late winter and would extend into the nesting season. The dredging/excavation operations would be confined to the wetted sediment trap. Therefore, direct effects to migratory birds would be avoided.

Implementation of the Sediment Management Measure would re-entrain sediment downstream of Prado Dam. The re-entrained sediment would reduce channel incision and would re-connect the river to its floodplain, potentially increasing the amount of riparian habitat along the river along with other restoration measures would increase habitat and provide beneficial effects for migratory birds.

Indirect Impacts
Because only a small number of birds are anticipated to seek alternative nesting locations when sediment removal activities are occurring and that there would be plenty of alternative nesting sites available in the Prado Basin, the potential relocation of them would not be a substantial adverse indirect effect. To minimize noise impacts, sound attenuation measures would be implemented for the Sediment Management Measure. With implementation of EC-BIO-2 and EC-BIO-3 potential adverse noise impacts to migratory birds would be less than substantial.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would include vegetation and debris and sediment removal from all features. To avoid direct and indirect noise impacts to migratory birds, maintenance activities involving the use of heavy construction equipment would be conducted outside of nesting season.

Wildlife Movement

Direct Impacts
The construction of the sediment trap and transition channel would interfere with existing wildlife movements occurring along the river. However, once the channel is constructed wildlife would most likely adapt to the presence of the transition channel and would establish movement corridors to avoid the transition channel. Additionally, the maintenance roads along the channel could function as wildlife corridors when not in operation, which would enhance and be beneficial for wildlife movement over the current condition.

The construction and operation of the sediment trap and transition channel would occur during daylight hours, which would avoid disturbance to many of the predatory species and other large mammals which typically move in the evening and early morning hours. The sides of the sediment removal channel would be constructed at 2:1 slope to allow wildlife to enter and exit the channel and would reduce the possibility of stranded and injured wildlife. Additionally, to minimize construction related impacts to wildlife at the sediment storage site a series of construction impact minimization measures would be implemented.

Sediment re-entrainment activities would occur along the south levee of the Prado Dam outlet channel. Chino Hills is located north of the sediment re-entrainment area and provides an open space destination and wildlife corridor for many wildlife species. The sediment re-entrainment activities would be confined to south bank of the outlet channel and would not impede wildlife movement into Chino Hills.

Indirect Impacts
The sediment re-entrainment activities could occur at night which would require onsite lighting during the night time hours. The lighting for the re-entrainment activities would be confined to the work area on the south bank of the outlet channel. Sound attenuation noise barriers would be provided around the work area to minimize noise effects. It is anticipated that wildlife would avoid the area when sediment re-entrainment activities are being conducted. With the implementation of EC-BIO-2 thru EC-BIO-5, EC-BIO-7 thru EC-BIO-12, and EC-BIO-17 and EC-BIO-18, potential adverse effects to wildlife movement would be less than substantial.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would involve removal of sediment from the sediment trap and transition channel. With the implementation of EC-BIO-2 thru EC-BIO-5, EC-BIO-7 thru EC-BIO-12, and EC-BIO-17 thru EC-BIO-21, potential adverse effects to wildlife movement would be less than substantial.

Chino Creek Channel Restoration Measure

Direct Impacts
Implementation of the Chino Creek Channel Restoration Measure would not construct any permanent barriers that would impede wildlife movement. The measure includes the construction of wildlife fencing along Pine Avenue and Euclid Avenue which would help direct wildlife to wildlife corridor entrances to facilitate wildlife movement and provide a beneficial effect. With the implementation of EC-BIO-2, EC-BIO-7, EC-BIO-12, EC-BIO-19, EC-BIO-20 and EC-BIO-21, potential adverse effects to wildlife movement and migratory birds from construction related impacts would be less than substantial.

Indirect Impacts
There are no indirect impacts that would affect migratory birds or wildlife movement.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would involve removal of sediment from Chino Creek and vegetation maintenance. With the implementation of EC-BIO-2, EC-BIO-7, EC-BIO-12, EC-BIO-19, EC-BIO-20 and EC-BIO-21, potential adverse effects to wildlife movement and migratory birds from construction related impacts would be less than substantial.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure, In-Stream Habitat Features Measure (Downstream Only)

Wildlife/Migratory Birds

Direct Impacts
Implementation of the above measures would not construct any permanent barriers that would impede wildlife movement. The measures would occur during the daylight hours, which would avoid disturbance to many predatory species and other large mammals that typically move in the evening and early morning hours.

Indirect Impacts
To avoid construction related effects to migratory birds the above measures would be implemented outside of the nesting season. With the implementation of EC-BIO-2, EC-BIO-7, EC-BIO-12, EC-BIO-18, EC-BIO-19, EC-BIO-20, and EC-BIO-21 potential adverse effects to wildlife movement and migratory birds would be less than substantial.

Long-Term Operation and Maintenance Impacts
To avoid long-term operation and maintenance impacts to migratory birds and wildlife movement EC-BIO-2, EC-BIO-7, EC-BIO-12, EC-BIO-18, EC-BIO-19, EC-BIO-20, and EC-BIO-21 would be implemented.

Fish

Direct Impacts
Implementation of the In-Stream Habitat Features Measure would not impact fish movement along the Santa Ana River. The presence of the rock groins would create refugee areas and enhance habitat for fish. The rock gabions would be constructed outside of fish spawning season and outside of nesting season to avoid effects to wildlife. With the implementation of EC-BIO-7 potential effects to spawning fish would be less than substantial.

Indirect Impacts
There are no indirect impacts that affect the movement of fish.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities that affect the movement of fish.

Non-Native Aquatic Species Management Measure and Cowbird Management Measure

Direct Impacts
Implementation of the above measures would focus on the removal and management non-native wildlife that preys upon native wildlife. The measures would be implemented by qualified biologist who would ensure that the implementation of the measure would not result in adverse impacts to native wildlife. Implementation of the measures would reduce predation and would have a beneficial effect on wildlife. With the implementation of EC-BIO-2, EC-BIO-7, EC-BIO-12, EC-BIO-18, EC-BIO-19, and EC-BIO-20 potential effects to wildlife and migratory birds would be less than substantial.

Indirect Impacts
There are no indirect impacts that affect the movement of fish.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities that affect the movement of fish.

Implementation of the MAMP
Specific actions in the MAMP include adjustments to methods, quantities, locations and timing of sediment removal and re-entrainment activities; minor adjustments to gradient, channel dimensions and plantings at Chino Creek; the importation and placement of substrates or re-positioning of in-stream habitat features to correct in-stream deficiencies; the removal of invasive vegetation; adjustments to cowbird control and fish removal methods, level of effort, and/or trap locations; and the replanting and temporary irrigation of failed vegetation. Generally, none of these actions would affect fish or wildlife movement. Vegetation removal activities associated with the MAMP would be implemented outside of the bird nesting season, and

placement of additional substrate in-stream would occur outside of fish spawning and/or migration windows. Any actions taken would occur within the existing footprint of the original construction effects. Given the purpose of the MAMP is to ensure success of habitat restoration efforts, no actions would be implemented that did not have an overall beneficial effect and help to ensure the successful restoration of habitats. As a result, no substantial adverse effects to fish or wildlife movement, whether direct, indirect, or long-term, would occur as a result of implementing the MAMP.

Level of Impact for Alternative 2
Less than Significant Impact. Construction and long-term operation and maintenance activities would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory corridors or impede the use of native wildlife nursery sites.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 Feet Year-Round with Incidental Sediment Removal)

Direct Impacts and Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, the level of impacts to wildlife movement from the Water Conservation Plan would be the same. Potential effects to wildlife movement and migratory birds would be less than substantial.
Under Alternative 3, an incidental sediment removal program would be implemented in-conjunction with the Water Conservation Plan. Similar to Alternative 2, the construction of the sediment removal channel could interfere with existing wildlife movements occurring along the river and once the removal channel is constructed wildlife would likely adapt to the presence of the trap and would establish movement corridors to avoid the area. Additionally, the construction and operation of the sediment trap would occur during daylight hours and would be implemented outside of nesting season and fish spawning season. With implementation of EC-BIO-2, EC-BIO-5, EC-BIO-7 thru EC-BIO12, and BIO-17 thru EC-BIO-21, potential adverse effects to wildlife movement and migratory birds would be less than substantial. Because under Alternative 3, the sediment removal activities would be implemented at a substantially reduced scale compared to Alternative 2, there would be less potential for interference with wildlife movement.

The proposed sediment removal and hauling activities would occur outside of the nesting season. Therefore, the activities would have no effects on nesting migratory birds. Additionally, sediment removal activities would occur outside of the spawning season to avoid effects to spawning fish. With the implementation of Environmental Commitments EC-BIO-2 and EC-BIO-7 potential effects to migratory birds and spawning fish would be less than substantial. Under the Proposed Action sediment removal activities would occur during the nesting season, which could disrupt nesting migratory birds. Because under Alternative 3 all of the sediment removal activities would occur outside of nesting season, there would be less potential for effects to migratory birds.

Long-term operation and maintenance activities for the Incidental Sediment Removal measure would involve maintaining the access road between the sediment removal trap and the sediment storage site. The maintenance activities would occur outside of nesting season. With the implementation of EC-BIO-2 potential effects to migratory birds would be avoided. No long-term operation and maintenance impacts would occur to wildlife movement.

Indirect Impacts
There are no indirect impacts that would affect migratory birds or wildlife movement.

Ecosystem Restoration Plan

Chino Creek Channel Restoration, Invasive Plant Management, Native Plantings, and Cowbird Management Measures

Direct, Indirect, and Long-Term Operation and Maintenance Impacts
The four measures contained in the Ecosystem Restoration Plan for Alternative 3 are identical to the measures of the same name as previously described under Alternative 2. As a result, the impacts associated with implementing these measures are also identical. Compared to Alternative 2, the level of potential direct, indirect, and long-term operation and maintenance impacts would be the same. With the implementation of EC-BIO-2, EC-BIO-5 EC-BIO-7, EC-BIO-11, EC-BIO-12, EC-BIO-13, EC-BIO-18, EC-BIO-19, and EC-BIO-20 potential adverse effects to wildlife movement and migratory birds would be less than substantial.

Implementation of the MAMP
Specific actions in the MAMP include adjustments to methods, quantities, locations and timing of sediment removal and re-entrainment activities; minor adjustments to gradient, channel dimensions and plantings at Chino Creek; the importation and placement of substrates or re-positioning of in-stream habitat features to correct in-stream deficiencies; the removal of invasive vegetation; adjustments to cowbird control and fish removal methods, level of effort, and/or trap locations; and the replanting and temporary irrigation of failed vegetation. Vegetation removal activities associated with the MAMP would be implemented outside of the bird nesting season, and placement of additional substrate in-stream would occur outside of fish spawning and/or migration windows. Any actions taken would occur within the existing footprint of the original construction effects. Given the purpose of the MAMP is to ensure success of habitat restoration efforts, no actions would be implemented that did not have an overall beneficial effect and help to ensure the successful restoration of habitats. As a result, no substantial adverse effects to fish or wildlife movement, whether direct, indirect, or long-term, would occur as a result of implementing the MAMP.

Level of Impact for Alternative 3
Less than Significant Impact. Construction, long-term operation and maintenance activities would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory corridors or impede the use of native wildlife nursery sites.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct, Indirect, and Long-Term Operation and Maintenance Impacts
The Water Conservation Plan for Alternative 4 is identical to the Water Conservation Plan for Alternative 2, and therefore the direct, indirect, and long-term impacts to wildlife movement and migratory birds are also identical. Potential effects to wildlife movement and migratory birds would be less than substantial.

Ecosystem Restoration Plan
As described under Alternative 2, while direct, indirect, and long-term impacts to federally protected wetlands could occur as a result of implementing these measures, such impacts are minimal and temporary in nature, and would be offset by long-term beneficial impacts as a result of the restoration process. Implementation of EC-BIO-12 thru EC-BIO-16, as well as EC-HWQ-3, would further reduce potentially adverse indirect effects. Therefore, direct, indirect, and long-term impacts under these measures would not result in substantial, adverse effects to federally protected wetlands.

Sediment Management Measure, Chino Creek Channel Restoration Measure, Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure, Non-Native Aquatic Species Management and Cowbird Management Measure
Implementation of the Chino Creek, Invasive Plant, Native Plantings, Riparian Edge Management, Non-Native Aquatic Species Control, and Cowbird Management Measures under Alternative 4 are identical to implementation of the same measures under Alternative 2, with the exception of non-native aquatic species management. The primary difference is that, under Alternative 4, non-native aquatic species management would occur in additional areas. The addition of new areas does not alter the impacts associated with this measure. As a result, the impacts associated with implementing these measures under Alternative 4 are also identical to those described under Alternative 2. With the implementation of EC-BIO-2 thru EC-BIO-5, EC-BIO-7 thru EC-BIO-13, and EC-BIO-18 thru BIO-21, potential adverse impacts to wildlife movement and migratory birds would be less than substantial.

In-Stream Habitat Features Measure (Upstream and Downstream)

Direct Impacts
Compared to Alternative 2, the level of potential effects to wildlife and migratory birds from implementation of the downstream measure would be the same. Impacts associated with upstream features would be similar to those described for downstream, and neither the upstream nor the downstream measure will adversely affect wildlife movement. As sediment collects upstream of the features, resulting in less bed degradation and improved floodplain connectivity in those areas, localized benefits to wildlife movement could occur. With the implementation of Environmental Commitments EC-BIO-2, EC-BIO-7, EC-BIO-12, EC-BIO-18, EC-BIO-19, EC-BIO-20, and EC-BIO- 21 potential impacts to wildlife movement and migratory birds would be less than significant.

Indirect Impacts
Compared to Alternative 2 indirect impacts would be the same.

Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, long-term operation and maintenance impacts would be the same.

Feral Pig Management Measure

Direct Impacts
There are no direct impacts that affect migratory birds or wildlife movement.

Indirect Impacts
There are no indirect impacts that affect migratory birds or wildlife movement.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities that would affect migratory birds or wildlife movement.

Implementation of the MAMP
Specific actions in the MAMP include adjustments to methods, quantities, locations and timing of sediment removal and re-entrainment activities; minor adjustments to gradient, channel dimensions and plantings at Chino Creek; the importation and placement of substrates or re-positioning of in-stream habitat features to correct in-stream deficiencies; the removal of invasive vegetation; adjustments to cowbird control and fish removal methods, level of effort, and/or trap locations; and the replanting and temporary irrigation of failed vegetation. Vegetation removal activities associated with the MAMP would be implemented outside of the bird nesting season, and placement of additional substrate in-stream would occur outside of fish spawning and/or migration windows. Any actions taken would occur within the existing footprint of the original construction effects. Given the purpose of the MAMP is to ensure success of habitat restoration efforts, no actions would be implemented that did not have an overall beneficial effect and help to ensure the successful restoration of habitats. As a result, no substantial adverse effects to fish or wildlife movement, whether direct, indirect, or long-term, would occur as a result of implementing the MAMP.

Level of Impact for Alternative 4
Less than Significant Impact. Construction and long-term operation and maintenance activities would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory corridors or impede the use of native wildlife nursery sites.

5.6.4.5 **IMPACT BIO-5**: Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

For the analysis of impacts that follow for each alternative under BIO-5, there are two applicable plans within the Action Area: Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) and the Santa Ana Canyon Habitat Management Plan (MHP).

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, neither the Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. There would not be any ecosystem restoration activities occurring in the study area and no potential that any of the restoration activities would conflict with policies and programs provided in the Western Riverside County MSHCP and the Santa Ana Canyon MHP.

ALTERNATIVE 2 PROPOSED ACTION

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts

The focus of the Western Riverside County MSHCP is to maintain existing riparian habitats, floodplain process and water quality within the lower Santa Ana River. The Water Conservation Plan has been determined to not be in conflict with Western Riverside County MSHCP for the following reasons.

- The Water Conservation Plan could periodically inundate but would not decrease riparian habitat.
- The Water Conservation Plan would not interfere with existing floodplain process.
- The Water Conservation Plan would not result in adverse water quality impacts along the Santa Ana River.

The segment of the Santa Ana River downstream of Prado Dam to Weir Canyon is included in the Santa Ana Canyon HMP. The Santa Ana Canyon HMP addresses the floodplain and open wildlife habitat in the Santa Ana Canyon below Prado Dam and provides for planning and management continuity for the canyon habitat. The Water Conservation Measure would not involve any activities that would be in conflict with the Santa Ana Canyon HMP. Potential releases rates from Prado Dam that might occur from the Water Conservation Plan would not be high enough jeopardize biological mitigation sites and other biological resources along the lower Santa Ana River.

Indirect Impacts

There are no indirect impacts tha**t** would conflict with policies and programs provided in the Western Riverside County MSHCP or the Santa Ana Canyon HMP.

Long-Term Operation and Maintenance Impacts

There are no long-term operation and maintenance activities tha**t** would conflict with policies and programs provided in the Western Riverside County MSHCP or the Santa Ana Canyon HMP.

Ecosystem Restoration Plan

Direct Impacts

Sediment Management Measure
The Sediment Management Measure has been determined to be consistent with the Western Riverside County MSHCP for the following reasons;

- The Sediment Management Measure would remove sediment from the basin to reverse the trend of declining riparian habitat.
- It would have the potential to create head cutting along the Santa Ana River upstream from the study area. The head cutting would steepen the gradient of the river, which would expose existing beds of gravel and enhance habitat conditions for native fish.
- It would not interfere with existing floodplain process.
- It would not result in adverse water quality effects along the Santa Ana River.

The proposed sediment re-entrainment activities would occur in areas included in the Santa Ana Canyon HMP. The HMP addresses the floodplain and open wildlife habitat in the Santa Ana Canyon below Prado Dam and provides for planning and management continuity for the canyon habitat from Prado Dam downstream to Weir Canyon. One objective of the Sediment Management Measure would be to enhance and restore habitat in the Santa Ana River by preventing further degradation of certain areas of certain areas of the river sediment transport processes and to prevent further degradation of the Santa Ana River due to sediment starved stream flows. The restoration of the Santa Ana River would be consistent with the permitted activities listed in HMP.

Chino Creek Channel Restoration Measure
The proposed measure would be consistent with the Western Riverside County MSHCP in that the proposed improvements would enhance existing habitat and floodplain values within the Prado Basin. The Santa Ana Canyon HMP does not apply.

Invasive Plant Management Measure, Native Plantings Measure, In-Stream Habitat Features Measure, Riparian Edge Management Measure
The proposed ecosystem restoration measures would be consistent with the Western Riverside County MSHCP and the Santa Ana Canyon HMP in that they would enhance existing habitat and floodplain values. No conflicts with either Habitat Management Plans would occur.

Non-Native Aquatic Species Management, Cowbird Management
The wildlife management measures would be consistent with Western Riverside County MSHCP in that it would provide ecosystem restoration measures that would enhance habitat conditions for wildlife. The Santa Ana Canyon HMP does not apply.

Indirect Impacts
There are no indirect impacts tha**t** would conflict with policies and programs provided in the Western Riverside County MSHCP.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities tha**t** would conflict with policies and programs provided in the Western Riverside County MSHCP.

Implementation of the MAMP
Specific actions in the MAMP will be implemented to ensure the success of ecosystem restoration efforts, and no actions would be implemented that did not have an overall beneficial effect. The MAMP efforts are therefore generally aligned with the purposes of both the Western Riverside County MSHCP and Santa Ana Canyon MHP. As a result, the MAMP would not conflict with either applicable plan.

Level of Impact for Alternative 2
Less than Significant Impact. Construction and long-term operation and maintenance activities would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

ALTERNATIVE 3

Water Conservation Plan and Ecosystem Restoration Plan

Direct Impacts
Similar to Alternative 2, the Water Conservation Plan and the mix of ecosystem restoration measures proposed under Alternative 3 would be consistent with the Western Riverside County MSHCP and the Santa Ana Canyon HMP. Under Alternative 3, an incidental sediment removal program would be implemented in conjunction with the Water Conservation Plan. Compared to Alternative 2, there would be a reduced amount of sediment that would be removed from Prado Basin. Similar, to Alternative 2, Alternative 3 would still help to reverse the trend of declining riparian habitat and would establish early succession riparian habitat. The sediment removal activities would help restore riparian habitat which would be consistent with the objectives of the Western Riverside County MSHCP and Santa Ana Canyon HMP.

Indirect Impacts
There are no indirect impacts tha**t** would conflict with policies and programs provided in the Western Riverside County MSHCP or the Santa Ana Canyon HMP.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities tha**t** would conflict with policies and programs provided in the Western Riverside County MSHCP or the Santa Ana Canyon HMP.

Implementation of the MAMP
Specific actions in the MAMP will be implemented to ensure the success of ecosystem restoration efforts, and no actions would be implemented that did not have an overall beneficial effect. The MAMP efforts are therefore generally aligned with the purposes of both the Western

Riverside County MSHCP and Santa Ana Canyon MHP. As a result, the MAMP would not conflict with either applicable plan.

Level of Impact for Alternative 3
Less than Significant Impact. Construction and long-term operation and maintenance activities would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

ALTERNATIVE 4

Water Conservation Plan and Ecosystem Restoration Plan

Direct Impacts
The Water Conservation Plan, and the majority of the measures within the Ecosystem Restoration Plan, are identical to those contained in Alternative 2. Three measures, the In-Stream Habitat Features, the Non-Native Aquatic Species Management, and the Feral Pig Management Measures, differ between Alternative 2 and Alternative 4. These measures would not result in substantial adverse impacts to sensitive habitat and species, and the beneficial effects to these resources are consistent with MSHCP and HMP goals and objectives. For the rest of the measures that are identical, impacts and benefits would be identical as those discussed for Alternative 2. The Water Conservation Plan, as well as the mix of ecosystem restoration measures, proposed under Alternative 4 would be consistent with the Western Riverside County MSHCP and Santa Ana Canyon HMP.

Indirect Impacts
There are no indirect impacts tha**t** would conflict with policies and programs provided in the Western Riverside County MSHCP or the Santa Ana Canyon

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities tha**t** would conflict with policies and programs provided in the Western Riverside County Multiple Species Habitat Conservation Plan or the County of Orange Santa Ana Canyon Habitat Management Plan.

Implementation of the MAMP
Specific actions in the MAMP will be implemented to ensure the success of ecosystem restoration efforts, and no actions would be implemented that did not have an overall beneficial effect. The MAMP efforts are therefore generally aligned with the purposes of both the Western Riverside County MSHCP and Santa Ana Canyon MHP. As a result, the MAMP would not conflict with either applicable plan.

Level of Impact for Alternative 4
Less than Significant Impact. Construction and long-term operation and maintenance activities would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural

Community Conservation Plan, or other approved local, regional or state habitat conservation plan.

5.7 CULTURAL RESOURCES

5.7.1 Regulatory Framework

5.7.1.1 Federal

National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to take into account the effects of their undertakings on any district, site, building, structure, or object that is included on or eligible for inclusion on the National Register of Historic Places (NRHP) and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on such undertakings (36 CFR 800.1). Properties that are eligible for the NRHP are referred to as historic properties. There are three main standards that a resource must meet to qualify for listing on the NRHP (36 CFR 60): age, integrity, and significance. To meet the age criteria, a resource generally must be at least 50 years old. Properties under 50 years of age can be found eligible when the resource is of exceptional significance (36 CFR 60.4). To meet the integrity criteria, a resource must possess integrity of location, design, setting, materials, workmanship, feeling, and association. Finally, a resource must be significant according to one or more of the following criteria:

1. be associated with events that have made a significant contribution to the broad patterns of our history; or
2. be associated with the lives of persons significant in our past; or
3. embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
4. have yielded, or may be likely to yield, information important in prehistory or history

Regulations at 36 CFR 800 outline the process through which Section 106 of the NHPA is administered. In general, the regulatory process can be broken into four steps. These are 1) defining the undertaking and assessing whether it has the potential to affect historic properties included on, or eligible for inclusion on, the National Register; 2) making a good faith effort to identify those properties within the area of potential effect; 3) assessing the undertaking's effects on those resources; and 4) taking steps to avoid or mitigate adverse effects if present.

5.7.2 State

California Environmental Quality Act (CEQA)

The California Environmental Quality Act (CEQA) requires a lead agency to determine whether a project would have a significant effect on one or more historical resources. According to Section 15064.5(a) of the State CEQA Guidelines, a "historical resource" is defined as a resource listed in or determined to be eligible for listing in the California Register of Historical Resources (CRHR) (PRC Section 21084.1); a resource included in a local register of historical resources

(14 CCR 15064.5[a][2]); or any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant (14 CCR 15064.5[a][3]). The basic guidelines that were used for the cultural resources report (Appendix I) were Section 5024.1 of the PRC; Section 15064.5 of the State CEQA Guidelines (14 CCR); and Sections 21083.2 and 21084.1 of the CEQA Statutes. PRC 5024.1 requires evaluation of historical resources to determine their eligibility for listing on the CRHR. The purpose of the CRHR is to maintain a list of the State's historical resources and to indicate which properties are to be protected from substantial adverse change. A resource is eligible for listing in the CRHR if the State Historical Resources Commission determines that it is a significant resource and that it meets any of the following criteria:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
2. Is associated with the lives of persons important in our past.
3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
4. Has yielded, or may be likely to yield, information important in prehistory or history.

Human Remains

Section 7050.5 of the *California Health and Safety Code* provides for the disposition of accidentally discovered human remains. Section 7050.5 states that, if human remains are found, no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains shall occur until the County Coroner has determined the appropriate treatment and disposition of the human remains.

Section 5097.98 of the PRC states that, if remains are determined by the Coroner to be of Native American origin, they must notify the Native American Heritage Commission (NAHC) within 24 hours which, in turn, must identify the person or persons it believes to be the most likely descended from the deceased Native American. The descendant(s) shall complete his/her inspection within 48 hours of being granted access to the site. The designated Native American representative would then determine, in consultation with the property owner, the disposition of the human remains.

5.7.3 Impact Significance Criteria

Under NEPA, significance is determined based on 'context' and 'intensity'. For cultural resources, context is often viewed in terms of how important the resource may or may not be, while intensity is viewed in terms of the severity of the impacts to the resource. While cultural resources that do not meet the definition of a historic property under NHPA or a historic resource under CEQA are still considered as part of the NEPA review, once that resource fails to meet the criteria for eligibility for inclusion on the NRHP or the CRHR its 'context' is found to be lacking.

Under the NHPA, impacts to cultural resources are typically examined in terms of how the project would affect the characteristics that make the property eligible for the National Register, or in NEPA terms the intensity of the impact. For instance archaeological sites that are eligible

under Criterion D may be impacted by ground disturbance. Meanwhile, a property that is eligible under Criterion A, such as a farmhouse or a traditional cultural property (TCP), may be impacted by the introduction of audible or visual intrusions because these intrusions would affect its integrity of location, setting, and feeling. Such impacts are referred to as adverse effects in the NHPA's implementing regulations (36 CFR 800.5). A similar process is completed to evaluate whether a substantial adverse change in the significance of an historical resource would result under CEQA.

The terms "historic property" (used in NHPA) and "historic resource" (used in CEQA) are similar in concept and the evaluation process is analogous (see Section 5.6.1). For the purposes of this analysis properties that have been determined to be eligible for the NRHP are assumed to be eligible for the CRHR. Consequently, an adverse effect under NHPA would constitute a substantial adverse change under CEQA.

In light of the above, the following impact significance criterion is adopted for both NEPA and CEQA purposes. For purposes of this analysis, Alternative 1, 2, 3, or 4 would have a significant impact on cultural resources if it would:

IMPACT CR-1: Have an adverse effect (substantial adverse change) substantial enough that implementation of the alternative would result in the loss of a property's (resources) eligibility for the NRHP or the CRHP.

5.7.4 Environmental Commitments

EC-CR-1: In consultation with the SHPO, OCWD, and any affected Indian Tribes, the Corps shall ensure that any areas within the project footprint with the potential to encounter historic properties/historic resources that have either not been surveyed or have not been surveyed in the past ten years, are (re)surveyed by an archaeologist meeting the Secretary of the Interior's Qualification Standards. The Corps shall follow the steps outlined at 36 C.F.R. 800.4 thru 36 C.F.R. 800.6.

EC-CR-2: An archaeologist meeting the Secretary of the Interior's Qualification Standards shall monitor all construction activities in areas where there is a potential for buried resources. The monitor shall immediately notify the Corps' on-site construction supervisor of any discovery. The Corps on-site construction supervisor shall temporarily stop construction in the area of the discovery. The discovery area and a surrounding buffer zone shall then be clearly delineated. Ground disturbing activities can resume outside the delineated buffer zone. Should previously unknown historic or archaeological remains be discovered, the Corps would comply with 36 C.F.R. § 800.13 or alternative procedures if agreed to under an executed programmatic agreement or memorandum of agreement.

EC-CR-3: When construction crews are working within 50 meters of an eligible or unevaluated cultural resource, the edge of the site, including a 25-meter site buffer will be fenced off, thus ensuring that no construction equipment inadvertently strays into the culturally sensitive area.

EC-CR-4: (*California Health and Safety Code*, Section 7050.5). If the landowner rejects the MLD's recommendations, the landowner shall rebury the remains with appropriate dignity on

the property in a location that would not be subject to further subsurface disturbance (*California Public Resources Code,* Section 5097.98).

5.7.5 Cultural Resource Impacts

5.7.5.1 **IMPACT CR-1**: Would the project have an adverse effect (substantial adverse change) substantial enough that implementation of the alternative would result in the loss of a property's eligibility for the NRHP or the CRHP.

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, none of the Water Conservation Plan or proposed Ecosystem Restoration Plan would be implemented. There would be no ground disturbances and no potential that buried pre-historic and/or historical cultural resources within the study area would be adversely affected.

ALTERNATIVE 2: PROPOSED ACTION

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts
Implementation of the water conservation measure would involve changes to the timing and duration of the water conservation pool. The water conservation pool extends to an elevation of 498 feet during the flood season (Oct 1 through February 28) and 505 feet during the non-flood season (March 1 thru September 30). Ideally these pools are held for the entire period. During the flood season, water levels are often held above 498 feet, but its purpose is for flood control not water conservation. The seven-foot area between 498 and 505 feet has been seasonally submerged since the dam was constructed in 1941 with higher inundation levels occurring up to 556 feet during major storm events. The Corps previously consulted with the State Historic Preservation Office (SHPO) and affected Indian Tribes about raising the water conservation pool from 494 feet to 505 feet culminating in the execution of the Memorandum of Agreement (MOA) in 1992 regarding adverse effects to four historic properties due to the increase in water storage (Appendix I). The Corps developed mitigation with the SHPO to address the effects of raising the conservation pool in genera and did not limit its effects finding to a specific time period during the year. Modifying the timing or purpose of water impoundment does not alter the current setting or integrity of any historic resource/historic properties that may be located within the Prado Basin. The proposed Plan would not result in an adverse effect under NHPA and would be less than significant under NEPA and CEQA.

Indirect Impacts
The types of indirect impacts to cultural resources associated with the changes in timing and duration of the water conservation pool could include things like a minor change in the visual setting of historic-aged structures. Assuming that the historic-aged structures were eligible for the NRHP or the CRHP, these changes would be so minor that they would be highly unlikely to be considered an adverse effect or a substantial adverse change. Setting is rarely an aspect of

integrity for archaeological resources so indirect changes in setting would not be an adverse effect or a substantial adverse change. Any potential indirect impacts to cultural resources would be so minor that they would be less than significant under NEPA and CEQA.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities associated with the water conservation plan that would affect cultural resources

Ecosystem Restoration Plan

Sediment Management Measure

Direct Impacts
Sediment would be removed from Prado Basin and re-entrained into the lower Santa Ana River below Prado Dam by a combination of sediment traps, transition channels, connector channels, sediment storage areas, and sediment re-entrainment systems. No cultural resources have been recorded within the footprint of the sediment trap, transition channel, or the connector channel. Much of the ground disturbance that would occur as part of this measure is located within the Santa Ana River channel or in areas where several feet of sediment that has accumulated behind the Dam since its construction in 1941. At some locations, the sediment depth is in excess 25 feet. The proposed excavation and grading activities would not exceed a depth of 12 feet and would not impact native soils. Therefore, it would be unlikely that unknown buried archaeological resources would be encountered since excavation and grading would not go below the amount of accumulated sediment that has taken place since the Dam was constructed.

Seven cultural resources have been recorded within the boundaries of or immediately adjacent to the sediment storage site and the re-entrainment slurry pipeline.
CA-RIV-3372: This site is the defunct town of Rincon's cemetery. The site is surrounded by a locked fence and gate, and all surface evidence has been removed. The site was determined to be not eligible for inclusion on the NRHP. In general, cemeteries are excluded from eligibility as a criteria consideration (36 C.F.R. 60.4). No sediment would be placed within the cemetery boundary and no direct impacts to the site would occur.

CA-RIV-5524H: This site consists the remains of the Metherell Ranch. The structures were removed in the 1940s. Archaeological testing occurred at the site (Foster 1996) and it was determined to be not eligible for the NRHP. The site is not anticipated to be directly impacted.

CA-RIV-5523H: A former poultry farm and ranch, this site will be completely buried by sediment. It has previously been evaluated and deemed not eligible for listing in the NRHP (Greenwood 1995).

CA-RIV-1039H: the former Ashcroft family ranch was determined to be eligible for the NRHP in 1996. In 1995, Greenwood and Associates conducted an extensive surface collection and subsurface testing of the resource. The testing program included the excavation of 26 trenches, one unit, and two surface exposures. Twenty separate features were identified including trash deposits, a privy pit, various structural remains, and two brick pottery kilns (Foster et al. 1996).

In 1998, the Corps consulted with the California SHPO regarding the necessity of data recovery at both CA-RIV-1039 and CA-RIV-1044 in anticipation of using the areas as a borrow area. Data recovery at CA-RIV-1039 included 19 mechanical stripping units, 26 backhoe trenches and 38 excavation units were excavated at the site. The site was fully mitigated and was destroyed by the excavation of the borrow pit. The proposed measure would place fill where the site was once located, but since it no longer exists, it would not be impacted.

CA-RIV-1044H: the site is a historic era ranch known as the Carrillo or Pate family ranch. The site was determined to be eligible for listing in the NRHP. Similar to CA-RIV-1039, the site was located within the boundaries of the proposed borrow area for the Santa Ana River Mainstem project and was slated to be mostly destroyed by the project. Extensive data recovery excavations occurred including 12 stripping units, ten backhoe trenches, and 19 excavation units (Sterner 2004). While portions of CA-RIV-1044 still exist, the site has been fully excavated/mitigated and is no longer treated as a historic property/historic resource.

CA-RIV-3694H (3698H): This site, the former site of the town of Rincon was determined to be eligible for listing on the NRHP (Greenwood 1987). Limited data recovery occurred at the site in 1992 as proposed mitigation associated with the raising the water conservation pool from 494' to 505' (Foster et al 1995). The current proposal would involve direct impacts to the southern edge of the site. As currently proposed, the measure would adversely affect site CA-RIV-3694. Additional data recovery would be required if the proposed measure is implemented.

CA-RIV-4730H: This site is the Prado Dam facility. The Dam was determined eligible for listing on the National Register in 1991. The Dam went through extensive changes in the late 1990s to a point where it is no longer eligible. In consultation with SHPO, mitigation for adverse effects to the Dam were completed in 1996 with the completion of Historic American Engineering Record documentation. The current proposal would involve downstream modifications to the Dam to allow for the sediment to be re-entrained.

The proposed measure would result in an adverse effect/substantial adverse change to historic properties through the direct impacts to NRHP eligible (assumed CRHP eligible) site CA-RIV-3694; however, these impacts would only be to a small fraction of the site and would not be substantial enough to preclude the site's eligibility, and therefore would be less than significant under NEPA and CEQA. Implementation of Cultural Commitments 2 and 3 would ensure that impacts to CA-RIV-3694 are minimized.

Indirect Impacts

While the re-entrainment of sediment into the Santa Ana River could cause minor changes in flows and sediment deposition downstream, it is not expected that these changes would cause erosion or other deleterious impacts to downstream cultural resources. The river itself is a dynamic environment where cultural resources are unlikely to exist. Any eligible resources would be located on the riverward side of the levee where small changes in flows and sediment deposition would not impact them. Indirect impacts associated with the sediment management measure would be less than significant under NEPA and CEQA.

Long-Term Operation and Maintenance Impacts
The long-term operation and maintenance activities as well as adaptive management for the sediment management measure would involve adjustments to methods, quantities, and possibly locations or material excavated and, or re-entrained to ensure success criteria are met. Implementation of long-term operation and maintenance impacts and adaptive management activities would mostly be confined to areas where construction had previously occurred and no further impacts to cultural resources would occur as part of the long-term operation and maintenance. Where adaptive management activities required ground disturbance outside of the previous construction footprint, activities would be excluded from areas where historic properties or historic resources exist and therefore they would not be adversely affected or experience a substantial adverse change. The long-term operation and maintenance impacts would be less than significant under NEPA and CEQA.

Chino Creek Channel Restoration Measure

Direct Impacts
The measure involves the construction of a new, sinuous channel across a low gradient field and shallow excavation/grading extending out along both sides of the creek, construction of access routes and staging areas, and native plantings. No cultural resources have been recorded within the footprint of the currently proposed measure but two nineteenth century adobe structures are located within a half mile so there is moderate potential for historic era refuse to be located within the measure's footprint. The project footprint was visually inspected in 2018 but the vegetation was too thick to effectively inventory the area (Maxon 2018). Construction of the Chino Creek Channel will require approximately 132 acres of ground disturbance. If historic properties or historic resources are located along the channel construction corridor, adverse effects/substantial adverse changes would be difficult to avoid. Historic resources and historic properties located within the planting area could likely be avoided. No cultural resources are known to exist within the construction footprint but could be encountered during cultural resource surveys that would occur in anticipation of the project. If historic properties/historic resources are located within the construction footprint and impacts cannot be avoided it is likely that they would be adverse and could be significant; however, the literature review and visual inspection did not identify any cultural resources within the project footprint. It is expected that the measure would most likely be less than significant under NEPA and CEQA.

Indirect Impacts
Implementation of the Chino Creek Channel restoration measure would not result in any indirect adverse impacts to any historic properties or historic resources. The impacts would be less than significant under NEPA and CEQA.

Long-Term Operation and Maintenance Impacts
Long Term Operation and Maintenance activities could include actions such as the removal of sediment from the channel, re-grading the access route, and replanting vegetation. The work would occur in areas previously disturbed by the construction of the Chino Creek channel restoration measures and would not result in additional impacts to cultural resources. The impacts would be less than significant under NEPA and CEQA.

In-stream Habitat Features Measure – SARM Downstream

Direct Impacts
While specific locations have not been identified for these features, the in-stream habitat features would be constructed within the Santa Ana River channel, a previously channelized river and a highly dynamic environment where no cultural resources are likely to occur. Similarly, impacts associated with constructing the features such as access routes and staging areas would be placed in areas where seasonal flooding has accumulated several feet of alluvial sediments. Furthermore, if sites were later identified along the river bank, access routes and staging areas could be routed around the sites to avoid impacts. The measure would be less than significant under NEPA and CEQA.

Indirect Impacts
Implementation of the in-stream habitat features measure is not expected to result in any perceivable indirect impacts to cultural resources. The habitat features are not expected to increase erosion or cause changes in flows up-stream or downstream from the features. The habitat features would not cause a change in the visual or auditory setting of any historic-era standing structures. The measure would not result in an adverse effect or a substantial adverse change to a historic property or historic resources. The measure would be less than significant under NEPA and CEQA.

Long-Term Operation and Maintenance Impacts
Long term operation and maintenance activities would involve regular inspections of the in-stream habitat rock structures to evaluate their performance. Adaptive management may require the occasional presence of equipment to reposition or bring in additional rocky material to ensure that success criteria are met. The work would occur in areas previously utilized for the construction of the rock structures and would not result in additional impacts to cultural resources. The impacts would be less than significant under NEPA and CEQA.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure

Direct Impacts
These measures would all involve some measure of ground disturbance. The invasive plant management measure would involve removing the initial biomass, the application of pesticides, and re-plantings. The native plantings measure entails slightly more ground disturbance and would involve the use of mechanize equipment to prepare the sites before plantings. Specific locations for the invasive plant and native plantings measures have not been selected. Only a small percentage of the total acreage of the focal areas would be treated and impacts to historic properties/historic resources would be avoided. And finally, riparian edge management would occur along the edges of the sediment management measure and therefore would occur in an area already disturbed by the implementation of that measure. The project areas would be surveyed for cultural resources prior to implementation of the measures and adverse impacts to any historic properties or historic resources would be avoided. The measure is less than significant under NEPA and CEQA.

Indirect Impacts
While the removal of invasive species and the planting of native species could have an indirect impact on cultural resources adjacent to the removal/planting areas, the impact would not be adverse. If any historic-era structures are located adjacent to the removal/planting areas, the re-plantings could actually improve viewshed of the property by restoring the area to a more historically appropriate landscape. The impacts would be less than significant under NEPA and CEQA.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance and adaptive management activities would involve regular inspections of the areas and perhaps additional removal of non-native species with herbicides or hand tools. As with the initial implementation of the measure, ground disturbing actives would not occur within boundaries of historic properties or historic resources and therefore the long-term operation and maintenance would not result in an adverse effect or a substantial adverse change. The impacts would be less than significant under NEPA and CEQA.

Non-Native Aquatic Species Management Measure, Cowbird Management Measure

Direct Impacts
The non-native aquatic species management measure and the cowbird management measure would be conducted in natural open space areas using existing maintenance roads and staging areas. The measures would not involve new ground disturbance. No impacts to cultural resources would occur under these measures. The measures are less than significant under NEPA and CEQA.

Indirect Impacts
Implementation of the non-native aquatic species management measure and the cowbird management measure would not indirectly impact cultural resources. The indirect impacts would be less than significant under NEPA and CEQA.

Long-Term Operation and Maintenance Impacts
The long-term operation and maintenance and adaptive management activities would involve regular inspection of the focal areas and the removal of non-native wildlife. Any future removal activities would be conducted in natural open space areas using existing maintenance roads and staging areas. Operation and maintenance activities would not involve new ground disturbance. No impacts to cultural resources would occur under these measures. The measures are less than significant under NEPA and CEQA.

Level of Impact for Alternative 2
Alternative 2 would result in an adverse effect/substantial adverse change to at least one historic property/historic resource related to the construction of the sediment storage area. The impacts to the historic property/historic resource would not be substantial enough to exceed the significance criteria. Additional adverse effects/substantial adverse changes could occur if a historic property/historic resource is located within the footprint of the Chino Creek channel restoration measure or any of the features associated with the sediment trap and cannot be

avoided. Due to the location and type of impacts associated with the Chino Creek channel or the sediment trap if there is an adverse effects/substantial adverse change the impact would likely be major enough to exceed the significance criteria. Alternative 2 would result in a known adverse effect/substantial adverse change that is less than significant under NEPA and CEQA; however, additional significant impacts could occur to as of unidentified cultural resources, but these impacts are unlikely.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 Feet with Incidental Sediment Removal)

Direct Impacts

Under Alternative 3, an incidental, smaller scale sediment removal program would be implemented in-conjunction with Water Conservation Measure. Compared to the Proposed Action, Alternative 3 would have a substantially less excavation activities and a smaller construction footprint. While encountering buried cultural resources under the proposed action is unlikely, the potential is further diminished with the smaller excavation footprint of Alternative 3. Impacts associated with the water conservation measure would be the same as Alternative 2.

Additionally, under Alternative 3 the sediment storage site would be substantially smaller than Alternative 2. The construction and operation of the sediment storage site would avoid impacts to previously recorded cultural resource sites CA-RIV-5523H, CA-RIV-1039H, CA-RIV-1044H and CA-RIV-3694H (3698H). Adverse effects to historic properties/historic resources would be avoided under this measure and impacts to cultural resources would be less than significant under NEPA and CEQA.

Indirect Impacts

As with the Water Conservation Plan under Alternative 2, any incidental indirect impacts to cultural resources would be less than significant under NEPA and CEQA. Potential impacts associated with the incidental sediment removal activities would be similar to the impacts associated with the sediment management measure under Alternative 2 but at an even smaller scale. Indirect impacts to cultural resources would be less than significant under NEPA and CEQA.

Long-Term Operation and Maintenance Impacts

Long-term operation and maintenance activities would be the same as those that would occur under the sediment management measure under Alternative 2 but at a smaller scale. Work would occur in areas already disturbed by the construction of the measure. No additional impacts to cultural resources would occur as part of the long-term operation and maintenance of the measure. The impacts would be less than significant under NEPA and CEQA.

Ecosystem Restoration Plan

Direct, Indirect, and Future Operation and Maintenance Impacts

Chino Creek Channel Restoration Measure
Under Alternative 3, the Chino Creek Channel Restoration would be constructed in the same manner as under the proposed action. Impacts to cultural resources would be the same. It is expected that the measure would most likely be less than significant under NEPA and CEQA.

Invasive Plant Management Measure, Native Plantings Measure
These measures are the same as described for Alternative 2 and therefore the level of potential impacts is the same. The measure is less than significant under NEPA and CEQA.

Cowbird Trapping Measure
This measure is the same as described for Alternative 2 and therefore the level of potential impacts is the same. The measure is less than significant under NEPA and CEQA.

Level of Impact for Alternative 3
Alternative 3 would not have an adverse effect/substantial adverse change on any known historic properties/historic resources. Adverse effects/substantial adverse changes could occur if a historic property/historic resource is located within the footprint of the Chino Creek channel restoration measure or any of the features associated with the sediment trap that cannot be avoided. Due to the location and type of impacts associated with the Chino Creek channel or the sediment trap, these impacts would likely be significant, but it is unlikely that there are unavoidable historic properties/historic resources present. Alternative 2 would likely be less than significant under NEPA and CEQA.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct, Indirect and Long-Term Operation and Maintenance Impacts
The plan is the same as described for Alternative 2 and therefore impacts to cultural resources would be the same. The proposed measure would not result in an adverse effect under NHPA and would be less than significant under NEPA and CEQA.

Ecosystem Restoration Plan

Direct, Indirect and Long-Term Operation and Maintenance Impacts

Sediment Management Measure
The sediment management measure is the same as under Alternative 2 and impacts to cultural resources would be the same. The measure would result in an adverse effect/ substantial adverse change to a historic property/historic resources through the direct impacts to NRHP eligible site CA-RIV-3694; however, these impacts would only be to a small fraction of the site and would not be substantial enough to preclude the site's eligibility, and therefore would be less than

significant under NEPA. Additional cultural sites are unlikely to be encountered within the sediment management measure footprint and the measure would be less than significant under NEPA and CEQA.

Chino Creek Channel Restoration Measure
Under Alternative 4, the Chino Creek Channel Restoration would be constructed in the same manner as under Alternative 2. Impacts to cultural resources would be the same. It is expected that the measure would most likely be less than significant under NEPA and CEQA.

In-stream Habitat Features Measures – Upstream and Downstream:
Under Alternative 4, in-steam habitat features would be constructed within the SARM Upstream Focal Area in addition to the in-stream habitat features that would occur in the SARM Downstream Focal Area which also are included under Alternatives 2 and 3. Impacts to cultural resources would be similar, to the impacts already described for the SARM downstream focal area. The in-stream habitat features would be constructed within the Santa Ana River channel, a previously channelized river and a highly dynamic environment where no cultural resources are likely to occur. Similarly, impacts associated with constructing the features such as access routes and staging areas would be placed in areas where seasonal flooding has accumulated several feet of alluvial sediments. Furthermore, if sites were later identified along the river bank, access routes and staging areas could be routed around the sites to avoid impacts. Indirect impacts would not occur with the measure and long-term operation and maintenance activities would occur within the same footprint and would not result in impacts to cultural resources. Impacts would be less than significant under NEPA and CEQA.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure
The same level of ground disturbance would occur under Alternative 4 as under Alternative 2 and impacts to cultural resources would be the same. The measure is less than significant under NEPA and CEQA.

Non-Native Aquatic Species Management Measure (Upstream and Downstream), Cowbird Management Measure, Feral Pig Management Measure:
Under Alternative 4, the cowbird management measure would be conducted in the same manner and would have the same impacts as under Alternatives 2 and 3. Also under this alternative, the non-native aquatic species management measure activities are expanded to occur in both the SARM upstream and downstream focal areas. The alternative also includes activities to reduce the non-native feral pig population. None of these non-native wildlife management measures would involve ground disturbance or changes to historic era structures. The measures would not have any direct or indirect impacts on cultural resources. The long-term operation and management activities would also not entail ground disturbing activities or impacts to historic era structures. There would be no long-term operation and maintenance impacts to cultural resources. This measure is less than significant under NEPA and CEQA.

Level of Impact for Alternative 4
Alternative 4 would result in an adverse effect/substantial adverse change to at least one historic property/historic resource related to the construction of the sediment storage area. The impacts

to the historic property/historic resource would not be substantial enough to exceed the significance criteria. Additional adverse effects/substantial adverse changes could occur if a historic property/historic resource is located within the footprint of the Chino Creek channel restoration measure or any of the features associated with the sediment trap and cannot be avoided. Due to the location and type of impacts associated with the Chino Creek channel or the sediment trap, if there is an adverse effects/substantial adverse change the impact would likely be major enough to exceed the significance criteria. Alternative 4 would result in a known adverse effect/substantial adverse change that is less than significant under NEPA and CEQA; however, additional significant impacts could occur to as of unidentified cultural resources, but these impacts are unlikely.

5.8 PALEONTOLOGICAL RESOURCES

5.8.1 Regulatory Framework

5.8.1.1 Federal

Paleontological Resources Preservation Act (PRPA)

The Paleontological Resources Preservation Act (PRPA) was signed in to law on March 30, 2009 (Public Law 111-11, Title VI, Subtitle D; 16 U.S.C. §§470aaa-470aaa-11). PRPA directs the Department of Agriculture (US Forest Service) and the department of the Interior (National Park Service, Bureau of Land Management, Bureau of Reclamation, and Fish and Wildlife Service) to implement comprehensive paleontological resources management programs. Section 6310 of the PRPA specifically states, "As soon as practical after the date of the enactment of this Act, the Secretary shall issue such regulations as are appropriate to carry out this subtitle, providing opportunities for the public notice and comment." The US Forest Service published the Department of Agriculture version of the PRPA regulations in the Federal Register in April 2015.[3] The Corps is not required to comply with the PRPA.

5.8.1.2 State

California Public Resources Code Related to Paleontological Resources

Several sections of the California Public Resources Code protect paleontological resources. Section 5097.5 prohibits "knowing and willful" excavation, removal, destruction, injury and defacement of any paleontological feature on public lands (lands under state, county, city district or public authority jurisdiction, or the jurisdiction of a public corporation), except where the agency with jurisdiction has granted express permission. Section 30244 requires reasonable mitigation for impacts to paleontological resources that occur as a result of development on public lands. The California Administrative Code Sections 4307-4309, relating to the State Division of Beaches and Parks, afford protection to geological features and "paleontological materials," but grand the director of the state park system authority to issue permits for specific activities that may result in damage to such resources, if the activities are for state park purposes and in the interest of the state park system.

[3] https://www.nps.gov/subjects/fossils/fossil-protection.htm

5.8.2 Impact Significance Criteria

Under NEPA, there is not an applicable significance criterion for paleontological resources, as the PRPA does not apply to USACE projects. Under CEQA, the California Public Resource Code prohibits "knowing and willful" excavation, removal, destruction, injury and defacement of any paleontological feature on public lands.

In light of the above, the following impact significance criterion is adopted for CEQA purposes. For purposes of this analysis, Alternative 1, 2, 3, or 4 would have a significant impact on paleontological resources if it would:

IMPACT PR-1: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature known to exist in the project area.

5.8.3 Environmental Commitments

EC-PR-1: A qualified paleontologist would be notified and retained when earth-moving activities are anticipated to impact undisturbed deposits in the Older Quaternary Alluvium on the project site. The designated Paleontologist should be present during the pre-grade meeting to discuss paleontological sensitivity and to assess whether scientifically important fossils have the potential to be encountered. The extent of monitoring activities would be determined at the meeting in consultation with the OCWD. If any scientifically important large fossil remains are uncovered during earth-moving activities, the Paleontological Monitor would divert heavy equipment away from the fossil site until s/he has had an opportunity to examine the remains. Samples of Older Quaternary Alluvium should be collected for processing and examination for very small vertebrate fossils.

5.8.4 Paleontological Resource Impacts

5.8.4.1 **IMPACT PR-1:** Would the project directly or indirectly destroy a unique paleontological resources or site or unique geologic feature?

Record Search

The Los Angeles County Museum of Natural History provided a records search for the study area in July of 2015. According to the Los Angeles County Museum of Natural History most of the study area, usually the lowest elevation terrain, has shallow surface deposits of younger Quaternary Alluvium or active wash deposits from Chino Creek from the northwest, Mill Creek from north central, the Santa Ana River from in the northeast and Temescal Creek from the southeast. These deposits typically do not contain significant vertebrate fossils, at least in the uppermost layers and there are not any known localities nearby from these deposits. Some of the slightly higher elevation in the study area has surface exposures that consist of older Quaternary Alluvium, derived predominantly of alluvial fan deposits from the San Bernardino Mountains to the north, and these deposits underlie the younger Quaternary Alluvium in the drainages. The closest fossil vertebrate locality from similar older Quaternary deposits is LACM 7811, directly north of Sumer Avenue that produced a fossil specimen of whipsnake, Masticophis, at a depth of 9 to 11 feet below the surface. Just outside the southeastern boundary of the project area, on the

northwest side of Corona, west of Cota Street between Railroad Street and Harrington, a vertebrate fossil locality LACM 1207 produced a fossil specimen deer, Odocoileus.

The study area is in a disturbed condition from sediment that has accumulated since Prado Dam was constructed in 1941, in some areas in excess of 25 feet. According to the Los Angeles County Museum of Natural History excavations in the younger Quaternary Alluvium deposits are unlikely to uncover significant fossil vertebrate remains. However, the deeper excavations that extent into older Quaternary Alluvium could encounter significant vertebrate fossil and should be monitored.

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, none of the Water Conservation Plan or proposed Ecosystem Restoration Plan would be implemented. There would be no ground disturbances and no potential that paleontological resources within the study area would be adversely affected.

ALTERNATIVE 2: PROPOSED ACTION

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts
Implementation of the water conservation measure would involve changes to the timing and duration of the water conservation pool. Because there would be no excavation or ground disturbance, the proposed Plan would not result in an adverse effect to paleontological resources under CEQA.

Indirect Impacts
Because the water conservation plan's indirect impacts to paleontological resources would be so minor that they would be less than significant under NEPA and CEQA.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities associated with the water conservation plan that would affect paleontological resources, therefore there would not be a significant impact under CEQA.

Ecosystem Restoration Plan

Sediment Management Measure

Direct Impacts
Sediment would be removed from Prado Basin and re-entrained into the lower Santa Ana River below Prado Dam by a combination of sediment traps, transition channels, connector channels, sediment storage areas, and sediment re-entrainment systems. No paleontological resources have been recorded within the footprint of the sediment trap, transition channel, or the connector

channel. Much of the ground disturbance that would occur as part of this measure is located within the Santa Ana River channel or in areas where several feet of sediment has accumulated behind the Dam since its construction in 1941. At some locations, the sediment depth is in excess 25 feet. There would be the potential that excavation activities associated with sediment management measurer could be over 25 feet in depth and could extend into older Quaternary Alluvium and vertebrate fossils could be encountered and damaged. To avoid potential significant impacts to vertebrate fossils, a qualified paleontologist would monitor ground disturbing activities that extend into older Quaternary Alluvium. With the implementation of Environmental Commitment Measure PR-1 potential adverse impacts to paleontological resources under CEQA would be less than significant.

Indirect Impacts
While the re-entrainment of sediment into the Santa Ana River could cause minor changes in flows and sediment deposition downstream, it is not expected that these changes would cause erosion or other deleterious impacts to downstream paleontological resources. The river itself is a dynamic environment where paleontological resources are unlikely to exist. Indirect impacts associated with the sediment management measure would be less than significant under CEQA.

Long-Term Operation and Maintenance Impacts
The long-term operation and maintenance activities as well as adaptive management for the sediment management measure would involve adjustments to methods, quantities, and possibly locations or material excavated and, or re-entrained to ensure success criteria are met. Implementation of long-term operation and maintenance impacts and adaptive management activities would mostly be confined to areas where construction had previously occurred and no further impacts to paleontological resources would occur as part of the long-term operation and maintenance. The long-term operation and maintenance impacts would be less than significant under CEQA.

Chino Creek Channel Restoration Measure

Direct Impacts
The measure involves the construction of a new, sinuous channel across a low gradient field and shallow excavation/grading extending out along both sides of the creek, construction of access routes and staging areas, and native plantings. No paleontological resources have been recorded within the footprint of the currently proposed measure. It is expected that the measure would most likely be less than significant under CEQA.

Indirect Impacts
Implementation of the Chino Creek Channel restoration measure would not result in any indirect adverse impacts to any known paleontological resources. The impacts would be less than significant under CEQA.

Long-Term Operation and Maintenance Impacts
Long Term Operation and Maintenance activities could include actions such as the removal of sediment from the channel, re-grading the access route, and replanting vegetation. The work would occur in areas previously disturbed by the construction of the Chino Creek channel

restoration measures and would not result in additional impacts to paleontological resources. The impacts would be less than significant under CEQA.

In-stream Habitat Features Measure – SARM Downstream

Direct Impacts
While specific locations have not been identified for these features, the in-stream habitat features would be constructed within the Santa Ana River channel, a previously channelized river and a highly dynamic environment where no paleontological resources are likely to occur. Similarly, impacts associated with constructing the features such as access routes and staging areas would be placed in areas where seasonal flooding has accumulated several feet of alluvial sediments. Furthermore, if sites were later identified along the river bank, access routes and staging areas could be routed around the sites to avoid impacts. The impacts to paleontological resources from this measure would be less than significant under CEQA.

Indirect Impacts
Implementation of the in-stream habitat features measure is not expected to result in any perceivable indirect impacts to paleontological resources. The habitat features are not expected to increase erosion or cause changes in flows up-stream or downstream from the features. The impacts to paleontological resources from this measure would be less than significant under CEQA.

Long-Term Operation and Maintenance Impacts
Long term operation and maintenance activities would involve regular inspections of the in-stream habitat rock structures to evaluate their performance. Adaptive management may require the occasional presence of equipment to reposition or bring in additional rocky material to ensure that success criteria are met. The work would occur in areas previously utilized for the construction of the rock structures and would not result in additional impacts to paleontological resources. The impacts would be less than significant under CEQA.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure

Direct Impacts
These measures would all involve some measure of ground disturbance. The invasive plant management measure would involve removing the initial biomass, the application of pesticides, and re-plantings. The native plantings measure entails slightly more ground disturbance and would involve the use of mechanize equipment to prepare the sites before plantings. Specific locations for the invasive plant and native plantings measures have not been selected. Because of the lack of excavation beyond existing soil horizons, the impacts of the measure to paleontological resources would be less than significant under CEQA.

Indirect Impacts
The removal of invasive species and the planting of native species would be very unlikely to have an indirect impact on paleontological resources because there would be no excavation below existing soil horizons. The impacts would be less than significant under CEQA.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance and adaptive management activities would involve regular inspections of the areas and perhaps additional removal of non-native species with herbicides or hand tools. As with the initial implementation of the measure, ground disturbing actives would not occur at depths of expected fossil containing deposits, and therefore the long-term operation and maintenance would not result in an adverse effect or a substantial adverse change. The impacts would be less than significant under CEQA.

Non-Native Aquatic Species Management Measure, Cowbird Management Measure

Direct Impacts
The non-native aquatic species management measure and the cowbird management measure would be conducted in natural open space areas using existing maintenance roads and staging areas. The measures would not involve new ground disturbance. No impacts to paleontological resources would occur under these measures. The measures' impacts to paleontological resources would be are less than significant under CEQA.

Indirect Impacts
Implementation of the non-native aquatic species management measure and the cowbird management measure would not indirectly impact paleontological resources. The indirect impacts would be less than significant under CEQA.

Long-Term Operation and Maintenance Impacts
The long-term operation and maintenance and adaptive management activities would involve regular inspection of the focal areas and the removal of non-native wildlife. Any future removal activities would be conducted in natural open space areas using existing maintenance roads and staging areas. Operation and maintenance activities would not involve new ground disturbance. No impacts to paleontological resources would occur under these measures. The measures are less than significant under CEQA.

Level of Impact for Alternative 2
The study area is presently in a disturbed condition from several feet of sediment that has accumulated since Prado Dam was constructed in 1941, in some areas in excess of 25 feet. There would be the potential that excavation activities associated with sediment management measurer could be over 25 feet in depth and could extend into older Quaternary Alluvium and vertebrate fossils could be encountered and damaged. To avoid potential significant impacts to vertebrate fossils, a qualified paleontologist would monitor ground disturbing activities that extend into older Quaternary Alluvium. With the implementation of Environmental Commitment Measure PR-1 potential adverse impacts to paleontological resources would be less than significant.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 Feet with Incidental Sediment Removal)

Direct Impacts
Under Alternative 3, an incidental, smaller scale sediment removal program would be implemented in-conjunction with Water Conservation Measure. Compared to the Proposed Action, Alternative 3 would have a substantially less excavation activities and a smaller construction footprint. While encountering buried paleontological resources under the proposed action is unlikely, the potential is further diminished with the smaller excavation footprint of Alternative 3. Impacts associated with the water conservation measure would be the same as Alternative 2.
Additionally, under Alternative 3 the sediment storage site would be substantially smaller than Alternative 2. Impacts to paleontological resources would be less than significant under CEQA.

Indirect Impacts
As with the Water Conservation Plan under Alternative 2, any incidental indirect impacts to paleontological resources would be less than significant under CEQA. Potential impacts associated with the incidental sediment removal activities would be similar to the impacts associated with the sediment management measure under Alternative 2 but at an even smaller scale. Indirect impacts to cultural resources would be less than significant under CEQA.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would be the same as those that would occur under the sediment management measure under Alternative 2 but at a smaller scale. Work would occur in areas already disturbed by the construction of the measure. No additional impacts to paleontological resources would occur as part of the long-term operation and maintenance of the measure. The impacts would be less than significant under CEQA.

Ecosystem Restoration Plan

Direct, Indirect, and Future Operation and Maintenance Impacts

Chino Creek Channel Restoration Measure
Under Alternative 3, the Chino Creek Channel Restoration would be constructed in the same manner as under the proposed action. Impacts to paleontological resources would be the same as under Alternative 2. It is expected that the measure would most likely be less than significant under CEQA.

Invasive Plant Management Measure, Native Plantings Measure
These measures are the same as described for Alternative 2 and therefore the level of potential impacts is the same. The measure is less than significant under CEQA.

Cowbird Trapping Measure
This measure is the same as described for Alternative 2 and therefore the level of potential impacts is the same. The measure is less than significant under CEQA.

Level of Impact for Alternative 3
Under Alternative 3, an incidental, smaller scale sediment removal program would be implemented in-conjunction with Water Conservation Plan. The study area is presently in a disturbed condition from several feet of sediment that has accumulated since Prado Dam was constructed in 1941, in some areas in excess of 25 feet. Under Alternative 3, the sediment removal activities would not exceed a depth of 15 feet and would occur within younger Quaternary Alluvium deposits, which according to the Los Angeles County Museum of Natural History are deposits that are unlikely to uncover significant fossil vertebrate remains. Compared to the Proposed Action, the sediment removal and hauling activities under Alternative 3 would have less excavation activities and less likelihood to encounter paleontological resources. Similar to the Proposed Action, to avoid potential impacts to unknown paleontological resources, the study area would be monitored by an onsite paleontologist. With the implementation of Environmental Commitment Measure PR-1 potential adverse impacts to paleontological resources would be less than significant.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct, Indirect and Long-Term Operation and Maintenance Impacts
The plan is the same as described for Alternative 2 and therefore impacts to paleontological resources would be the same. The proposed measure would result in impacts that are less than significant under CEQA.

Ecosystem Restoration Plan

Direct, Indirect and Long-Term Operation and Maintenance Impacts

Sediment Management Measure
The sediment management measure is the same as under Alternative 2 and impacts to paleontological resources would be the same. To avoid potential significant impacts to vertebrate fossils, a qualified paleontologist would monitor ground disturbing activities that extend into older Quaternary Alluvium. With the implementation of Environmental Commitment Measure PR-1 potential adverse impacts to paleontological resources under CEQA would be less than significant.

Chino Creek Channel Restoration Measure
Under Alternative 4, the Chino Creek Channel Restoration would be constructed in the same manner as under Alternative 2. Impacts to cultural resources would be the same. It is expected that the measure's impacts would most likely be less than significant under CEQA.

In-stream Habitat Features Measures – Upstream and Downstream:
Under Alternative 4, in-steam habitat features would be constructed within the SARM Upstream Focal Area in addition to the in-stream habitat features that would occur in the SARM Downstream Focal Area which also are included under Alternatives 2 and 3. While specific locations have not been identified for these features, the in-stream habitat features would be constructed within the Santa Ana River channel, a previously channelized river and a highly dynamic environment where no paleontological resources are likely to occur. Similarly, impacts associated with constructing the features such as access routes and staging areas would be placed in areas where seasonal flooding has accumulated several feet of alluvial sediments. Furthermore, if sites were later identified along the river bank, access routes and staging areas could be routed around the sites to avoid impacts. The impacts to paleontological resources from this measure would be less than significant under CEQA.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure
The same level of ground disturbance would occur under Alternative 4 as under Alternative 2 and impacts to cultural resources would be the same. The measure is less than significant under CEQA.

Non-Native Aquatic Species Management Measure (Upstream and Downstream), Cowbird Management Measure, Feral Pig Management Measure:
Under Alternative 4, the cowbird management measure would be conducted in the same manner and would have the same impacts as under Alternatives 2 and 3. Also under this alternative, the non-native aquatic species management measure activities are expanded to occur in both the SARM upstream and downstream focal areas. The alternative also includes activities to reduce the non-native feral pig population. None of these non-native wildlife management measures would involve ground disturbance. The measures would not have any direct or indirect impacts on paleontological resources. There would be no long-term operation and maintenance impacts to paleontological resources. This measure is less than significant under CEQA.

Level of Impact for Alternative 4
The level of potential impacts to paleontological resources would be the same as the Proposed Action. With the implementation of Environmental Commitment Measure PR-1 potential adverse impacts to paleontological resources would be less than significant.

5.9 TRAFFIC AND CIRCULATION

The following analysis is based on Traffic Impact Analysis prepared for the Prado Basin Ecosystem Restoration and Water Conservation Integrated Feasibility Report by Kuzman Associates in February 2018. The traffic analysis is presented in its entirety in Appendix J, Traffic Impact Analysis.

5.9.1 Regulatory Framework

Traffic operations are quantified through the determination of Level of Service (LOS). Level of Service is a qualified measure of traffic operating conditions, whereby a letter grade “A” through

"F" is assigned to an infrastructure facility, such as an intersection, freeway mainline, or freeway ramp.

Signalized intersections are analyzed using the Intersection Capacity Utilization (ICU) technique. To calculate an ICU value, the volume of traffic using the intersection is compared with the capacity of the intersection. ICU is usually expressed as a volume to capacity (V/C) ratio. The V/C represents that portion of the hour required to provide sufficient capacity to accommodate all intersection traffic if all approaches operate at capacity. The same LOS thresholds in terms of roadway segment V/C ratio and intersection ICU apply to both types of analysis. The V/C ratio (ICU) and corresponding Level of Service (LOS) are shown in Table 5-39.

Table 5-39: Intersection Capacity Utilization (ICU) LOS Criteria

Level of Service	**Volume to capacity Ratio/ICU**
A	0.00-0.60
B	0.61-0.70
C	0.71-0.80
D	0.81-0.90
E	0.91-1.00
F	>1.00

The definitions of level of service for uninterrupted flow (flow unrestricted by the existence of traffic control devices) are

- LOS A represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream.
- LOS B is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver.
- LOS C is in the range of stable flow but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by intersections with others in the traffic stream.
- LOS D represents high density but stable flow. Speed and freedom to maneuver are severely restricted, and the driver experiences a generally poor level of comfort and convenience.
- LOS E represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform value. Small increases in flow will cause breakdowns in traffic movement.
- LOS F is used to define forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount which can traverse the point. Causing vehicles to back up behind each other.

Implementation of the IFR ecosystem restoration measures would generate traffic within nine jurisdictional areas which include: Riverside County, Orange County, City of Chino, City of Corona, City of Costa Mesa, City of Fountain Valley, City of Irvine, City of Norco, and City of

Yorba Linda. The significant impact criteria for local roadways and regional freeways systems for each City, County, and State jurisdiction is shown in Table 5-40.

Table 5-40 Levels of Deficiencies

Jurisdiction	Level of Service	Other Criteria[1] or Significant Impact
County of Riverside	C or better	No other Criteria or significant impact.
City of Chino	D or better	If the pre-project traffic condition is Level of Service E or F, the project shall mitigate to the pre-project Level of Service
City of Corona	C or better	No other Criteria or significant impact.
City of Norco	D or better	No other Criteria or significant impact.
County of Orange	D or better	A project related impact is considered significant if the volume to capacity ratio increases by 0.10 (10%)
City of Costa Mesa	D or better	A project related impact is significant if volume to capacity ratio increases by 0.01 (1%) for Level of Service E.
City of Fountain Valley	D or better	No other Criteria or significant impact.
City of Irvine	D or better	A project related impact is significant if the volume to capacity ratio increases by 0.02 (2%) for Level of Service D and 0.01 (1%) for Level of Service E.
City of Yorba Linda	D or better	No other Criteria or significant impact.
California Department of Transportation Regional Freeway Systems	D or better	The project site does not contribute 100 or more morning or evening peak hour trips to freeway segments. The project site does not contribute 100 or more morning or evening peak hour trips to a freeway segment which operates at Level of Service A to D prior to the project trip contribution then worsens to operate at Level of Service E or F after the project trip contribution. The project site does not contribute 100 or more morning or evening peak hour trips to a freeway segment which operates at Level of Service D prior to the project trip contribution then worsens the volume to capacity ratio by greater than 0.02 (2%). The project site does not contribute 100 or more morning or evening peak hour trips to a freeway segment operates at Level of Service E or F prior to the project trip contribution then worsens the volume to capacity ratio by greater than 0.01(1%)
Traffic Impacts to Intersections		The project site does not contribute 50 or more morning or evening peak hour trips to local roadway intersections. The project site does not contribute 50 or more morning or evening peak hour trips to an intersection which operates at Level of Service A to D prior to the project trip contribution then worsens to operate at Level of Service E or F after the project trip contribution.

Jurisdiction	Level of Service	Other Criteria[1] or Significant Impact
		The project site does not contribute 50 or more morning or evening peak hour trips to an intersection which operates at Level of Service D prior to the project trip contribution then worsens the volume to capacity ratio by greater than 0.02 (2%). The project site does not contribute 50 or more morning or evening peak hour trips to an intersection operates at Level of Service E or F prior to the project trip contribution then worsens the volume to capacity ratio by greater than 0.01(1%)
[1] Except that a Level of Service E which can be allowed on at any combination of Major Arterials, Expressways, or conventional State Highways as specified in the General Plan and/or Congestion Management Program.		

5.9.2 Access Routes

The proposed ecosystem restoration measures would be implemented in four focal areas. Traffic generated by the project would utilize the regional freeway system and local roadways and wherever possible designated truck routes. The freeways used for construction or maintenance by the project would include SR-91, SR-71, I-15, I-5 and I-405.

The Upstream Santa Ana River Focal Area is located approximately one mile north of the SR-91 freeway, with regional access to the SR-91 Freeway from Auto Center Drive and Lincoln Avenue. Proposed access routes for activities occurring in the Upstream Stream Santa Ana River Focal Area are shown in Figure 5-20. Figure 5-21 depicts the access route to the El Sobrante Landfill, where material would be deposited from proposed clearing, grubbing, and excavation activities associated with the Sediment Management Measure.

The Downstream Santa Ana River Focal Area is located approximately one-half mile north of the SR-91 Freeway and would have regional access to the SR-91 Freeway from Gypsum Canyon Road and Green River Road. In addition to the Downstream Santa Ana River Focal Area, there is a Lower Santa Ana River Reach where maintenance activities would occur to remove sediment deposited near the tidal prism resulting from the sediment re-entrainment activities. The Lower Reach is located approximately one and one-half miles south of the I-405 Freeway and would have regional access to the I-405 Freeway from Santa Ana River Maintenance Road onto Talbert Avenue and then onto Harbor Boulevard. Proposed access routes for activities occurring in the Downstream Santa Ana River Focal Area are shown in Figure 5-22. Figures 5-23 and 5-24 depict the access route Lower Santa Ana River Reach where maintenance activities would occur and the proposed access route to the Bowerman Landfill where sediment removed from the Lower Santa Ana River Reach would be deposited.

The Chino Creek Focal Area is located approximately one-half mile east of the SR-71 Freeway and would have regional access to the SR-71 Freeway via Euclid Avenue and Pine Avenue (future connection). Proposed access routes for activities occurring in the Chino Creek Focal Area are shown in Figure 5-25.

The Mill Creek Focal Area is located approximately three and one-half miles north of the SR-91 Freeway and would have regional access to the SR-91 Freeway from River Road and Lincoln Avenue. Additionally, the Mill Creek Focal Area, east of the SR-71 Freeway has regional access to the SR-71 Freeway from Euclid Avenue and Pine Avenue. Proposed access routes for activities occurring in the Mill Creek Focal Area are shown in Figure 5-26.

5.9.3 Construction Traffic

The projected traffic trips are based on employee and truck data provided by the Orange County Water District and the U.S. Army Corps of Engineers. The project has proposed scheduling and truck hauling restrictions to not add project-related morning or evening peak hour trips onto the public roadways. The on-site construction activity schedules would be from 7:00 AM to 3:00 PM, which would allow construction workers to arrive at and depart from the site before the morning peak period (7:00 AM to 9:00 AM) and evening peak period (4:00 PM to 6:00 PM). Truck hauling for the Prado Basin area would begin after the initial phases of construction and proceed for the entire duration of the project.

The number of construction worker vehicles has been estimated using the average ridership of 1.135 persons per vehicle per the South Coast Air Quality Management District CEQA Air Quality Handbook (1993). It would be anticipated that most of the construction workers would remain on-site throughout the day. Based on traffic patterns observed on other large-scale construction projects, it is reasonable to assume that approximately half of the workers would leave and return to the site via their vehicles for lunch. The peak hour trip generation would be projected to be negligible as majority of the construction workers would be expected to arrive and depart at the project site during off-peak hours (i.e., arrive prior to 7:00 AM and depart prior to 4:00 PM). The project activities would occur 5 days per week, and every month of the year. During sediment re-entrainment activities at Prado Dam during the high flow season sediment re-entrainment would occur twenty-four hours per day/7 days per week duration. Both the daytime and evening construction work shifts would be scheduled outside of peak traffic periods. The construction activities would require truck hauling activities into and out of the study area. The projected traffic trips are based on the number of truck deliveries, multiplied by two (2) to cover both the inbound and outbound trips. To assess the impact trucks would have on the flow of traffic, all truck traffic volumes were converted into Passenger Car Equivalents (PCE). Trucks occupy the same space as two passenger cars. Therefore, all trucks were multiplied by a PCE factor of two. During the implementation of the Sediment Management Measure the highest amount of truck hauling trips would occur during construction year 1 and 2.

5.9.4 Maintenance Traffic

The maintenance traffic would begin in Year 6. Both regional and local traffic trips would be generated, including both vehicle trips and truck hauling trips. During sediment re-entrainment activities, some re-entrained sediment could be deposited in the lower reach of the Santa Ana River near the tidal prism. Induced sediment deposition at this location would require the removal and hauling of the sediment to the Bowerman Landfill. Hauling of sediment from this location would also occur during the non-peak hours.

5.9.5 Traffic Generation Summary

During the construction period, the traffic trips would vary by year. During the maintenance period, traffic trips would be more constant. The minimum and maximum daily construction trips and daily maintenance traffic generated from Alternative 2 and the Project Alternatives during the life of the project activities is shown in Table 5-41. As shown in Table 5-41, for Alternative 2 and Alternative 4, Year 1 would generate the least amount of traffic and Year 2 would generate the most traffic. For Alternative 3, Year 1 would generate the least amount of traffic and Year 3 would generate the most traffic.

Table 5-41: Proposed Action & Project Alternatives Minimum/Maximum Traffic Trips

Construction Period Years 1 to 5					**Maintenance Period Years 6 to 50**
Alterative	Year	Min. Daily	Year	Max Daily	Daily
Alternative 2	1	471 (Year 1)	2	1,103	559
Alternative 3	1	324	3	630	310
Alternative 4	1	471	2	1,222	559

5.9.6 Impact Significance Criteria

The impact criteria below were taken from Appendix G of the CEQA guidelines and are also being adopted for NEPA. The impacts on traffic and circulation associated with the proposed alternatives would be considered significant if one or more of the conditions described below were to occur as a result of implementation of the project.

IMPACT T-1: Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking account of all modes of transportation including mass transit, and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrians and bicycle paths and mass transit.

IMPACT T-2: Substantially increase hazards to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

5.9.7 Environmental Commitments

EC-T-1: Construction equipment mobilization, demobilization, truck deliveries and truck hauling activities will occur between 9:00 AM and 3:00 PM.

EC-T-2: Wherever possible the project haul route trips will use designated truck routes to and from the freeways which include I-5, I-15, I-405, SR-71, and SR-91.

EC-T-3: The project will require the construction workers to park on the predetermined off-street parking area.

EC-T-4: The project will work with the City Engineer and Public Works Department Traffic Engineering Division to identify lane closure time limitations on roadways within the Cities of Chino, Corona, Costa Mesa, Fountain Valley, Irvine, Norco, and Yorba Linda, and unincorporated areas of Orange and Riverside Counties. A description of project activities will be given to each jurisdiction that includes:

- Identified hours of construction and hours for deliveries.
- Identified haul routes.
- Identify location of staff parking for the construction period.
- Identify the location of material storage.

EC-T-5: Two months prior to the beginning of construction and periodically throughout the construction duration, if needed, the project will notify Emergency Services within the study area of possible travel lane and the potential for traffic delays during construction (see listing below).

EC-T-6: Two months prior to the beginning of construction and periodically throughout the construction duration, the project will notify the City Public Works Department Traffic Engineering Division of construction activities on a regular basis.

EC-T-7: Two months prior to the beginning of construction and periodically throughout the construction duration, the project will notify the School District of possible travel lane closures and the potential for traffic delays during construction. This is to allow the District to alter bus routing when possible and review the need for crosswalk assistance as necessary during the construction duration.

EC-T-8: Two months prior to the beginning of construction, the project will notify the community-at-large of potential roadway lane closure(s). The written notification will include the construction schedule, the approximate location and duration of activities within each section of roadway, and a toll-free telephone number for receiving questions or complaints. The notification program will consist of a local newspaper notice and signage posted prior to the limits of construction. Notification prior to the intersections affected by the construction will also be placed on either side of the intersection at intersection crossings. The signage will reflect the current construction activity and precede the construction to allow traffic the opportunity to find alternative routes.

EC-T-9: One month prior to specific roadway lane closure(s), the project will implement a notification program to notify the public of the closure(s). The written notification will include the construction schedule, the exact location and duration of activities within each street (i.e., which travel lanes and access point/driveways would be blocked on which days and for how long), and a toll-free telephone number for receiving questions or complaints. The notification program will consist of a local newspaper notice, mailed information to residents and businesses in the study area and signage posted at the construction limits. The notification will provide alternate routes around the temporary closure that direct traffic to utilize alternative routes when possible.

Design Recommendations

EC-T-10: The primary access entry to the site is proposed to be located on the north side of Pomona-Rincon Road approximately 3,000 feet east of Prado Dam and 2,750 feet north of Railroad Street. The width of improved access at this location will be a minimum of 35-feet . The truck turning movements at the proposed site will be reviewed to ensure adequate clearance exists on the proposed access driveway to/from the public roadway, such that truck-trailer combination vehicles can adequately enter and leave the site without any required access restrictions.

EC-T-11: Fire apparatus accessible roadways will be designed and constructed to maintain, and support emergency vehicle loads and dimensions on an all-weather drivable surface. In general, the minimum width and vertical clearance of emergency roadways is 13 feet in width for one-way access and 20 feet in width for two-way access with 13.5 feet vertical clearance. For emergency access, cross-section of 36 feet or greater parallel parking is typically allowed on both sides of the street. For emergency access, cross-section of less than 36 feet in width consult local fire authority for minimum width and parking restrictions. Fire apparatus accessible maximum cross-sectional slope grade of two percent (2%) or a maximum cross-sectional slope grade change of five percent (5%). Fire apparatus accessible preferred maximum longitudinal slope grade of ten percent (10%) or where grades exceeding 10% are necessary because of topographical conditions, the grade percentage allowable for a maximum approved length should be obtained from the local fire authority.

5.9.8 Traffic and Circulation Impacts

Rather than addressing effects measure-by-measure as is done for most other resource categories, effects related to traffic and transportation can be presented more clearly by considering the total volume of construction and maintenance equipment and support vehicles that would be required for implementation of each alternative, the expected phasing or time period when work would be occurring, the roadways that would be affected, and other related information and analyses. This cumulative analysis is presented below for each of the significance criteria.
This assessment assumes a 5-year construction period followed by operation, maintenance and adaptive management of project features. “Maintenance Year 6” refers to the first year of operation and maintenance that follows five years of construction.

5.9.8.1 **IMPACT T-**1: Conflicts with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, considering all modes of transportation including mass transit, and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrians and bicycle paths and mass transit.

A significant impact would occur if long-term operational traffic and short-term construction would reduce the level of service of a roadway segment or intersection within project area to below the acceptable level of standard based on the criteria provided in Table 5-40.

Project Traffic Impacts

To assess potential traffic impacts, existing traffic volumes have been combined with ambient growth and projected project traffic trips associated with implementation of the Water Conservation Plan and Ecosystem Restoration Plan for each alternative. Because the project traffic trips would vary during the construction period and to provide a conservative analysis of the alternatives, the years with the maximum construction trips have been analyzed. The maximum construction trips would occur during construction years 1, 2, and 3 and have been analyzed along with the first and last year of the maintenance period.

To account for ambient growth on roadways, traffic volumes have been calculated based on a "conservative" 2.0 percent annual growth rate of existing traffic volumes for construction year 2 (2022), construction year 3 (2023) and maintenance year 6 (2026). The 2026 traffic volume reflects 4 years of growth, 2023 reflects 5 years of growth and 2026 reflects 9 years of growth. For the ultimate year of the project maintenance year, 50 (2071), the growth of the area has been reduced to 0.5 percent annual growth rate to reflect the future buildout.

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, neither the water conservation plan nor the proposed ecosystem restoration measures would be implemented. There would be no additional vehicle or truck trips generated within the study area and no changes to existing traffic conditions due to project implementation, other than expected increases due to population growth. The study area circulation system would be operating at acceptable Levels of Service, except for the following study area roadway segments that are currently at or near capacity.

Existing Traffic Conditions

Freeway Segments at or near Capacity

- I-15 Freeway from Temescal Canyon Road to Ontario Avenue
- I-405 Freeway from Sand Canyon to University Drive
- I-405 Freeway from Culvert Road to Jamboree Boulevard
- I-405 Freeway from Harbor Boulevard to Euclid Street

Roadway Segments at or near capacity

- Pine Avenue from Euclid Avenue to east of Euclid Avenue
- Euclid Avenue from Pine Avenue to Pomona-Rincon Road
- Euclid Avenue from Pomona-Rincon Road to SR-71 Freeway

It should be noted at the time the traffic analysis was being prepared the Pine Avenue/SR-71 Freeway interchange adjacent to Euclid Avenue within the City of Chino area was temporary closed for future construction action activities. After reconstruction when the Pine Avenue roadway segment to the SR-71 Freeway is re-opened, traffic volumes on Euclid Avenue would be reduce and would return to an acceptable Levels of Service.

Future Traffic Conditions

Under the No Federal Action/No Project Alternative, the study area circulation system future traffic conditions for construction years 2 and 3 and maintenance years 6 and 50 would be operating at acceptable Levels of Service, except for the following study area roadway segments that are projected to be at or near capacity.

Year 2022 (For Comparison to Construction Year 2)

Freeway Segments at or near Capacity

- I-15 Freeway from Temescal Canyon Road to Ontario Avenue
- SR-91 Freeway from I-15 Freeway to Main Street
- SR-91 Freeway Ramps Junction to SR-71 Freeway Ramps

Roadway Segments at or near Capacity

- River Road from SAR to east of Corydon Street
- Lincoln Avenue from River Road to Railroad Street
- Pine Avenue from Euclid Avenue to east of Euclid Avenue
- Euclid Avenue from Pomona-Rincon Road to SR-71 Freeway

It should be noted that the following study area roadway segments are scheduled for improvements to be completed by the end of 2021. One lane in each direction has been anticipated for the Pine Avenue roadway reconstruction and connection to SR-71 Freeway. The I-405 Freeway from SR-133 Freeway to Euclid Avenue would have one additional general use lane in each direction added and the number of express high occupancy or toll lanes would be 2 lanes in each direction.

Year 2023 (For Comparison to Construction Year 3)

Freeway Segments at or near Capacity

- SR-91 Freeway from I-15 Freeway to Main Street
- SR-91 Freeway SR-71 Freeway to Green River Drive
- SR-91 Freeway Ramps Junction to SR-71 Freeway Ramps

Roadway Segments at or near Capacity

- River Road from SAR to east of Corydon Street
- Lincoln Avenue from River Road to Railroad Street
- Pine Avenue from Euclid Avenue to east of Euclid Avenue
- Euclid Avenue from Pomona-Rincon Road to SR-71 Freeway

It should be noted that the following study area roadway segments are scheduled for improvements to be completed by the end of 2022. The I-15 Freeway from Temescal Canyon Road to SR-91 Freeway would have two express high occupancy or toll lanes added in each direction. The I-15 Freeway interchange at Calico Road project would add one auxiliary lane each direction to the north.

Year 2026 (For Comparison to Maintenance Year 6)

Freeway Segments at or near Capacity

- SR-91 Freeway from I-15 Freeway to Main Street
- SR-91 Freeway Lincoln Avenue to Maple Street
- SR-91 Freeway SR-71 Freeway Junction to Gypsum Road
- SR-71 Freeway from SR-91 Junction to Pine Avenue
- I-405 Freeway from Harbor Boulevard to Euclid Street

Roadway Segments at or near Capacity

- River Road from SAR to east of Corydon Street
- Lincoln Avenue from River Road to Railroad Street
- Pine Avenue from Euclid Avenue to east of Euclid Avenue
- Euclid Avenue from Pomona-Rincon Road to SR-71 Freeway

Year 2071 (For Comparison to Maintenance Year 50)

Freeway Segments at or near Capacity

- SR-91 Freeway from I-15 Freeway to Gypsum Road
- I-405 Freeway from SR-73 Boulevard to Euclid Street

Roadway Segments at or near Capacity

- Lincoln Avenue from River Road to Railroad Street
- Pine Avenue from Euclid Avenue to east of Euclid Avenue

It should be noted that the following study area roadway segments are scheduled for improvements to be completed by 2035. The SR-71 Freeway from SR-91 Freeway to Pine Avenue would have one general use lane added in each direction. Local roadways have been reviewed at the classification number of lanes and capacity.

ALTERNATIVE 2: PROPOSED ACTION

Direct Impacts

This analysis assumes that implementation of the measures would start in 2021 and extend for 50 years through 2071. During this time frame a combination of construction related traffic, operational related traffic and maintenance related traffic would be generated. During the first five years of the project, the traffic would be construction related followed by 45 years of operational and maintenance related traffic. During the five years of construction activity, and in particular the first three years, the largest amount of traffic trips would be generated. Therefore, potential traffic impacts from the first three years of construction activities have been analyzed separately. Project-related traffic generated during the maintenance period would not vary substantially from year to year, therefore only the traffic impacts for the first and last year of the maintenance activities have been analyzed.

Construction Year 1 (2021)
The study area roadway segments are projected to operate at acceptable Levels of Service except for the study area roadway segments that have been identified to be at or near capacity at year 2021. No additional study area roadway segments are projected to be at or near capacity with the additional traffic generated by the project activities. Therefore, the project would not conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system. Potential impacts would be less than significant.

Construction Year 2 (2022)
The study area roadway segments are projected to operate at acceptable Levels of Service for year 2022 except for the study roadway segments listed for the year 2022 that are projected to be at or near capacity. No additional study area roadway segments are projected to be at or near capacity with the additional traffic generated by the project activities. Therefore, the project would not conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system. Potential impacts would be less than significant.

Construction Year 3 (2023)
The study area roadway segments are projected to operate at acceptable Levels of Service for year 2023 except for the study area roadway segments listed for the year 2023 that are projected to be at or near capacity. No additional study area roadway segments are projected to be at or near capacity with the additional traffic generated by the project activities. Therefore, the project would not conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system. Potential impacts would be less than significant.

Indirect Impacts
There would be no indirect generation of traffic, and as such, no indirect impacts.

Long-Term Operation and Maintenance Impacts

Operation/Maintenance Year 6 (2026)
The study area roadway segments are projected to operate at acceptable Levels of Service for year 2026 except for the study area roadway segments listed for the year 2026 that are projected to be at or near capacity. As shown below, three additional study area roadway segments are projected to be at or near capacity with the additional traffic generated by the project activities. However, the project trip contribution impact would not be significant as the project trip contribution would not be occurring during the morning or evening peak hours and the daily trip contribution would be less than 1.0 %.

Freeway Segments at or near Capacity
- I-15 Freeway from Warrick Road to Cajalco Road
- SR-91 Freeway Maple Street to Serfas Club Drive

Roadway Segments at or near Capacity
- River Road from SAR to east of Corydon Street

Operation/Maintenance Year 50 (2071)
The study area roadway segments are projected to operate at acceptable Levels of Service for year 2071 except for the study roadway segments listed for the year 2071 that are projected to be at or near capacity. No additional study roadway segments are projected to be at or near capacity with the project trip contributions, and significant impacts would occur.

Level of Impact for Alternative 2
Less than Significant impact. Construction and long-term operation and maintenance activities would not conflict with an applicable plan, ordinance or policy establishing measures of effectiveness (Level of Service) for the performance of the circulation system, considering all modes of transportation including mass transit, and non-motorized travel and relevant components of the circulation system.

ALTERNATIVE 3

Direct Impacts

Construction Year 1 (2021)
Daily construction traffic is expected to be less than Alternative 2 as the sediment management measure would not be implemented, and no additional impacts would occur. Impacts would be less than significant.

Construction Year 2 (2022)
Daily construction traffic is expected to be less than Alternative 2 and no additional impacts would occur. Impacts would be less than significant.

Construction Year 3 (2023)
Daily construction traffic is expected to be less than Alternative 2 and no additional impacts would occur. Impacts would be less than significant.

Indirect Impacts
There would be no indirect generation of traffic, and as such, no indirect impacts.

Long-Term Operation and Maintenance Impacts

Maintenance Year 6 (2026)
The study area roadway segments are projected to operate at acceptable Levels of Service for year 2026 except for the study area roadway segments that are projected to be at or near capacity. As shown below, three additional study area roadway segments are projected to be at or near capacity with the additional traffic generated by the project activities. However, the project trip contribution would not be significant impact as the project trip contribution would not be occurring during the morning or evening peak hours and the daily trip contribution would be less than 1.0 %.

Freeway Segment at or near Capacity

- I-15 Freeway from Warrick Road to Cajalco Road
- SR-91 Freeway Maple Street to Serfas Club Drive

Roadway Segments at or near Capacity

- River Road from SAR to east of Corydon Street

Maintenance Year 50 (2071)

Daily construction traffic is expected to be less than Alternative 2 and no additional impacts would occur. Impacts would be less than significant.

Level of Impact for Alternative 3

Less than Significant Impact. Construction and long-term operation and maintenance activities would not conflict with an applicable plan, ordinance or policy establishing measures of effectiveness (Level of Service) for the performance of the circulation system, considering all modes of transportation including mass transit, and non-motorized travel and relevant components of the circulation system.

ALTERNATIVE 4

Direct Impacts

Construction Year 1 (2021)

The additional measures proposed under Alternative 4 would not generate substantially more traffic, and in fact the average daily rates calculated above for Construction Year 1 would be identical to Alternative 2. Impacts would be less than significant.

Construction Year 2 (2022)

The additional measures proposed under Alternative 4 would not generate substantially more traffic, and in fact the average daily rates calculated above for Construction Year 2 would be identical to Alternative 2. Impacts would be less than significant.

Construction Year 3 (2023)

The additional measures proposed under Alternative 4 would not generate substantially more traffic, and in fact the average daily rates calculated above for Construction Year 3 would be identical to Alternative 2. Impacts would be less than significant.

Indirect Impacts

There would be no indirect generation of traffic, and as such, no indirect impacts.

Long-Term Operation and Maintenance Impacts

Maintenance Year 6 (2026)

The study roadway segments are projected to operate at acceptable Levels of Service for year 2026 with project traffic trips, except for the study roadway segments listed for the year 2026

without project traffic conditions that are projected to be at or near capacity. As shown below three additional study roadway segments are projected to be at or near capacity with the additional traffic generated by the project activities. However, the project trip contribution would not be significant impact as the project trip contribution would not occur during the morning or evening peak hours and the daily trip contribution would be less than 1.0 %.

Freeway Segments at or near Capacity

- I-15 Freeway from Warrick Road to Cajlico Road
- SR-91 Freeway Maple Street to Serfas Club Drive

Roadway Segments at or near Capacity

- River Road from SAR to east of Corydon Street

Maintenance Year 50 (2071)

The additional measures proposed under Alternative 4 would not generate substantially more traffic, and in fact the average daily rates calculated above for Maintenance Year 50 would be identical to Alternative 2. Impacts would be similar and less than significant.

Level of Impact for Alternative 4

Less than Significant impact. Construction and long-term operation and maintenance activities would not conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, considering all modes of transportation including mass transit, and non-motorized travel and relevant components of the circulation system.

5.9.8.2 **IMPACT T-2**: Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

The following analysis evaluates incompatibility and potential hazards associated with truck hauling and mobilization and demobilization of heavy construction equipment on the study area's circulation system. The analysis focuses on each alternative rather than evaluating individual truck trips generated by each measure.

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, neither the water conservation plan nor the proposed ecosystem restoration measures would be implemented. Therefore, no impact related to this criterion would occur.

ALTERNATIVE 2: PROPOSED ACTION

Direct Impacts

Truck Hauling Traffic Impacts

Implementation of the Proposed Action would generate truck hauling trips along study area local roadways and freeways systems. To reduce traffic impacts, the truck hauling activities would occur outside of peak traffic periods. Additionally, the project would require the mobilization and demobilization of large pieces of construction equipment. The mobilization and demobilization of large pieces of construction equipment may require the closure or traffic lanes, bikeways or sidewalks which could potentially cause local traffic congestion and increase potential hazards to motorists and pedestrians. To minimize potential traffic congestion, the mobilization and demobilization of construction equipment would also occur outside of the peak traffic period and would use designated truck routes where available. To further reduce potential traffic congestion impacts, it is recommended that a public outreach program be implemented with local communities that would include the identification of project truck hauling routes. The public outreach program would notify communities when the trucking activities would occur, the number of truck trips expected, and the duration of truck hauling activities. With the implementation of Environmental Commitments EC-T-3 through EC-T-11, potential traffic hazards from the truck hauling activities would be less than significant.

Indirect Impacts

There would be no indirect traffic hazards, and as such, no indirect impacts.

Long-Term Operation and Maintenance Impacts

During the maintenance year there would be substantially less truck hauling and mobilization and demobilization of heavy construction equipment. The majority of vehicle trips would involve the use of light-medium trucks. In those instances when truck hauling and the mobilization and demobilization of heavy construction equipment would be required, these activities would be scheduled to occur during off peak traffic periods to the extent practicable, and coordination with local jurisdictions would occur. With the implementation of Environmental Commitments EC-T-3 through EC-T-11, potential long-term operation and maintenance traffic hazards from truck hauling and mobilization and demobilization and heavy construction equipment would be less than significant.

Level of Impact for Alternative 2

Less than Significant Impact. Construction and long-term operation and maintenance activities would not substantially increase hazards to a design feature of a roadway or incompatible uses or equipment on the public roadway.

ALTERNATIVE 3

Direct Impacts

Compared to the Proposed Action, Alternative 3 would generate fewer truck traffic trips. Under Alternative 3, a substantially smaller amount of material would be exported offsite and there would be no maintenance and sediment hauling activities occurring in the Lower Santa Ana

River. While truck trips would be reduced in number, there would still be the potential that truck hauling activities and construction equipment mobilization and demobilization activities could cause hazards due to design features. With the implementation of Environmental Commitments EC-T-3 through EC-T-11, potential traffic hazards from the truck hauling activities would be less than significant.

Indirect Impacts
Compared to Alternative 2, indirect traffic hazard impacts would be the same. No indirect traffic impacts would occur.

Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, there would be substantially less truck hauling activities. Similar, to Alternative 2, in those instances when truck hauling and mobilization and demobilization of heavy construction equipment would be required, these activities would be scheduled to occur during off peak traffic periods when practicable and coordination with local jurisdictions would occur. With the implementation of Environmental Commitments EC-T-3 through EC-T-11, potential long-term operation and maintenance traffic hazards from truck hauling and mobilization and demobilization and heavy construction equipment would be less than significant.

Level of Impact for Alternative 3
Less than Significant Impact. Construction and long-term operation and maintenance activities would not substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

ALTERNATIVE 4

Direct Impacts
Compared to the Proposed Action, the amount of truck hauling trips would be similar and the level of potential traffic impacts from truck hauling activities would be the same. With the implementation of Environmental Commitments EC-T-3 through EC-T-11, potential long-term operation and maintenance traffic hazards from truck hauling and mobilization and demobilization and heavy construction equipment would be less than significant.

Indirect Impacts
Compared to Alternative 2, indirect traffic impacts would be same. No indirect traffic hazard impacts would occur.

Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, long-term operation and maintenance traffic hazards would be the same. With the implementation of Environmental Commitment EC-T-3 through EC-T-11, potential long-term operation and maintenance traffic hazards from truck hauling and mobilization and demobilization and heavy construction equipment would be less than significant.

Level of Impact for Alternative 4
Less than Significant Impact. Construction and long-term operation and maintenance activities would not substantially increase hazards to a design feature or incompatible uses or equipment.

5.10 NOISE

5.10.1 Regulatory Framework

5.10.1.1 State

State Office of Noise Control Standards
The California Office of Noise Control has set the land use compatibility noise standards for different types of land uses and has encouraged local jurisdictions to adopt them.

According to the land use compatibility noise standards, for commercial and industrial uses, long-term noise levels up to 65 Community Noise Equivalent Level (CNEL) are "normally acceptable;" noise levels between 65 and 75 dBA CNEL are "conditionally acceptable," which means that noise levels are acceptable only when a detailed noise analysis is conducted and needed noise insulation features are included in the design. Long term noise levels between 70 and 80 dBA CNEL are "generally unacceptable."

For residential development and schools, long term exterior noise levels ranging up to 60 dBA CNEL are classified as "normally acceptable," based upon the assumption that the homes are built with normal conventional construction. Long term noise levels ranging up to 70 dBA CNEL are "conditionally acceptable" and noise levels in the 70- to 75-dBA CNEL range are classified as "generally unacceptable," but could proceed if a detailed noise analysis is conducted and needed noise insulation features are included in the design.

Local Regulations
The local noise regulations that would be applicable to the study area would be noise ordinances and/or General Plan Noise Elements for Riverside County and the Cities of Corona, Eastvale, Norco, Chino Hills, Chino, Yorba Linda, and Anaheim. Table 5-42, summarizes the noise standards by the various jurisdictions in and around the study area and Focal Area they are applicable too.

Table 5-42: Summary of Noise Standards

Jurisdiction	Noise Ordinance or General Plan Standards	Exemptions	Applicable Focal Area
Riverside County	Residential: Max Exterior 55 dB 7 AM – 10 PM and 45 dB 10 PM – 7 AM Conservation Habitat and Recreation: Max Exterior 45 dB	Riverside County Noise Ordinance Exemptions for the following: Government agency facilities and capital improvement projects Private construction projects located ¼ of a mile or more from a residence Private construction projects within ¼ mile of residence if construction	Upstream Santa Ana River Focal Area

Jurisdiction	Noise Ordinance or General Plan Standards	Exemptions	Applicable Focal Area
		does not occur 6PM-6 PM (June – September) and 6 PM – 7 AM (October – May)	
City of Corona	Residential: Max Exterior 55 dB 7 AM – 10 PM and 45 dB 10 PM – 7 AM Other Sensitive Land Uses: Max Exterior 55 dB 7 AM – 10 PM and 50 dB 10 PM – 7 AM	City of Corona Noise Ordinance Exemptions for: Noise sources associated with maintenance provided the activities take place between the hours of 7 AM and 8 PM on any day except Sunday or between the hours of 9 AM to 8 PM on Sunday	Upstream and Downstream Santa Ana River Focal Area
City of Norco	Residential: Max Exterior 55 dB 7 AM – 10 PM and 45 dB 10 PM – 7 AM Open Space: Max Exterior 45 dB	City of Norco Noise Ordinance Exemptions for: Noise sources associated with maintenance provided the activities take place between the hours of 7 AM and 7 PM Monday – Friday and 7 AM to 8 PM Saturday and Sunday	Upstream Focal Area
City of Eastvale	Noise Ordinance does not establish daytime or night maximum noise levels	City of Eastvale Noise Ordinance Exemptions for: Operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration, grading or demolition work between the hours of 7 AM on week days and between 8 AM and 5 PM on Saturdays.	Upstream Focal Area
City of Chino	Residential: Max Exterior 50 dB 7 AM – 10 PM and 45 dB 10 PM – 7 AM	City of Chino Noise Ordinance Exemption for: Construction activity within 500 feet of existing residence is exempt from the Noise Ordinance if the construction activity occurs between the hours from 7 AM to 7 PM on weekdays and Saturdays	Chino Creek Focal Area, Mill Creek Focal Area
City of Chino Hills	Residential: Max Exterior 65 dB Open Space: Max Exterior 65 dB	Except when necessary for the immediate preservation of life, health, or property, no person shall construct, repair, remodel, demolish, or grade any real property or structures thereon at any time other than between the hours of 7 AM and 7 PM weekdays, and between 8 AM and 6 PM on Saturdays, excluding federal holidays	Chino Creek Focal Area
City of Yorba Linda	Residential: Max Exterior 55 dB 7 AM – 10 PM and 50 dB 10 PM – 7 AM	City of Yorba Linda Noise Ordinance Exemption for: Noise sources associated with construction, repair, remodeling, or grading of any real property,	Downstream Santa Ana River Focal Area

Jurisdiction	Noise Ordinance or General Plan Standards	Exemptions	Applicable Focal Area
		provided said activities do not take place between the hours of 8:00 p.m. and 7:00 am on weekdays, including Saturday, or at any time on Sunday or a federal holiday	
City of Anaheim	City of Anaheim Municipal Code Noise Ordinance limits sound levels for stationary sources of noise radiated for extended periods from any premises in excess of 60 dB at the property line	City of Anaheim Noise Ordinance Exemption for: Sound created by construction within the City is exempt from the requirement of the Municipal Code if it is conducted from 7 AM to 7 PM Monday through Friday	Downstream Santa Ana River Focal Area

5.10.2 Impact Significance Criteria

The impact criteria below were taken from Appendix G of the CEQA guidelines and are also being adopted for NEPA. For purposes of this analysis, Alternatives 1, 2, 3, or 4 would have a significant impact related to Noise if it would:

IMPACT N-1: Expose person(s) to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

IMPACT N-2: Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

5.10.3 Environmental Commitments

EC-N-1: All booster pumps and generators would be contained in sound attenuation enclosures.

EC-N-2: Construction contractors would be required to use only construction equipment that has noise-reduction features, such as mufflers and engine shrouds.
EC-N-3: During sediment re-entrainment activities sound attenuation measures would be provided to minimize noise impacts to meet local night time noise standards.

5.10.4 Noise Impacts

5.10.4.1 **IMPACT N-1**: Expose person(s) to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, neither the Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. Water would continue to be stored up to elevation 498 feet during the winter and 505 feet during the summer. No construction or long-term operation and maintenance activities would occur without implementation of the Ecosystem Restoration Plan. Therefore, no adverse impacts from the exposure of person(s) to or generation of noise in excess standards established in the local general plans or noise ordinance standards would occur.

ALTERNATIVE 2: PROPOSED ACTION

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts
The Water Conservation Plan would increase the surface water elevation in the buffer pool from elevation 498 ft. up to elevation 505 ft. during the flood season, given sufficient inflow. Implementation of the Water Conservation Plan would not involve any activities or operation of any equipment that would emit noise. Therefore, no adverse impacts from the exposure of person(s) to or generation of noise in excess standards established in the local general plans or noise ordinance standards would occur.

Indirect Impacts
There are no indirect impacts that would result in the exposure of person(s) to or generation of noise in excess standards established in the local general plans or noise ordinance standards.

Future Operation and Maintenance Impacts
No future operation and maintenance activities would result in the exposure of person(s) to or generation of noise in excess standards established in the local general plans or noise ordinance standards.

Ecosystem Restoration Plan

Sediment Management Measure

Direct Impacts
The construction, long-term operation and maintenance of the proposed Ecosystem Restoration Plan would involve the operation of various pieces of construction equipment. Below in Table 5-43 is a listing of equipment that would be used for the construction, operation and maintenance of the Sediment Management Measure and the associated noise levels.

Table 5-43: Construction Equipment Noise Levels

Construction Equipment	Maximum dBA Noise Level at 50 Feet
Excavator	81
Backhoe	78
Tub Grinder	85
Dozer	82
Crane	81
Hydraulic Dredge	85
Dump Truck	76
Source: Federal Transit Agency	

The Sediment Management Measure involves four primary activities that could be a potential source for noise impacts. The primary construction activities are listed below. To minimize construction noise impacts for construction activities, Environmental Commitments EC-N-1 and EC-N-2 would be implemented.

- Construction of the sediment trap and transition channels
- Construction of the sediment storage Site A and Site B
- Sediment processing activities
- Sediment removal
- Sediment re-entrainment

Construction of the Sediment Trap and Transition Channel

The proposed transition channel and sediment trap would be constructed along the Santa Ana River within the Prado Basin. Applicable noise regulations would include the City of Eastvale Noise Ordinance, City of Norco Noise Ordinance, and County of Riverside Noise Ordinance. Sensitive receptors within the study area would include residential uses located on the northwest side of the river within the City of Eastvale and residential uses located on the southeast side of the river within the City of Norco. The closest sensitive receptors to where construction activities would occur would be residential uses, upstream of River Road Bridge near where the forebay groin would be constructed. The construction of the forebay groin and associated transition channel and sediment trap would involve the operation of heavy construction equipment, which would generate short term noise within the study area. The noisiest piece of construction equipment that would be operating would be a dozer at an estimated noise level of 82 dBA at 50 feet. Noise output for construction equipment is provided in Table 5-43.

On the northwest side of the river the construction activity for the forebay groin would be as close as 350 feet to existing residential uses within the City of Eastvale. During construction operations the estimated construction equipment noise level would be approximately 65 dBA. The City of Eastvale has no daytime noise standard that would apply. Therefore, the construction activity would not conflict with standards established in the local general plans or noise ordinance standards.

Upstream of River Road Bridge, the construction activity for the forebay groin would be as close as 100 feet to existing residential uses within the City of Norco. During construction, the estimated noise levels would be approximately 75 dBA, which would exceed the City of Norco daytime noise standard threshold of 55 dBA. Downstream of River Road Bridge, the closest

construction activity would be approximately 200 feet from existing residential uses. The estimated noise level would be approximately 68 dBA, which would also exceed thresholds for the City of Norco and County of Riverside daytime noise standard of 55 dBA.

All construction activities would occur during the hours of the day when construction noise would be exempt under the City of Norco Noise Ordinance and the County of Riverside Noise Ordinance. Therefore, the construction activities would not conflict with standards established in the local general plans or noise ordinance standards.

Construction of Sediment Storage Site A and Site B

The sediment storage area is composed of 2 sites situated near the Prado Basin's southernmost auxiliary embankment and near the USACE Prado Field Office. The east site (Site B) would be used for storage of dry excavation sediment. The west site (Site A) would be used for slurry dewatering, dry sediment stockpiling, re-entrainment mixing and pumping. Sediment from the trap area would be transported to the storage site by dry excavation and/or dredging. The construction of the sediment storage site would involve the operation of heavy construction equipment to create suitable work area for sediment handling and processing. The closest sensitive receptor would be single family residential uses within the City of Corona, located at approximately 1,700 feet south of the sediment storage Site A. The noisiest piece of construction equipment that would be operating would be a dozer at an estimated noise level of 82 dBA at 50 feet. The estimated construction equipment noise level would be estimated to be approximately 47 dBA, which would be below the threshold for the City of Corona daytime outdoor noise standard. Therefore, the construction activity would not expose people to noise levels in excess of standards established in the local general plan or noise ordinance.

Sediment Removal Activities

Sediment removal activities would involve a combination of dry excavation with heavy construction equipment and hydraulic dredging. Of the two methods proposed, hydraulic dredging would emit the highest noise levels. A hydraulic dredge would have an estimated noise level of 85 dBA at 50 feet. Upstream of River Road Bridge, the closest sensitive receptors would be existing residential uses within the City of Eastvale and the City of Norco, located at approximately 1,000 feet from the dredging activities. At this distance, the estimated noise levels would be 57 dBA, which would exceed the threshold for the City of Norco daytime outdoor noise standard of 55 dBA. However, under the City of Norco Noise Ordinance, construction noise would be exempt if construction occurs between the hours of 7:00 a.m. to 7:00 p.m., Monday through Saturday. The City of Eastvale has no daytime noise standard that would apply. Therefore, the construction activities would not conflict with standards established in the local general plans or noise ordinance standards.

Downstream of River Road Bridge, the closest sensitive receptor would be residential land uses within the City of Norco, at approximately 400 feet from the dredging activities. At this distance, the estimated noise levels would be 64 dBA, which would exceed the threshold for the City of Norco daytime outdoor noise standards of 55 dBA. However, under the City of Norco Noise Ordinance, construction noise would be exempt if construction occurs between the hours of 7:00 a.m. to 7:00 p.m., Monday through Saturday. All of the proposed sediment removal activities

would occur during daytime hours. Therefore, the construction activities would not conflict with standards established in the local general plans or noise ordinance standards.

Sediment Processing Activities

The closest sensitive receptor to where sediment processing activities would occur would be single family residential uses within the City of Corona, located at approximately 1,700 feet south of the sediment storage Site A. The noisiest piece of construction equipment operating would be the hydraulic dredge at an estimated noise level of 85 dBA at 50 feet. The estimated construction equipment noise level would be approximately 51 dBA, which would be below the threshold for City of Corona daytime noise standard. Therefore, the construction activities associated with sediment processing would not expose people to noise levels in excess of standards established in the local general plans or noise ordinance standards.

Sediment Re-Entrainment Activities

The proposed sediment re-entrainment activities would occur on the south side of the Santa Ana River levee, downstream of Prado Dam. The nosiest piece of construction equipment operating would be the use of a crane, at an estimated noise level of 81 dBA at 50 feet. The closest sensitive receptors to the sediment re-entrainment activities would be existing residential uses, located at approximately 2,600 feet to the west and existing residential uses to the south, both within the City of Corona. At these distances, the estimated construction equipment noise levels would range between 49 dBA and 51 dBA. The City of Corona Noise Ordinance establishes a maximum daytime exterior noise standard of 55 dBA and a maximum exterior night time noise standard of 45 dBA.

Sediment re-entrainment activities could occur 24 hours per day depending if high rates of surface water flows are available. During the day, the sediment re-entrainment activities would not exceed the threshold for the City of Corona daytime noise standard and no conflicts with local noise ordinances would occur. However, during the night, the operation of the crane and booster pumps associated with the sediment re-entrainment activities would exceed the threshold for the City of Corona night time noise standard, which would be considered a significant noise impact. To reduce noise levels to below the City of Corona Noise Ordinance threshold, sound attenuation would be provided at the re-entrainment site. With the implementation of Environmental Commitments N-1, N-2 and N-3, potential noise impacts would be less than significant, and the re-entrainment activities would not expose people to noise levels in excess of standards established in the local general plan or noise ordinance.

Indirect Impacts

Indirect noise-related impacts would occur from off-site vehicle travel (e.g., haul trucks) associated with construction of the Sediment Management Measure. Because no local noise standards directly apply to such sources of noise, the off-site vehicle travel noise impacts would not conflict with any local general plan or noise ordinance.

Long-Term Operation and Maintenance Impacts

Long-term operation, maintenance and adaptive management activities would involve a similar mix of heavy construction equipment that would be used in the construction of the Sediment Management Measure. Adaptive management would include adjustments to methods, quantities

and possibly locations of material excavated and, or re-entrained to ensure that success criteria are met. All operation, maintenance and adaptive management activities other than ongoing sediment re-entrainment would occur during the daytime hours when construction noise would be exempt under local noise ordinances. Environmental Commitment N-3 would continue to be implemented during any night-time sediment re-entrainment activities. Therefore, the construction activities would not conflict with standards established in the local general plans or noise ordinance standards.

Riparian Edge Treatment Measure

Direct Impacts
The construction activities for the Riparian Edge Treatment Measure would be implemented in conjunction with the construction activities for the transition channel and sediment trap. The noisiest piece of construction equipment that would be operating would be a dozer at an estimated noise level of 82 dBA at 50 feet (Table 5-43). Similar to the transition channel and sediment trap, the estimated construction noise associated with implementation of the Riparian Edge Treatment Measure could exceed the thresholds for the County of Riverside and City of Norco daytime noise standards. However, similar to the transition channel and sediment trap, the construction activities for the Riparian Edge Treatment Measure would occur during the hours of the day when construction noise would be exempt under the County of Riverside Noise Ordinance and City of Norco Noise Ordinance. Therefore, the construction activities would not conflict with standards established in the local general plans or noise ordinance standards.

Indirect Impacts
Indirect noise-related impacts would occur from off-site vehicle travel (e.g., haul trucks) associated with construction of the Riparian Edge Treatment Measure. Because no local noise standards directly apply to such sources of noise, the off-site vehicle travel noise impacts would not conflict with any local general plans or noise ordinance standards.

Long-Term Operation and Maintenance Impacts
Long-term operation, maintenance and adaptive management activities would mostly involve vegetation maintenance with manual labor and hand-held tools. In the event that heavy construction equipment is used, the operation of the heavy equipment would occur during the daytime when construction noise would be exempt under local noise ordinances. Therefore, the long-term operation and maintenance-related noise associated with the Riparian Edge Treatment Measure would not conflict with standards established in the local general plans or noise ordinance standards.

Chino Creek Channel Restoration Measure

Direct Impacts
The closest sensitive receptor to where the construction activity would occur for the Chino Creek Channel Restoration Measure would be residential land uses, located at approximately 1,350 feet to the southwest of the creek within the City of Chino Hills. The noisiest piece of construction equipment that would be in operation would be a dozer at an estimated noise level of 82 dBA at 50 feet. At this distance, the estimated noise level would be approximately 51 dBA, which would

be below City of Chino Hills daytime noise standard of 65 dBA. Therefore, the construction activity would not expose people to noise levels in excess of standards established in the local general plans or noise ordinance.

Indirect Impacts
Indirect noise impacts would occur from off-site vehicle travel (e.g., haul trucks) associated with construction of the Chino Creek Channel Restoration Measure. Because no local noise standards directly apply to such sources of noise, the off-site vehicle travel noise impacts would not conflict with any local general plans or noise ordinance standards.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities, as well as adaptive management would involve a similar mix of heavy construction in the same areas where construction occurred. Adaptive management may require the occasional use of equipment to adjust gradient, channel dimensions or plantings to ensure that success criteria are met. These activities would occur during the daytime and therefore would be exempt from the local general plans or noise ordinance standards.

In-stream Habitat Features Measure Downstream

Direct Impacts
In-Stream Habitat Features are proposed between Prado Dam and the Green River Golf Course and between the Green River Golf Course and the Weir Canyon/Santa Ana River crossing. The applicable noise regulations would include the City of Corona Noise Ordinance, City of Yorba Linda Noise Ordinance and the City of Anaheim Noise Ordinance. The construction and placement of the rock habitat features would require the operation of heavy construction equipment to clear vegetation and excavate the river substrate.

The nosiest piece of construction equipment that would be operated would be a dozer with an estimated noise level of 82 dBA at 50 feet. The closest sensitive receptors between Prado Dam and the Green River Golf Course would be residential land uses within the City of Corona. Within this reach, the construction activity would be at approximately 200 ft. from the closest sensitive receptor. At this distance, the estimated noise level would be approximately 68 dBA, which would exceed the threshold for City of Corona daytime noise standard. However, all of the proposed in-stream habitat construction activities would occur during the daytime hours, and therefore would be exempt from the City of Corona daytime noise standard, where construction noise is permitted between the hours of 7:00 a.m. to 8:00 p.m. Monday through Saturday. Therefore, the construction activities associated with the In-Stream Habitat Features Measure Downstream would not would not conflict with any local general plans or noise ordinance standards.

The closest sensitive receptors between the Green River Golf Course and the Weir Canyon Road crossing would be residential uses within the City of Yorba Linda, located at approximately 400 feet from the where construction activities would occur. At this distance, the estimated construction equipment noise level would be approximately 61 dBA, which would exceed the City of Yorba Linda daytime noise standard of 55 dBA. Under the City of Yorba Linda Noise

Ordinance, construction noise would be exempt if construction occurs between 7:00 a.m. to 8:00 p.m. Monday through Saturday. All the proposed in-stream habitat construction activities would occur during the hours of the day when construction noise would be exempt under the City of Yorba Linda Noise Ordinance. Therefore, the construction activity would not conflict with any local general plans or noise ordinance standards and noise-related impacts would be less than significant.

The closest sensitive receptor within the City of Anaheim would be residential uses, located at approximately 1,000 feet from where the construction activities would occur. At this distance, the estimated construction equipment noise level would be approximately 51 dBA, which would be below the City of Anaheim daytime noise standard of 60 dBA. Therefore, the construction activity would not expose people to noise levels in excess of standards established in the local general plans or noise ordinance standards.

Indirect Impacts
Indirect noise-related impacts would occur as a result of off-site vehicle travel (e.g., haul trucks) associated with construction of the In-Stream Habitat Features Measure. Because no local noise standards directly apply to such sources of noise, the off-site vehicle travel noise impacts would not conflict with any local general plans or noise ordinance standards.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would involve regular inspections of the in-stream habitat rock structures to evaluate their performance. The only construction vehicle on site for regular inspections would be a light-weight truck that emits minimal noise impacts. Adaptive management activities, if needed, would require occasional presence of additional heavy equipment to reposition or bring in additional rocky material to ensure that success criteria are met, at which time impacts would be similar to construction impacts described above, and would only occur for a short time. Maintenance and adaptive management activities would occur during the hours of the day when construction noise would be exempt therefore would not conflict with any local general plans or noise ordinance standards.

Invasive Plant Management Measure and Native Plantings Measure

Direct Impacts
The Invasive Plant Management Measure would be implemented in all four focal areas. The Native Plantings Measure would be implemented in the SARM Upstream Focal Area, Chino Creek Focal Area and the Mill Creek Focal Area. Applicable noise regulations would include: County of Riverside Noise Ordinance, City of Eastvale Noise Ordinance, City of Norco Noise Ordinance, City of Chino Hills Noise Ordinance, and City of Chino Noise Ordinance.
The above measures would involve the use of heavy construction equipment. The nosiest piece of construction equipment that would be operated would be a dozer with an estimated noise level of 82 dBA at 50 feet. Construction activities would occur during the hours of the day when construction noise would be exempt under local general plans and noise ordinance standards and therefore noise impacts would be less than significant.

Indirect Impacts
Indirect noise-related impacts would occur as a result of off-site vehicle travel (e.g., haul trucks) associated with implementation of the above measures. Because no local noise standards directly apply to such sources of noise, the off-site vehicle travel noise impacts would not conflict with any local general plans or noise ordinance standards.

Long-Term Operation and Maintenance Impacts
Long-term operation, maintenance, and adaptive management activities would involve regular inspections of the areas and removal of non-native vegetation by a combination of herbicide treatment, manual labor with hand-held tools and potential, occasional use of motorized equipment. Supplemental watering may be included for a period of time to support achievement of percent cover criteria and successful restoration of target vegetation communities as part of adaptive management. In the event motorized equipment is used, the operation of the equipment would occur during the daytime when construction noise would be exempt under local noise ordinances. The long-term operation and maintenance-related noise would not expose people to noise levels in excess of standards established in the local general plan or noise ordinance.

Non-Native Aquatic Species Management Measure, Cowbird Trapping Measure

Direct Impacts
Implementation of the above non-native wildlife management measures would involve the use of light to medium size trucks. It is anticipated that minimal noise impacts would be generated. Additionally, these measures would be conducted during hours of the day, when construction noise would be exempt under local noise ordinances. Therefore, the non-native wildlife management activities would not expose people to noise levels in excess standards established in the local general plan or noise ordinance.

Indirect Impacts
Implementation of the above non-native wildlife management measures would not result in any indirect noise-related impacts. Therefore, non-native wildlife management measures would not conflict with any local general plan or noise ordinance.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would involve regular inspection of the focal areas and the removal of non-native wildlife with light to medium size trucks that would emit minimal noise impacts. Additional adaptive management may include adjustments to cowbird control and fish removal methods, level of effort, and/or trap locations. These activities would not expose people to noise levels in excess standards established in the local general plans or noise ordinance standards.

Level of Impact for Alternative 2
Less than Significant Impact. Construction, operation, maintenance, and adaptive management activities associated with the non-native wildlife management would not result in an exposure of persons to or generation of noise levels in excess standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 Feet Year-Round with Incidental Sediment Removal)
Compared to Alternative 2, the level of noise impacts from the Water Conservation Plan would be similar. No adverse noise impacts would occur.

Under Alternative 3, an incidental, smaller scale sediment removal program would be implemented in conjunction with the Water Conservation Plan. Potential sources of noise impacts from the implementation of incidental sediment removal program would include:

- Construction of the Sediment Removal Channel and Sediment Storage Site B
- Green Waste Processing
- Sediment Removal Activities
- Sediment Storage

Construction of Sediment Removal Channel and Sediment Storage Site B
The construction of the sediment removal channel and sediment storage Site B would involve the operation of heavy construction equipment. The nosiest piece of equipment operating for both construction activities would be a dozer at an estimated noise level of 82 dBA at 50 feet. The applicable noise regulations would be the County of Riverside Noise Ordinance and the City of Corona Noise Ordinance. There are no sensitive receptors in vicinity of the sediment removal channel or sediment storage Site B. Additionally, the construction activities for the sediment removal channel and the sediment storage site would occur during the hours of the day when construction noise would be exempt under the Riverside County Noise Ordinance and the City of Corona Noise Ordinance. Therefore, the construction activity would not conflict with any local general plans or noise ordinance standards and the noise impacts would be less than significant.

Green Waste Processing
The vegetation removed from the sediment removal channel would be processed at a green waste area within sediment storage Site B. The nosiest piece of construction equipment that would be operating would be a tub grinder at an estimated noise level of 85 dBA at 50 feet. The construction activities for the sediment removal channel and the sediment storage site would occur during the hours of the day when construction noise would be exempt under the Riverside County Noise Ordinance and the City of Corona Noise Ordinance. Therefore, the construction activity would not conflict with any local general plans or noise ordinance standards and the noise impacts would be less than significant.

Sediment Removal Activities
Under Alternative 3, the sediment would be removed by heavy construction equipment. The nosiest piece of equipment would be a dozer at an estimated noise level of 85 dBA at 50 feet. The sediment removal activities would occur during the hours of the day when construction noise would be exempt under the Riverside County Noise Ordinance and the City of Corona Noise Ordinance. Therefore, the construction activity would not conflict with any local general plans or noise ordinance standards and the noise impacts would be less than significant.

Sediment Storage Activities
The sediment removed from the sediment removal channel would be stockpiled at the sediment storage Site B. The nosiest piece of equipment involved with the stockpiling of the sediment would be a dozer at an estimated noise level of 85 dBA. The sediment storage activities would occur during the hours of the day when construction noise would be exempt under the Riverside County Noise Ordinance and the City of Corona Noise Ordinance. Therefore, the construction activity would not conflict with any local general plans or noise ordinance standards and the noise impacts would be less than significant.

Indirect Impacts
Indirect noise-related impacts would occur from off-site vehicle travel (e.g., haul trucks) associated with implementation of the incidental sediment removal activities. Because no local noise standards directly apply to such sources of noise, the off-site vehicle travel noise impacts would not conflict with any local general plans or noise ordinance standards.

Long-Term Operation and Maintenance Impacts
The primary long-term operation and maintenance activity would be the maintenance of the access road. Vegetation, sediment and debris would be removed from the alignment of the access road and would involve a similar mix of heavy construction equipment that would be used in Alternative 2. These activities would occur during the hours of the day when construction noise would be exempt under local noise ordinances. Therefore, long-term operation and maintenance impacts due to noise levels in excess of standards established in the local general plans or noise ordinances would be less than significant.

Ecosystem Restoration Plan

Direct, Indirect and Long-Term Operation and Maintenance Impacts

Chino Creek Channel Restoration Measure
This measure is the same as described for Alternative 2 and therefore the level of potential noise impacts would be the same and would be less than significant. Construction, operations and maintenance activities would not expose people to noise levels in excess standards established in the local general plans or noise ordinance.

Invasive Plant Management Measure, Native Plantings Measure
This measure is the same as described for Alternative 2 and therefore the level of potential impacts would be the same. Construction, operations and maintenance activities would occur during the hours of the day when construction noise would be exempt under local general plans and noise ordinance standards and therefore noise impacts would be less than significant.

Cowbird Trapping Measure
As described for Alternative 2, implementation of the Cowbird Trapping Measure would involve the use of light to medium size trucks. It is anticipated that minimal noise impacts would be generated. Additionally, the measure would be conducted during hours of the day when construction noise would be exempt under local noise ordinances. Therefore, activities

associated with the Cowbird Trapping Measure would not expose people to noise levels in excess of standards established in the local general plans or noise ordinance standards.

Level of Impact for Alternative 3
Less than Significant Impact. Construction and long-term operation and maintenance activities would not result in the exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts
This plan is the same as described for Alternative 2 and therefore the level of potential noise-related impacts would be the same. No adverse impacts would occur.

Indirect Impacts
Compared to Alternative 2, indirect impacts would be same. No adverse impacts would occur.

Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, long-term operation and maintenance impacts would be the same. No adverse impacts would occur.

Ecosystem Restoration Measures

Direct Impacts

Sediment Management Measure
This measure is the same as described for Alternative 2 and therefore the potential noise-related impacts would be the same and would be less than significant. This measure would not result in noise levels that exceed standards established in the local general plans or noise ordinances, except possibly during night-time re-entrainment activities. Similar to Alternative 2, with the implementation of Environmental Commitments EC-N-2 and EC-N-3 the construction activity would not expose people to noise levels in excess of standards established in the local general plan or noise ordinance.

Chino Creek Channel Restoration Measure
This measure is the same as described for Alternative 2 and therefore the potential noise-related impacts would be the same and would be less than significant. Construction activities would not expose people to noise levels in excess of standards established in the local general plans or noise ordinance.

In-stream Habitat Features Measure Downstream
This measure is the same as described for Alternative 2 and therefore potential noise-related impacts would be the same and would be less than significant. This measure would not result in noise levels that exceed standards established in the local general plans or noise ordinances.

In-stream Habitat Features Measure Upstream

Under Alternative 4, In-Stream Habitat Features would also be constructed within the SARM Upstream Focal Area. A similar mix of heavy equipment would be used for construction as the In-stream Habitat Features Downstream as described in Alternative 2. Construction activities would occur during the hours of the day when construction noise would be exempt under local noise ordinances. Therefore, this measure would not conflict with standards established in the local general plans or noise ordinances and the noise impacts would be less than significant.

Riparian Edge Management Measure, Invasive Plant Management Measure, Native Plantings Measure

These measures are the same as described for Alternative 2 and therefore potential noise-related impacts would be the same and would be less than significant. These measures would not result in noise levels that exceed standards established in the local general plans or noise ordinances.

Non-Native Aquatic Species Management Measure, Feral Pig Management Measure, Cowbird Management Measure

With exception of feral pig management, these measures are the same as described for Alternative 2 and therefore potential noise-related impacts would be the same and would be less than significant. These measures would not result in noise levels that exceed standards established in the local general plans or noise ordinances. Feral pig management would not require the use of heavy equipment and would not generate noise levels in excess of applicable standards.

Indirect Impacts

With exception of feral pig management, expanded non-native aquatics control to include downstream areas, and placement of instream habitat features in the upstream transition channel, all of the other measures are the same as described for Alternative 2, and therefore indirect impacts would be the same and no adverse impacts would occur. Feral pig management and non-native aquatics control would not require any construction activity or use of heavy equipment and therefore would not result in indirect noise impacts that exceed applicable standards. Similar, to instream features in the downstream location, placement of these features in the upstream area would occur during daylight hours and therefore would be in compliance with applicable standards.

Long-Term Operation and Maintenance Impacts

Compared to Alternative 2, long-term operation, maintenance and adaptive management impacts would be similar and would be less than significant.

Level of Impact for Alternative 4

Less than Significant Impact. Construction, long-term operation and maintenance, and adaptive management activities would not result in an exposure of persons to or generation of noise levels in excess standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

5.10.4.2 **IMPACT N-2**: A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, neither the Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. Water would continue to be stored up to elevation 498 feet during the winter and up to elevation 505 feet during the summer. Additionally, none of the proposed Ecosystem Restoration Plan measures would be implemented. Therefore, no construction or operational noise impacts would occur in the study area and existing ambient noise levels would remain at their current levels.

ALTERNATIVE 2: PROPOSED ACTION

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts
Implementation of the Water Conservation Plan would not involve any activities that would generate noise. Therefore, there would be no temporary or periodic increase in ambient noise levels in the area where the Water Conservation Plan would be implemented.

Indirect Impacts
As no noise would be generated, no indirect impacts would occur.

Future Operation and Maintenance Impacts
Continued operation of the Water Conservation Plan would not generate noise, and therefore no impacts would occur.

Ecosystem Restoration Plan

Direct Impacts
The construction of the proposed measures under the Ecosystem Restoration Plan in some cases would involve the operation of heavy construction equipment which would result in the temporary increase in existing ambient noise levels within the areas where the measure would be implemented. The level of increase would depend on the measure implemented and the mix of construction equipment used. Anticipated noise levels associated with individual restoration measures are described above for the previous significance criteria. Implementation of the proposed sediment management measure, the Chino Creek measure and the in-stream habitat features measure in particular involve the operation of several pieces of construction equipment that would temporarily increase in existing ambient noise levels where the construction activity would occur. In those instances where sensitive receptors are nearby, there would be temporary substantial increase in ambient noise levels over the current condition. Sound attenuation measures would be incorporated into the construction operations to minimize noise level impacts. With the implementation of Environmental Commitments EC-N-1, EC-N-2 and EC-N-

3, impacts due to the temporary or periodic increase in ambient noise levels above existing levels where construction activities would take place would be less than significant.

Indirect Impacts
Indirect noise impacts would occur from truck hauling trips, delivery of materials and the transportation of workers to the various construction sites. A typical large truck would generate noise levels of approximately 50 dB CNEL at 50 feet. The off-site traffic would occur along designated truck hauling routes, major arterials and the mainline freeway system. This level of noise emitted from the truck traffic most likely would not be discernable from the ambient traffic noise occurring along the roadways and freeway system. Additionally, there would be no truck hauling or truck deliveries through streets where sensitive receptors would be present. Therefore, no sensitive receptors along the haul route would be exposed to a temporary increase in the ambient noise level.

Long-Term Operation and Maintenance Impacts
During long-term operation, maintenance, and adaptive management, there would be substantially less truck hauling and mobilization and demobilization of heavy construction equipment. A majority of the vehicle trips would involve the use of light to medium trucks that emit minimal noise impacts. Traffic relative to the long-term operation, maintenance, and adaptive management activities would still occur in designated truck hauling routes, major arterials and the mainline freeway system. Sensitive receptors away from major roadways or streets, therefore, would not be exposed to the potential increase in ambient noise level and therefore there would be no adverse impacts.

Level of Impact for Alternative 2
Less than Significant Impact. Construction, long-term operation and maintenance, and adaptive management activities would not result in a temporary or periodic increase in ambient noise levels above existing levels.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 Feet with Incidental Sediment Removal)

Direct, Indirect and Long-Term Operation and Maintenance Impacts
As with Alternative 2, water conservation would not involve any activities that would generate noise. Alternative 3, however, also includes a small-scale sediment removal program. Implementation of this measure would involve the operation of several pieces of construction equipment that would temporarily increase in existing ambient noise levels where the construction activity would occur. In those instances where sensitive receptors are nearby, there would be temporary substantial increase in ambient noise levels over the current condition. Sound attenuation measures would be incorporated into the construction operations to minimize noise level impacts. With the implementation of Environmental Commitments EC-N-1, EC-N-2 and EC-N-3, impacts due to the temporary or periodic increase in ambient noise levels above existing levels where construction activities would take place would be less than significant.

Ecosystem Restoration Plan

Direct Impacts
Compared to Alternative 2, Alternative 3 would implement a smaller mix of measures under the Ecosystem Restoration Plan. There would be less heavy construction equipment operating and fewer temporary ambient noise level impacts. Additionally, sound attenuation measures would be incorporated into the construction activities to minimize temporary ambient noise level impacts. Similar to Alternative 2, with the implementation of Environmental Commitments EC-N-1, EC-N-2 and EC-N-3, impacts to the temporary or periodic increase in ambient noise levels above existing levels where construction activities would take place would be less than significant.

Indirect Impacts
Compared to Alternative 2, indirect impacts would be the same. Temporary or periodic increase in ambient noise levels above existing levels where construction activities would take place would not occur.

Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, level of impacts would be the same and Temporary or periodic increase in ambient noise levels above existing levels where construction activities would take place would not occur.

Level of Impact for Alternative 3
Less than Significant Impact. Construction and long-term operation and maintenance activities would not result in a temporary or periodic increase in ambient noise levels above existing levels.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct, Indirect and Long-Term Operation and Maintenance Impacts
This is the same plan as described under Alternative 2, and therefore impacts would be the same. As discussed under Alternative 2, implementation of the Water Conservation Plan would not involve any activities that would generate noise. Therefore, there would be no temporary or periodic increase in ambient noise levels in the area where the Water Conservation Plan would be implemented.

Ecosystem Restoration Plan

Direct Impacts
Compared to Alternative 2, Alternative 4 would implement a larger mix of measures under the Ecosystem Restoration Plan. There would be an increased amount of heavy construction equipment operating and higher potential for temporary ambient noise level impacts. Similar to Alternative 2, the temporary increase in ambient noise levels would be short-term and would occur during daytime hours when most people are not home and during the hours when

construction equipment noise would be exempt under local noise ordinances. Additionally, sound attenuation measures would be incorporated into the construction operations to minimize ambient noise level impacts. Similar to Alternative 2, with the implementation of Environmental Commitments EC-N-1, EC-N-2 and EC-N-3, impacts to the temporary or periodic increase in ambient noise levels above existing levels where construction activities would take place would be less than significant.

Indirect Impacts
Compared to Alternative 2, indirect impacts would be the same. There would not be a temporary or periodic increase in ambient noise levels above existing levels where construction activities would take place.

Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, indirect impacts would be the same. Temporary or periodic increase in ambient noise levels above existing levels where construction activities would take place would not occur.

Level of Impact for Alternative 4
Less than Significant Impact. Construction and long-term operation and maintenance activities would not result in a temporary or periodic increase in ambient noise levels above existing levels where construction activities would take place.

5.11 AESTHETICS

5.11.1 Regulatory Framework

State Scenic Highway
The State Scenic Highway Program was established to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to State highways. A scenic highway is designated under this program when a local jurisdiction adopts a scenic corridor protection program, applies to the California Department of Transportation for scenic highway approval, and receives notification from the California Department of Transportation that the highway has been designated as a Scenic Highway. Located within the vicinity of the study area, both State Route 71 and State Route 91 are identified as Eligible State Scenic Highways.

5.11.2 Impact Significance Criteria

The impact criteria below were taken from Appendix G of the CEQA guidelines and are also being adopted for NEPA. The impacts on aesthetics associated with the proposed alternatives would be considered significant if one or more of the conditions described below were to occur as a result of implementation of the project.

IMPACT A-1: Have a substantial adverse effect(s) on a scenic vista.

IMPACT A-2: Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a State Scenic Highway.

IMPACT A-3: Substantially degrade the existing visual character or quality of the site and its surrounding area.

IMPACT A-4: Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

5.11.3 Environmental Commitments

EC-A-1: Construction lighting fixtures would be shielded by providing side flap on lights. Onsite construction lighting would be arranged so that direct rays would not shine in or produce glares to nearby residential uses.

EC-A-2: If the onsite construction lighting creates a lighting or glare problem for residential properties, OCWD would implement corrective measures to resolve the problem. Such corrective measures would include raising the height of temporary construction walls or providing other shielding for lighting such as shielding on the light fixtures or relocating light fixtures.

5.11.4 Aesthetics Impacts

5.11.4.1 **IMPACT A-1**: Have a substantial adverse effect(s) on a scenic vista.

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under No Federal Action/No Project Alternative, neither the Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. Therefore, no impacts to existing scenic vistas would occur. Existing views surrounding the study area would not change.

ALTERNATIVE 2: PROPOSED ACTION

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts

Implementation of the Water Conservation Plan would not involve any construction activities that would result in adverse impacts to existing scenic vistas within the study area. The Water Conservation Plan would raise the surface water in the buffer pool from elevation 498 ft. up to elevation 505 ft. during the flood season, given sufficient inflow. The seven-foot increase in the buffer pool would not have a substantial adverse effect on existing scenic vistas in the Prado Basin and the surrounding areas.

Indirect Impacts
There are no activities proposed that would indirectly affect existing scenic vistas in the Prado Basin and the surrounding areas.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities that would affect existing scenic vistas in the Prado Basin and the surrounding areas.

Ecosystem Restoration Plan

Sediment Management Measure

Direct Impacts
Under the Proposed Action, the Sediment Management Measure would be implemented at the SARM Upstream Focal Area and at the SARM Downstream Focal Area. The measure would not involve the construction of any structures that would obstruct views into the Prado Basin. However, a substantial amount of vegetation would be removed to construct the sediment trap and water conveyance channels. The sediment trap and water conveyance channels would be constructed in the interior of the Prado Basin and most likely would not be viewable from public vistas. In the event they are noticed, they would appear as water bodies and when the vegetation grows back within temporarily affected areas, the features would blend into the existing landscape.

A sediment processing and sediment storage area is proposed northeast of the USACE Prado Field Office. Construction and operation of the sediment processing and sediment storage site would be within viewshed of the separately proposed future Santa Ana River Trail. The sediment processing and sediment storage activities would not adversely impact the overall views in the Prado Basin and the surrounding areas, and therefore potential impacts would be less than significant.

The proposed sediment re-entrainment system would involve the placement of a series of above ground pipelines and a crane on the Santa Ana River southern levee, downstream of Prado Dam. The re-entrainment area would be in an area that contains a considerable amount of improved structures and is largely void of any scenic resources. Therefore, existing scenic vistas in the Prado Basin and the surrounding areas could be adversely affected with construction equipment and construction activity during construction.

Indirect Impacts
Implementation of Sediment Management Measure would not result in any indirect impacts to scenic vistas in the Prado Basin and the surrounding areas.

Long-Term Operation and Maintenance Impacts
The long-term operation and maintenance activities, as well as adaptive management for the Sediment Management Measure would involve the operation of heavy construction equipment in the same areas where construction occurred. Adaptive management would include adjustments to methods, quantities and possibly locations of material excavated and, or re-entrained to ensure

that success criteria are met. Operation, maintenance and adaptive management activities would be confined to specific locations in the basin where sediment removal and placementwould occur and would not adversely affect overall scenic views of the Prado Basin and surrounding areas. Additionally, the operation, maintenance, and adaptive management activities, being at a distance, would have a less than significant impact on existing scenic vistas in the Prado Basin and the surrounding areas.

Chino Creek Channel Restoration Measure

Direct Impacts
Public views into the Chino Creek Focal Area are provided from Prado Regional Park, El Prado Golf Course, Prado Olympic Shooting Park, and SR 71. The primary scenic vistas in the area would be Chino Creek and the riparian forest in the Prado Basin. The proposed improvements to Chino Creek would involve vegetation clearing, grading, excavation of a new channel, construction of diversion pipes, stabilizers, and grade control structures, and the re-routing of Chino Creek through a new channel. The proposed improvements would have a less than significant impact on the existing vistasof Chino Creek or surrounding areas due to the temporary presence of construction equipment and construction activity..

Indirect Impacts
Implementation of the Chino Creek Channel Restoration Measure would not result in any indirect impacts to scenic vistas in the surrounding areas.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities could involve the use heavy construction equipment to remove debris from the channel and regrade existing access roads. Adaptive management may require the occasional presence of equipment to adjust gradient, channel dimensions or plantings to ensure that success criteria are met. The operation of the heavy construction equipment would be a temporary impact and would be for a short period of time. When completed, existing views of the Prado Basin and the surrounding areas would return to their pre-construction condition. Therefore, the operation, maintenance, and adaptive management activities would be a less than significant impact,

In-stream Habitat Features Measure Downstream

Direct Impacts
Under Alternative 2, In-Stream Habitat Features would be constructed within the SARM Downstream Focal Area. There would be a potential that the habitat features could be within the viewshed of the Santa Ana River Trail and SR 91. The in-stream habitat features consist of rock structure placements within the wetted channel of lower Santa Ana River. During construction, existing vistas of the lower Santa Ana River would temporarily be replaced with construction equipment and construction activity. After construction, scenic vistas within the Santa Ana River and the surrounding areas would return to the pre-construction condition and impacts would be less than significant.

Indirect Impacts
Implementation of In-Stream Habitat Features Measure would not result in any indirect impacts to existing scenic vistas within the Santa Ana River downstream and the surrounding areas.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would involve regular inspections of the in-stream habitat rock structures to evaluate their performance and adaptive management may require occasional presence of equipment to reposition or bring in additional rocky material to ensure that success criteria are met. The temporary disruption would not involve any activities that would permanently alter existing scenic vistas within the Santa Ana River or vicinity and therefore, impacts would be less than significant.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Treatment Measure

Direct Impacts
Implementation of the above ecosystem restoration measures would not involve the construction of any structures that would permanently obstruct or modify existing scenic vistas, site quality, or visual character of the Santa Ana River and the surrounding areas. However, during implementation of the measures, existing vegetation would be removed and some existing scenic vistas and surrounding areas would be impacted with the presence of construction equipment and construction activity. Construction would take place for short periods of time and would be confined to specific locations that would most likely be obstructed from public view by surrounding terrain and vegetation. Once construction is completed, existing scenic vistas would return to their pre-construction condition and impacts would be less than significant.

Indirect Impacts
Implementation of the In-Stream Habitat Features Measure would not result in any indirect impacts to existing scenic vistas within the Santa Ana River and the surrounding areas.

Long-Term Operation and Maintenance Impacts
Long-term operation, maintenance and adaptive management activities would involve regular inspection of the areas and removal of non-native vegetation by a combination of herbicide treatment and manual labor with hand-held tools. Supplemental watering may be included to support achievement of percent cover criteria and successful restoration of target vegetation communities as part of adaptive management. These activities would be confined to specific areas for a short period of time. Potential operation, maintenance, and adaptive management impacts to existing scenic vistas would return to their pre-construction condition and would be less than significant.

Cowbird Trapping Measure, Non-Native Aquatic Management Measure

Direct Impacts
The above non-native wildlife management measures would be conducted in natural open space areas using existing maintenance roads and trails and would not involve the construction of any structures. Therefore, impacts to existing scenic vistas would be less than significant.

Indirect Impacts
Implementation of the above non-native wildlife management measures would not result in any indirect impacts to existing scenic vistas.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would involve regular inspection of the focal areas and the removal of non-native wildlife. These activities would be confined to specific areas for a short period of time. Additional adaptive management may include adjustments to cowbird control and fish and removal methods, level of effort, and/or trap locations. Potential operation, maintenance, and adaptive management impacts to scenic vistas would be less than significant.

Level of Impact for Alternative 2
Less than Significant Impact. Construction and long-term operation and maintenance activities would not have a substantial adverse effect on existing scenic vistas, site quality, or visual character of the Santa Ana River and the surrounding areas would return to their pre-construction condition and would be less than significant.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 Feet with Incidental Sediment Removal)

Direct Impacts
Compared to Alternative 2, the level of potential impacts to existing scenic vistas from the Water Conservation Plan would be similar. No adverse impacts to scenic vistas would occur.
Under Alternative 3, a smaller scale sediment removal program would be implemented in conjunction with the Water Conservation Plan. The sediment removal activities would only occur in the SARM Upstream Focal Area and would have a substantially smaller sediment trap and sediment storage site construction footprint. Implementation of the measure would not involve the construction of any structures that would permanently obstruct or modify existing views into the study area. Similar to Alternative 2, the sediment trap and water conveyance channels would be constructed in the interior of the Prado Basin and most likely would not be viewable from public vistas.
Under Alternative 3, the sediment processing and storage site would have a smaller construction footprint but would still be within the viewshed of the Santa Ana River Trail. Similar to Alternative 2, the sediment processing and sediment storage activities would only impact views along a small segment of the trail and would not adversely impact overall scenic views. Therefore, potential impacts to scenic vistas would be less than significant.

Indirect Impacts
Implementation of the above incidental sediment removal activities would not result in any indirect impacts to existing scenic vistas, site quality, or visual character in the Prado Basin and the surrounding areas would be less than significant.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would involve the maintenance of existing roads, which most likely would be obstructed from public viewshed by surrounding terrain and vegetation. Similar to Alternative 2, potential maintenance impacts to existing scenic vistas would be less than significant. Compared to Alternative 2, there would be smaller construction footprints, fewer pieces of construction equipment operating and less potential that existing views would be interrupted with construction activities.

Ecosystem Restoration Plan

Direct, Indirect and Future Operation and Maintenance Impacts

Chino Creek Channel Restoration Measure
This measure is the same as described for Alternative 2 and therefore the level of potential impacts to existing scenic vistas in the surrounding areas would be the same and would be less than significant.

Invasive Plant Management Measure, Native Plantings Measure
These measures are the same as described for Alternative 2 and therefore the level of potential impacts to existing scenic vistas in the surrounding areas would be the same and would be less than significant.

Cowbird Trapping Measure
This measure is the same as described for Alternative 2 and therefore the level of potential impacts to existing scenic vistas in the surrounding areas would be the same and would be less than significant.

Level of Impact for Alternative 3
Less than Significant Impact. Construction and long-term operation and maintenance activities would not have a substantial adverse effect on existing scenic vistas.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts
This plan is the same as described for Alternative 2 and therefore the level of potential impacts to existing scenic vistas would be the same. Potential impacts to scenic vistas would be less than significant.

Indirect Impacts
Compared to Alternative 2, indirect impacts would be the same, and would be less than significant.

Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, long-term operation and maintenance impacts would be the same, and would be less than significant.

Ecosystem Restoration Plan

Direct impacts

Sediment Management Measure
This measure is the same as described for Alternative 2 and therefore the level of potential impacts to existing scenic vistas would be the same. Potential impacts to scenic vistas would be less than significant.

Chino Creek Channel Restoration Measure
This measure is the same as described for Alternative 2 and therefore the level of potential impacts to existing scenic vistas would be the same. Potential impacts to scenic vistas would be less than significant.

In-stream Habitat Features Measure Downstream
This measure is the same as described for Alternative 2 and therefore potential impacts to existing vistas within the SARM Downstream Focal Area and surroundings would be the same and would be less than significant.

In-stream Habitat Features Measure Upstream
Under Alternative 4, In-Stream Habitat Features would also be constructed within the SARM Upstream Focal Area. There would be low potential for the habitat features to be observed from existing trails. The in-stream habitat features consist of rock structure placements within the wetted channel of the Santa Ana River. The rock structures would blend into the existing aesthetic environment and would not result in substantial adverse impacts to existing scenic vistas of the Santa Ana River. During construction, existing vistas of the lower Santa Ana River would temporarily be replaced with construction equipment and construction activity. The temporary impact would be for a short period of time and when completed the existing scenic vistas within the Santa Ana River upstream would return to their pre-construction condition.
Invasive Plant Management Measure, Native Planting Measure, Riparian Edge Management Measure
These measures are the same as described for Alternative 2 and therefore the level of potential impacts to existing scenic vistas would be the same. Potential impacts to existing scenic vistas would be less than significant.

Feral Pig Management Measure, Non-Native Aquatic Control Measure (Upstream and Downstream), Cowbird Trapping Measure
Implementation of the above non-native wildlife management measures would not result in any long-term operation and maintenance or short-term construction-related physical changes to the environment that would affect scenic vistas. Impacts to existing vistas within the study area would be less than significant.

Indirect Impacts
With the exception of feral pig management, expanded non-native aquatics control to include downstream areas, and placement of instream habitat features in the upstream transition channel, all other measures are the same as described for Alternative 2, and therefore indirect impacts would be the same and would be less than significant. Feral pig management could indirectly benefit the viewshed by reducing damage to vegetation by an expanding population, although the change would be minor as seen from a distance. Expanded non-native aquatics control and placement of instream habitat features in the transition channel would not have indirect impacts.

Long-Term Operation and Maintenance Impacts
With exception of feral pig management, expanded non-native aquatics control to include downstream areas, and placement of instream habitat features in the upstream transition channel, all of the other measures are the same as described for Alternative 2, and therefore impacts from long-term operation and maintenance would be the same and would be less than significant. Continued implementation of feral pig management could indirectly benefit the viewshed by reducing damage to vegetation by an expanding population, although the change would be minor as seen from a distance. Continued implementation, operation and maintenance of the expanded aquatics control and instream habitat features in the transition channel would have no additional impact beyond insignificant construction impacts.

Level of Impact for Alternative 4
Less than Significant Impact. Construction and long-term operation and maintenance activities would not have a substantial adverse effect on existing scenic vistas.

5.11.4.2 **IMPACT A-2**: Substantially damages scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a State Scenic Highway.

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT ALTERNATIVE

Under the No Federal Action/No Project Alternative, neither the Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. There would be no change to existing views from State Scenic Highways surrounding Prado Basin or along Reach 9 of the Santa Ana River.

ALTERNATIVE 2: PROPOSED ACTION

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts
Both State Route 71 and State Route 91 are identified as Eligible State Scenic Highways that provide scenic views into the Prado Basin and along the lower Santa Ana River. The proposed Water Conservation Plan would raise the water surface elevation in the buffer pool from elevation 498 ft. up to elevation 505 ft. during the flood season when sufficient inflow occurs and would retain water longer in the Prado Basin reservoir. A seven-foot increase in the water surface level and the longer retention of water would not result in adverse changes to existing

scenic views along SR 71 or SR 91. No adverse impacts to scenic resources within a state scenic highway would occur.

Indirect Impacts
Implementation of the Water Conservation Plan would not result in any indirect impacts to scenic resources within a state scenic highway.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities that result in any indirect impacts to scenic resources within a state scenic highway.

Ecosystem Restoration Plan

Sediment Management Measure

Direct Impacts
The proposed Sediment Management Measure would be implemented within the interior of Prado Basin. Because of the distance, topography and vegetation between SR 71 and SR 91, only limited components of the Sediment Management Measure would likely be visible to motorists along the SR 71 and SR 91. Any potential view impacts from construction would be temporary and most likely not discernable. Impacts to scenic resources within a state scenic highway would be less than significant.

Indirect Impacts
Implementation of Sediment Management Measure would not result in any indirect impacts to scenic resources within a state scenic highway.

Long-Term Operation and Maintenance Impacts
The long-term operation and maintenance activities for the Sediment Management Measure would involve the operation of heavy construction equipment in the same areas where construction occurred. Adaptive management would include adjustments to methods, quantities and possibly locations of material excavated and, or re-entrained to ensure that success criteria are met. Because of the distance, topography and vegetation between SR 71 and SR 91, only limited components of the Sediment Management Measure would likely be within the viewshed of motorists along the SR 71 and SR 91. Any potential view impacts from operation, maintenance and adaptive management would be short-term and most likely not discernable. Impacts to scenic resources within a state scenic highway, therefore, would be less than significant.

Chino Creek Channel Restoration Measure

Direct Impacts
Construction activities for the Chino Creek Channel Restoration Measure could partially be within the viewshed of motorists driving along SR 71. Implementation of the Chino Creek Channel Measure would modify Chino Creek. Heavy construction equipment would be present during construction activities, but upon completion of construction, the feature would appear as

a natural creek system as viewed from the SR 71. Over the long-term, scenic resources of Chino Creek from SR 71 would not substantially damaged over the current condition. Impacts to scenic resources within a state scenic highway would be less than significant.

Indirect Impacts
Implementation of Chino Creek Channel Restoration Measure would not result in any indirect impacts to scenic resources within a state scenic highway.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities could involve the use of heavy construction equipment to remove sediment from the channel and regrade existing access roads. Adaptive management may require the occasional presence of equipment to adjust gradient, channel dimensions or plantings to ensure that success criteria are met. The operation of the heavy construction equipment would be a temporary impact and would be for a short period of time and most likely would not be discernable. Impacts to scenic resources within a state highway would be less than significant.

In-stream Habitat Features Measure Downstream

Direct Impacts
Under Alternative 2, In-Stream Habitat Features would be constructed along the Santa Ana River within the SARM Downstream Focal Area. There is a potential that habitat features/structures are within the viewshed of the Santa Ana River along SR 91. The In-stream Habitat Features would consist of rock structures positioned in the Santa Ana River Channel. The rock structures would blend in with the existing aesthetic environment and would not substantially damage the long-term existing scenic vistas of the Santa Ana River along SR-91. During construction, scenic vistas of the lower Santa Ana River would temporarily be replaced with construction equipment and construction activity. The temporary impact would be for a short period of time, and when completed the scenic vistas would return to their pre-construction condition. Impacts to scenic resources within a state scenic highway would be less than significant.

Indirect Impacts
Implementation of In-Stream Habitat Features Measure would not result in any indirect impacts to scenic resources within a state scenic highway.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would involve regular inspections of the habitat structures to evaluate their performance and would not result in any impacts to scenic resources within a state scenic highway. Adaptive management may require the occasional presence of equipment to reposition or bring in additional rocky material to ensure that success criteria are met. Potential impacts would be less than significant.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Treatment Measure

Direct Impacts
Implementation of the above measures would not substantially change existing long-term views along SR 71 or SR 91. The measures would involve grading and non-native vegetation removal activities. There would be some potential that existing views from SR 71 and SR 91 be temporarily replaced with construction equipment and construction activities. Potential construction-related visual impacts along State Scenic Highways would be temporary and for a short period of time and most likely would be screened by surrounding terrain and vegetation. Therefore, the overall scenic resources impact within a state scenic highway would be less than significant.

Indirect Impacts
Implementation of the above measures under the Ecosystem Restoration Plan would not result in any indirect impacts to scenic resources within a state highway.

Long-Term Operation and Maintenance Impacts
Long-term operation, maintenance, and adaptive management activities would involve regular inspections of the restoration areas and removal of non-native vegetation by a combination of herbicide treatment and manual labor with hand held tools. Similar to construction activities, the long-term operation and maintenance activities would be confined to specific areas and would be for a short period of time and most likely would be screened by surrounding terrain and vegetation. Impacts to scenic resources from the long-term operation and maintenance of the project within a State Scenic highway would be less than significant.

Non-Native Aquatic Species Management Measure, Cowbird Trapping Measure

Direct Impacts
Implementation of the above non-native wildlife management measures would not involve any activities that would result in substantial adverse impacts to scenic resources along a state scenic highway.

Indirect Impacts
Implementation of the above measures under the Ecosystem Restoration Plan would not result in any indirect impacts to scenic resources within a State Scenic highway.
Long-Term Operation and Maintenance Impacts
Long-term operation, maintenance and adaptive management activities would not cause significant impacts to scenic resources within a State Scenic highway.

Level of Impact Alternative 2
Less than Significant Impact. Construction and long-term operation and maintenance activities would not substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a State Scenic Highway.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 Feet with Incidental Sediment Removal)

Direct Impacts
Compared to Alternative 2, the level of impacts to scenic resources along SR 91 and SR 71 from the implementation of the Water Conservation Plan would be similar. Less than significant impacts to scenic resources within a State Scenic highway would occur.
Under Alternative 3, a smaller scale sediment removal program would be implemented in conjunction with the Water Conservation Plan. Similar to Alternative 2, the sediment removal construction activity would be conducted at a distance where it would most likely not be discernable from any State Scenic highway. Potential impacts to scenic resources within a State Scenic highway would be less than significant. Compared to Alternative 2, there would be a smaller construction footprint with fewer pieces of heavy equipment operating. Therefore, potential impacts to scenic resources within a State Scenic highway would be less than significant.

Indirect Impacts
Implementation of the incidental sediment removal activities would not result in any indirect impacts to scenic resources within a state highway.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would involve the maintenance of existing roads which would likely be obstructed from public viewshed by surrounding terrain and vegetation. Potential impacts to scenic resources within a state highway would be less than significant.

Ecosystem Restoration Plan

Direct, Indirect and Future Operation and Maintenance Impacts

Chino Creek Channel Restoration Measure
This measure is the same as described for Alternative 2 and therefore, the level of potential impacts to scenic resources within a State Scenic highway would be the same and would be less than significant.

Invasive Plant Management Measure, Native Plantings Measure
These measures are the same as described for Alternative 2 and therefore implementation of the above measures would not substantially change existing long-term views along SR 91 or SR71. Because of the distance, existing topography and vegetation, it would be unlikely that the implementation of the Invasive Plant Management Measure or the Native Plantings Measure would affect scenic resources from SR 91 or SR 71. Compared to Alternative 2, the level of potential impacts to scenic resources within a State Scenic highway would be the same and less than significant.

Cowbird Trapping Measure
Implementation of the Cowbird Trapping Measure would not impact scenic resources within a State Scenic highway.

Level of Impact Alternative 3
Less than Significant Impact. Construction and long-term operation and maintenance activities would not substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state highway.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts
This measure is the same as described for Alternative 2 and therefore, the level of potential impacts to scenic resources within SR 91 and SR 71 would be the same. Potential impacts to scenic resources within a state highway would be less than significant.

Indirect Impacts
Compared to Alternative 2, indirect impacts would be the same and would not result in any impacts to scenic resources within a State Scenic highway.

Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, long-term operation and maintenance impacts would be the same and would not result in any impacts to scenic resources within a State Scenic highway.

Ecosystem Restoration Plan

Direct Impacts

Sediment Management Measure
This measure is the same as described for Alternative 2 and therefore, the level of potential impacts to scenic resources within SR 71 and SR 91 would be the same. Potential impacts to scenic resources within a State Scenic highway would be less than significant.

Chino Creek Channel Restoration Measure
This measure is the same as described for Alternative 2 and therefore, the level of potential impacts to scenic resources within SR 71 would be the same. Potential impacts to scenic resources within a State Scenic highway would be less than significant.

In-stream Habitat Features Measure Downstream
This measure is the same as described for Alternative 2 and therefore, the level of potential impacts to scenic resources along SR 91 would be the same. Potential impacts to scenic resources within a State Scenic highway would be less than significant.

In-stream Habitat Features Measure Upstream
Under Alternative 4, In-Stream Habitat Features would also be constructed within the SARM Upstream Focal Area. The in-stream habitat features consist of rock structure placements within the wetted channel of the Santa Ana River. The rock structures would blend into the existing aesthetic environment and would not result in substantial adverse impacts to scenic resources of the Santa Ana River.

Invasive Plant Management Measure, Native Planting Measure, Riparian Edge Management Measure
These measures are the same as described for Alternative 2 and therefore, the level of potential impacts to scenic resources along SR 71 and SR 91 would be the same. Potential impacts to scenic resources within a State Scenic highway would be less than significant.

Feral Pig Management Measure, Non-Native Aquatic Control Measure, Cowbird Trapping Measure
Implementation of the above non-native wildlife management measures would not involve any activities that would result in permanent or temporary impacts to existing scenic resources within a State Scenic highway.

Indirect Impacts
With exception of feral pig management, expanded non-native aquatics control to include downstream areas, and placement of instream habitat features in the upstream transition channel, all other measures are the same as described for Alternative 2, and therefore indirect impacts would be the same and would be less than significant. None of the proposed activities would result in permanent or temporary impacts to existing scenic resources within a State Scenic highway.

Long-Term Operation and Maintenance Impacts
With exception of feral pig management, expanded non-native aquatics control to include downstream areas, and placement of instream habitat features in the upstream transition channel, all of the other measures are the same as described for Alternative 2, and therefore impacts from long-term operation and maintenance would be the same and would be less than significant. None of the proposed activities would result in permanent or temporary impacts to existing scenic

Level of Impact for Alternative 4
Less than Significant Impact. Construction and long-term operation and maintenance activities would not substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a State Scenic highway.

5.11.4.3 **IMPACT A-3** Substantially degrade the existing visual character or quality of the site and its surroundings of the project area.

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, neither the Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. Therefore, no adverse impacts to aesthetic resources would occur and there would not be any changes to the existing visual character or quality of the site and its surroundings or of the aesthetic character of the study area.

ALTERNATIVE 2: PROPOSED ACTION

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts

After the implementation of the Water Conservation Plan, the visual character of the study area would be similar, to the existing condition, except that the water surface level during the winter could potentially be higher and would be retained for longer periods of time. An increase in the buffer pool water level and the potential for water to be stored behind Prado Dam for longer periods of time would not substantially change the existing visual character or quality of the site and its surroundings.

Indirect Impacts

There are no activities associated with the Water Conservation Plan that would indirectly affect the visual character or quality of the site and its surroundings of the study area.

Long-Term Operation and Maintenance Impacts

There are no long-term operation and maintenance activities associated with the Water Conservation Plan that would affect the existing visual character or quality of the site and its surroundings of the study area.

Ecosystem Restoration Plan

Sediment Management Measure

Direct Impacts

The study area consists of undisturbed open space. The Sediment Management Measure would change the existing open space visual character of the study area. Additionally, during construction activities, some existing views into Prado Basin could temporarily be replaced with construction equipment and construction activities. However, the Sediment Management Measure would be confined to specific areas in the Prado Basin and would not adversely affect its overall existing visual character or quality of the site and its surroundings in the study area. Potential direct impacts would be less than significant.

Indirect Impacts

There are no activities associated with the Sediment Management Measure that would indirectly affect the existing visual character or quality of the site and its surroundings of the study area.

Long-Term Operation and Maintenance Impacts
The long-term operation, maintenance and adaptive management activities for the Sediment Management Measure would involve the operation of heavy construction equipment. The impacts would be confined to specific areas and would occur for short periods of time and would not adversely affect the overall existing visual character or quality of the site and its surroundings of the study area.

Chino Creek Channel Restoration Measure

Direct Impacts
Implementation of Chino Creek Channel Restoration Measure would not involve any activities that would substantially change the long-term aesthetic character of the Chino Creek Focal Area. The proposed ecosystem restoration measure would involve vegetation removal and grading activities within Chino Creek which would temporarily impact the existing open space setting of the area. The temporary construction impacts would be for a short period of time and once the construction and restoration activities are completed, the aesthetic character of the area would be returned to its pre-project condition. Potential impacts to the existing visual character or quality of the site and its surroundings of the study area would be less than significant.

Indirect Impacts
There are no activities associated with the Chino Creek Restoration measure that would indirectly affect the existing visual character or quality of the site and its surroundings of the study area.

Long-Term Operation and Maintenance Impacts
Long-term operation, maintenance and adaptive management activities could involve the use heavy construction equipment to remove sediment from the channel and regrade existing access roads. The maintenance impacts would be for a short period of time and once the operation and maintenance and restoration activities are completed the aesthetic character of the area would be returned to its pre-project condition. Potential long-term operation and maintenance impacts to the existing visual character or quality of the site and its surroundings of the study area would be less than significant.

In-Stream Habitat Features Measure Downstream

Direct Impacts
Under the Proposed Action, In-Stream Habitat Features are proposed along the lower Santa Ana River within the SARM Downstream Focal Area. Construction of the habitat features would include the placement of natural rock structures in the Santa Ana River Channel that would blend in with the existing aesthetic environment and remain unchanged over the long-term. Existing open water setting would temporarily be replaced with construction equipment and construction activities. The temporary impact would be for a short period of time and when completed, the existing visual character or quality of the site and its surroundings would return to its pre-construction condition. The temporary disruption to the existing visual character or quality of the site and its surroundings of the study area would be a less than significant impact.

Indirect Impacts
There are no activities associated with the In-Stream Habitat Features that would indirectly affect the visual character or quality of the site and its surroundings of the study area.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would involve regular inspections and minor modifications of the habitat structures to evaluate their performance and meet success criteria. These activities would not result in any impacts that would affect the existing visual character or quality of the site and its surroundings of the study area.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Treatment Measure

Direct Impacts
Implementation of the above ecosystem restoration measures would not involve the construction of any permanent structures or landform alterations that would result in substantial changes to the long term visual character or quality of the site and its surroundings of the study area. During construction, the existing open space character of the locations where the habitat restoration activities would be implemented could be altered with the operation of heavy construction equipment and construction activities. The construction activities would occur for a short period of time and when completed the existing visual character would be returned to pre-project condition with enhanced native vegetation and habitats. Potential impacts to the existing visual character or quality of the site and its surroundings of the study area would be less than significant.

Indirect Impacts
There are no activities associated with the above ecosystem restoration measures that would indirectly affect the existing visual character or quality of the site and its surroundings of the study area.

Long-Term Operation and Maintenance Impacts
Long-term operation, maintenance and adaptive activities would involve regular inspections of the area and removal of non-native vegetation by a combination of herbicide treatment and manual labor with hand held tools. These activities would have a less than significant effect to the overall existing visual character or quality of the site and its surroundings of the study area.

Non-Native Aquatic Species Management Measure, Cowbird Trapping Measure

Direct Impacts
Implementation of the above non-native wildlife management measures would not involve any activities that result in permanent or temporary impacts that would significantly change the existing visual character or quality of the site and its surroundings of the study area.

Indirect Impacts
There are no activities associated with the above wildlife management measures that would indirectly affect the existing visual character or quality of the site and its surroundings of the study area.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities associated with the above wildlife management measures that would affect the existing visual character or quality of the site and its surroundings of the study area.

Level of Impact Alternative 2
Less than Significant Impact. Construction and long-term operation and maintenance activities would not substantially degrade the existing visual character or quality of the site and its surroundings of the porjectarea.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 Feet with Incidental Sediment Removal)

Direct Impacts
Compared to Alternative 2, the level of potential impacts to the visual character or quality of the site and its surroundings of the study area from implementation of the Water Conservation Plan would be similar. The existing visual character of the study area would not substantially change. Under Alternative 3, a smaller scale incidental sediment removal program would be implemented in conjunction with the Water Conservation Plan. Similar, to Alternative 2, the construction of the Sediment Management Measure would not substantially change the overall existing visual character of the Prado Basin. Compared to Alternative 2, there would less area that would experience changes to the existing visual character or quality of the site and its surroundings of the study area.

Indirect Impacts
There are no activities associated with the Water Conservation Plan with incidental sediment removal activities that would indirectly affect the existing visual character or quality and its surroundings of the study area.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would involve the maintenance of existing roads. The maintenance impacts would be short-term and would not degrade the existing visual character quality of the site and its surroundings of the study area.

Ecosystem Restoration Plan

Direct, Indirect and Long-Term Operation and Maintenance Impacts

Chino Creek Channel Restoration Measure
This measure is the same as described for Alternative 2 and therefore, the level of impacts to the existing visual character or quality of the site and its surroundings would be the same and would be less than significant.

Invasive Plant Management Measure, Native Plantings Measure
These measures are the same as described for Alternative 2 and therefore, the level of impacts to the existing visual character or quality of the site and its surroundings would be the same and would be less than significant.

Cowbird Trapping Measure
Implementation of the Cowbird Trapping Measure would not involve any activities that would temporarily or permanently change the existing visual character or quality of the site and its surroundings of the study area.

Level of Impact for Alternative 3
Less than Significant Impact. Construction and long-term operation and maintenance activities would not substantially degrade the existing visual character or quality of the site and its surroundings of the study area.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts
Compared to Alternative 2, the level of potential impacts to the aesthetic character of the study area would be the same. No adverse impact to the existing visual character or quality of the site and its surroundings of the study area would occur.

Indirect Impacts
Compared to Alternative 2, indirect impacts would be the same and the existing visual character or quality of the site and its surroundings of the study area would have no adverse impacts.

Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, long-term operation and maintenance impacts would be the same and the existing visual character or quality of the site and its surroundings of the study area would have no adverse impacts.

Ecosystem Restoration Plan

Direct Impacts

Sediment Management Measure
This measure is the same as described for Alternative 2 and therefore, the level of potential impacts to the existing visual character or quality of the site and its surroundings of the study area would be the same and would be less than significant.

Chino Creek Channel Restoration Measure
This measure is the same as described for Alternative 2 and therefore, the level of potential impacts to the existing visual character or quality of the site and its surroundings of the study area would be the same and would be less than significant.

In-Stream Habitat Features Measure Downstream
In-Stream Habitat Features are proposed along the lower Santa Ana River within the SARM Downstream Focal Area. Construction of the habitat features would consist of the placement of natural rock structures in the Santa Ana River Channel that would blend in with the existing environment and would remain unchanged over the long-term. The existing open water setting would temporarily be replaced with construction equipment and construction activities for a short period of time and when completed, the open water setting would return to its pre-construction condition. The temporary disruption to the existing visual character or quality of the site and its surroundings of the study area would be a less than significant impact.

In-stream Habitat Features Measure Upstream
Under Alternative 4, In-Stream Habitat Features would also be constructed within the SARM Upstream Focal Area. As with the downstream features, the temporary disruption to the existing visual character or quality of the site and its surroundings of the study area would be a less than significant impact.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure
Implementation of the above ecosystem restoration measures would not involve the construction of any permanent structures or landform alterations that would result in substantial changes to the long term visual character or quality of the site and its surroundings of the study area. During construction, the existing open space character of the locations where the habitat recovery activities would be implemented could temporarily be altered with the operation of heavy construction equipment and construction activities. The construction activities would occur for a short period of time and when completed the existing visual character would be returned to pre-project condition with enhanced native vegetation or habitats. Similar, to Alternative 2, potential adverse impacts to the existing visual character or quality of the site and its surroundings of the study area would be less than significant.

Non-Native Aquatic Species Management Measure, Feral Pig Management Measure, Cowbird Trapping Measure

Implementation of the above non-native wildlife management measures would not involve any activities that result in permanent or temporary impacts that would significantly change the existing visual character or quality of the site and in areas where the measures would take place.

Indirect Impacts

With exception of feral pig management, expanded non-native aquatics control to include downstream areas, and placement of instream habitat features in the upstream transition channel, all other measures are the same as described for Alternative 2, and therefore indirect impacts would be the same and would be less than significant. None of the proposed activities would significantly change the existing visual character or quality of the site and in areas where the measures would take place.

Long-Term Operation and Maintenance Impacts

With exception of feral pig management, expanded non-native aquatics control to include downstream areas, and placement of instream habitat features in the upstream transition channel, all other measures are the same as described for Alternative 2, and therefore impacts from long-term operation and maintenance would be the same and would be less than significant. None of the proposed activities would significantly change the existing visual character or quality of the site and in areas where the measures would take place.

Level of Impact for Alternative 4

Less than Significant Impact. Construction and long-term operation and maintenance activities would not cause a substantial change to the visual character or quality of the site and its surroundings of the study area.

5.11.4.4 **IMPACT A-4**: Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under No Federal Action/No Project Alternative, neither the Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. There would be no change to the existing light or glare conditions in the study area. The study area would continue to experience day or night time lighting or glare impacts from existing land uses and road ways situated near the study area.

ALTERNATIVE 2: PROPOSED ACTION

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts

Implementation of the Water Conservation Plan would not create or introduce new sources of light or glare during the day or nighttime into the study area. No adverse light and glare impacts would occur.

Indirect Impacts
There are no activities associated with the Water Conservation Plan that would indirectly cause day or nighttime light or glare impacts.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities associated with the Water Conservation Plan that would cause day or nighttime light or glare impacts.

Ecosystem Restoration Plan

Sediment Management Measure

Direct Impacts
There is the potential that some of the sediment re-entrainment activities could occur at night. To insure safe working conditions when sediment re-entrainment would be occurring, temporary night time lighting would be required. The use of temporary lighting would be periodic and would only be used when high enough flows are available to re-entrain the sediment. There are existing residential land uses within the distant vicinity of where the sediment re-entrainment activities would occur and nearby residential uses could potentially be within the line of sight of the flood lights where spill over lighting or glare impacts would occur. To reduce potential light or glare impacts, the light fixtures would have side flaps to direct and confine the lighting to the sediment re-entrainment area. With implementation of Environmental Commitment EC-A-1 and EC-A-2, potential construction-related light or glare impacts would be less than significant.

Indirect Impacts
The operation of heavy construction equipment during construction could reflect glare from the surfaces of the construction equipment, especially those with reflective surfaces. The impact would be confined to specific locations in the study area for a short period of time. Potential light or glare impacts would be less than significant.

Long-Term Operation and Maintenance Impacts
The long-term operation, maintenance and adaptive management activities for the Sediment Management Measure would involve the operation of heavy construction equipment. All activities would occur during the day and would not require lighting. Operation of heavy equipment with reflective surfaces could indirectly result in temporary glare impact but the impact would be less than significant.

Chino Creek Channel Restoration Measure

Direct Impacts
Implementation of the proposed improvements would not introduce any new permanent or temporary sources of light or glare impacts into the study area. The operation of heavy equipment with reflective surfaces during construction could create glare which could indirectly affect views. The impact would be confined to specific locations in the study area for a short period of time and therefore, potential light and glare impacts would be less than significant.

Indirect Impacts
The operation of heavy construction equipment during construction activities could reflect glare from the surfaces of the construction equipment, especially those with reflective surfaces. The impact would be confined to specific locations in the study area for a short period of time and therefore, potential glare impacts would be less than significant.

Long-Term Operation and Maintenance Impacts
Long-term operation, maintenance and adaptive management activities could involve the use of heavy construction equipment to remove sediment from the channel and regrade existing access roads. All activities would occur during the day and would not require lighting. However, the operation of heavy equipment with reflective surfaces could create glare and indirectly affect views. The impact would be confined to specific locations in the study area for a short period of time and therefore, potential light and glare impacts would be less than significant.

In-Stream Habitat Features Measure Downstream

Direct Impacts
Implementation of the proposed In-Stream Habitat Features Measure Downstream would not introduce any new permanent or temporary sources of light. No light or glare impacts would occur.

Indirect Impacts
The operation of heavy construction equipment during construction activities could reflect glare from the surfaces of the construction equipment which could indirectly affect views. The impact would be confined to specific locations in the study area for a short period of time. Potential glare impacts would be less than significant.

Long-Term Operation and Maintenance Impacts
Long-term operation, maintenance and adaptive management activities would involve regular inspections and minor modifications to the habitat structure to evaluate their performance and meet success criteria. All activities would occur during the day and would not require lighting. No light or glare impacts would occur.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Treatment Measure

Direct Impacts
The proposed ecosystem restoration measures would not introduce any new permanent or temporary sources of light and glare impacts into the study area. No light and glare impacts would occur.

Indirect Impacts
The operation of heavy construction equipment during construction activities could reflect glare from the surfaces of the construction equipment which could indirectly affect views. The impact would be confined to specific locations in the study area for a short period of time. Potential glare impacts would be less than significant.

Long-Term Operation and Maintenance Impacts
Long-term operation, maintenance and adaptive management activities would involve regular inspections of the area and removal of non-native vegetation by a combination of herbicide treatment and manual labor with hand held tools. All activities would occur during the day and would not require lighting. No light or glare impacts would occur.

Non-Native Aquatic Species Management Measure, Cowbird Trapping Measure

Direct Impacts
Implementation of the above non-native wildlife management measures would not introduce any new permanent or temporary sources of light and glare impacts into the study area. No light and glare impacts would occur.

Indirect Impacts
No indirect light and glare impacts would occur.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities that would generate light and glare impacts.

Level of Impact for Alternative 2
Less than Significant Impact. Construction and long-term operation and maintenance activities would not create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 Feet with Incidental Sediment Removal)

Direct Impacts
Compared to Alternative 2, the level of light or glare impacts from the Water Conservation Plan would be the same. No light and glare impacts would occur.
Under Alternative 3, a smaller scale incidental sediment removal program would be implemented in-conjunction with the Water Conservation Plan. The sediment removal and hauling activities would not involve any activities that would require night time lighting. Compared to Alternative 2, no light and glare impacts would occur.

Indirect Impacts
The operation of heavy construction equipment during construction activities could reflect glare from the surfaces of the construction equipment which could indirectly affect views. The impact would be confined to specific locations in the study area for a short period of time. Therefore, potential light and glare impacts would be less than significant.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would involve the maintenance of existing roads. All activities would occur during the day and would not require lighting. Operation of heavy equipment could indirectly result in less than significant temporary glare impact.

Ecosystem Restoration Plan

Direct, Indirect and Long-Term Operation and Maintenance Impacts

Chino Creek Channel Restoration Measure
This measure is the same as described for Alternative 2 and therefore, the level of light or glare impacts would be the same. No light and glare impacts would occur.

Invasive Plant Management Measure, Native Plantings Measure
The proposed ecosystem restoration measures would not introduce any new permanent or temporary sources of light and glare impacts into the study area. No light and glare impacts would occur.

Cowbird Trapping Measure
Implementation of the Cowbird Trapping Measure would not introduce any new permanent or temporary sources of light and glare impacts into the study area. No light and glare impacts would occur.

Level of Impact for Alternative 3
Less than Significant Impact. Construction and long-term operation and maintenance activities would not create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts
Compared to Alternative 2, the level of light or glare impacts would be the same. No light and glare impacts would occur.

Indirect Impacts
Compared to Alternative 2, indirect impacts would be the same. No light and glare impacts would occur.

Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, long-term operation and maintenance impacts would be the same. No light and glare impacts would occur.

Ecosystem Restoration Plan

Direct Impacts

Sediment Management Measure
This measure is the same as described for Alternative 2 and therefore, the level of light or glare impacts would be the same. With the implementation of Environmental Commitments EC-A-1 and EC-A-2, potential construction-related light and glare impacts would be less than significant.

Chino Creek Channel Restoration
Implementation of the Chino Creek Channel Restoration Measure would not introduce any new permanent or temporary sources of light and glare impacts into the study area. Compared to the Proposed Action, the level of light glare impacts would be the same and would be less than significant.

In-Stream Habitat Feature Measure Downstream
Implementation of the SARM Downstream In-Stream Habitat Features would not introduce any new permanent or temporary sources of light and glare impacts into the study area. No light and glare impacts would occur.

In-stream Habitat Features Measure Upstream
Under Alternative 4, In-Stream Habitat Features would also be constructed within the SARM Upstream Focal Area. As with the downstream features, In-Stream Habitat Features would not introduce any new permanent or temporary sources of light and glare impacts into the study area. No light and glare impacts would occur.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure
Implementation of the above ecosystem restoration measures would not introduce any new permanent or temporary sources of light and glare impacts into the study area. No light and glare impacts would occur.

Non-Native Aquatic Species Management Measure, Feral Pig Management Measure, Cowbird Trapping Measure
Implementation of the above non-native wildlife management measures would not introduce any new permanent or temporary sources of light and glare impacts into the study area. No light and glare impacts would occur.

Indirect Impacts
With exception of feral pig management, expanded non-native aquatics control to include downstream areas, and placement of instream habitat features in the upstream transition channel, all of the other measures are the same as described for Alternative 2, and therefore indirect impacts would be the same and would be less than significant. None of the proposed activities would introduce any new permanent or temporary sources of light and glare impacts into the study area. No indirect light and glare impacts would occur.

Long-Term Operation and Maintenance Impacts
With exception of feral pig management, expanded non-native aquatics control to include downstream areas, and placement of instream habitat features in the upstream transition channel, all other measures are the same as described for Alternative 2, and therefore impacts from long-term operation and maintenance would be the same and would be less than significant. None of the proposed operation and maintenance activities would introduce any new permanent or temporary sources of light and glare impacts into the study area. No light and glare impacts would occur.

Level of Impact Alternative 4
Less than Significant Impact. Construction and long-term operation and maintenance activities would not create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

5.12 PUBLIC HEALTH AND SAFETY, HAZARDOUS, TOXIC, RADIOACTIVE WASTE

5.12.1 Regulatory Framework

5.12.1.1 Federal Regulations

The principal federal regulatory agency for hazardous substances is the U.S. EPA. The key federal regulations pertaining to hazardous substances are as follows.

Resource Conservation and Recovery Act (RCRA)
The Resource Conservation and Recovery Act (RCRA) gives EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)
The Comprehensive Environmental Response, Compensation, and Liability Act -- otherwise known as CERCLA or Superfund -- provides a Federal "Superfund" to clean up uncontrolled or abandoned hazardous-waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment. Through CERCLA, EPA was given power to seek out those parties responsible for any release and assure their cooperation in the cleanup.

5.12.1.2 State Regulations

State regulations may implement federal requirements where the state regulations are authorized to implement federal regulatory programs under a delegated authority. State requirements that are not implemented under a delegated federal authority would apply to the actions of the non-federal sponsor for operations and maintenance activities.

Hazardous Waste Control Law

The Hazardous Waste Control Law (HWCL) is the State Law similar to the Federal RCRA program. HWCL. Describes the requirements for the proper management of hazardous wastes including:

- Criteria for identification and classifications of hazardous wastes
- Generation and transportation of hazardous waste
- Design and permitting of facilities that recycle, treat, store and dispose hazardous wastes
- Treatment Standards
- Operation of facilities
- Closure of facilities and liability requirements

Local Regulations

Hazardous Material Ordinance

Local hazardous waste control ordinances establish detailed procedures for monitoring establishments where hazardous waste is generated, stored, handled, disposed, treated, or recycled, and regulate by the issuance of permits and the activities of establishments where hazardous waste is generated. In addition, local municipal ordinances adopt by reference the hazardous waste-related California Health and Safety Code which establishes and provides for a program for the prevention of contamination from improper storage of hazardous substances. Most jurisdictions rely on the California Health and Safety Code as a basis for hazardous waste enforcement and monitoring programs.

5.12.2 Impact Significance Criteria

The impact criteria below were taken from Appendix G of the CEQA guidelines and are also being adopted for NEPA. For purposes of this analysis, Alternatives 1, 2, 3, or 4 would have a significant impact related to Public Health and Safety if it would:

IMPACT HAZ-1: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

IMPACT HAZ-2: Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

IMPACT HAZ-3: Expose people or structures to a significant risk of loss, injury or death involving wild land fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

5.12.3 Environmental Commitments

EC-HAZ-1: During construction and operation of the project, all local, state and federal regulations would be complied with regarding to the transportation, handling, and storage of hazardous substances.

EC-HAZ-2: At each work area involving the operation of heavy equipment and handling and storage of hazardous substances, a Hazardous Material Spill Prevention Plan would be prepared. The Hazardous Material Spill Prevention Plan shall contain contingency plans in the event of an accidental release into the environment.

EC-HAZ-3: Prior to the start of construction the applicant would prepare an Emergency Evacuation Plan that contains procedures for the demobilization of construction equipment and evacuation of personnel from the study area in the event of a pending significant storm event or other emergency that jeopardizes the safety of personnel or equipment.

5.12.4 Public Health and Safety Impacts

5.12.4.1 **IMPACT HAZ-1**: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, neither the proposed Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. Water would continue to be stored at elevation 498 feet during flood season and up to elevation 505 feet during the non-flood season in accordance with the Prado Dam Water Control Plan. In addition, no construction activity would occur as the Ecosystem Restoration Plan would not be implemented. Therefore, there would be no adverse impacts in creating a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

ALTERNATIVE: 2 PROPOSED ACTION

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts
Implementation of the Water Conservation Plan would raise the water surface elevation in the buffer pool from elevation 498 ft. up to 505 ft. during the flood season, given sufficient inflow. The measure would not involve the handling, storage or transportation of hazardous substances. Therefore, no impacts regarding release of hazardous materials into the environment would occur through the routine transport, use, or disposal of hazardous materials.

Indirect Impacts
There are no activities that would result in indirect impacts that would create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities that would result in impacts that would create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

Ecosystem Restoration Plan

Sediment Management Measure

Direct Impacts
The proposed Sediment Management Measure would remove sediment from the Prado Basin and re-entrain it into the lower Santa Ana River. To help characterize the chemical profile of the sediment deposited in the Prado Basin, boring samples were taken from the location where the sediment removal activities would occur. These samples provide a representation of past and recent sediment deposited in the basin. The boring samples showed non-detectable levels of total petroleum hydrocarbons, volatile organic compounds, organophosphorus, pesticides, PCBs, chlorinated herbicides and hexavalent chromium. Low concentrations of heavy metals were also detected. However, these levels were well below the EPA Region 9 levels and were within the regional background range for soils in the region and would not pose significant hazard to the public.

The construction of the sediment traps and transition channels would require the operation of heavy equipment in the Prado Basin. The operation of the heavy equipment would involve the handling of incidental amounts of hazardous substances such as fuels and oil. Contractors would be required to adhere to local, state and federal laws and regulations regarding the handling, storage and transporting of substances and would implement Environmental Commitments EC-HAZ-1 and EC-HAZ-2 to avoid the release of hazardous substances into the environment. With implementation of the environmental commitments, impacts would be less than significant.

Indirect Impacts
There would be no indirect impacts related to construction activities because they would occur in localized areas and best management practices would be employed to avoid offsite impacts.

Long-Term Operation and Maintenance Impacts
The long-term operation and maintenance activities, as well as adaptive management for the Sediment Management Measure would involve the operation of heavy construction equipment in the same areas where construction occurred. Adaptive management would include adjustments to methods, quantities and possibly locations of material excavated and, or re-entrained to ensure that success criteria are met. Operation of heavy construction equipment would be required to perform those activities and the handling of incidental amounts of hazardous substances such as fuels and oil would occur. Contractors would be required to adhere to local, state and federal laws and regulations regarding the handling, storage and transporting of substances and would implement Environmental Commitments EC-HAZ-1 and EC-HAZ-2 to avoid the release of hazardous substances into the environment. With implementation of the environmental commitments, impacts would be less than significant.

Chino Creek Channel Restoration Measure

Direct Impacts
Implementation of the Chino Creek Restoration Measure would not involve any activities that would directly release hazardous substances into the environment. The implementation of the

measure would require the operation of heavy equipment near and within Chino Creek and would involve the handling of incidental amounts of hazardous substances such as fuels and oil. Contractors would be required to adhere to local, state and federal laws and regulations regarding the handling, storage and transporting of substances and would implement Environmental Commitments EC-HAZ-1 and EC-HAZ-2 to avoid the release of hazardous substances into the environment. With implementation of the environmental commitments, impacts would be less than significant.

Indirect Impacts
There would be no indirect impacts related to construction activities because they would occur in localized areas and environmental commitments would be employed to avoid offsite impacts.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities could involve the use of heavy construction equipment to remove sediment from the channel and regrade existing access roads. Adaptive management may require the occasional presence of equipment to adjust gradient, channel dimensions or plantings to ensure that success criteria are met. These activities would involve the handling of incidental amounts of hazardous substances such as fuels and oil. Contractors would be required to adhere to local, state and federal laws and regulations regarding the handling, storage and transporting of substances and would implement Environmental Commitments EC-HAZ-1 and EC-HAZ-2 to avoid the release of hazardous substances into the environment. With implementation of the environmental commitments, impacts would be less than significant.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Treatment Measure

Direct Impacts
Implementation of the above ecosystem restoration measures would not involve any activities that would directly release hazardous substances into the environment. Implementation of the measures could require the operation of heavy equipment in the Prado Basin and would involve the handling of incidental amounts of hazardous substances such as fuels and oil. Contractors would be required to adhere to local, state and federal laws and regulations regarding the handling, storage and transporting of substances and would implement Environmental Commitments EC-HAZ-1 and EC-HAZ-2 to avoid the release of hazardous substances into the environment. With implementation of the environmental commitments, impacts would be less than significant.

Indirect Impacts
There would be no indirect impacts related to construction activities because they would occur in localized areas and environmental commitments would be employed to avoid offsite impacts.

Long-Term Operation and Maintenance Impacts
Long-term operation, maintenance, and adaptive management activities would involve regular inspections of the areas and removal of non-native vegetation by a combination of herbicide treatment and manual labor with hand-held tools. Supplemental watering may be included to

support achievement of percent cover criteria and successful restoration of target vegetation communities as part of adaptive management. These activities would be confined to specific areas of the Prado Basin and would involve the handling of hazardous substances such herbicide, oils, gas and solvents. Contractors would be required to adhere to local, state and federal laws and regulations regarding the handling, storage and transporting of substances and would implement Environmental Commitments EC-HAZ-1 and EC-HAZ-2 to avoid the release of hazardous substances into the environment. With implementation of the environmental commitments, impacts would be less than significant.

In-stream Habitat Features Measure Downstream

Direct Impacts
Under Alternative 2, In-Stream Habitat Features measure would be constructed within the SARM Downstream Focal Area and would not involve any activities that would directly release hazardous substances into the environment. The implementation of the measure could require the operation use of equipment that involves the handling of hazardous substances such and oils, gas and solvents. Contractors would be required to adhere to local, state and federal laws and regulations regarding the handling, storage and transporting of substances and would implement Environmental Commitments EC-HAZ-1 and EC-HAZ-2 to avoid the release of hazardous substances into the environment. With implementation of the environmental commitments, impacts would be less than significant.

Indirect Impacts
There would be no indirect impacts related to construction activities because they would occur in localized areas and environmental commitments would be employed to avoid offsite impacts.

Long-term Operation and Maintenance Impacts
Long-term operation, maintenance, and adaptive management activities would involve regular inspections of the areas and removal of non-native vegetation by a combination of herbicide treatment and manual labor with hand-held tools. Supplemental watering may be included to support achievement of percent cover criteria and successful restoration of target vegetation communities as part of adaptive management. These activities would be confined to specific areas of the Santa Ana River Downstream and would involve the handling of hazardous substances such herbicide, oils, gas and solvents. Contractors would be required to adhere to local, state and federal laws and regulations regarding the handling, storage and transporting of substances and would implement Environmental Commitments EC-HAZ-1 and EC-HAZ-2 to avoid the release of hazardous substances into the environment. With implementation of the environmental commitments, impacts would be less than significant.

Non-Native Aquatic Species Management Measure, Cowbird Trapping Measure

Direct Impacts
Implementation of the above Non-Native Wildlife Management Measures would not involve the handling of any hazardous substances that could inadvertently be released into the environment. Therefore, no impacts would occur that would create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

Indirect Impacts
There are no activities that would result in indirect impacts that would create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would involve regular inspection of the focal areas and the removal of non-native wildlife. These activities would be confined to specific areas for a short period of time. Additional adaptive management may include adjustments to cowbird control and fish and removal methods, level of effort, and/or trap locations. Therefore, long-term operation, maintenance, and adaptive management activities would not result in impacts that would create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

Level of Impact for Alternative 2
Less than Significant. Construction, long-term operation, maintenance, and adaptive management activities would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 feet with Incidental Sediment Removal)

Direct Impacts
Compared to Alternative 2, the level of hazardous substance exposure impacts from the Water Conservation Plan would be similar. No adverse impacts to the public or the environment through the routine transport, use, or disposal of hazardous materials would occur.
Under Alternative 3, a smaller scale sediment removal program would be implemented in conjunction with the Water Conservation Plan. The sediment removal activities would generally occur in the same locations where the Alternative 2 Sediment Management Measure would be implemented. Similar to Alternative 2, boring samples were taken from the location where the sediment removal activities would occur. These samples provide a representation of past and recent sediment deposited in the basin. The boring samples showed non-detectable levels of total petroleum hydrocarbons, volatile organic compounds, organophosphorus, pesticides, PCBs, chlorinated herbicides and hexavalent chromium. Low concentrations of heavy metals were also detected. However, these levels were well below the EPA Region 9 levels and were within the regional background range for soils in the region and would not pose significant hazard to the public.

Implementation of the smaller scale sediment removal program would require the operation of heavy equipment in the Prado Basin and within the wetted channel of the Santa Ana River. Compared to Alternative 2, there would be less construction equipment operating and less potential for the inadvertent release of hazardous substances into the environment. Similar to Alternative 2, Environmental Commitments EC-HAZ-1 and EC-HAZ-2 would be implemented to avoid the release of hazardous substances into the environment and therefore impacts to the

public or the environment through the routine transport, use, or disposal of hazardous materials would be less than significant.

Indirect Impacts
There would be no indirect impacts related to construction activities because they would occur in localized areas and environmental commitments would be employed to avoid offsite impacts.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would involve the maintenance of existing roads using heavy equipment. Similar to Alternative 2, Environmental Commitments EC-HAZ-1 and EC-HAZ-2 would be implemented to avoid the release of hazardous substances into the environment and therefore impacts to the public or the environment through the routine transport, use, or disposal of hazardous materials and therefore impacts would be less than significant.

Ecosystem Restoration Plan

Direct Impacts

Chino Creek Channel Restoration Measure
This measure is the same as described for Alternative 2 and therefore the level of potential impacts for the inadvertent release of hazardous substances into the environment would be similar and would be less than significant with the implementation of Environmental Commitments EC-HAZ-1 and EC-HAZ-2.

Invasive Plant Management Measure, Native Plantings Measure
This measure is the same as described for Alternative 2 and therefore the level of potential impacts for the inadvertent release of hazardous substances into the environment would be similar and would be less than significant with the implementation of Environmental Commitments EC-HAZ-1 and EC-HAZ-2.

Cowbird Trapping Measure
This measure is the same as described for Alternative 2 and therefore the level of potential impacts for the inadvertent release of hazardous substances into the environment would be similar and would be less than significant with the implementation of Environmental Commitments EC-HAZ-1 and EC-HAZ-2.

Indirect Impacts
Compared to Alternative 2, indirect impacts would be the same and would be no adverse impacts.

Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, long-term operation and maintenance impacts would be the same and would be no adverse impacts.

Level of Impact for Alternative 3
Less than Significant. Construction and long-term operation and maintenance activities would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts
This plan is the same as described for Alternative 2 and therefore the level of hazardous substance exposure impacts would be the same. No impacts would occur in regards to release of hazardous materials into the environment.

Indirect Impacts
Compared to Alternative 2 indirect impacts would be the same and no adverse impacts would occur.

Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, long-term operation and maintenance impacts would be the same and no adverse impacts would occur.

Ecosystem Restoration Plan

Direct Impacts

Sediment Management Measure
This measure is the same as described for Alternative 2 and therefore the level of potential impacts for the inadvertent release of hazardous substances into the environment would be similar and would be less than significant with the implementation of Environmental Commitments EC-HAZ-1 and EC-HAZ-2.

Chino Creek Channel Restoration Measure
This measure is the same as described for Alternative 2 and therefore the level of potential impacts for the inadvertent release of hazardous substances into the environment would be similar and would be less than significant with the implementation of Environmental Commitments EC-HAZ-1 and EC-HAZ-2.

In-Stream Habitat Features Measure Downstream
This measure is the same as described for Alternative 2 and therefore the level of potential impacts for the inadvertent release of hazardous substances into the environment would be similar and would be less than significant with the implementation of Environmental Commitments EC-HAZ-1 and EC-HAZ-2.

In-stream Habitat Features Measure Upstream
Under Alternative 4, In-Stream Habitat Features would also be constructed within the SARM Upstream Focal Area. The in-stream habitat features consist of rock structure placements within the wetted channel of the Santa Ana River and would not involve any activities that would directly release hazardous substances into the environment. The implementation of the measure could require the operation use of equipment that involves the handling of hazardous substances such and oils, gas and solvents. Contractors would be required to adhere to local, state and federal laws and regulations regarding the handling, storage and transporting of substances and would implement Environmental Commitments EC-HAZ-1 and EC-HAZ-2 to avoid the release of hazardous substances into the environment. With implementation of the environmental commitments, impacts would be less than significant.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure
This measure is the same as described for Alternative 2 and therefore the level of potential impacts for the inadvertent release of hazardous substances into the environment would be similar and would be less than significant with the implementation of Environmental Commitments EC-HAZ-1 and EC-HAZ-2.

Non-Native Aquatic Species Management Measure (Upstream and Downstream), Feral Pig Management Measure, Cowbird Management Measure
Implementation of the above non-native wildlife management measures would not involve the handling of any hazardous substances that could inadvertently be released into the environment. No impacts in regards to the release of hazardous materials into the environment would occur.

Indirect Impacts
Compared to Alternative 2, indirect impacts would be the same.

Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, long-term operation and maintenance impacts would be the same and would be less than significant.

Level of Impact for Alternative 4
Less than Significant. Construction and long-term operation and maintenance activities would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

5.12.4.2 **IMPACT HAZ-2**: Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, neither the proposed Water Conservation Plan nor the Ecosystem Restoration Plan would not be implemented. Water would continue to be stored at elevation 498 feet during flood season and up to elevation 505 feet during the non-flood

season in accordance with the Prado Dam Water Control Plan. In addition, no construction activity would occur as the Ecosystem Restoration Plan would not be implemented. Therefore, there would be no activities occurring in Prado Basin that could potentially interfere with the operation of the dam and with the emergency evacuation of Prado Basin. No adverse impacts would occur.

ALTERNATIVE 2: PROPOSED ACTION

Water Conservation Plan (elevation 505 Feet Year-Round)

Direct Impacts
Implementation of the Water Conservation Plan would be consistent with the USACE Prado Dam Water Control Plan and would be implemented in a manner that would not interfere with emergency evacuation of Prado Basin. . With the implementation of Environmental Commitment HAZ-3, the Water Conservation Plan would not interfere with any emergency response plans or emergency evacuation plans within the study area, the operation of the dam and the emergency evacuation of Prado Basin and therefore impacts would be less than significant.

Indirect Impacts
There are no activities that would indirectly interfere with any emergency response plans or emergency evacuation plans within the study area, the operation of the dam, and the emergency evacuation of Prado Basin and therefore no adverse impacts would occur.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and management activities that would interfere with any emergency response plans or emergency evacuation plans within the study area, the operation of the dam, and the emergency evacuation of Prado Basin and therefore no adverse impacts would occur.

Ecosystem Restoration Plan

Sediment Management Measure

Direct Impacts
The Sediment Management Measure has been designed to avoid impacts to the operation of Prado Dam. The sediment trap and transition channel are located sufficiently upstream of the outlet works to allow for a vegetation buffer to be provided to trap floating debris as it currently does, thereby minimizing the potential for floating debris to adversely impact the outlet works operations. To minimize safety conflicts during the operation the sediment management activities, onsite equipment would be secured to prevent its movement into the dam outlet works. Plans would also be developed for emergency evacuation of equipment and personnel during storm events and when the pool level rises above the level such that the Corps needs to discharge at high rates. During the implementation of the Sediment Management Measure, the Corps would be operating Prado Dam following the protocol as described in the Water Control Manual. The Corps has indicated that the current operational plan allows for coordination of flow releases and therefore implementation of the Sediment Management Measure would not conflict with the

operation of Prado Dam and would not result in any adverse impacts that would compromise the integrity of the dam.

The study area could be subject to events, such as earthquakes, wild land fire or flooding that could require evacuation of workers and construction equipment from the study area. Implementation of the Sediment Management Measure would not involve the construction of any permanent structures or involve permanent road closures that could interfere with the operation of the dam. Prior to the start of construction, OCWD would prepare an emergency evacuation plan that would include procedures for the demobilization of construction equipment and personnel from the Prado Basin in the event of a pending significant storm event or other emergency that could jeopardize the safety of personnel or construction equipment. In addition, OCWD would maintain routine coordination with the USACE's Reservoir Regulation staff to receive alert of any forecast inflows. With the implementation of Environmental Commitment EC-HAZ-3, the measure would not interfere with any emergency response plans or emergency evacuation plans within the study area, the operation of the dam, and the emergency evacuation of Prado Basin and therefore impacts would be less than significant.

Indirect Impacts
There would be no indirect impacts related to construction/restoration activities that would interfere with any emergency response plans or emergency evacuation plans within the study area, the operation of the dam, and the emergency evacuation of Prado Basin and therefore no adverse impacts would occur.

Chino Creek Channel Restoration Measure

Direct Impacts
Implementation of the Chino Creek Channel Restoration Measure would not involve the construction of any permanent structures or permanent road closures that would interfere with any emergency response plans or emergency evacuation plans within the study area. With the implementation of Environmental Commitment EC-HAZ-3, the measure would not interfere with the operation of the dam and with the emergency evacuation of Prado Basin and therefore impacts would be less than significant.

Indirect Impacts
There are no activities that would indirectly interfere with any emergency response plans or emergency evacuation plans within the study area, the operation of the dam, and the emergency evacuation of Prado Basin and therefore no adverse impacts would occur.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and management activities that would interfere with any emergency response plans or emergency evacuation plans within the study area. Adaptive management may require periodic adjustment to gradient, channel dimensions or plantings to ensure that success criteria are met. With the implementation of Environmental Commitment HAZ-3, the measure would not interfere with any emergency response plans or emergency evacuation plans within the study area, the operation of the dam, and the emergency evacuation of Prado Basin and therefore impacts would be less than significant.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Treatment Measure

Direct Impacts
Implementation of the above restoration measures would not involve the construction of any permanent structures or permanent road closures that would interfere with any emergency response plans or emergency evacuation plans within the study area. With the implementation of Environmental Commitment EC-HAZ-3, the measure would not interfere with any emergency response plans or emergency evacuation plans within the study area, the operation of the dam, and the emergency evacuation of Prado Basin and therefore impacts would be less than significant.

Indirect Impacts
There are no activities that would indirectly interfere with any emergency response plans or emergency evacuation plans within the study area, the operation of the dam, and the emergency evacuation of Prado Basin and therefore no adverse impacts would occur.

Long-Term Operation and Maintenance Impacts
Long-term operation, maintenance, and adaptive management activities would involve regular inspections of the areas and removal of non-native vegetation by a combination of herbicide treatment and manual labor with hand-held tools. Supplemental watering may be included to support achievement of percent cover criteria and successful restoration of target vegetation communities as part of adaptive management. These activities would be confined to specific areas for a short period of time. No permanent structures would be constructed, and no permanent road closures would take place during the long-term operation, maintenance, and adaptive management activities such that it would interfere with any emergency response plans or emergency evacuation plans within the study area. With the implementation of Environmental Commitment EC-HAZ-3, the measure not interfere with the operation of the dam and with the emergency evacuation of Prado Basin and therefore impacts would be less than significant.

In-stream Habitat Features Measure Downstream

Direct Impacts
Under Alternative 2, In-Stream Habitat Features measure would be constructed within the SARM Downstream Focal Area and would not involve the construction of any permanent structures or permanent road closures that would interfere with any emergency response plans or emergency evacuation plans within the study area. With the implementation of Environmental Commitment EC-HAZ-3, the measure would not interfere with the operation of the dam and with the emergency evacuation of Prado Basin and therefore impacts would be less than significant.

Indirect Impacts
There are no activities that would indirectly interfere with any emergency response plans or emergency evacuation plans within the study area, the operation of the dam, and the emergency evacuation of Prado Basin and therefore impacts would be less than significant.

Long-term Operation and Maintenance Impacts
Long-term operation, maintenance, and adaptive management activities would involve regular inspections of the areas and removal of non-native vegetation by a combination of herbicide treatment and manual labor with hand-held tools. Supplemental watering may be included to support achievement of percent cover criteria and successful restoration of target vegetation communities as part of adaptive management. No permanent structures would be constructed, and no permanent road closures would take place during the long-term operation, maintenance, and adaptive management activities such that it would interfere with any emergency response plans or emergency evacuation plans within the study area. With the implementation of Environmental Commitment EC-HAZ-3, the measure would not interfere with the operation of the dam and with the emergency evacuation of Prado Basin and therefore impacts would be less than significant.

Non-Native Aquatic Species Management Measure, Cowbird Trapping Measure

Direct Impacts
Implementation of the non-native wildlife management measures would not involve the construction of any permanent structures or permanent road closures that would interfere with any emergency response plans or emergency evacuation plans within the study area, the operation of the dam, and the emergency evacuation of Prado Basin and therefore no adverse impacts would occur.

Indirect Impacts
There are no activities that would indirectly interfere with any emergency response plans or emergency evacuation plans within the study area, the operation of the dam, and the emergency evacuation of Prado Basin and therefore no adverse impacts would occur.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would involve regular inspection of the focal areas and the removal of non-native wildlife. Additional adaptive management may include adjustments to cowbird control and fish and removal methods, level of effort, and/or trap locations. No permanent structures would be constructed, or no permanent road closures would take place such that it would interfere with any emergency response plans or emergency evacuation plans within the study area, the operation of the dam, and the emergency evacuation of Prado Basin and therefore no adverse impacts would occur.

Level of Impact for Alternative 2
Less than Significant. Construction, long-term operation and maintenance, and adaptive management activities would not interfere with any emergency response plans or emergency evacuation plans within the study area, the operation of the dam, and the emergency evacuation of Prado Basin.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 Feet with Incidental Sediment Removal)

Direct Impacts
Compared to Alternative 2, the level of impacts to potential emergency evacuation access from the implementation of the Water Conservation Plan would be similar. No permanent structures would be constructed, or no permanent road closures would take place such that it would interfere with any emergency response plans or emergency evacuation plans within the study area, the operation of the dam, and the emergency evacuation of Prado Basin and with the implementation of Environmental Commitment EC-HAZ-3, impacts would be less than significant.

Under Alternative 3, a smaller scale sediment removal program would be implemented in conjunction with the Water Conservation Plan. Compared to Alternative 2, there would be a smaller construction footprint and the Sediment Management Measure would not involve the construction of any permanent structures or involve permanent road closures that could interfere with the operation of the dam. Prior to the start of construction, OCWD would prepare an emergency evacuation plan that would include procedures for the demobilization of construction equipment and personnel from the Prado Basin in the event of a pending significant storm event or other emergency that could jeopardize the safety of personnel or construction equipment. In addition, OCWD would maintain routine coordination with the USACE's Reservoir Regulation staff to receive alert of any forecast inflows. With the implementation of Environmental Commitment EC-HAZ-3, the measure would not interfere with any emergency response plans or emergency evacuation plans within the study area, the operation of the dam, and the emergency evacuation of Prado Basin and therefore impacts would be less than significant.

Indirect Impacts
This measure is the same as described for Alternative 2 and therefore indirect impacts would be the same and would have no adverse impacts.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and management activities that would interfere with any emergency response plans or emergency evacuation plans within the study area. With the implementation of Environmental Commitment EC-HAZ-3, the Water Conservation Plan with Incidental Sediment Removal would not interfere with any emergency response plans or emergency evacuation plans within the study area, the operation of the dam, and the emergency evacuation of Prado Basin and therefore impacts would be less than significant.

Ecosystem Restoration Plan

Direct Impacts

Chino Creek Channel Restoration Measure
Compared to Alternative 2, the level of impacts would be the same and impacts would be less than significant.

Invasive Plant Management Measure, Native Plantings Measure
Compared to Alternative 2, the level of impacts would be the same and impacts would be less than significant.

Cowbird Trapping Measure
Compared to Alternative 2, the level of impacts would be the same and impacts would be less than significant.

Indirect Impacts
Compared to Alternative 2, indirect impacts would be the same and no adverse impacts would occur.

Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, long-term operation, maintenance, and adaptive management impacts would be the same and would be less than significant.

Level of Impact for Alternative 3
Less than Significant. Construction, long-term operation and maintenance, and adaptive management activities would not interfere with any emergency response plans or emergency evacuation plans within the study area, the operation of the dam, and the emergency evacuation of Prado Basin.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 feet Year-Round)

Direct Impacts
This measure is the same as described for Alternative 2 and therefore, the level of impacts to potential emergency evacuation access impacts would be the same. With the implementation Environmental Commitment EC-HAZ-3, the Water Conservation Plan would not interfere with the operation of the dam and with emergency evacuation of Prado Basin and therefore impacts would be less than significant.

Indirect Impacts
Compared to Alternative 2, indirect impacts would be the same and would be no adverse impacts.

Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, long-term operation and maintenance impacts would be the same and would be no adverse impacts.

Ecosystem Restoration Plan

Sediment Management Measure

Direct Impacts
This measure is the same as described for Alternative 2 and therefore the level impacts to potential emergency evacuation access would be the same. With the implementation of Environmental Commitment EC-HAZ-3, the measure would not interfere with the operation of the dam and with emergency evacuation of Prado Basin and therefore impacts would be less than significant.

Chino Creek Channel Restoration Measure
This measure is the same as described for Alternative 2 and therefore the level impacts to potential emergency evacuation access would be the same. With the implementation of Environmental Commitment EC-HAZ-3, the measure would not interfere with the operation of the dam and with emergency evacuation of Prado Basin and therefore impacts would be less than significant.

In-Stream Habitat Features Measure Downstream
This measure is the same as described for Alternative 2 and therefore the level impacts to potential emergency evacuation access would be the same. With the implementation of Environmental Commitment EC-HAZ-3, the measure would not interfere with the operation of the dam and with emergency evacuation of Prado Basin and therefore impacts would be less than significant.

In-Stream Habitat Features Measure Upstream
This measure is the same as described for Alternative 2 and therefore the level impacts to potential emergency evacuation access would be the same. With the implementation Environmental Commitment EC-HAZ-3, the measure would not interfere with the operation of the dam and with emergency evacuation of Prado Basin and therefore impacts would be less than significant.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure
This measure is the same as described for Alternative 2 and therefore the level impacts to potential emergency evacuation access would be the same. With the implementation Environmental Commitment EC-HAZ-3, the measure would not interfere with the operation of the dam and with emergency evacuation of Prado Basin and therefore impacts would be less than significant.

Non-Native Aquatic Species Management Measure (Upstream and Downstream), Cowbird Trapping Measure, Feral Pig Management Measure
These measures are the same as described for Alternative 2 and therefore the level of impacts to potential emergency access would be the same and no adverse impacts would occur.

Indirect Impacts
Compared to Alternative 2, indirect impacts would be the same and no adverse impacts would occur.

Long-Term Operation and Maintenance Impacts
With the exception of feral pig management, expanded non-native aquatics control to include downstream areas, and placement of in-stream habitat features in the upstream transition channel, all of the other measures are the same as described for Alternative 2, and therefore impacts from long-term operation and maintenance would be the same and would be less than significant.

Level of Impact for Alternative 4
Less than Significant. Construction and long-term operation and maintenance activities would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan, operation of the dam, and the emergency evacuation of Prado Basin.

5.12.4.3 **IMPACT HAZ-3**: Would the project expose people or structures to a significant risk of loss, injury or death involving wild land fires?

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, neither the proposed Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. Water would continue to be stored at elevation 498 feet during flood season and up to elevation 505 feet during the non-flood season in accordance with the Prado Dam Water Control Plan. As there would be no construction activity taking place, there would be no handling of flammable materials and exposure of people or structures to a significant risk of loss, injury or death involving wild land fires. Prado Basin would continue to have a moderate potential for wild land fire susceptibility.

ALTERNATIVE 2: PROPOSED ACTION

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts
The additional water stored during the flood season would not result in the exposure of people or structures to a significant risk of loss, injury or death involving wild land fires and therefore no adverse impacts would occur.

Indirect Impacts
There are no indirect impacts that would result in the exposure of people or structures to a significant risk of loss, injury or death involving wild land fires and therefore no adverse impacts would occur.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities that would result in the exposure of people or structures to a significant risk of loss, injury or death involving wild land fires and therefore no adverse impacts would occur.

Ecosystem Restoration Plan

Sediment Management Measure
According to the Riverside County General Plan, the Prado Basin has moderate potential for wild land fire susceptibility. Implementation of the measure would require the handling of limited amounts of flammable substances and would not substantially increase risk for wild land fire. Best management practices would be implemented requiring that all flammable substances be handled in accordance with local, states and federal laws and regulations. In addition, the sediment management measure would not require any road closures that would increase fire response times to the study area. With the implementation of Environmental Commitment EC-HAZ-1, the project would not result in the exposure of people or structures to a significant risk of loss, injury or death involving wild land fires and therefore impacts would be less than significant.

Indirect Impacts
Implementation of the measure would include the construction of new maintenance roads within the study area which would in turn improve access. This improved access would provide an indirect potential beneficial effect for fire response due to increased accessibility within the study area in the event of a fire and therefore no adverse impacts would occur.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would involve the operation of heavy construction equipment in the same areas where construction occurred and the handling of flammable substances. With the implementation of Environmental Commitment EC-HAZ-1, the project would not result in the exposure of people or structures to a significant risk of loss, injury or death involving wild land fires and therefore impacts would be less than significant.

Chino Creek Channel Restoration Measure

Direct Impacts
Implementation of the Chino Creek Channel Restoration Measure would not involve the use or handling of any materials that would substantially increase the risk for wild land fires or require road closures that would increase fire response times to the study area. The measure would implement best management practices that requires all flammable substances be handled in accordance with local, states and federal laws and regulations. With the implementation of Environmental Commitment EC-HAZ-1, the project would not result in the exposure of people or structures to a significant risk of loss, injury or death involving wild land fires and therefore impacts would be less than significant.

Indirect Impacts
Implementation of the measure would include the construction of new maintenance roads within the study area which would in turn improve access. This improved access would provide an indirect potential beneficial effect for fire response due to increased accessibility within the study area in the event of a fire and therefore no adverse impacts would occur.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would involve the operation of heavy construction equipment in the same areas where construction occurred and the handling of flammable substances. With the implementation of Environmental Commitment EC-HAZ-1, the project would not result in the exposure of people or structures to a significant risk of loss, injury or death involving wild land fires and therefore impacts would be less than significant.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Treatment Measure

Direct Impacts
Implementation of the above ecosystem restoration measures would not involve any use of materials that would substantially increase the risk for wild land fires. Best management practices would be implemented requiring all flammable substances be handled in accordance with local, states and federal laws and regulations. In addition, the sediment management measure would not require any road closures that would increase fire response times to the study area. With the implementation of Environmental Commitment EC-HAZ-1, the exposure of people or structures to a significant risk of loss, injury or death involving wild land fires would be less than significant.

Indirect Impacts
Implementation of these measures would include the construction of new maintenance roads within the study area which would in turn improve access. This improved access would provide an indirect potential beneficial effect for fire response due to increased accessibility within the study area in the event of a fire and therefore no adverse impacts would occur.

Long-Term Operation and Maintenance Impacts
Long-term operation, maintenance activities would involve the operation of heavy construction equipment in the same areas where construction occurred and the handling of flammable substances. Best management practices would be implemented requiring that all flammable substances be handled in accordance with local, state and federal laws and regulations. With the implementation of Environmental Commitment EC-HAZ-1, these measures would not result in the exposure of people or structures to a significant risk of loss, injury or death involving wild land fires and impacts would be less than significant.

In-stream Habitat Features Measure Downstream

Direct Impacts
Implementation of the Stream Habitat Features would not involve the use or handling of any materials that would substantially increase the risk for wild land fires or require road closures

that would increase fire response time to the study area. Best management practices would be implemented requiring all flammable substances be handled in accordance with local, state and federal laws and regulations. With the implementation of Environmental Commitments EC-HAZ-1, the measure would not result in the exposure of people or structures to a significant risk of loss, injury or death involving wild land fires and impacts would be less than significant.

Non-Native Aquatic Species Management Measure, Cowbird Trapping Measure

Direct Impacts
Implementation of the non-native wildlife management measure would not involve the use or handling of any materials that would substantially increase the risk for wild land fires or require road closures that would increase fire response time to the study area. Best management practices that requires all flammable substances be handled in accordance with local, states and federal laws and regulations. With the implementation Environmental Commitments EC-HAZ-1, the project would not result in the exposure of people or structures to a significant risk of loss, injury or death involving wild land fires and impacts would be less than significant.

Indirect Impacts
There are no indirect impacts that would result in the exposure of people or structures to a significant risk of loss, injury or death involving wild land fires and impacts would be less than significant.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would involve regular inspection of the focal areas and the removal of non-native wildlife. Additional adaptive management may include adjustments to cowbird control and fish and removal methods, level of effort, and/or trap locations. These activities would not involve the use of any materials that would increase the risk of wild land fires. Therefore, there are no adverse impacts to the exposure of people or structures to a significant risk of loss, injury or death involving wild land fires.

Level of Impact for Alternative 2
Less than Significant. Construction, long-term operation, maintenance, and adaptive management activities would not result in the exposure of people or structures to a significant risk of loss, injury or death involving wild land fires and impacts would be less than significant.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 Feet Year-Round with Incidental Sediment Removal)

Direct Impacts
Compared to Alternative 2, the level of risk for potential wild land fires from the Water Conservation Plan would be the same and no adverse impacts would occur.
Implementation of the incidental removal activities would require the handling of limited amounts of flammable substances and would not substantially increase the risk for wild land fires. Best management practices would be implemented requiring all flammable substances be handled in accordance with local, state and federal laws and regulations. In addition, the

sediment management measure would not require any road closures that would increase fire response time to the study area. With the implementation of Environmental Commitment EC-HAZ-1, the Water Conservation Plan with Incidental Sediment Removal would not result in the exposure of people or structures to a significant risk of loss, injury or death involving wild land fires and therefore impacts would be less than significant.

Indirect Impacts
Similar to Alternative 2, implementation of the measure would include the construction of new maintenance roads within the study area which would in turn improve access. This improved access would provide an indirect potential beneficial effect for fire response due to increased accessibility within the study area in the event of a fire and therefore no adverse impacts would occur.

Long-Term Operation and Maintenance Impacts
Long-term operation and maintenance activities would involve the operation of heavy construction which would involve the handling of flammable substances. With the implementation of Environmental Commitment EC-HAZ-1 the Water Conservation Plan with Incidental Sediment Removal would not result in the exposure of people or structures to a significant risk of loss, injury or death involving wild land fires and therefore impacts would be less than significant.

Ecosystem Restoration Plan

Direct Impacts

Chino Creek Channel Restoration Measure
This measure is the same as described for Alternative 2 and therefore the level of risk for potential wild land fires would be the same and would be less than significant.

Invasive Plant Management Measure, Native Plantings Measure
This measure is the same as described for Alternative 2 and therefore the level of risk for potential wild land fires would be the same and would be less than significant.

Cowbird Trapping Measure
This measure is the same as described for Alternative 2 and therefore the level of risk for potential wild land fires would be the same and would be less than significant.

Indirect Impacts
This measure is the same as described for Alternative 2 and therefore indirect impacts associated with the above measures would be the same and no adverse impacts would occur.

Long-Term Operation and Maintenance Impacts
This measure is the same as described for Alternative 2 and therefore long-term operation, maintenance, and adaptive management impacts would be the same and would be less than significant.

Level of Impact for Alternative 3
Less than Significant. Construction, long-term operation, maintenance, and adaptive management activities would not result in the exposure of people or structures to a significant risk of loss, injury or death involving wild land fires.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts
This measure is the same as described for Alternative 2 and therefore the level of risk for potential wild land fires would be the same and no adverse impacts would occur.

Indirect Impacts
This measure is the same as described for Alternative 2 and therefore indirect impacts would be the same and no adverse impacts would occur.

Long-Term Operation and Maintenance Impacts
This measure is the same as described for Alternative 2 and therefore the long-term operation and maintenance impacts would be the same and no adverse impacts would occur.

Ecosystem Restoration Plan

Sediment Management Measure
This measure is the same as described for Alternative 2 and therefore the level of risk for potential wild land fires would be the same and would be less than significant.

Chino Creek Channel Restoration Measure
This measure is the same as described for Alternative 2 and therefore the level of risk for potential wild land fires would be the same and would be less than significant.

In-Stream Habitat Features Measure Downstream
This measure is the same as described for Alternative 2 and therefore the level of risk for potential wild land fires would be the same and would be less than significant.

In-stream Habitat Features Measure Upstream
Under Alternative 4, In-Stream Habitat Features would not involve any use of materials that would substantially increase the risk for wild land fires. Best management practices would be implemented requiring all flammable substances be handled in accordance with local, states and federal laws and regulations. In addition, the implementation of the sediment management measure would not require any road closures that would increase fire response time to the study area. With the implementation of Environmental Commitment EC-HAZ-1, the exposure of people or structures to a significant risk of loss, injury or death involving wild land fires would be less than significant.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure
This measure is the same as described for Alternative 2 and therefore the level of risk for potential wild land fires would be the same and would be less than significant.

Non-Native Aquatic Species Management Measure (Upstream and Downstream), Feral Pig Management Measure, Cowbird Management Measure
This measure is the same as described for Alternative 2 and therefore the level of risk for potential wild land fires would be the same and would be less than significant.

Indirect Impacts
Compared to Alternative 2, indirect impacts would be the same and no adverse impacts would occur.

Long-Term Operation and Maintenance Impacts
Compared to Alternative 2, long-term operation and maintenance impacts would be the same and would be less than significant.

Level of Impact for Alternative 4
Less than Significant. Construction and long-term operation and maintenance activities would not expose people or structures to a significant risk of loss, injury or death involving wild land fires.

5.13 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

5.13.1 Regulatory Framework

5.13.1.1 Federal

Federal Executive Order 12898 was signed by President Bill Clinton on February 11, 1994, to focus Federal attention on the environmental and human health conditions of minority and low-income populations with the goal of achieving environmental protection for all communities. The Order directed Federal agencies to develop environmental justice strategies to aid Federal agencies identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. Environmental justice concerns may arise from impacts on the natural and physical environment, such as human health or ecological impacts on minority populations, low-income populations, and Indian tribes, or from related social or economic impacts.

5.13.1.2 State

In addition to its prioritization by the Federal government, California was one of the first states in the Nation to pass legislation to codify environmental justice in state statute, defining “environmental justice” as "The fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations and policies." (Government Code Section 65040.12)

5.13.2 Impact Significance Criteria

CEQA Threshold
The following impact significance criterion is derived from Appendix G of the CEQA Guideline. For purposes of analysis, Alternatives 1, 2, 3, or 4 would have a significant impact related to Socioeconomics and Environmental Justice if it would:

IMPACT SE-1: Induce substantial population growth in an area, either directly or indirectly.

NEPA Threshold
Under NEPA, Alternative 1, 2, 3 or 4 would have a significant impact related to Socioeconomics and Environmental Justice if one or more of the conditions described below were to occur because of implementation of the project:

IMPACT SE-2: Have disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations. The CEQ guidance identifies three factors to be considered to the extent practicable when determining whether environmental effects are disproportionately high and adverse (CEQ, 1997):

- Whether there is or would be an impact on the natural or physical environment that significantly (as the term is employed by NEPA) and adversely affects a minority population, low-income population, or Indian tribe. Such effects may include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or Indian tribes when those impacts are interrelated to impacts on the natural or physical environment.
- Whether the environmental effects are significant (as the term is employed by NEPA) and are or may be having an adverse impact on minority populations, low-income populations, or Indian tribes that appreciably exceeds or is likely to appreciably exceed those on the general population or other appropriate comparison group.
- Whether the environmental effects occur or would occur in a minority population, low income population or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards.

5.13.3 Environmental Commitments

None required or proposed.

5.13.4 Socioeconomic and Environmental Justice Impacts

Rather than addressing effects measure-by-measure as is done for most other resource categories, effects related to socioeconomics and environmental justice can be presented more clearly by considering the overall total population, ethnic groups, and household income levels that are present and may be affected within the entire study area. This cumulative analysis is presented below for each of the significance criteria.

5.13.4.1 **IMPACT SE-1**: Induce substantial population growth in an area, either directly or indirectly.

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, neither the Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. Therefore, there would be no impact to the existing levels of population within the study area.

ALTERNATIVE 2: PROPOSED ACTION

Direct Impacts
Under Alternative 2, both the Water Conservation Plan and the Ecosystem Restoration Plan would be implemented. Neither Plan involves the construction of new housing, commercial, or industrial development, and would not facilitate such development. The additional water stored at Prado Dam would meet existing and planned water demands within the OCWD service area and would not facilitate new growth. The purpose of the Ecosystem Restoration Plan is to create and restore native habitat within the study area. The restoration activities would maintain existing open space. The maintenance of open space within the study area would not induce additional growth in the study area. Therefore, implementation of Alternative 2 have no impact related to this criterion.

Indirect Impacts
Construction activities associated with Alternative 2 would generate a limited amount of short-term and seasonal employment opportunities within the study area. It is expected that majority of these employment opportunities would be filled by currently employed and unemployed labor force participants from the local and surrounding areas and therefore population growth would be limited within the study area. Therefore, the change to the existing levels of population within the study area would be less than significant.

Long-Term Operation and Maintenance Impacts
Long-term operation, maintenance, and adaptive management activities would generate a limited amount of employment opportunities. It is expected that majority of these employment opportunities would be filled by currently employed and unemployed labor force participants from the local and surrounding areas and population growth would be limited within the study area. Therefore, change to the existing levels of population within the study area would be less than significant.

Level of Impact for Alternative 2
Less than Significant Impact. Construction, long-term operation and maintenance, and adaptive management activities would not induce population growth within the study area, either directly or indirectly.

ALTERNATIVE 3

Direct Impacts

Under Alternative 3, the Water Conservation Plan (elevation 505 ft. with incidental sediment removal) and a smaller scale Ecosystem Restoration Plan as compared to Alternative 2 would be implemented. Similar to Alternative 2, implementation of Alternative 3 would not involve the construction of new housing, commercial, or industrial development. Therefore, this alternative would not induce population growth within the study area, and no impact related to this criterion would occur.

Indirect Impacts

Similar to Alternative 2, construction activities associated with Alternative 3 would generate a limited amount of short-term and seasonal employment opportunities within the study area and therefore potential impacts related to inducing population growth within the study area would be similar and would be less than significant.

Long-Term Operation and Maintenance Impacts

Similar, to Alternative 2, long-term operation, maintenance, and adaptive management activities under Alternative 3 would generate a limited amount of employment opportunities. It is expected that the majority of these employment opportunities would be filled by currently employed and unemployed labor force participants from the local and surrounding areas, therefore levels of population growth within the study area would be limited and would be less than significant.

Level of Impact for Alternative 3

Less than Significant Impact. Construction and long-term operation and maintenance activities would not induce substantial population growth in an area, either directly or indirectly.

ALTERNATIVE 4

Direct Impacts

The Water Conservation Plan for Alternative 4 is the same plan presented for Alternative 2. Most of the Ecosystem Restoration Plan features are also identical, although Alternative 4 also includes feral pig management, expanded non-native aquatic management to include additional areas, and placement of additional instream habitat features in an upstream location. None of these measures and neither Plan would induce substantial population growth, and impacts related to this criterion would be less than significant.

Indirect Impacts

Compared to Alternative 2, indirect impacts would be the same, and would be less than significant.

Long-Term Operation and Maintenance Impacts

Compared to Alternative 2, long-term operation, maintenance and adaptive management impacts would be the same, and would be less than significant.

Level of Impact for Alternative 4
Less than Significant Impact. Construction and long-term operation and maintenance activities would not induce substantial population growth in an area, either directly or indirectly.

5.13.4.2 **IMPACT SE-2**: Have disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and, or low-income populations.

The CEQ guidance identifies three factors to be considered to the extent practicable when determining whether 19 environmental effects are disproportionately high and adverse (CEQ, 1997):

- Whether there is or would be an impact on the natural or physical environment that significantly (as the term is employed by NEPA) and adversely affects a minority population, low-income population, or Indian tribe. Such effects may include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or Indian tribes when those impacts are interrelated to impacts on the natural or physical environment.
- Whether the environmental effects are significant (as the term is employed by NEPA) and are or may be having an adverse impact on minority populations, low-income populations, or Indian tribes that appreciably exceeds or is likely to appreciably exceed those on the general population or other appropriate comparison group.
- Whether the environmental effects occur or would occur in a minority population, low income population or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards.

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, neither the Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. Water would continue to be stored up to elevations 498 feet during flood season and up to elevation 505 feet during the non-flood season and none of the measures under the Ecosystem Restoration Plan would be implemented. No programs, policies or activities would be proposed that would have a disproportionately high or cumulative effect on human health, or disproportionately high or cumulative environmental effects on minorities, low-income populations, or Indian tribes.

ALTERNATIVE 2: PROPOSED ACTION

Direct Impacts
The Water Conservation Plan and Ecosystem Restoration Plan would be implemented within Riverside County, San Bernardino County, and Orange County. To evaluate potential disproportional adverse impacts to minority populations or to low-income households within the study area, socioeconomic data from cities adjacent to the study area was compared to countywide socioeconomic data.

Riverside County

To evaluate potential disproportional adverse impacts to minority populations or to low-income households, socioeconomic data from the adjacent cities of Corona, Norco and Eastvale was compared to socioeconomic data for all of Riverside County. Approximately 63.7 % of the total population in Riverside County is comprised of minority populations. In comparison, approximately 63.3 % of the total population of the cities of Corona, Norco, and Eastvale is comprised of minority populations. These comparable percentages indicate that there would not be a significantly higher percentage of minority populations within the study area as compared to the County as a whole.

The average household income in Riverside County is $57,362. The average household income in the cities of Corona, Norco and Eastvale is $89,429, which indicates that there is a lower percentage of low-income households in the study area as compared to Riverside County as a whole. Additionally, within Riverside County, 16.7 % of households are below the poverty line, whereas an average 8.1% of households in the cities of Corona, Norco, and Eastvale are below the poverty line. These differences in percentages also indicate that fewer low-income households occur within the study area as compared to the County as a whole. Because there is not a significantly higher percentage of minority populations or low-income households in the study area as compared to the County of Riverside as a whole, implementation of the Water Conservation Plan and, or the Ecosystem Restoration Plan would have a less than significant impact related to this criterion. No programs, policies or activities would be proposed through either or both plans that would have a disproportionately high or cumulative effect on human health, or disproportionately high or cumulative environmental effects on minorities, low-income populations, or Indian tribes.

San Bernardino County

To evaluate potential disproportional adverse impacts to minority populations or to low-income households, socioeconomic data from the adjacent cities of Chino and Chino Hills was compared to socioeconomic data for all of San Bernardino County. Approximately 70.5% of the total population in San Bernardino County is comprised of minority populations. In comparison, approximately 73.1% of the total population in the cities of Chino and Chino Hills is comprised of minority populations. These comparable percentages indicate that there would not be a disproportionately high concentration of minority populations within the study area as compared to the County as a whole.

The average household income in the San Bernardino County is $54,496. The average household income in the cities of Chino and Chino Hills is $82,858, which indicates that there is a lower percentage of low-income households in the study area as compared to San Bernardino County as a whole. Additionally, within all of San Bernardino County, 15.8 % of all households are below the poverty line, whereas an average 6.6 % of households in the cities of Chino and Chino Hills are below the poverty line. The differences in percentages also indicate that fewer low-income households occur within the study area as compared to the County as a whole. Because there is not a higher percentage of minority populations or low-income households in the study area as compared to the San Bernardino County as a whole, implementation of the Water Conservation Plan and, or the Ecosystem Restoration Plan would have a less than significant effect related to this criterion. No programs, policies or activities would be proposed through

either or both plans that would have a disproportionately high or cumulative effect on human health, or disproportionately high or cumulative environmental effects on minorities, low-income populations, or Indian tribes.

Orange County

To evaluate potential disproportional adverse impacts to minority populations or to low-income households, socioeconomic data from the adjacent cities of Yorba Linda and Anaheim was compared to socioeconomic data for all of Orange County. Approximately 58.9% of the total population of all of Orange County is comprised of minority populations. In comparison, approximately 57.2 % of the total population in the cities of Yorba Linda and Anaheim is comprised of minority populations. These comparable percentages indicate that there would not be a disproportionately high concentration of minority populations within the study area as compared to the County as a whole.

The average household income in Orange County is $77,390. The average household income in the cities of Yorba Linda and Anaheim is $88,626, which indicates that there is a lower percentage of low-income households in the study area as compared to Orange County as a whole. Additionally, within Orange County, 12.7 % of all households are below the poverty line, whereas an average 9.3% of all households in the cities of Yorba Linda and Anaheim are below the poverty line. This difference in percentages also indicate that fewer low-income households occur within the study area as compared to the County as a whole. Because there is not a higher percentage of minority populations or low-income households in the study area as compared to Orange County as a whole, implementation of the Water Conservation Plan and, or the Ecosystem Restoration Plan would have a less than significant effect related to this criterion. No programs, policies or activities would be proposed through either or both plans that would have a disproportionately high or cumulative effect on human health, or disproportionately high or cumulative environmental effects on minorities, low-income populations, or Indian tribes.

Indirect Impacts

There are no indirect impacts that could potentially result in a disproportionately high or cumulative effect to the human health, or disproportionately high or cumulative environmental effects on minority, low-income population, or Indian tribes.

Long-Term Operation and Maintenance Impacts

There are no long-term operation and maintenance impacts that could potentially result in a disproportionately high or cumulative effect to the human health, or disproportionately high or cumulative environmental effects on minority, low-income population, or Indian tribes.

Level of Impact for Alternative 2

Less than Significant Impact. Construction and long-term operation and maintenance activities would not have a disproportionately high or cumulative effect on human health, or disproportionately high or cumulative environmental effects on minority, low-income population, or Indian tribes.

ALTERNATIVE 3

Direct Impacts

Under Alternative 3, the Water Conservation Plan (elevation 505 ft. with incidental sediment removal) and a smaller scale Ecosystem Restoration Plan as compared to Alternative 2 would be implemented. Similar to Alternative 2, there would not be a disproportionately high or cumulative effect on human health, or disproportionately high or cumulative environmental effects on minority, low-income population, or Indian tribes.

Indirect Impacts

There are no indirect impacts that could potentially result in a disproportionately high or cumulative effect to the human health, or disproportionately high or cumulative environmental effects on minority, low-income population, or Indian tribes.

Long-Term Operation and Maintenance Impacts

There are no long-term operation and maintenance impacts that could potentially result in a disproportionately high or cumulative effect to the human health, or disproportionately high or cumulative environmental effects on minority, low-income population, or Indian tribes.

Level of Impact for Alternative 3

Less than Significant Impact. Construction and long-term operation and maintenance activities would not have a disproportionately high or cumulative effect on human health, or disproportionately high or cumulative environmental effects on minority, low-income population, or Indian tribes.

ALTERNATIVE 4

Direct Impacts

The Water Conservation Plan for Alternative 4 is the same plan presented for Alternative 2. Most of the Ecosystem Restoration Plan features are also identical, although Alternative 4 also includes feral pig management, expanded non-native aquatic management to include additional areas, and placement of additional instream habitat features in an upstream location. None of these measures and neither Plan would have a disproportionately high or cumulative effect on human health, or disproportionately high or cumulative environmental effects on minority, low-income population, or Indian tribes.

Indirect Impacts

There are no indirect impacts that could potentially result in a disproportionately high or cumulative effect to the human health, or disproportionately high or cumulative environmental effects on minority, low-income population, or Indian tribes.

Long-Term Operation and Maintenance Impacts

There are no long-term operation and maintenance impacts that could potentially result in a disproportionately high or cumulative effect to the human health, or disproportionately high or cumulative environmental effects on minority, low-income population, or Indian tribes.

Level of Impact for Alternative 4
Less than Significant Impact. Construction and long-term operation and maintenance activities would not have a disproportionately high or cumulative effect on human health, or disproportionately high or cumulative environmental effects on minority, low-income population, or Indian tribes.

5.14 UTILITIES

5.14.1 Regulatory Framework

No Federal agency jurisdictions or regulations are applicable to utilities impacts associated with the proposed alternatives. The Santa Ana Watershed Project Authority and the Orange County Sanitation District manage and operate the Inland Empire Brine Line/Santa Ana Regional Interceptor (IEBL/SARI) Line. The California Public Utilities Commission and the Federal Energy Regulatory Commission both regulate operation of Southern California Gas pipelines and SoCal Edison's high-tension electrical transmission lines.

5.14.2 Impact Significance Criteria

The impact criteria below were taken from Appendix G of the CEQA guidelines and are also being adopted for NEPA. For purposes of this analysis, Alternatives 1, 2, 3, or 4 would have a significant impact related to Utilities if it would:

IMPACT U-1: Require a substantial modification to existing facilities or services that would have an adverse environmental effect.

5.14.3 Environmental Commitments

None required or proposed.

5.14.4 Utilities Impacts

5.14.4.1 **IMPACT U-1**: Require a substantial modification to existing facilities or services that would have an adverse environmental effect.

ALTERNATIVE 1: NO FEDERAL ACTION/NO PROJECT

Under the No Federal Action/No Project Alternative, neither the Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. Water would continue to be stored at elevation 498 ft. during the flood season and up to elevation 505 ft. during the non-flood season in accordance with the Water Control Plan for Prado Dam. The IEBL/SARI Line would continue to be inundated periodically from water conservation activities and flood control management activities at Prado Dam, but this would not require any modification of those facilities.

ALTERNATIVE 2: PROPOSED ACTION

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts

The water conservation measure would store surface water in the buffer pool up to elevation 505 ft. during the flood season, given sufficient inflow. The additional water stored would result in increased pooling and additional days of inundation in parts of the Prado Basin. The IEBL/SARI Line is situated between 470 ft. and 566 ft. A total of 8.8 miles, approximately 65 percent of the total length of the IEBL/SARI Line in the Prado Basin is located above 505 ft. The IEBL/SARI Line alignment could experience up to 51 additional days of inundation at 490 ft. and up to 5 additional days of inundation at 505 ft. The highest amount of additional days of inundation would be during the winter months or flood season when maintenance activities are typically not conducted. In the spring (March to June) depending on the elevation in the Prado Basin there could be up to 5 additional days of inundation and during the summer (June to September) there would be no additional days of inundation. Implementation of the Water Conservation Plan would not significantly reduce the amount of available time to conduct maintenance activities along the IEBL/SARI Line. The additional days of inundation would have a less than significant impact on the IEBL/SARI Line.

Implementation of the Water Conservation Plan would not involve any activities that would uncover and damage the IEBL/SARI Line. The additional water stored in the Prado Basin would deposit approximately 3,500 cubic yards of additional sediment in the Prado Basin. The sediment would likely deposit over large areas below 505 ft. at an estimated depth of 0.001 ft. per year and access to the IEBL/SARI Line for maintenance activities should not be significantly affected. Within the last few years the IEBL/SARI Line has been relocated within Prado Basin and along Reach 9 either outside of the floodplain or at sufficient depths to be adequately protected from a 30,000 cfs release. Based on the SARI pipeline's new location and protective cover depth, no long-term adverse impacts to the IEBL/SARI pipeline are expected to occur from water releases associated with the Water Conservation Plan.

A Southern California Gas Pipeline (gas line) extends through the southern portion of Prado Basin and is within the footprint of the proposed sediment storage areas near the Corps field office. The sediment storage areas are located above 505 feet elevation. Neither this pipeline nor SoCal Edison's high-tension electrical transmission lines would be affected by the Water Conservation Plan.

Indirect Impacts

There are no activities that would require modification to existing facilities and therefore no adverse environmental effect would occur.

Long-Term Operation and Maintenance Impacts

There are no long-term operation and maintenance activities that would require modification to existing facilities and therefore no adverse environmental effect would occur.

Ecosystem Restoration Plan

Direct Impacts

Sediment Management Measure
The IEBL/SARI Line alignment is not close to where the Sediment Management Measure would be implemented. Therefore, the construction, operation and maintenance of the Sediment Management Measure would not have any effect on the IEBL/SARI Line.
The gas line that crosses through Prado Basin is located within the footprint of the proposed sediment storage areas near the Corps field office. However, this utility will be moved prior to the construction of the modified spillway for Prado Dam, which is a component of the Santa Ana River Mainstem Project for Flood Risk Management. That project has already been authorized by Congress and funds have been appropriated for construction. Moving the gas line would be undertaken prior to spillway construction, which is expected to be completed prior to implementation of sediment management.

Chino Creek Channel Restoration Measure
The IEBL/SARI Line alignment and the gas line are not close to where the Chino Creek Restoration Measure would be implemented. Therefore, the construction, operation and maintenance of the Chino Creek Restoration Measure would not have any effect on the IEBL/SARI Line or the gas line. There is a 500kV high-tension electrical transmission line that crosses Chino Creek at about 200 feet north of the northern end of the Chino Creek Channel Restoration Measure. The towers for this line are located at approximately 400 feet east-northeast and 1,000 feet west-southwest of the northern end of this feature. This utility would not be affected by the construction, operation or maintenance of the Chino Creek Channel Restoration Measure.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Treatment Measure
The IEBL/SARI Line alignment and the gas line are not close to where the above ecosystem restoration measures would be implemented. Therefore, the construction, operation and maintenance of the ecosystem restoration measures would not have any effect on the IEBL/SARI Line, the high tension electrical transmission line that crosses Prado Basin, or the gas transmission line.

In-stream Habitat Features Measure Downstream
The SARI Line segment of the IEBL/SARI Line extends through the wetted channel of the Santa Ana River, immediately downstream of the Green River Golf Course. There are no in-stream habitat structures proposed where the SARI Line alignment crosses the river. The SARI Line alignment is located along existing access roads within the floodplain that would be used by heavy construction equipment to construct and to monitor the In-Stream Habitat Features. The SARI Line is located at a depth where the heavy equipment would not affect the pipeline.
The gas line is not close to where the In-Stream Habitat Features would be implemented. Therefore, the construction, operation and maintenance of the ecosystem restoration measures would not have any effect on the IEBL/SARI Line or the gas line.

Non-Native Aquatic Species Management Measure, Cowbird Trapping Measure
Implementation of the above non-native wildlife management measures would not involve any activities that would affect the IEBL/SARI Line, the Southern California Gas Pipeline or the SoCal Edison high-tension electrical transmission line.

Indirect Impacts
There are no activities that would require modification to existing facilities and therefore no adverse environmental effect would occur.

Long-Term Operation and Maintenance Impacts
There are no long-term operation, maintenance or adaptive management activities that would require modification to existing facilities and therefore no adverse environmental effect would occur.

Level of Impact for Alternative 2
Less than Significant Impact. Construction, long-term operation, maintenance, and adaptive management activities would not require modification to existing facilities and therefore no adverse environmental effect would occur.

ALTERNATIVE 3

Water Conservation Plan (Elevation 505 Feet with Incidental Sediment Removal)

Direct Impacts
This Plan is similar, to that described for Alternative 2, and the level of potential impacts on existing facilities would be the same. The additional days of inundation would have a less than significant impact on existing facilities.
Under Alternative 3, an incidental, smaller scale sediment removal program would be implemented in conjunction with the Water Conservation Plan. The incidental sediment removal activities would only require the use of Sediment Storage Site A and therefore would have no adverse impacts on existing facilities and the environment.

Indirect Impacts
There are no activities that would require modification to existing facilities and therefore no adverse environmental effect would occur.

Long-Term Operation and Maintenance Impacts
There are no long-term operation and maintenance activities that would require modification to existing facilities and therefore no adverse environmental effect would occur.

Ecosystem Restoration Plan

Direct Impacts

Chino Creek Channel Restoration Measure
Under Alternative 3, Chino Creek Channel Restoration Measure would be implemented in the same construction footprint as Alternative 2 and therefore the construction, operation and maintenance of the Chino Creek Restoration Measure would not have any effect on the IEBL/SARI Line, the Southern California Gas pipeline, or the SoCal Edison high-tension electrical transmission line and no adverse environmental effect would occur.

Cowbird Trapping Measure
This measure is the same as described for Alternative 2 and therefore there would not be any activities that would affect existing facilities such as the IEBL/SARI Line, the Southern California Gas pipeline, or the SoCal Edison high-tension electrical transmission line and no adverse environmental effect would occur.

Indirect Impacts
There are no activities that would require modification to existing facilities and therefore no adverse environmental effect would occur.

Long-Term Operation and Maintenance Impacts
There are no long-term operation, maintenance or adaptive management activities that would require modification to existing facilities and therefore no adverse environmental effect would occur.

Level of Impact for Alternative 3
Less than Significant Impact. Construction, long-term operation, maintenance, and adaptive management activities would not require modification to existing facilities and therefore no adverse environmental effect would occur.

ALTERNATIVE 4

Water Conservation Plan (Elevation 505 Feet Year-Round)

Direct Impacts
This Plan is the same as described for Alternative 2 and therefore the level of potential impacts on existing facilities would be the same. The additional days of inundation would have a less than significant impact on existing facilities and no adverse environmental effect would occur.

Ecosystem Restoration Plan

Direct Impacts

Sediment Management Measure
This measure is the same as described for Alternative 2 and therefore modification of existing facilities having an adverse environmental effect would not occur.

Chino Creek Channel Restoration Measure
This measure is the same as described for Alternative 2 and therefore modification of existing facilities having an adverse environmental effect would not occur.

In-Stream Habitat Features Measure Downstream
This measure is the same as described for Alternative 2 and therefore modification of existing facilities having an adverse environmental effect would not occur.

In-stream Habitat Features Measure Upstream
Under Alternative 4, In-Stream Habitat Features would be constructed within the SARM Upstream Focal Area and there are no utilities close to the project area. Therefore, no adverse impacts associated with the modification of existing utilities or facilities and environmental effect would occur.

Invasive Plant Management Measure, Native Plantings Measure, Riparian Edge Management Measure
These measures are the same as described for Alternative 2 and therefore modification of existing facilities having an adverse environmental effect would not occur.

Non-Native Aquatic Species Management Measure (Upstream and Downstream), Feral Pig Management Measure, Cowbird Management Measure
Implementation of the above non-native wildlife management measures would not involve any activities that would affect the IEBL/SARI Line, the Southern California Gas pipeline, or the SoCal Edison high-tension electrical transmission line and therefore no adverse environmental effect would occur.

Indirect Impacts
There are no activities that would require modification to existing facilities and therefore no adverse environmental effect would occur.

Long-Term Operation and Maintenance Impacts
There are no long-term operation, maintenance or adaptive management activities that would require modification to existing facilities and therefore no adverse environmental effect would occur.

Level of Impact for Alternative 4
Less than Significant Impact. Construction, long-term operation, maintenance, adaptive management activities would not require the modification of existing facilities and therefore no adverse environmental effect would occur.

5.15 CUMULATIVE IMPACTS

The CEQA guidelines and the regulations implementing NEPA require that the cumulative effect of a proposed action be assessed (14 CCR Section 15130; 40 CFR Parts 1500-1508). A cumulative effect is an "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions" (40 CFR § 1508.7). In addition, they are defined as "two or more individual effects, which, when considered together, are considerable or which compound or increase other environmental impacts" (CEQA Guidelines Sec. 15355). Cumulative effects can result from individually minor but collectively significant actions taking place over time (40 CFR § 1508.7). CEQ's guidance for considering cumulative effects states that NEPA documents "should compare the cumulative effects of multiple actions with appropriate national, regional, state, or community goals and policies to determine whether the total effect is significant" (CEQA 2010). The following sections discuss local and regional growth trends and projects that may result in cumulative effects when combined with effects from the actions discussed above.

In general, past, present, and reasonably foreseeable future projects are assessed by resource area. Cumulative effects may arise from single or multiple actions and may result in additive or interactive effects. Interactive effects may be countervailing, where the adverse cumulative effect is less than the sum of the individual effects, or synergistic, where the net adverse cumulative effect is greater than the sum of the individual effects (CEQA 2010). The factors considered in determining the significance of cumulative effects are similar, to those presented for each resource earlier in Chapter 5.

An integral part of the cumulative effects analysis involves determining whether effects from the project would contribute to ongoing or foreseeable resource trends. Where effects from the project contribute to regional resource trends, there is a potential for a cumulative effect. The cumulative effects analysis does not assess all expected environmental impacts from regional projects but only those resulting from the current proposed project and other past, present, and reasonably foreseeable future actions.

The timeframe for analysis of cumulative effects can be described as the reasonable and foreseeable estimate for implementation of cumulative projects, in addition to the proposed action. For purpose of this analysis and discussion of existing, ongoing, or planned projects, this timeframe would extend from the recent past to the life of the project in 2071.

5.15.1 Past Activities, Present Activities, Future Activities

This section is a discussion of past, present and future activities combined with the proposed alternatives to determine if significant cumulative effects, would occur. The past activities and present activities focus on activities occurring in the Prado basin and Reach 9. Because of the

large geographic region affected by the proposed alternatives, the future activities occurring within the study area are based on regional plans and planning programs that relevant to each focal area.

Past Actions

Since 1941 when Prado Dam was constructed there have been several operation changes and improvements to the dam and to Reach 9. These improvements have been analyzed in numerous environmental documents and biological opinions. Potential effects to federally listed species and designated critical habitat have been consulted on and have been adequately mitigated through the implementation of habitat restoration activities and wildlife management programs. These previous habitat restoration efforts and wildlife management activities have resulted in substantial increases in Least Bell's Vireo populations in the Prado Basin.

Present Actions

Presently, and for the next five years Prado Dam operations would allow the buffer pool to be held up to 505 ft. elevation during the flood season and non-flood season to allow for increased water conservation to help replenish the Orange County ground water basin. Flood risk management improvements to Prado Dam and along Reach 9 are currently occurring and are expected to continue for the next several years. Additionally, ongoing monitoring and restoration activities within the Prado Basin and along Reach 9 are currently occurring to conserve and expand habitat. Additionally, the regional area surrounding the study continues to grow with new urban development.

Future Activities

The study area consists of several thousands of acres of undeveloped area. These areas are included in both local and county-wide General Plans that would guide development of land uses within the study area. To evaluate potential cumulative impacts from future activities the proposed alternatives were combined with the relevant planning programs within the study area. Land use and development within Prado Basin are also constrained by flood control requirements.

5.15.1.1 Prado Basin Area Activities

Orange County Water District Ongoing Arundo Control Program

OCWD began involvement in the Santa Ana River Watershed-wide Arundo Control Program in 1995. Mitigation and restoration activities under the Arundo Control Program have largely been accomplished in partnership with Santa Ana Watershed Association (SAWA), a non-profit corporation run by a 5-member board with one representative each from the Orange County Water District, and four Resource Conservation Districts (RCDs). Multiple partners are also involved in the efforts including the Fish and Wildlife Service (Service), California Department of Fish and Wildlife (CDFW) , U.S. Army Corps of Engineers, Regional Water Quality Control Board, the counties, several cities, and many other individuals and organizations.

Approximately 5,000 acres of river bottom lands formerly infested by arundo and other weeds have been treated. The entire upper watershed of the Santa Ana River and all the major tributaries have been cleared and are under a regime of re-treatment as needed down to the

vicinity of Hamner Road and OCWD property approximately four miles upstream of Prado Dam. In April of 2015, the Highway Fire burned about 1,000 acres of habitat in the Prado Basin including about 321 acres of arundo on OCWD property. Almost immediately after the fire the arundo began to re-sprout and invade additional acreage of the burn area. To prevent the re-sprouting of the arundo, OCWD is currently implementing a five-year arundo treatment program within the 321 acres burn area on OCWD property.

OCWD Prado Wetlands Regional Maintenance Permits

OCWD has permit approval from United States Fish and Wildlife Service (FWS-WRIV-11B0269-12F0166), United States Army Corps of Engineers (SPL-2012-00084-CLD), California Department Fish and Wildlife (1600-2011-0148-R-6) and Regional Water Quality Control Board (30-2011-12) to conduct routine maintenance activities to maintain the Prado Wetlands, which includes up to 35,000 cubic yards of sediment allowed to be removed annually from the wetland's conveyance and diversion channels and from the Santa Ana River. As condition of the permit OCWD us required to restore 24 acres of habitat.

Santa Ana River Conservation and Conjunction Use Project

The Santa Ana River Conservation and Conjunction Use Project involves a group of Santa Ana River water shed agencies, that in the Orange County Water District, Eastern Municipal Water District, Inland Empire Utilities District, San Bernardino Valley Municipal Water District, Western Municipal Water District, anta Ana Watershed Project Authority. The project would remove 640 acres of arundo from Prado Basin, restore 3.5 miles of in-stream habitat with the Santa Ana River and restore 40.5 acres riparian habitat along the Santa Ana River.

U.S. Army Corps Engineers Santa Ana River Mainstem (SARM) Improvements

The SARM Project involves improvements to Corps flood risk management structures and facilities within areas of the Prado Dam Basin and Reach 9. Construction has already been completed on the Prado Embankment and Outlet Works modifications, several perimeter dikes around Prado Basin, and portions of Reach 9 embankment protection. Remaining improvements within the study area include, Alcoa Dike, Auxiliary Dike (Phases 2 and 3), minor improvements to existing dikes, Norco Bluffs, Prado Dam Spillway, River Road Dike, and ongoing construction of Reach 9 embankment and bridge protection features (Reach 9 Phases 4, 5A, 5B, and BNSF). SARM also includes mitigation for project effects. Within the study area, this mitigation includes removal of hundreds of acres of arundo and other non-native invasive plants, and restoration of native riparian, coastal sage scrub and perennial stream habitats. It is currently anticipated that most if not all of the SARM construction within the study area would be completed prior to implementation of Prado Feasibility ecosystem restoration measures, although SARM mitigation and restoration of temporary impact areas would be ongoing for a period of time.

Santa Ana River Trail (SART)

The Riverside County Parks and Open Space District, in cooperation with the County of Riverside, the City of Corona, the City of Norco, and the City of Eastvale, proposes to construct a 12.8-mile section of the SART and Parkway Project (project) to facilitate pedestrian, equestrian, and bicycling trail use through both new construction and improvements to the existing trail. The project would fill in the gaps of the SART within the Prado Basin.

Approximately 70 percent of the proposed alignment incorporates existing trails, while only 30 percent is projected to affect previously undisturbed native soils. Roughly a quarter of the existing trails are paved, while the remaining segments are composed of either well-defined or washed out dirt trails. Depths of excavation within the alignment are currently projected to be minimal with only select areas receiving light restoration grading, resulting in a 1 to 2-foot cut below the current surface.

State Route 91/State Route 71 Interchange Improvement Project
The California Department of Transportation (Department), in cooperation with the Riverside County Transportation Commission (RCTC), proposes to improve the State Route (SR) 91/SR 71 interchange by constructing a new direct flyover connector from eastbound SR 91 (post mile [PM] R0.6/R2.6) to northbound SR 71 (PM 1.6/3.0). The project includes the following project components: flyover connec/tor ramp, bridge widening, restriping of SR 91 eastbound lanes, modification or construction of new drainage facilities, retaining walls, and relocation of access roads. The project will improve the current and future operational efficiency and enhance the capacity of the eastbound SR 91 to northbound SR 71 connector.

5.15.2 Study Area Relevant Planning Programs

The following are planning programs that are relevant to the four focal areas in the IFR areas that could potentially contribute to or address cumulative effects when combined with implementation of the proposed alternatives.

5.15.2.1 Upper Santa Ana River Focal Area

Western Riverside County Multiple Species Habitat Conservation Plan
The project area is included within the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP). The project area is included within Existing Core Area A, which is defined as areas that contain a block of habitat of appropriate size, configuration, and vegetation characteristics to generally support the life history requirements of one or more covered species. The core functions as a linkage, connecting Orange County to the west and San Bernardino County to the north. The objective of the MSHCP in this area is to maintain riparian habitat within the existing core and along the existing core edges, the maintenance of existing floodplain processes and the maintenance of water quality along the Santa Ana River.

Riverside County General Plan
The western portion of the focal area is situated in unincorporated Riverside County and included within Temescal Canyon Area Plan of the Riverside County General Plan. The General Plan designates the focal area for Open Space Conservation land uses. Several policies have been established that provide for the protection of natural resources and for the expansion of recreation uses along the Santa Ana River Corridor.

San Bernardino County General Plan
According to the San Bernardino County General Plan, the Prado Basin is situated within the West Valley Sub-Regional Planning Area of San Bernardino County. The West Valley contains six major cities, that includes; Chino, Chino Hills, Fontana, Montclair, Ontario, Rancho

Cucamonga and Upland. The County of San Bernardino limits are primarily located north of the 566 ft. elevation in the central portion of the Prado Basin. The County Land Use designation for this area is open space.

City of Eastvale General Plan
The eastern portion of the focal area, just south of River Road Bridge is located within the City of Eastvale. According to the General Plan the study area is designated conservation, open space, recreation and water. The intent of the open space designations is to provide for the preservation of natural and scenic resources, flood control protection and to provide for active and passive recreation uses.

5.15.2.2 Lower Santa Ana River Focal Area

County of Orange Santa Ana Canyon Habitat Management Plan
The focal area is included within the County of Orange Santa Ana Canyon Habitat Management Plan (HMP). The HMP addresses the floodplain and open wildlife habitat in the Santa Ana Canyon below Prado Dam and provides for planning and management continuity for the canyon habitat from Prado Dam downstream to Weir Canyon. The HMP lists permitted activities within the study area that include; maintenance, repair and operations of flood control works, utilities, trails, bridges, park facilities, habitat restoration, use of recreation trails, hiking, bicycling, construction of remaining regional trail and bikeway segments, wildlife viewing, camping, picnicking and golfing.

Riverside County General Plan
A portion of the focal area, just west of Prado Dam is included within the County of Riverside General Plan. The General Plan designates the area for open space and conservation uses.

City of Anaheim General Plan
A portion of the focal area is included within the City of Anaheim. The General Plan designates the Santa Ana River for water related uses. The intent of the water designation is to provide for the preservation natural and scenic resources and water conservation along the Santa Ana River.

City of Yorba Linda General Plan
A portion of the focal area is included within the City of Yorba Linda. The General Plan identifies the Santa Ana River for water related uses. The intent of the water designation is to provide for the preservation natural and scenic resources and water conservation along the Santa Ana River.

5.15.2.3 Chino Creek Focal Area

Riverside County General Plan
A portion of the focal area, south of Euclid Avenue is included within the County of Riverside General Plan. The General Plan identifies the Santa Ana River for open space and conservation uses.

Chino Hills General plan
A small portion of the Chino Creek Focal Area is included within the City of Chino Hills General Plan. The General Plan designates the area private and public open space.

City of Chino General Plan
A portion of the focal area, north of Euclid Avenue is included within the City of Chino General Plan. The General Plan designates the focal area for open space and recreation uses. The intent of the open space and recreation designation is to maintain the area as open space for recreation uses.

5.15.2.4 Mill Creek Focal Area

City of Chino General Plan
The General Plan identifies the focal area for open space and recreation uses.

5.15.3 Cumulative Impact Analysis

5.15.3.1 Aesthetics

Implementation of the proposed alternatives combined with the other restoration activities proposed in the Prado Basin and along the Santa River would further enhance the natural aesthetic character of the study area. Additionally, the general plans of surrounding cities within the study designate the project focal areas for open space and conservation activities. Implementation of these planning programs combined with any of the alternative ecosystem restoration measures would enhance the existing aesthetic environment of the study area and the surrounding area. Implementation of any the proposed alternatives combined with other activities occurring in the study area would not permanently obstruct views or permanently introduce new sources of light and glare. There is the potential that construction activities associated with the implementation of the alternatives combined with the other activities occurring in the study area could temporarily replace existing scenic views with construction activities. These impacts would be confined to specific sites for a short period of time and would not cumulatively affect the overall aesthetic character of the study area or surrounding area.

5.15.3.2 Air Quality

Cumulative air quality and greenhouse gas impacts can occur when multiple emission sources affect the same geographic area simultaneously or when sequential projects extend the duration of air quality impacts on a given area over a long period. For cumulative air quality and greenhouse gas impacts, the study area would be the South Coast Air Basin which includes the greater Orange County/ Riverside County/San Bernardino County area. There are present or reasonably foreseeable construction projects occurring within the regional area when combined with emissions generated from the proposed alternatives that would contribute to cumulative regional air quality and greenhouse gas impacts. Of the projects listed above, SARM and the proposed 91/71 Interchange project would be most likely to have substantial air quality impacts of their own and would therefore create the greatest potential for cumulative air quality impacts. It is anticipated that SARM construction would be substantially completed prior to

implementation of Prado Feasibility ecosystem restoration measures, and therefore cumulative air quality impacts would be minimized or avoided. The schedule for the 91/71 Interchange project is not known at this time, but that project would likely include standard BMPs and other measures that would minimize the potential for cumulative impacts.

The South Coast Air Basin, which is currently designated by the EPA as a non-attainment area for ozone and PM2.5 and is designated by ARB as a non-attainment area for ozone, PM10, and PM2.5, which means that the background levels of those pollutants are at times higher than the ambient air quality standards. The regional air quality analysis prepared for the proposed alternatives shows that under CEQA, Alternative 2 and Alternative 4 would generate NOx (ozone precursor), emissions that would exceed the South Coast Air Quality Management District (SCAQMD) NOx threshold and would result in significant regional air quality impact and combined other past, present, and reasonably foreseeable future projects in the regional area under CEQA would result in cumulative air quality impacts. Implementation of Alternative 3 would not exceed the NOx and therefore would not contribute to cumulatively significant regional air quality impacts. For purposes for NEPA compliance, the construction and long-term operation and maintenance for all alternatives would not result in project-related emissions that would exceed General Conformity de minimis levels as established in 40 CFR 93.153(b.) and would not contribute to significant cumulative regional air quality impacts.

According to the SCAQMD draft threshold of significance, a significant greenhouse gas emission impact under CEQA would occur if the greenhouse gas emissions would exceed 3,000 $MTCO_2e$ per year. Alternative 2 and Alternative 4 would exceed the annual CEQA threshold. Because Alternative 2 and Alternative 4 would exceed the annual threshold and would not be contributing to help meeting the State's goal of reducing greenhouse gas emissions to 1990 levels by 2020, a significant cumulative regional greenhouse gas emission impact would occur. Implementation of Alternative 3 would not exceed the 3,000 $MTCO_2e$ per year threshold and therefore under CEQA would not contribute to significant cumulative regional greenhouse gas emission impacts. No conclusion are made with respect to the project's greenhouse gas emissions and the cumulative effects thereoffor the purposes of NEPA.

5.15.3.3 Biology

The study area includes four focal areas where the proposed ecosystem restoration activities would be implemented, as well those locations where ongoing restoration activities, flood risk improvements, freeway construction and future open space planning programs would be implemented. The study area contains special status wildlife species and sensitive habitat. Implementation of the proposed alternatives would have the potential to adversely affect special status wildlife species and sensitive habitat. However, with the implementation of environmental commitments no substantial significant impacts would occur that would jeopardize special status species within the project area and with implementation of the ecosystem restoration measures there would be no net loss of sensitive habitat. Additionally, implementation of the other ongoing restoration activities and open space planning programs would preserve and conserve open space habitat that would support special status wildlife species. The proposed alternatives combined with ongoing restoration activities and open space planning programs within the study area would cumulatively benefit special status wildlife and their habitat.

5.15.3.4 Cultural Resources

Cumulative impacts on cultural and paleontological resources consider the incremental impacts of each alternative in combination with the ongoing impacts of past projects and reflected in the current state of knowledge about the cultural and paleontological context and potential resource as well as other present and reasonably foreseeable future actions. Implementation of all proposed alternatives would not have any adverse effects on recorded cultural resources and therefore would not contribute to any cumulative loss or damage to cultural resource. Because the regional area is known to contain historical and pre-historic cultural resources, there would be some potential that unknown cultural resources including Native American resources could be encountered during construction activities. To avoid potential significant impacts to unknown cultural resources, environmental commitments have been incorporated into the proposed alternatives that requires onsite monitoring during construction. Because none of the alternatives would not cause any direct or indirect significant impacts to cultural resources or paleontological resources, none of the alternative would cause or contribute to any significant cumulative impact to cultural or paleontological resources.

5.15.3.5 Socioeconomics / Environmental Justice

The study area does not contain a disproportional number of minority communities or households below the poverty line compared to the regional area. Therefore, implementation of the proposed alternatives combined with the other activities occurring in the study area would not contribute significant cumulative adverse impacts to low-income households or minority households. Implementation of all alternatives would result in minor, short-term, beneficial employment and economic effects. No direct or indirect no adverse employment, housing, or economic impacts would occur because of any of the Alternatives that could contribute to adverse cumulative impacts.

5.15.3.6 Geology

Geologic and seismic impacts typically are tied to site specific conditions and the geotechnical hazards that are present which do not combine with other sites to become cumulatively significant. The presence of past, current, and future projects in the cumulative scenario would have no effect on either the severity or the probability of geotechnical challenges associated with seismicity and/or the character of underlying soils on the Project site and as a result would not combine to create a cumulatively significant impact. Such hazards are site-specific and unaffected by the presence of other projects in the cumulative scenario, but rather are dependent on site specific characteristics of underlying materials and the geotechnical measures taken during site design to minimize those hazards. None of the proposed alternatives, include the construction of habitable structures. Therefore, the proposed alternatives would not cumulatively increase the potential for habitat structures within the study area to be adversely affected by seismic impacts. During construction, the proposed alternatives, other ongoing restoration activities, flood risk management improvements and future planning programs implemented within the study area could uncover soils potentially leading to adverse erosion sedimentation impacts. The proposed alternatives, other ongoing restoration activities, flood risk improvements, freeway construction and future planning programs would be required to implement measures to

minimize erosion and sedimentation generated from construction sites. Therefore, the cumulative effect related to geology and soils is less than significant.

5.15.3.7 Hazards/Hazardous Materials

Hazard and hazardous materials incidents tend to be isolated occurrences and do not combine unless they occur at the same location and overlap in time. Only simultaneous releases that occur on adjacent sites or within proximity of one another would have the potential to overlap and result in a cumulative impact. Due to the limited potential for other construction activities to be occurring within the same time frame and within or near the same footprint, this is not considered to be a likely scenario and therefore cumulative impacts would be less than significant. Existing conditions do not demonstrate significant adverse existing conditions within the study area. Therefore, the less-than-significant incremental impact of the alternatives and the unlikeliness of simultaneous releases in combination with the incremental impacts of past, other present, and reasonably foreseeable future projects would not cause or contribute to a significant cumulative impact.

Construction operations associated with the implementation of the proposed alternatives, other ongoing restoration activities, flood risk improvements, freeway construction and implementation future planning programs within the study area could involve operation of heavy construction equipment and the handling of incidental amounts of hazardous materials, such fuels, oil and solvents, which could have the potential to be inadvertently released into the environment. The operation of heavy construction equipment for the proposed alternatives and other activities in the study area would be required to comply with Federal, State and local laws and regulations regarding the handling of hazardous materials. With compliance with Federal, State and local laws, proposed alternatives combined with other activities occurring within the study area would avoid the potential for significant cumulative hazardous impacts.

5.15.3.8 Public Safety

Implementation of the proposed alternatives would not adversely affect the safety of Prado Dam or involve any activities that would require road closures that would affect emergency access. Additionally, other ongoing restoration activities, flood risk improvements, freeway construction, and future planning programs within the study area would be required to be implemented in a manner that maintains public safety. This would ensure that cumulative activities do not occur that adversely affect emergency access within the study area or other aspects of public safety.

5.15.3.9 Water Resources

All proposed alternatives include a Water Conservation Plan. Implementation of the Water Conservation Plan along with naturally occurring incoming sediment would incrementally contribute to the cumulative long-term accumulation of sediment in the Prado Basin which in time could result in reduced water storage capacity. All proposed alternatives include some form of sediment removal activities that would remove sediment from the Prado Basin. With the removal of an amount of incoming sediment that is at least equivalent to what would accumulate

due to the proposed change in Water Conservation, the project's contributions to cumulative impacts would be avoided.

The greatest potential for cumulative impacts with respect to water quality would occur if land disturbing activities associated with the other ongoing restoration activities, flood risk improvements, freeway construction and future planning programs within the study area were to happen concurrently. Construction activities would have the potential to generate degraded surface water runoff which could be conveyed into streams and drainages reducing water quality. The construction activities for the proposed alternatives, other ongoing restoration activities, flood risk improvements, freeway construction and future planning programs within the study area would all be required to comply with NPDES permit requirements to reduce potential storm water impacts to a less than significant level. Because each activity occurring in the study area would be required to comply with the NPDES requirement for each site, the implementation of the proposed alternatives combined with the other activities occurring in the study area would avoid significant cumulative adverse surface water runoff impacts.

5.15.3.10 Land Use/Relevant Planning Programs

The study area encompasses the general plans of surrounding cities and counties. The implementation of any of the alternatives would be consistent with the applicable general plans. Future activities occurring in the study area would be required to demonstrate consistency with applicable planning programs and policies. Compliance with the study area planning programs would avoid significant cumulative land use impacts from occurring.

5.15.3.11 Noise

Cumulative noise impacts typically occur when multiple projects affect the same geographic areas simultaneously or when sequential projects extend the duration of noise impacts on a given area over a longer period. Based on the list of ongoing or reasonably foreseeable projects identified above, it is unlikely that sensitive receptors such as housing developments would be subjected to noise impacts from other sources at the same time or in the same area that ecosystem restoration construction would be occurring. Noise impacts are primarily localized because sound levels decrease relatively quickly with increasing distance from the source; therefore, the area of potential effect would be limited to the area subject to an audible increase in noise levels associated with construction of one or more projects.

Implementation of the proposed alternatives would not generate permanent long-term noise impacts. Therefore, the proposed alternatives combined other activities occurring in the study area would not contribute to significant cumulative long-term noise impacts.

Construction activities for the proposed alternatives, other ongoing restoration activities, flood risk management activities, freeway construction and implementation of the planning programs within the study area would generate short-term construction noise impacts. There would be little potential that construction activities would be close enough to each other to contribute to significant cumulative construction noise impacts. Additionally, the proposed alternatives and the other activities occurring within the study area would be required to comply with local noise

ordinances and where needed would be required to mitigate for construction noise impacts at sensitive receptors. Therefore, the proposed alternatives combined with the other activities within the study area would not result in significant cumulative noise impacts.

Vibration is a highly localized phenomenon. Because of the distances between the measures proposed in the alternatives and the other activities occurring in the study area, there would be very low potential that vibration associated with the proposed alternatives combined with the other activities occurring within the study area could result in significant cumulative vibration impacts.

5.15.3.12 Traffic/Transportation

The proposed alternatives would not generate long term daily traffic trips within the study area that would reduce the level of service of any study area intersection or roadway segment. Therefore, the proposed alternatives would not contribute significant impacts to long term cumulative traffic impacts within the study area. To account for potential cumulative traffic impacts within the study area, the traffic analysis assumed a 2 percent annual growth rate to the study area circulation system for the life of the project. Based on the 2 percent growth rates, the proposed alternatives combined with other activities occurring in the study would not result in significant cumulative traffic impacts.

5.15.3.13 Recreation

Existing recreation uses within study currently experience various levels of inundation from the existing flood control and water conservation activities at Prado Basin. All alternatives include a Water Conservation Plan that would result in additional days of inundation. Implementation of all alternatives would cumulatively increase the overall days of inundation for some recreation uses beyond the current condition. However, because the additional days of inundation would not affect the operation of the recreation facilities to the extent that there would there would be a substantial increase in use or deterioration of other recreation facilities within the study area, the project would not cause or contribute to significant cumulative effects on recreation..

5.15.3.14 Utilities

Public utilities that occur in the project area include the IEBL/SARI pipeline and the Southern California gas line located beneath the proposed sediment storage site. Currently segments of the IEBL/SARI pipeline are regularly inundated due to flood control and water conservation activities at Prado Basin. It is anticipated that the Southern California gas line would be moved prior to implementation of the proposed sediment management measure for SARM spillway construction, and therefore this utility would not be affected by the ecosystem restoration project. Implementation of all alternatives would cumulatively increase the overall days of inundation along segments of the IEBL/SARI pipeline within the Prado Basin. However, because the additional days of inundation would not affect the operation or maintenance needs of the IEBL/SARI pipeline the cumulative effect would not be substantial. Additionally, the previous relocation of the Reach 9 segment of the IEBL/SARI to protective depths and locations ensures that no adverse cumulative impacts would occur to that segment from the proposed alternatives.

5.16 OTHER CEQA/NEPA REQUIRED SECTIONS

5.16.1 Growth-Inducing Impacts

NEPA requires consideration growth-inducing effects and other effects related to induced changes in population density or growth rate (40 C.F.R. §1508.8). CEQA Guidelines Section 15126.2(d) requires a discussion of growth-inducing impacts. Pursuant both NEPA and CEQA, but following the framework provided in CEQA Guidelines Sections 15126.2(d), this section evaluates if the proposed alternatives as the potential to foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Specifically, the following questions would be evaluated to determine potential growth inducing impacts associated with the implementation of the alternatives.

1. Would the project remove obstacles to growth through the construction or extension of major infrastructure facilities that do not presently exist in the project area, or through changes in existing regulations pertaining to land development?
2. Would the project result in the need to expand one or more public services to maintain desired levels of service?
3. Would the project encourage or facilitate economic effects that could result in other activities that could significantly affect the environment?
4. Would approval of the project involve some precedent setting action that could encourage and facilitate other activities that could significantly affect the environment?

1. Would the project remove obstacles to growth through the construction or extension of major infrastructure facilities that do not presently exist in the project area, or through changes in existing regulations pertaining to land development?

The purpose of the Water Conservation Plan would be to temporarily store additional water during the flood season to enhance existing water conservation activities at the Prado Basin. The additional water stored at Prado dam would meet existing and planned water demands within OCWED service area and would not facilitate new growth. The purpose of the Ecosystem Restoration Plan is to create and restore native habitat within the study area. The restoration activities would maintain existing open space. The maintenance of open space within the study area would not induce additional growth in the study area.

2. Would the project result in the need to expand one or more public services to maintain desired levels of service?

Implementation of any of the alternatives would not involve the construction of land uses or other activities that would require the expansion of any public service to maintain desired levels of service.

3. Will the project encourage or facilitate economic effects that could result in other activities that could significantly affect the environment?

Implementation of the proposed alternatives would not generate long term employment opportunities within the study area. The proposed ecosystem restoration measures would

generate seasonal and short-term construction related employment opportunities. More than likely the short employment opportunities would be filled by people local to the area and would not cause substantial amount of new populations new to re--located to area that could significantly affect the environment.

4. Will approval of the project involve some precedent setting action that could encourage and facilitate other activities that could significantly affect the environment?

The proposed alternatives are not part of larger actions that facilitate new activities within the study area.

5.16.2 Relationship Between Short-Term Uses of the Environment and Maintenance and Enhancement of Long-Term Productivity

The National Environmental Policy Act (NEPA) (40 CFR 1502.16) requires that an EIS consider the relationship between short-term uses of the environment and the impacts that such uses may have on the maintenance and enhancement of long-term productivity of the affected environment. This section compares the short and long term environmental effects of the proposed alternatives. Overall, the proposed alternatives would provide minor and temporary short-term losses, while resulting in significant beneficial impacts to the long-term productivity of the affected area.

The period of construction for the proposed alternatives represents the cause of most short-term impacts. These temporary and minor impacts or losses are considered non-significant and would include increases in noise, construction traffic, potential erosion impacts from uncovering and removal of sediment and vegetation, reduction in air, water, and aesthetic quality, and disturbance to biological resources. However, except for regional air quality impacts with the incorporation environmental commitments potential impacts to the environment would be less than significant. Under CEQA Significant adverse regional air quality for Alternative 2 and Alternative 4 would occur.

No long-term adverse impacts would result from the project. However, long-term beneficial impacts would result from the restoration riparian and aquatic habitats within the Prado Basin and Reach 9, which would increase suitable habitat to support special status wildlife species within the Prado Basin. Additionally, removal of non-native vegetation and restoration of native habitat would further increase fish and wildlife habitat. Secondary long-term benefits of restoration efforts would include improvements to aesthetic quality of the Prado Basin which would enhance open space relief to a regional area that continues to experience substantial urban growth. Ecological restoration would maintain open space within the study area and in doing so, would enhance the well-being of the human population in the surrounding area. These long-term benefits have been envisioned and designed to outweigh the short-term adverse impacts that are necessary to achieve the project goals.

5.16.3 Irreversible and Irretrievable Commitment of Resources

The irreversible environmental changes that would result from implementation of the proposed projects involve the consumption of material resources, energy resources, and human resources

that affect the sustainability of resource use in future generations. The use of these resources would be considered permanent because the use or destruction of the resource cannot be replaced within a reasonable timeframe.

Overall, the proposed alternatives would result in the use of materials, energy, and human resources that would be irreversible and irretrievably lost. Losses would include those from materials used, fill material removed, vegetation uprooted, energy resources utilized, and labor hours spent. Levels of significance of these losses, both adverse and beneficial, are described in further detail in subsequent paragraphs.

For all alternatives proposed, a variety of materials in place within the study area would be removed or altered in a way that would result in their irretrievable loss. This loss would be offset in part by the reuse of materials where possible. For example, some of the vegetation removed from the basin could be processed into mulch to resurface existing and proposed access roads. The re-use of the vegetation would minimize the amount of materials would be deposited in landfills. Transfer of non-reusable materials for disposal would create irretrievable losses as landfill capacity.

Non-native vegetation that would be altered would be irretrievably lost, though this is a designated objective of the restoration project in many portions of the study area. The irretrievable loss of non-native and invasive vegetation is a preferred outcome. In other areas, loss of vegetation due to construction will be remedied with revegetation efforts. Biological resources will be protected from irretrievable loss through construction management BMPs and site surveys conducted prior to groundbreaking. And during maintenance of the project.

Materials used for construction would also be irretrievably lost, as they would no longer be available for other projects. In addition, use of water for dust abatement will be irretrievable. These needed materials are not in short supply and would not limit other unrelated construction activities. The land itself will be committed to the selected restoration alternative and unavailable for use in future projects.

Energy resources used would include fuels and electricity, which would be utilized during construction and continue to be used during operation and maintenance activities. These uses would constitute an irretrievable loss of energy. However, consumption of energy would not place a significant demand on energy in the region.

Use of human resources during construction would be an irreversible loss of labor supply for other projects. However, labor opportunities are desired in the study area and this use of human resources represents short-term beneficial employment opportunities.

Sediment impounded behind Prado Dam is not considered an irretrievable resource since continued sediment transport would replenish excavated sediment. The sediment would be mechanically transported from behind Prado Dam and re-entrained downstream of the dam to assist in restoring the severely degraded streambed. The excavated sediment would be irretrievable to the area upstream of the dam but is productively utilized downstream to replenish the sediment starved stream. Over time some of the sediment is likely to be transported by flows

to the ocean in the nearshore environment. Implementation of the Water Conservation Plan would help to capture more storm water for groundwater recharge which would help reduce the need for imported water supplies to meet domestic water needs. Because the energy commitments to import water are high relative to the energy commitments for local groundwater supplies, there would be a net benefit regarding the commitment of non-renewable resources within the study area.

5.16.4 Unavoidable Significant Impacts

NEPA
All impacts resulting from construction and maintenance of the proposed project alternatives were reduced to less than significant levels with environmental commitments incorporated into each alternative.

CEQA
All impacts resulting from construction and maintenance of the proposed project alternatives were reduced to less than significant levels with environmental commitments incorporated into each alternative, except for the impacts, summarized in Table 5-44 below, which are significant and unavoidable.

Table 5-44: Unavoidable Adverse Effects

Resource	Alternative 2	Alternative 3	Alternative 4
Air Quality	The construction and operational phases are expected to exceed the NOx threshold under CEQA.	No unavoidable Adverse Effects	The construction and operational phases are expected to exceed the NOx threshold under CEQA.

NEPA Environmentally Preferred Alternative and the CEQA Environmentally Superior Alternative

The State CEQA Guidelines CCR Section 15126.6(e)(2) requires identification of an environmentally superior alternative from among the Proposed Action and Action Alternatives. Based on analysis provided in the EIS/EIR, Alternative 3 would be considered the environmentally superior alternative among the action alternatives. The construction activities for Alternative 3 would not result exceed SCAQMD regional air quality thresholds and greenhouse gas emission thresholds and would result in marginally lower level of intensity of impacts to the environment.

Federal NEPA regulations also recommend that an environmentally preferred alternative be identified. The TSP (Alternative 2) has been identified as the NEPA Environmentally Preferred Alternative due to the long-term net ecosystem benefits.

5.17 EFFECTS FOUND NOT TO BE SIGNIFICANT

This section provides information regarding impacts that were determined to be insignificant during the scoping process, pursuant to Section 15128 of the CEQA Guidelines, as amended. As stated in the CEQA Guidelines: “An EIR shall contain a statement briefly indicating the reason

that various possible significant effects of a project were determined to not be significant and were therefore not discussed in detail in the EIR."

The following presents a brief summary of the effects found not to be significant and therefore not discussed in detail in the EIR. Reasons are provided why they would not be significant.

5.17.1 Agricultural and Forestry Resources

No significant impacts were identified with respect to conversion of prime farmland, unique farmland or farmland of statewide importance to non-agricultural use or conflict with existing agricultural zoning or a Williamson Act contract.

No impacts were identified that would conflict with existing zoning or cause rezoning of forest land resulting in the loss of forest-land, or conversion of forest land to non-forest use. No impacts were identified that would involve other changes in the existing environment which, due to their location or nature, could result in the conversion of farmland to non-agricultural use or conversion of forest land to non-forest use.

The NER/LPP project sites are within areas labeled as urban and built up land and other land on the State Important Farmland Maps prepared by the state of California Department of Conservation. For the most part, the NER and LPP project sites are within the existing parkland owned by the CDPR. The NER and LPP project sites are not located in forest land areas and not under a Williamson Act contract. Neither the NER nor LPP will involve the construction of buildings and is a restoration project and therefore will not have a direct or indirect impact on farmland or forest-land.

5.17.2 Land Use and Planning

No significant impacts were identified that would physically divide an established community; conflict with an applicable land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect; or conflict with an applicable habitat conservation plan or natural community conservation plan. The NER and LPP are restoration projects and will not result in any changes to the underlying land uses. Neither the NER nor LPP will conflict with an applicable habitat conservation plan or natural community conservation plan and therefore will not have a direct or indirect impact on land use and planning.

5.17.3 Mineral Resources

No significant impacts were identified that would result in the loss of availability of a known mineral resource or the loss of a locally important mineral resource recovery site. The NER and LPP are restoration projects and do not involve urbanization or other uses that would potentially restrict access to mineral resources. Therefore, no impacts associated with mineral resources would occur.

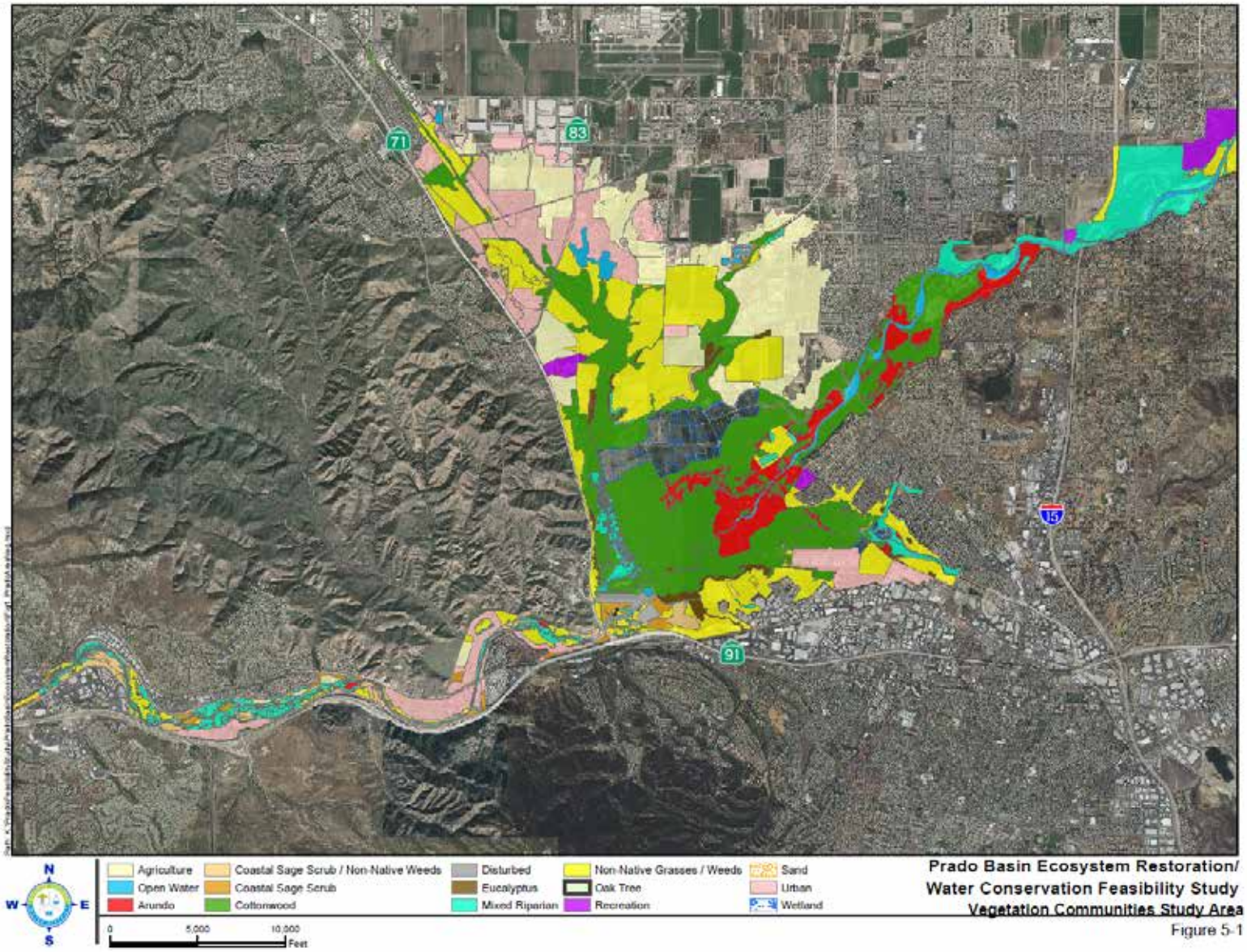

Figure 5-1: Vegetation Communities Study Area

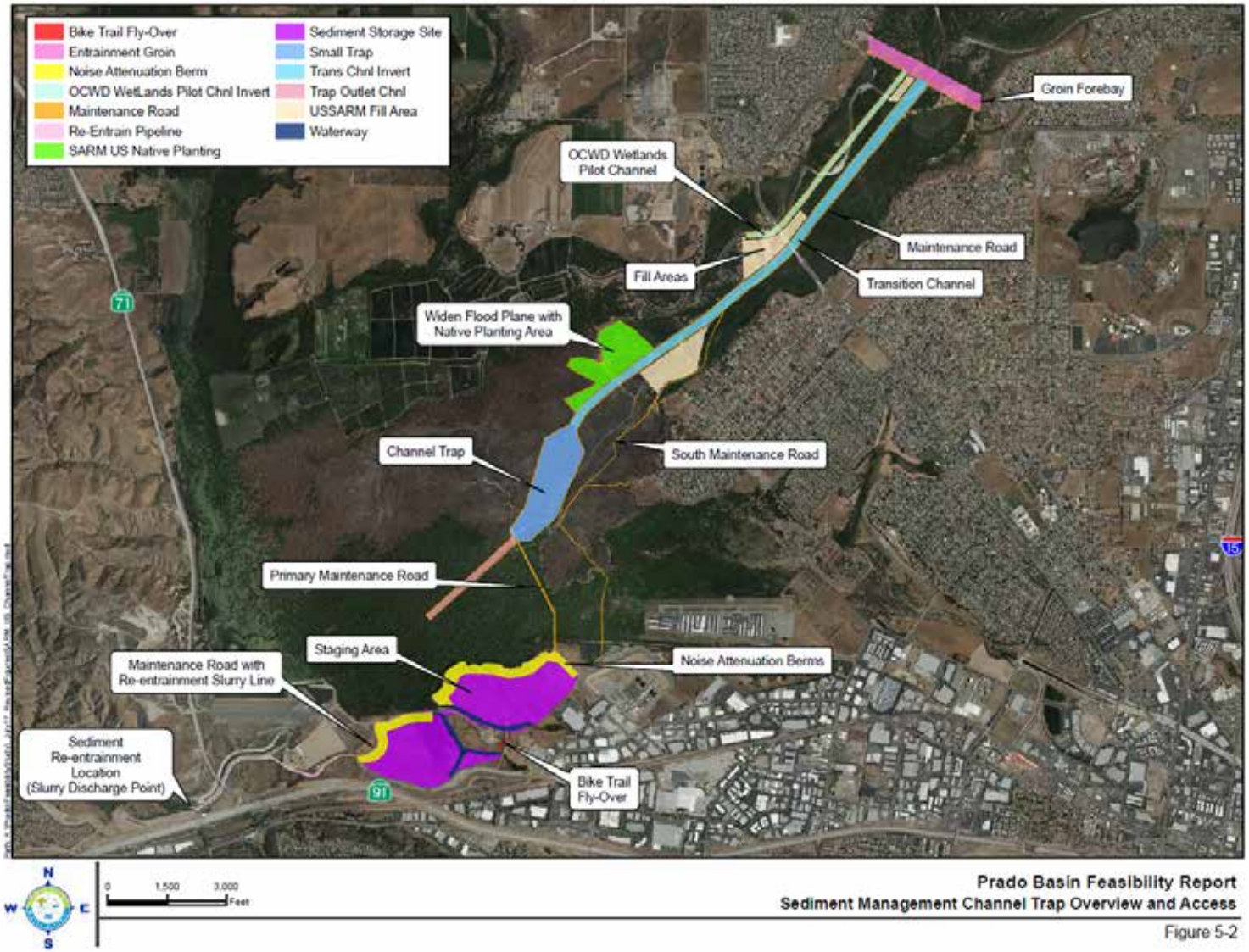

Figure 5-2: Sediment Management Channel Trap Overview and Access

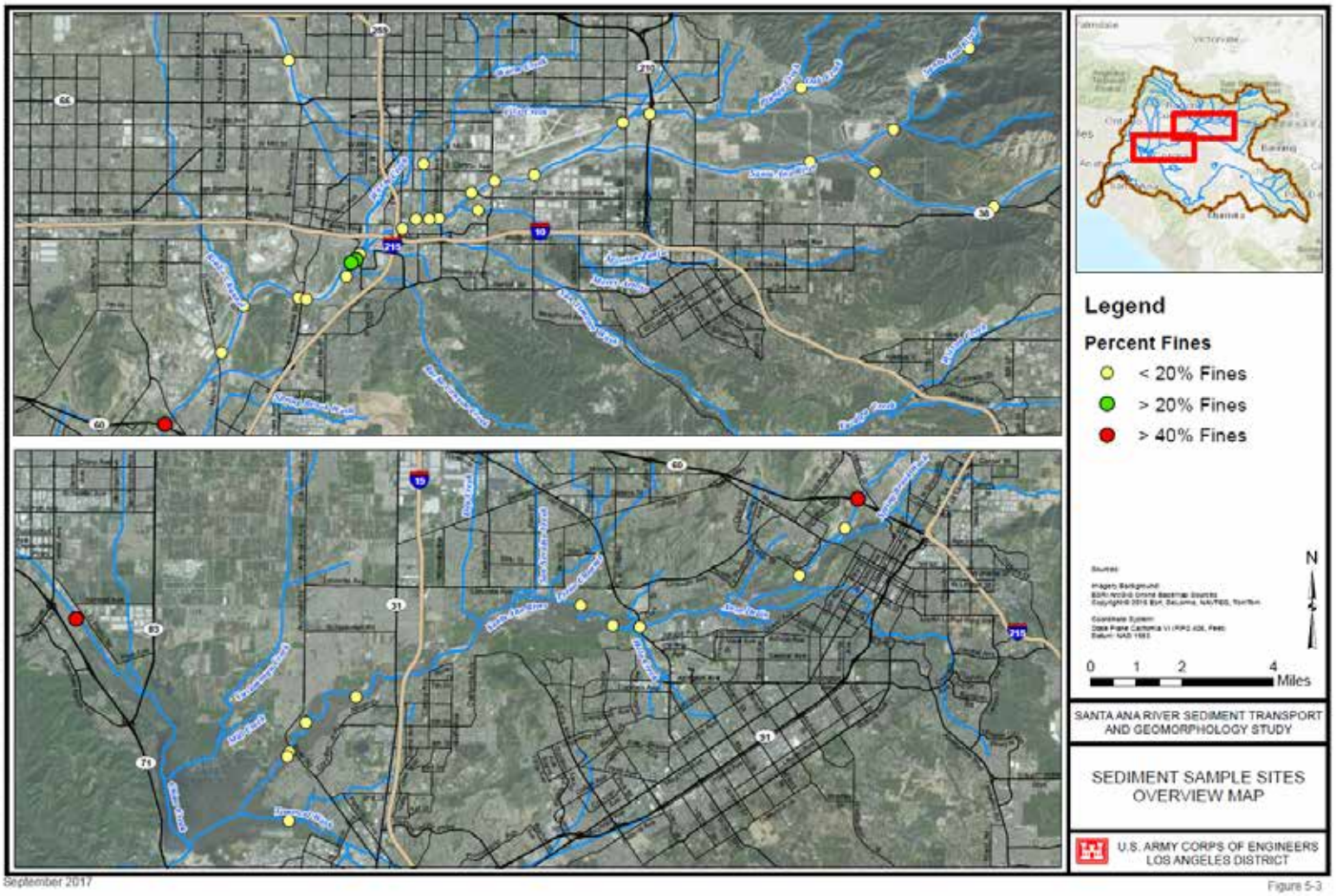

Figure 5-3: Sediment Sample Sites Overview Map

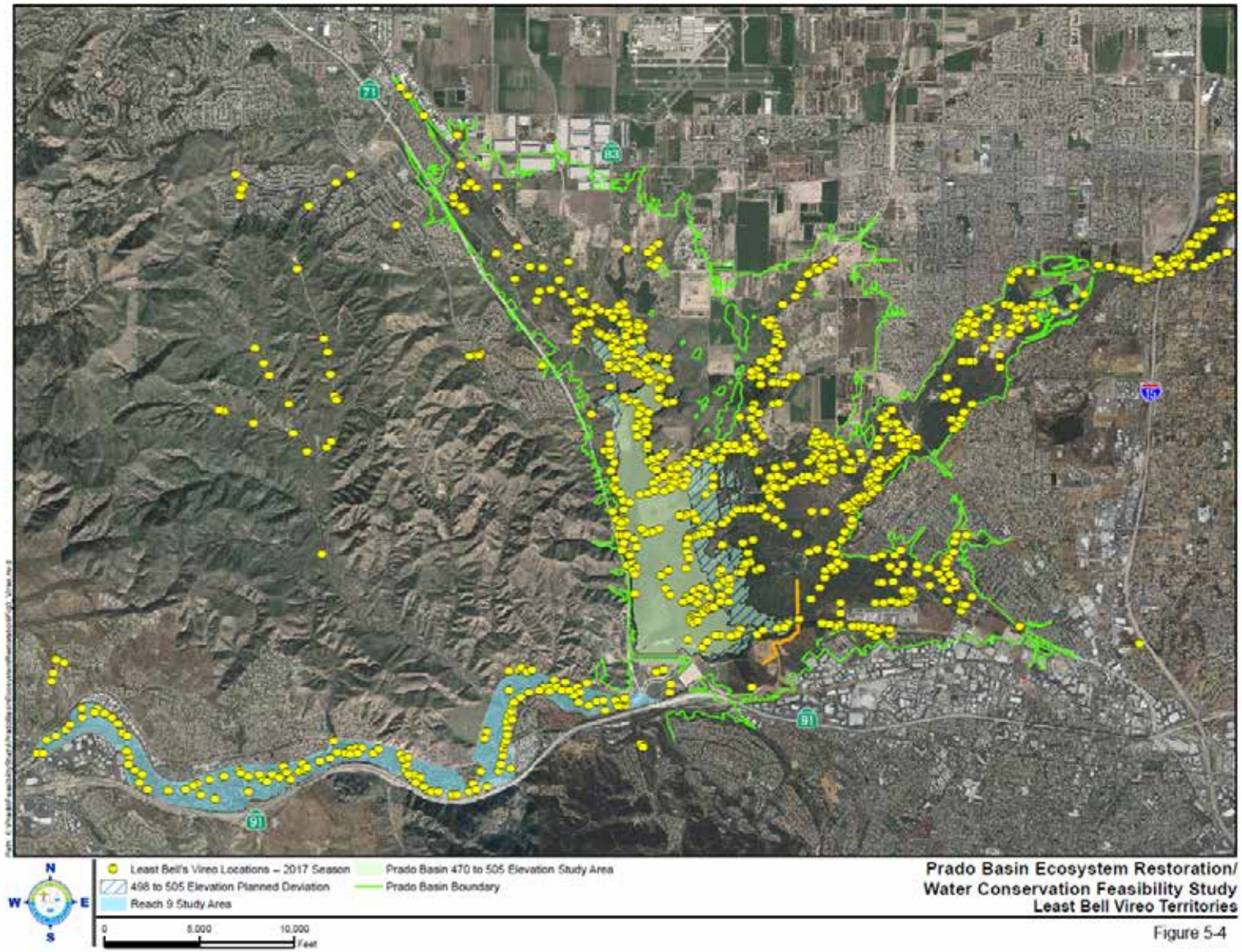

Figure 5-4: Least Bell Vireo Territories

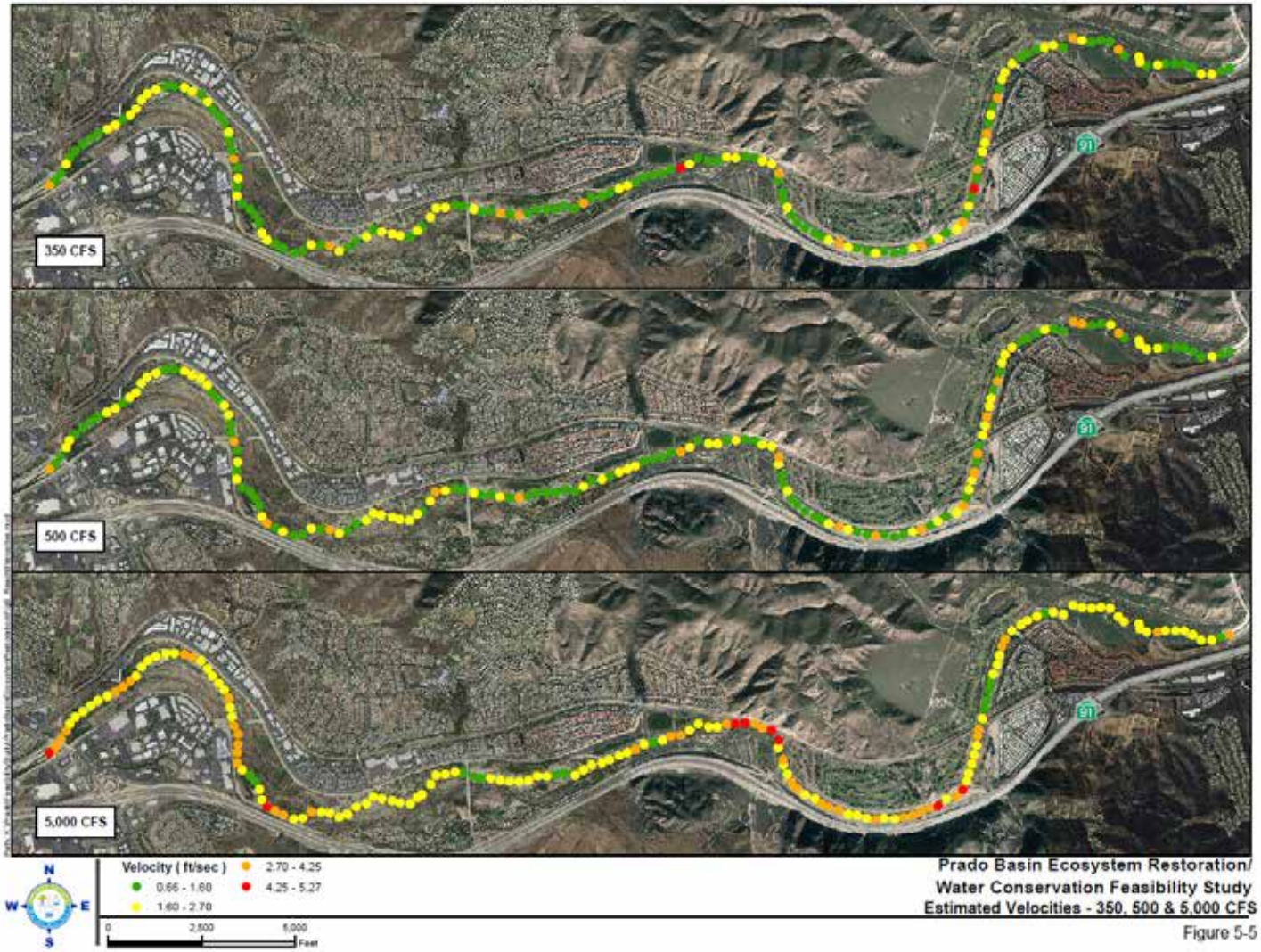

Figure 5-5: Estimated Velocities – 350, 500, and 5,000 CFS

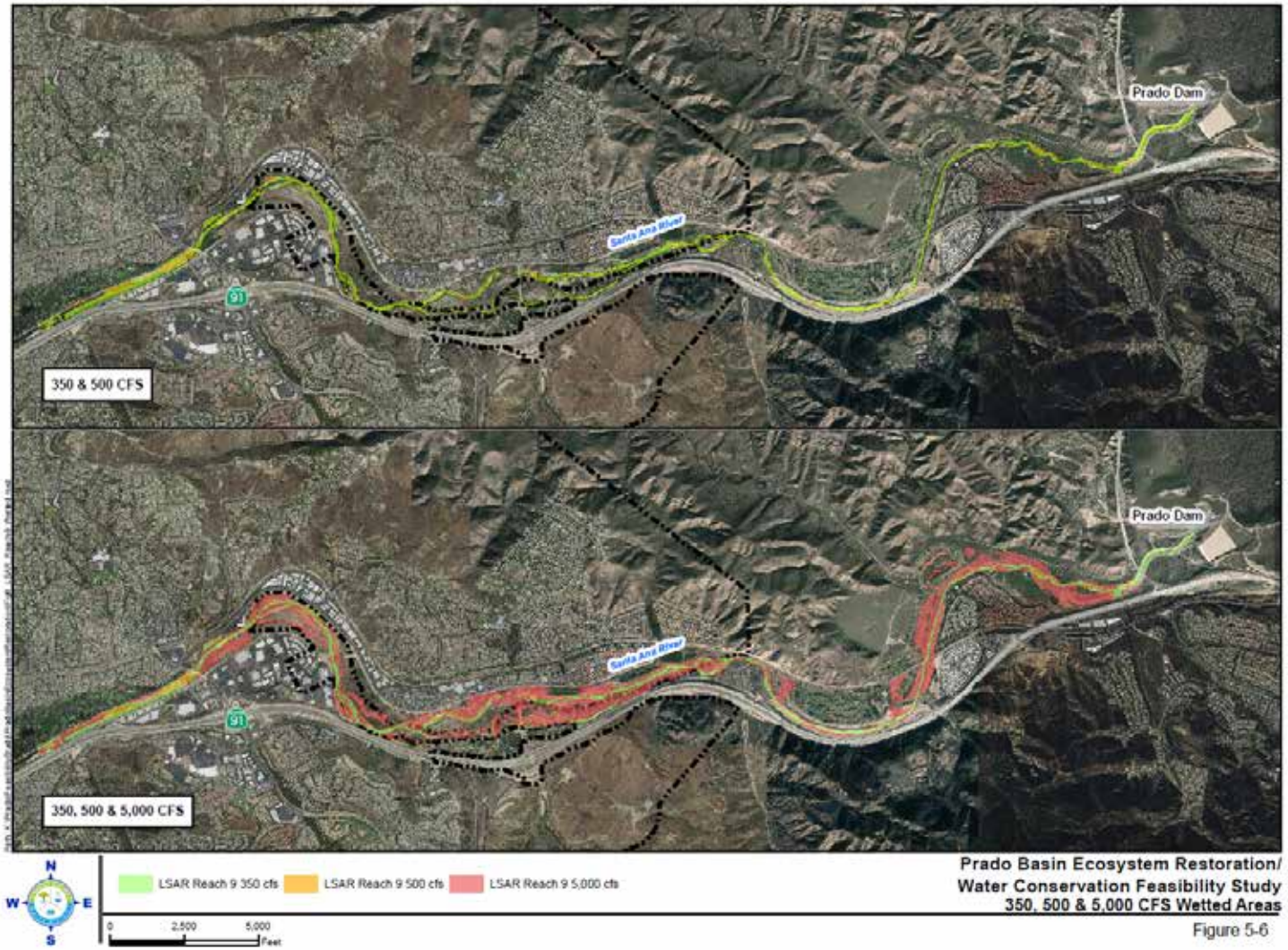

Figure 5-6: 350, 500, and 5,000 CFS Wetted Areas

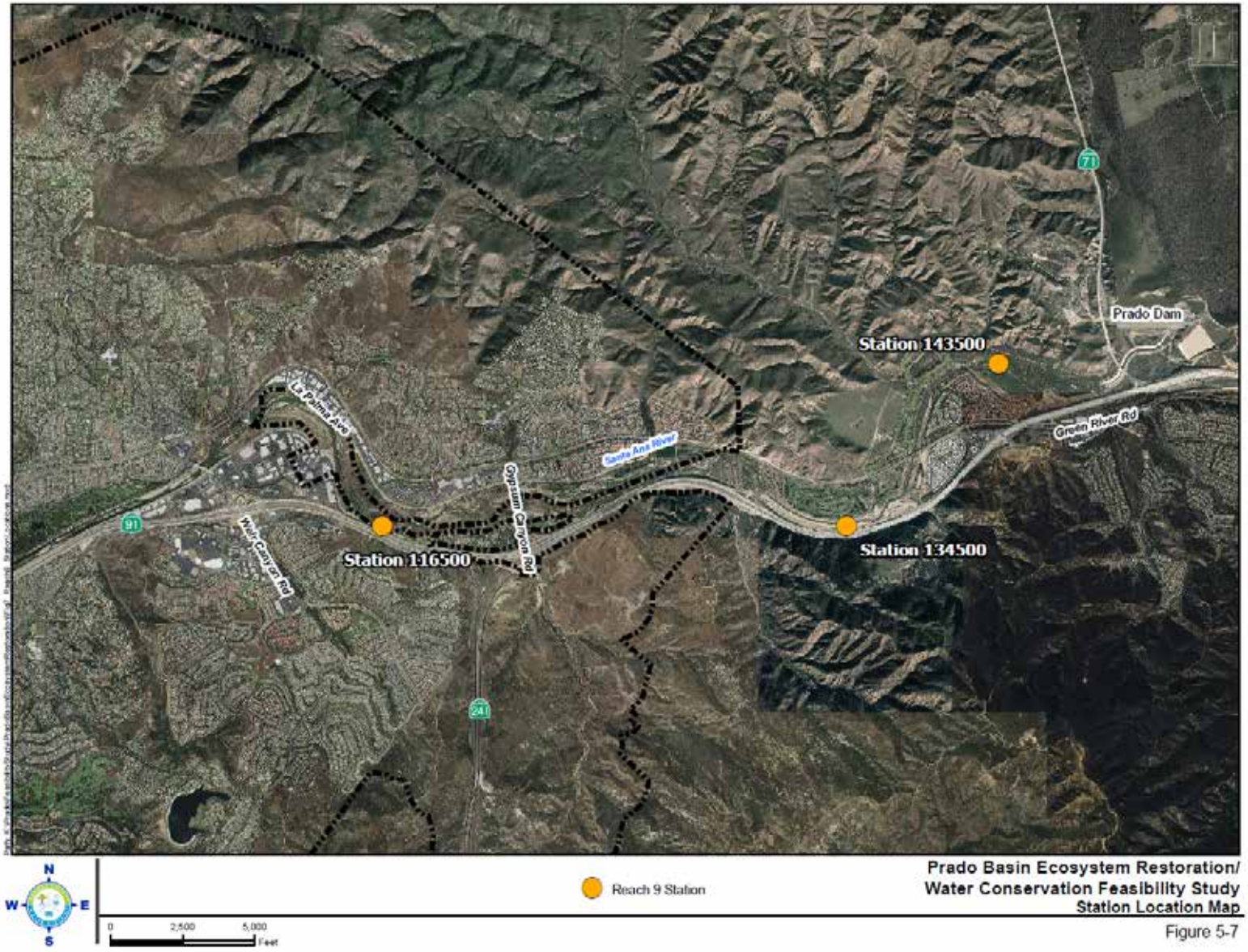

Figure 5-7: Station Location Map

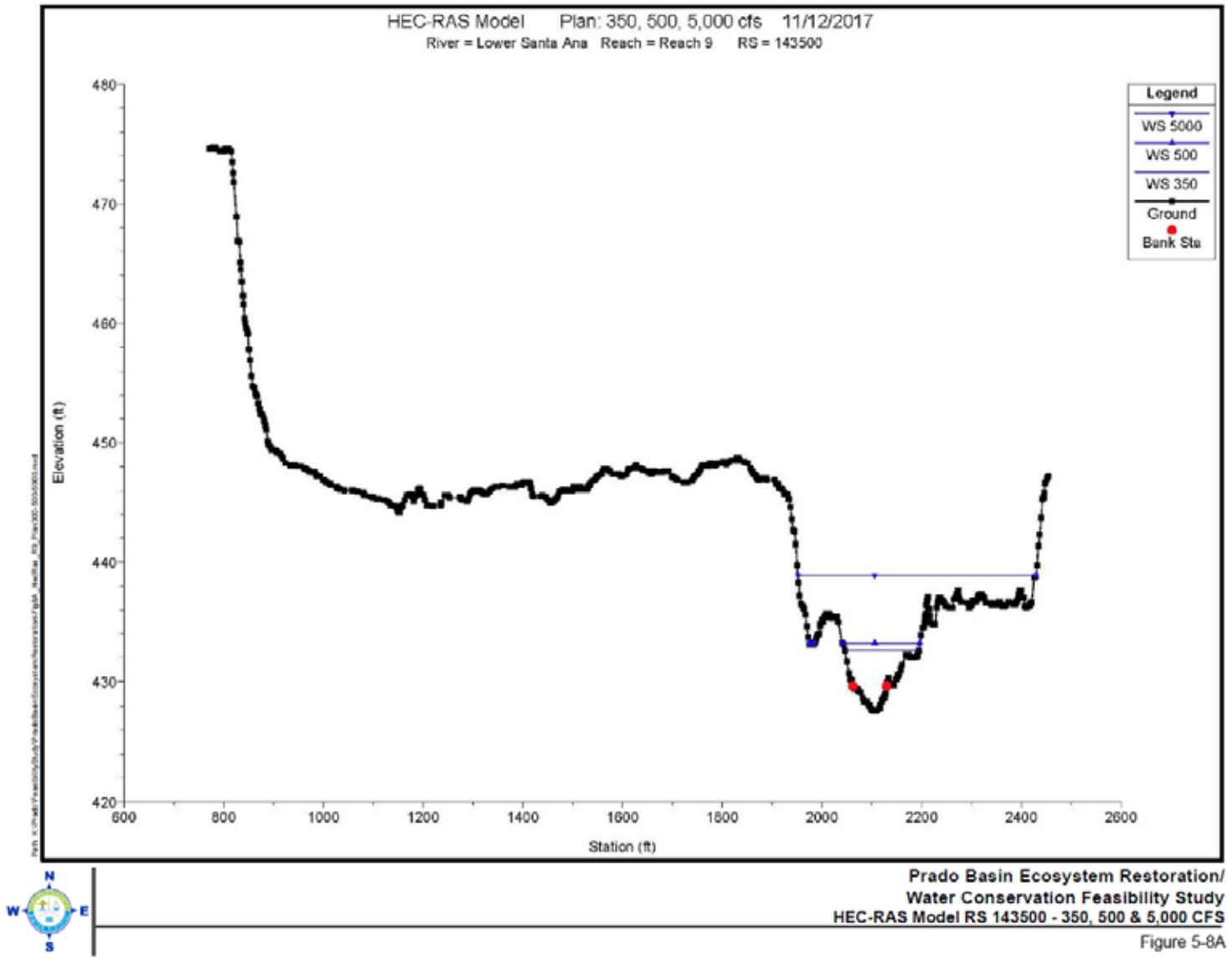

Figure 5-8A: HEC-RAS Model RS 143500 – 350, 500, and 5,000 CFS

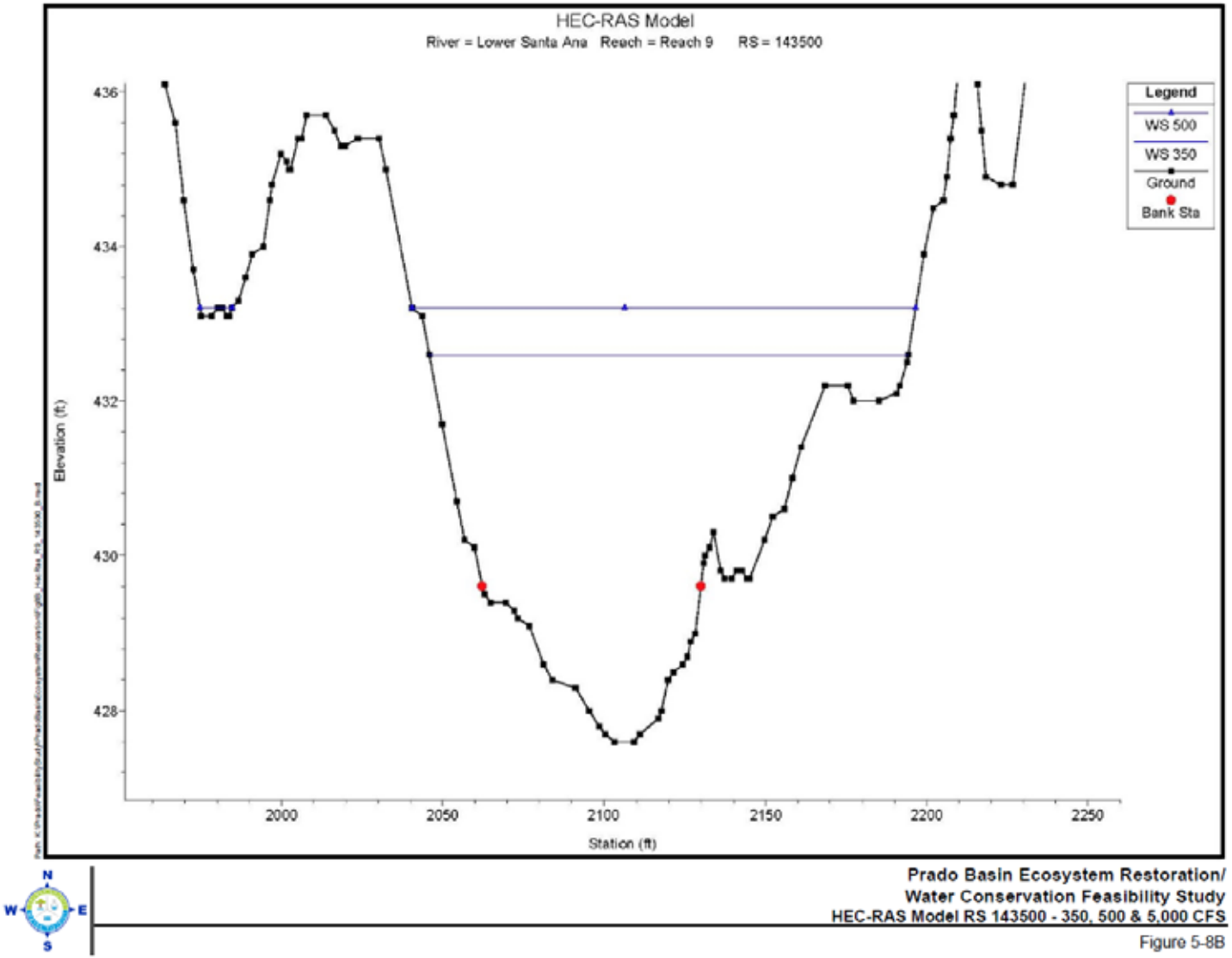

Figure 5-8B: HEC-RAS Model RS 143500 – 350, 500, and 5,000 CFS

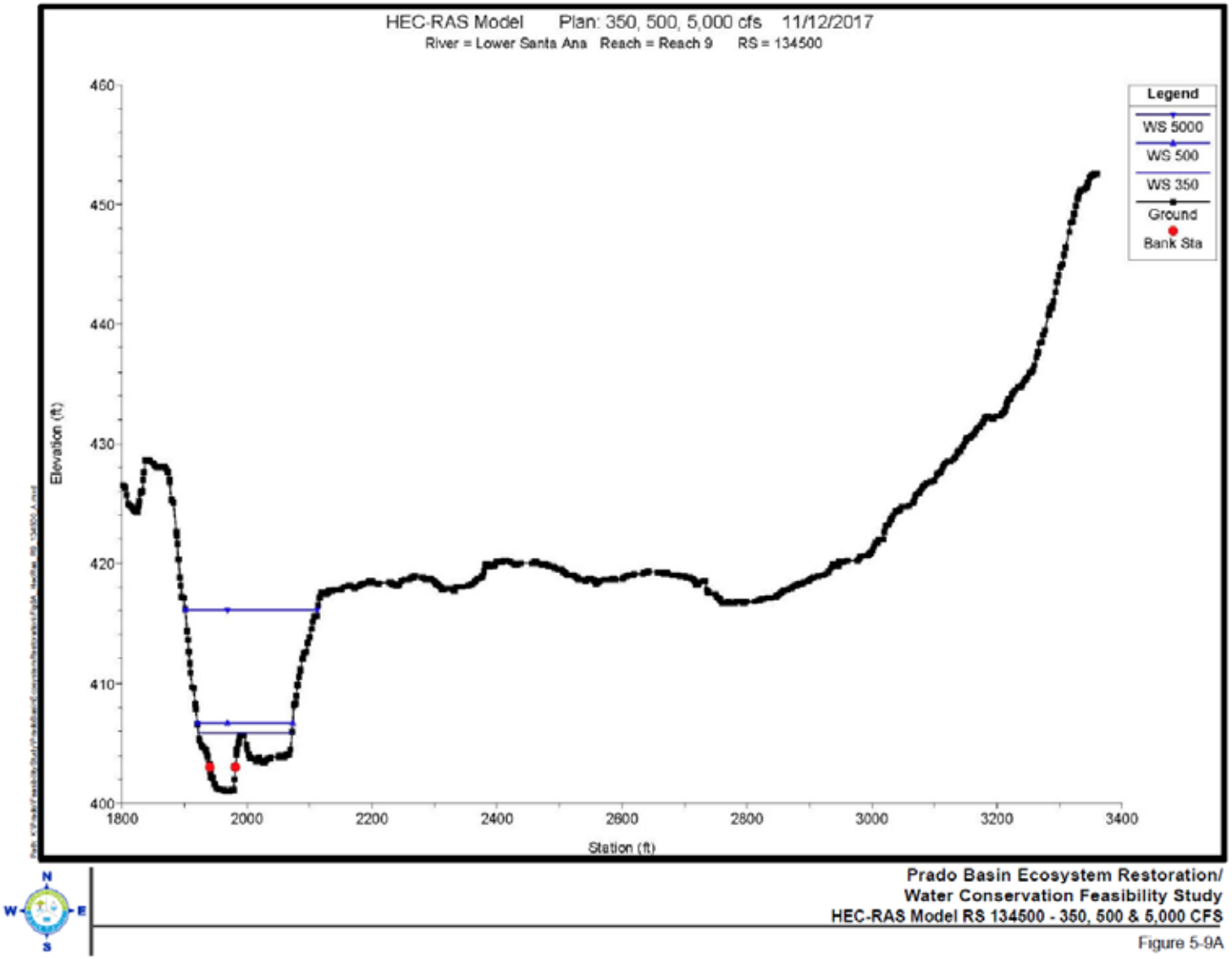

Figure 5-9A: HEC-RAS Model RS 134500 – 350, 500, and 5,000 CFS

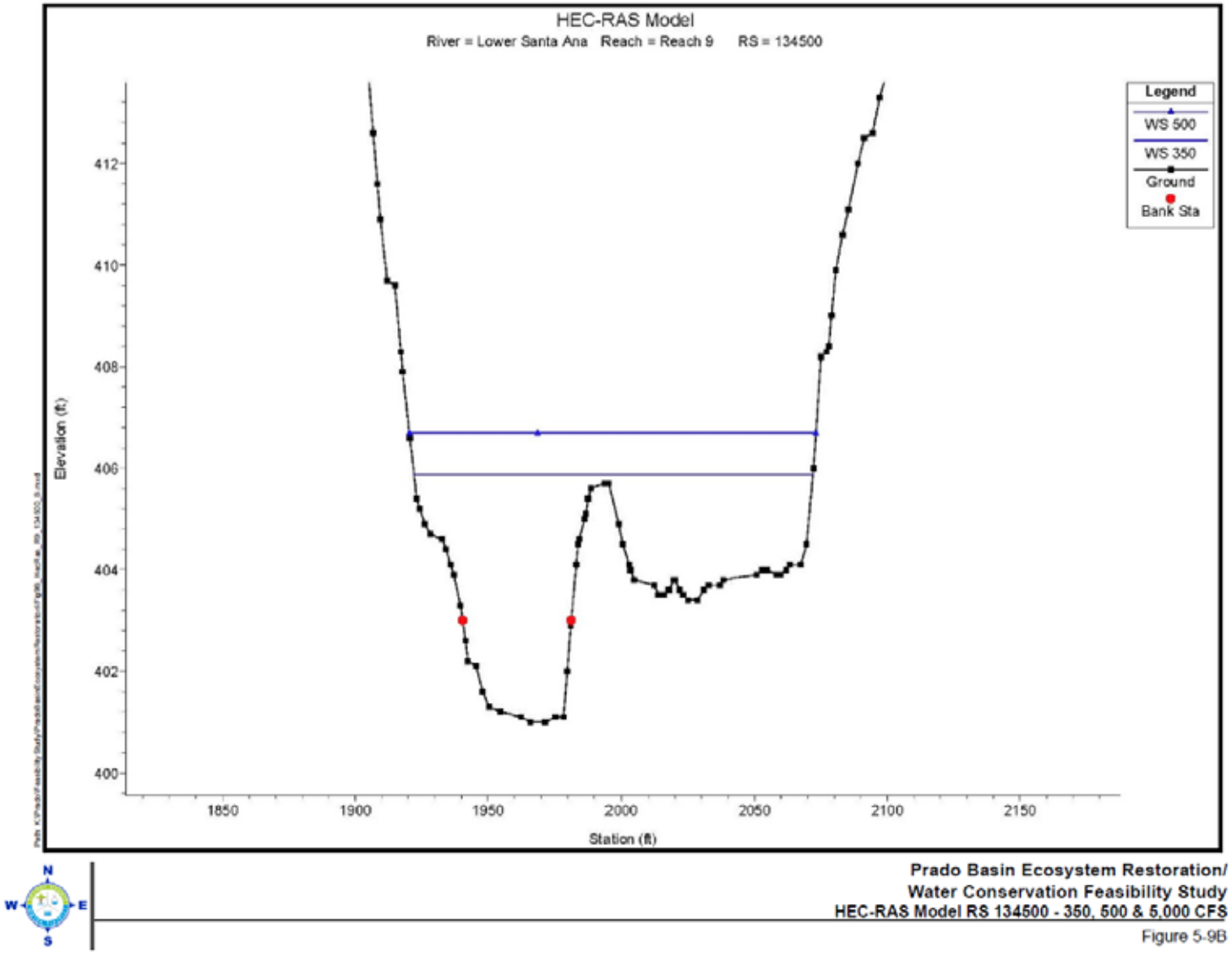

Figure 5-9B: HEC-RAS Model RS 134500 – 350, 500, and 5,000 CFS

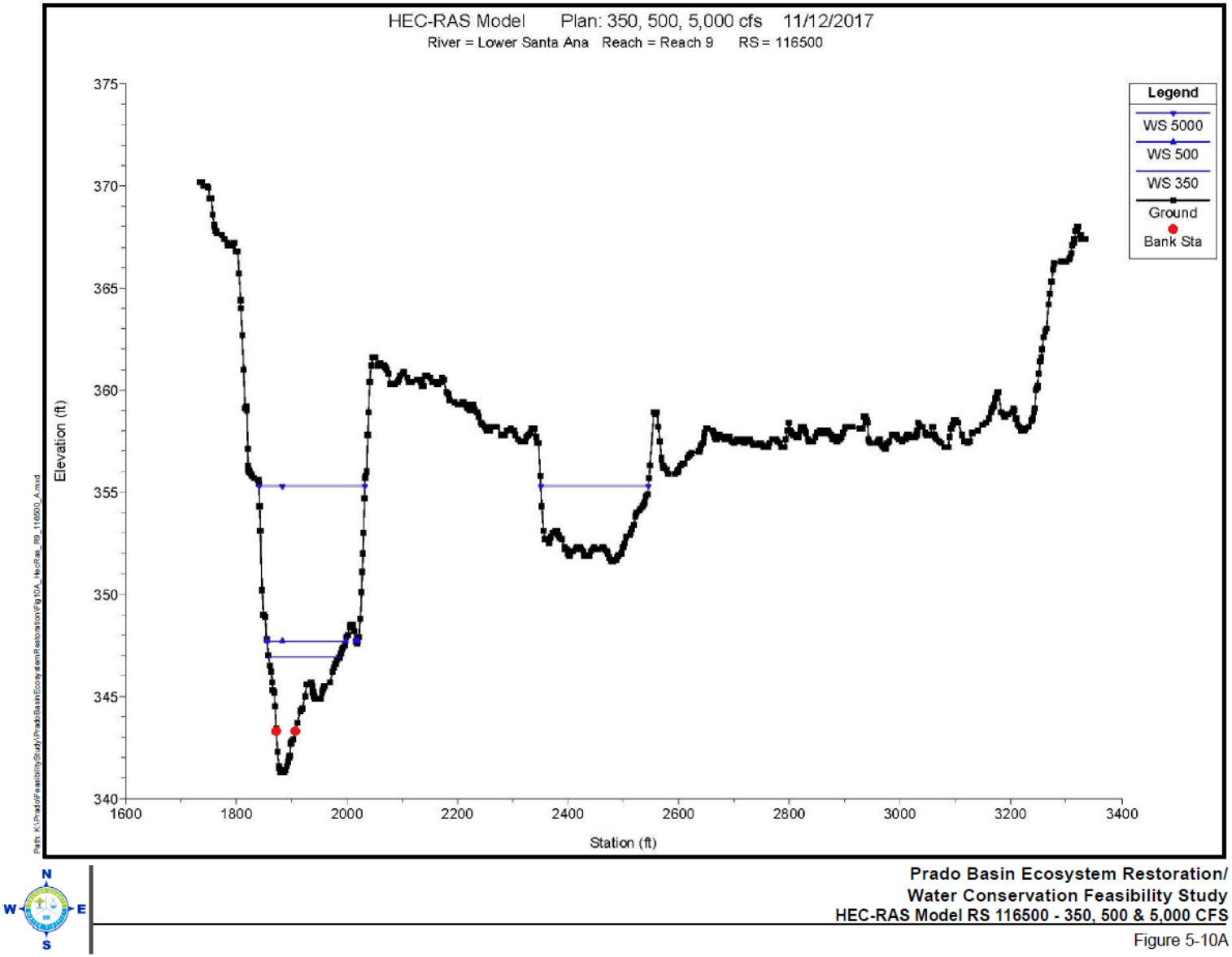

Figure 5-10A: HEC-RAS Model RS 116500 – 350, 500, and 5,000 CFS

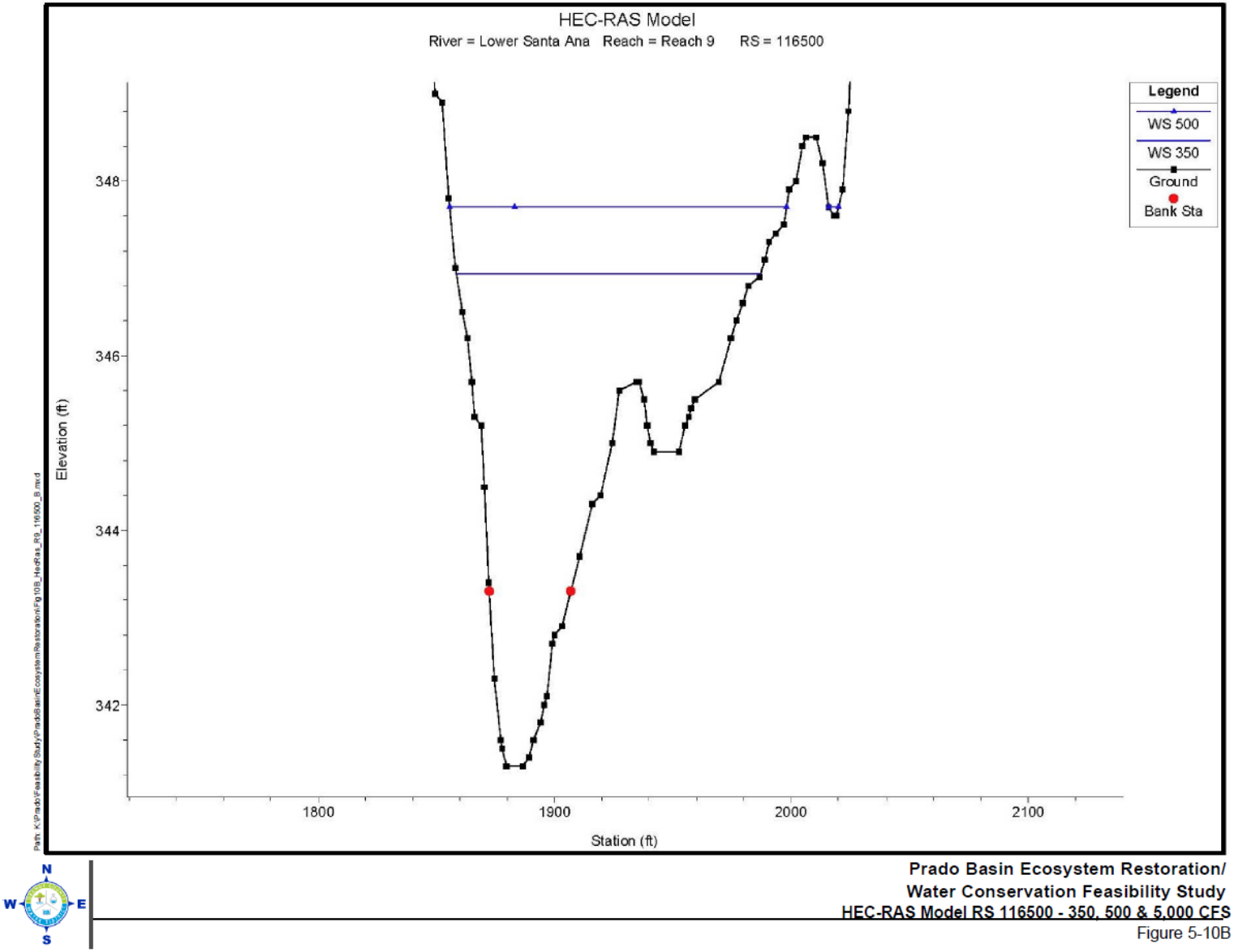

Figure 5-10B: HEC-RAS Model RS 116500 – 350, 500, and 5,000 CFS

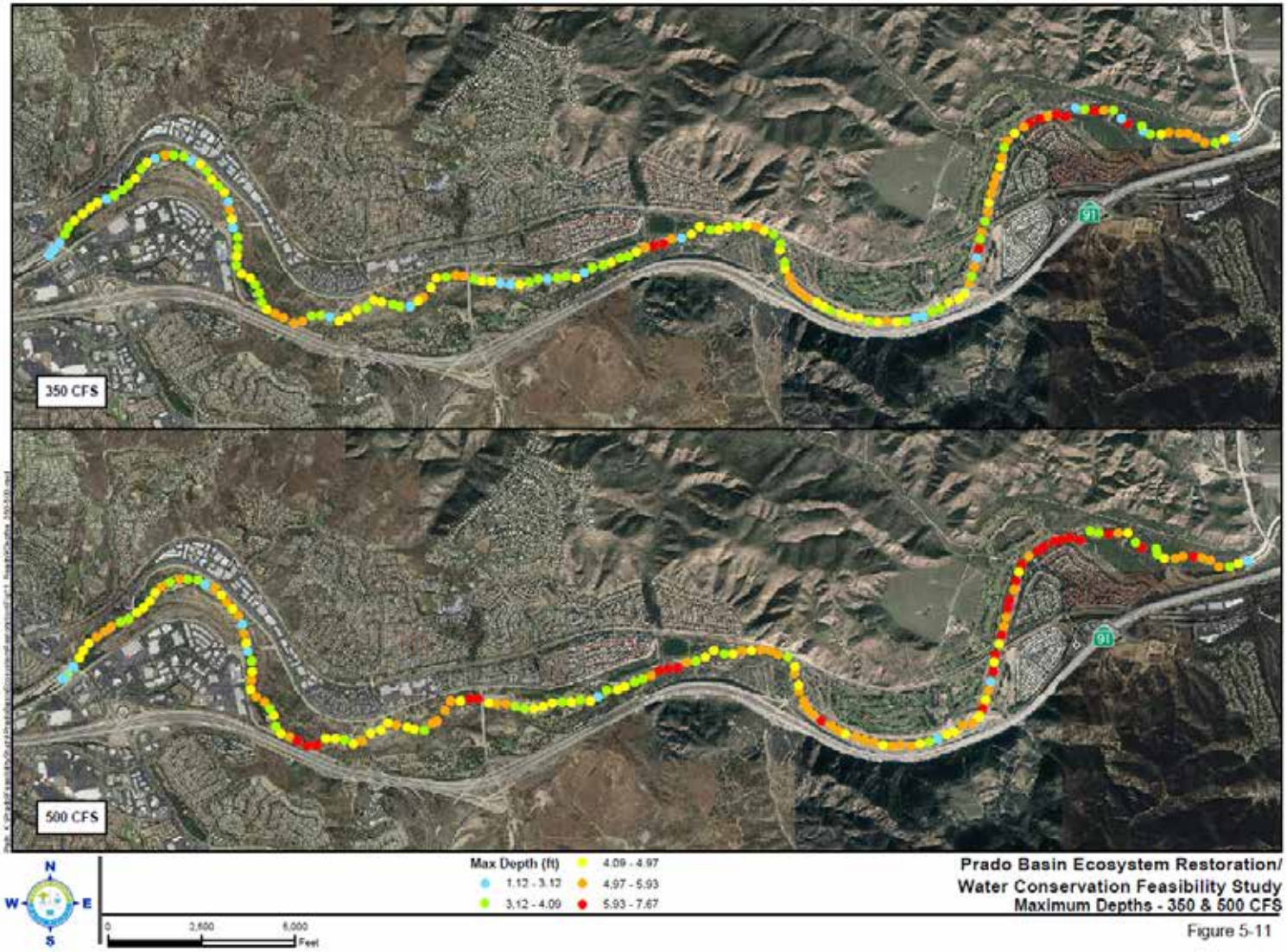

Figure 5-11: Maximum Depths – 350 and 500 CFS

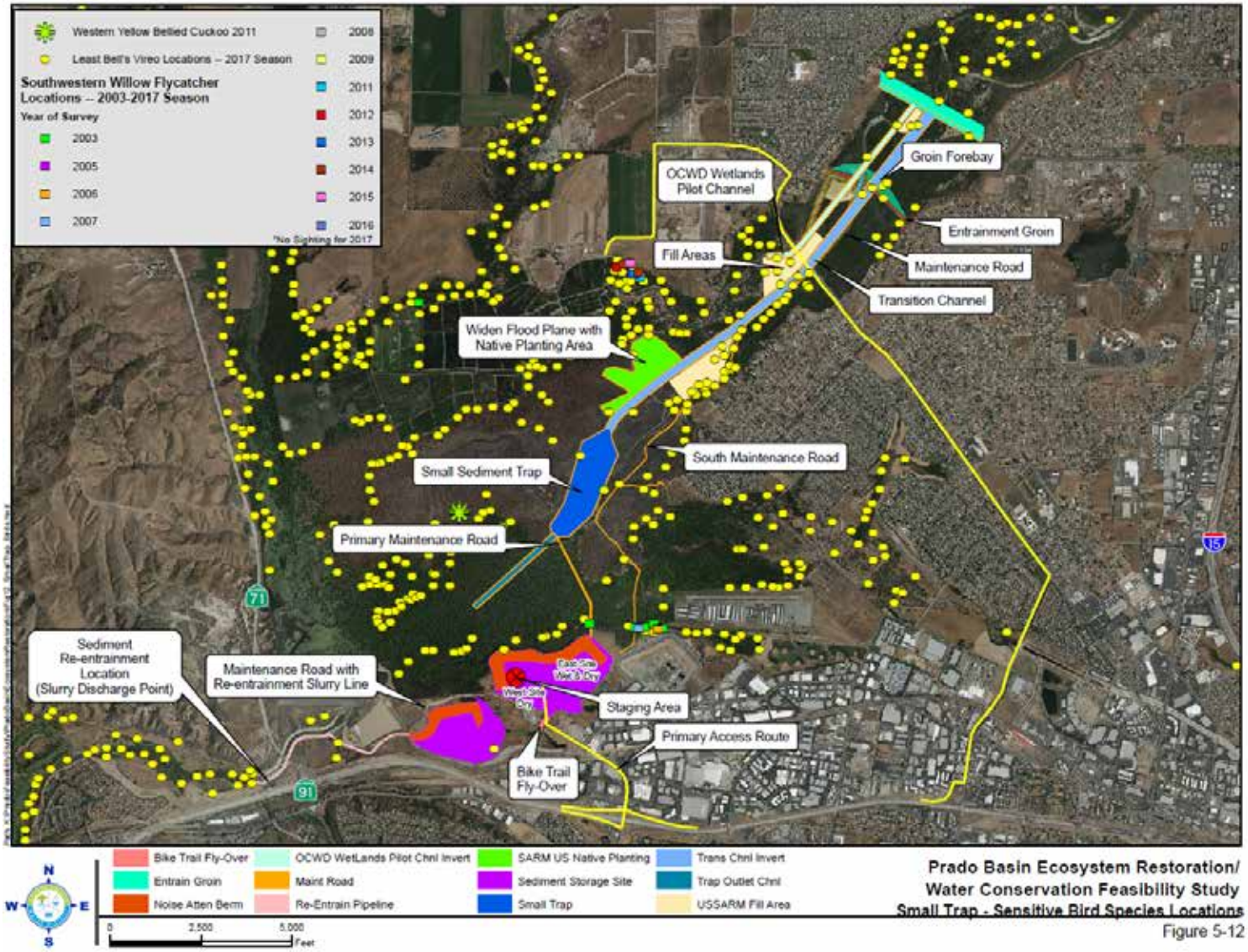

Figure 5-12: Small Trap – Sensitive Bird Species Locations

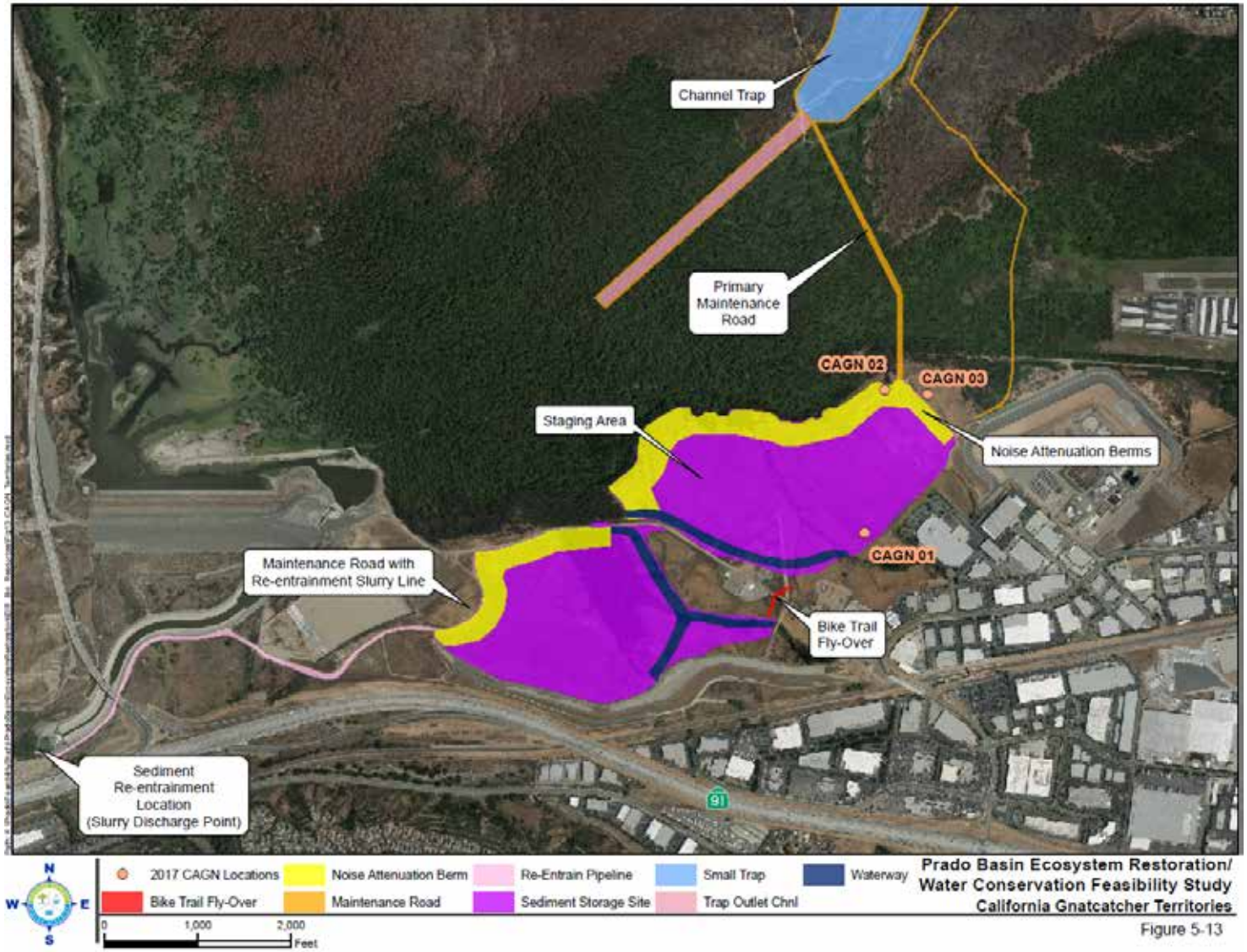

Figure 5-13: California Gnatcatcher Territories

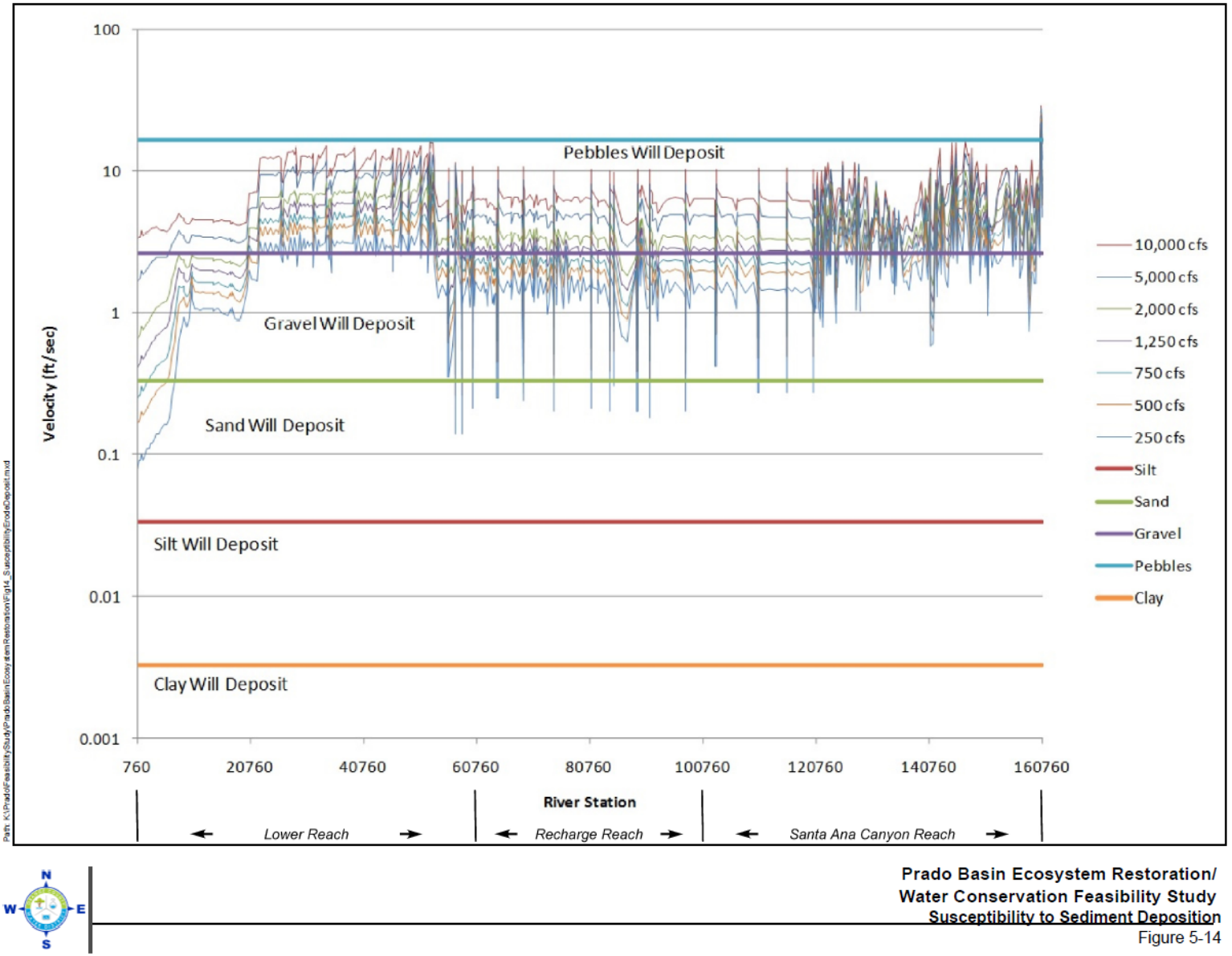

Figure 5-14: Susceptibility to Sediment Deposition

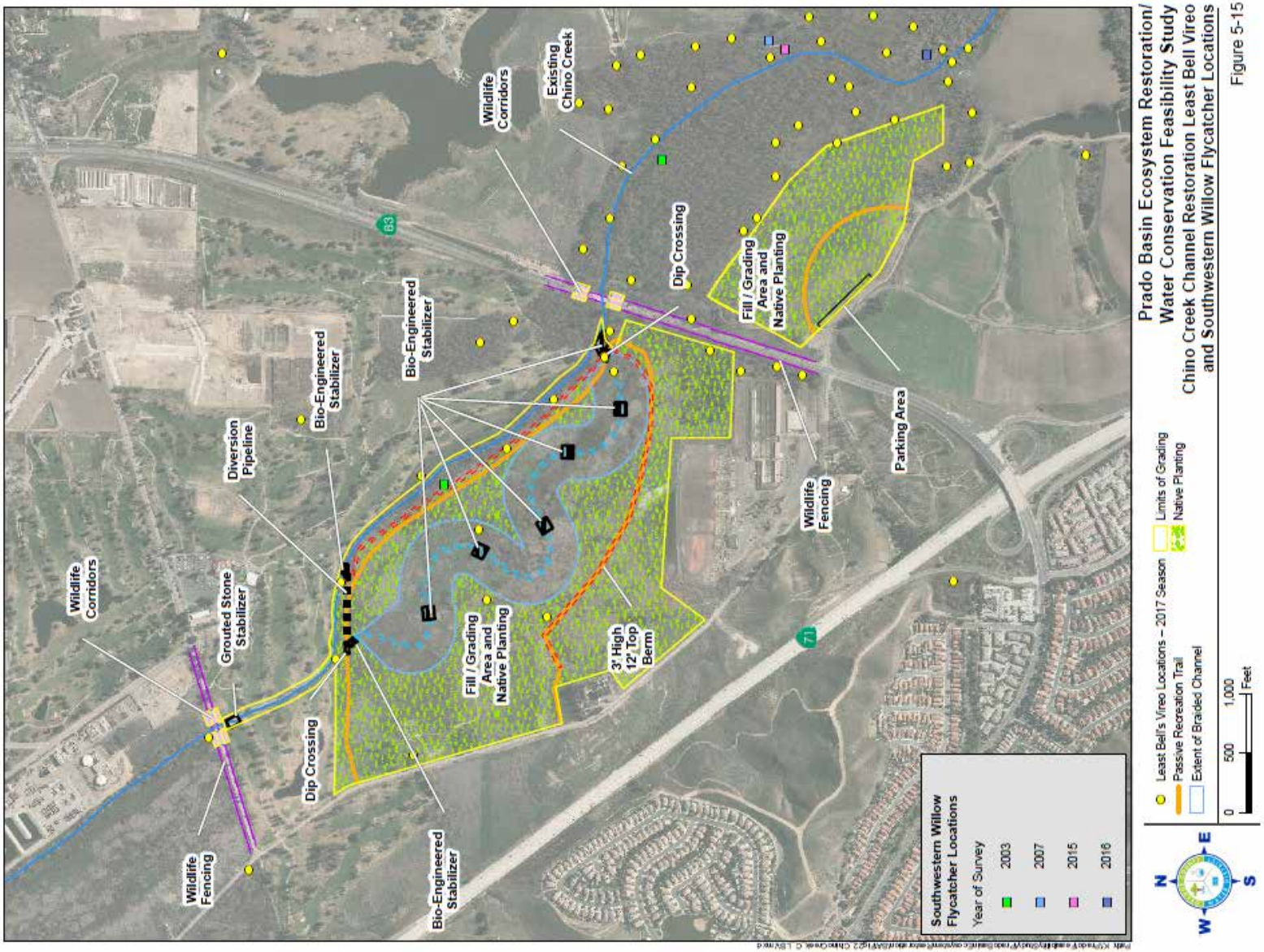

Figure 5-15: Chino Creek Channel Restoration Least Bell Vireo and Southwestern Willow Flycatcher Locations

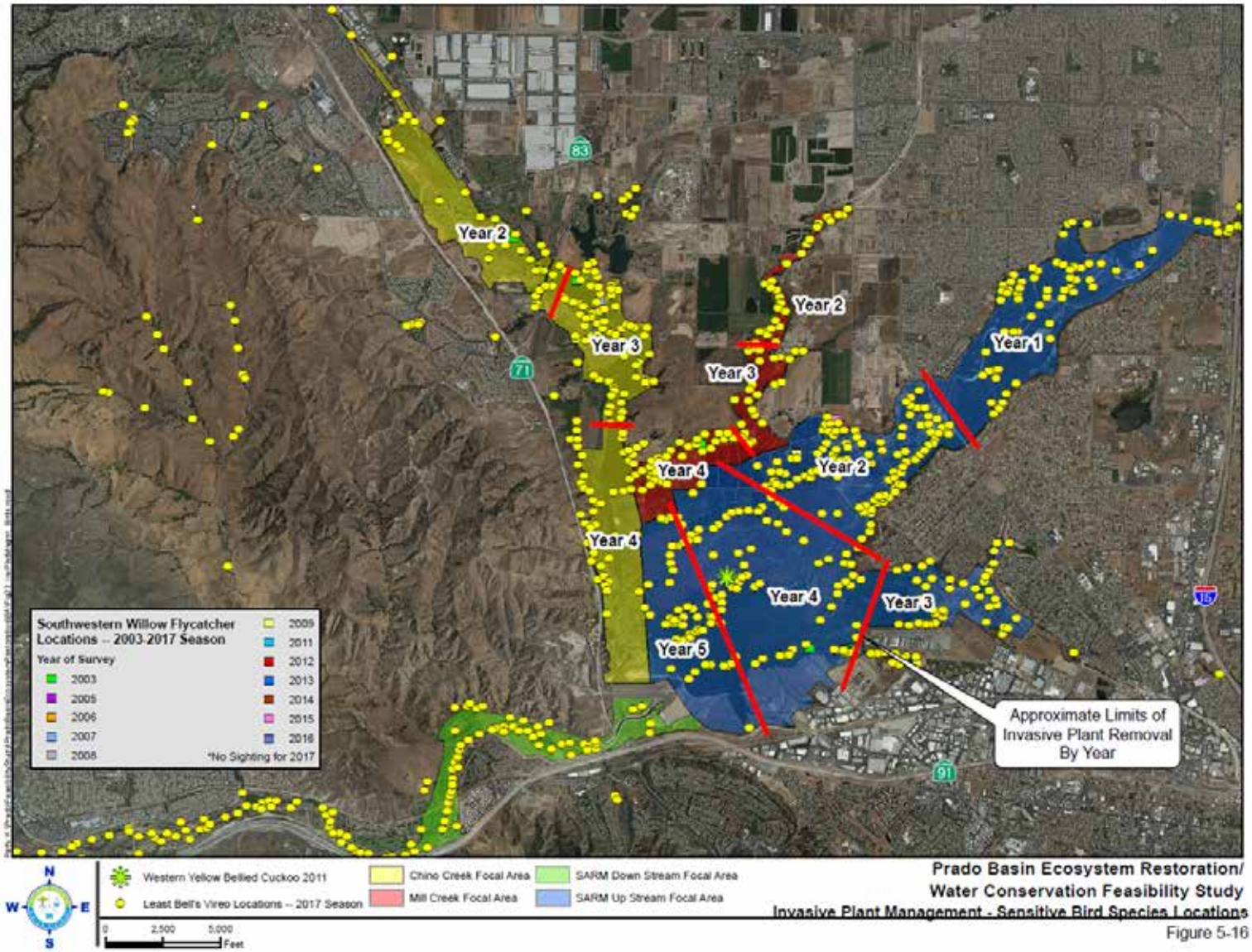

Figure 5-16: Invasive Plant Management – Sensitive Bird Species Locations

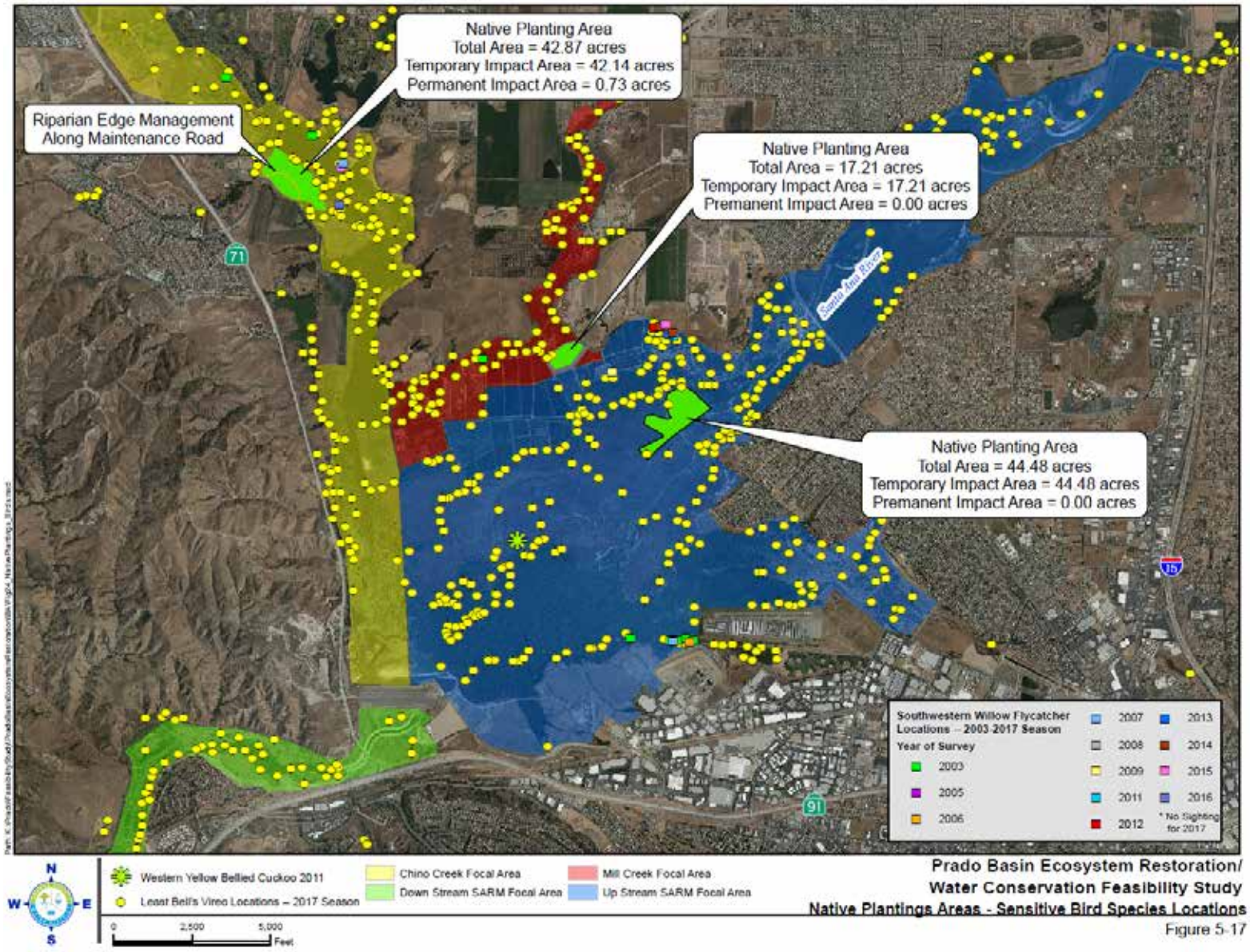

Figure 5-17: Native Plantings Areas – Sensitive Bird Species Locations

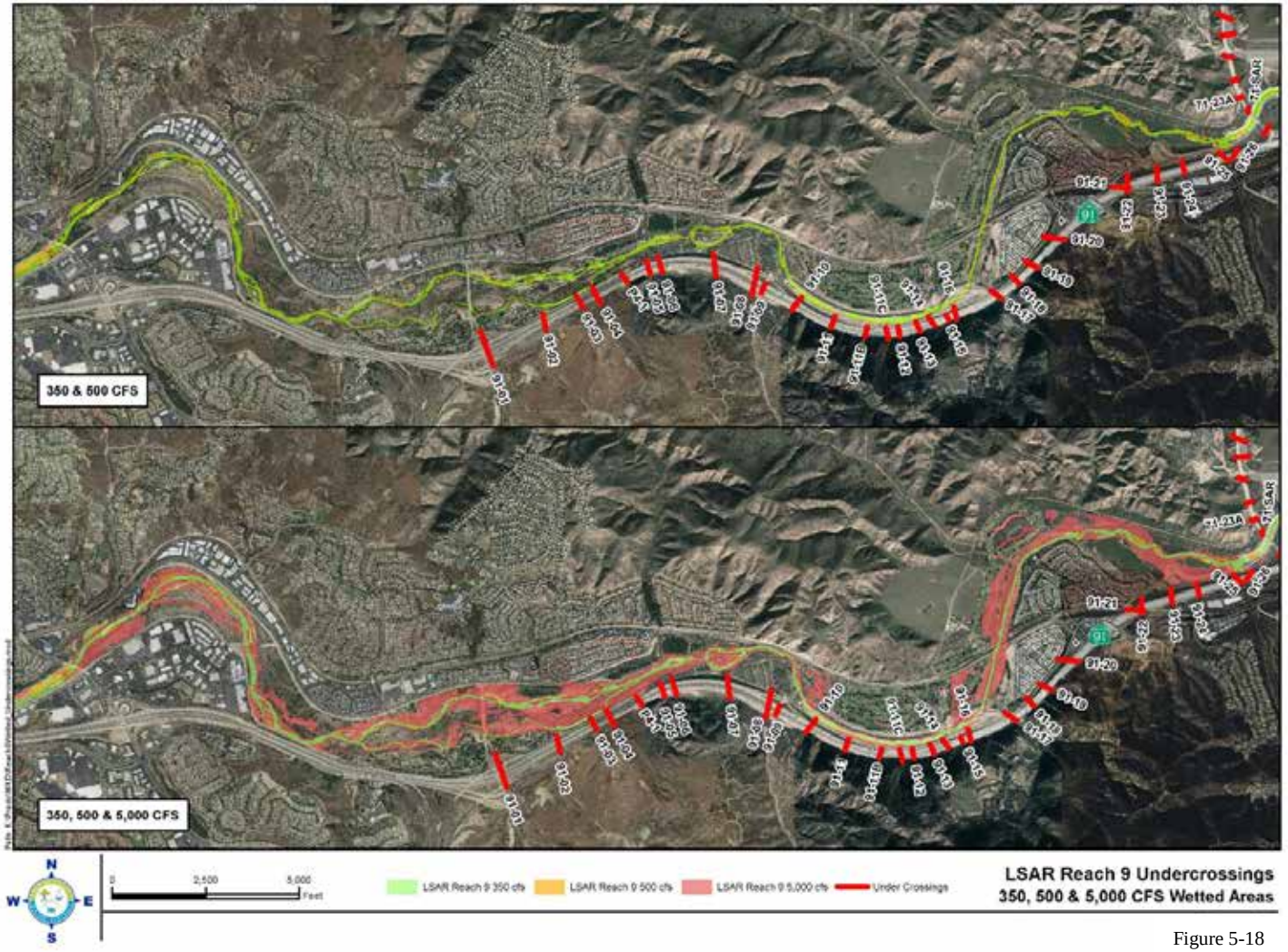

Figure 5-18: 350, 500, and 5,000 CFS Wetted Areas

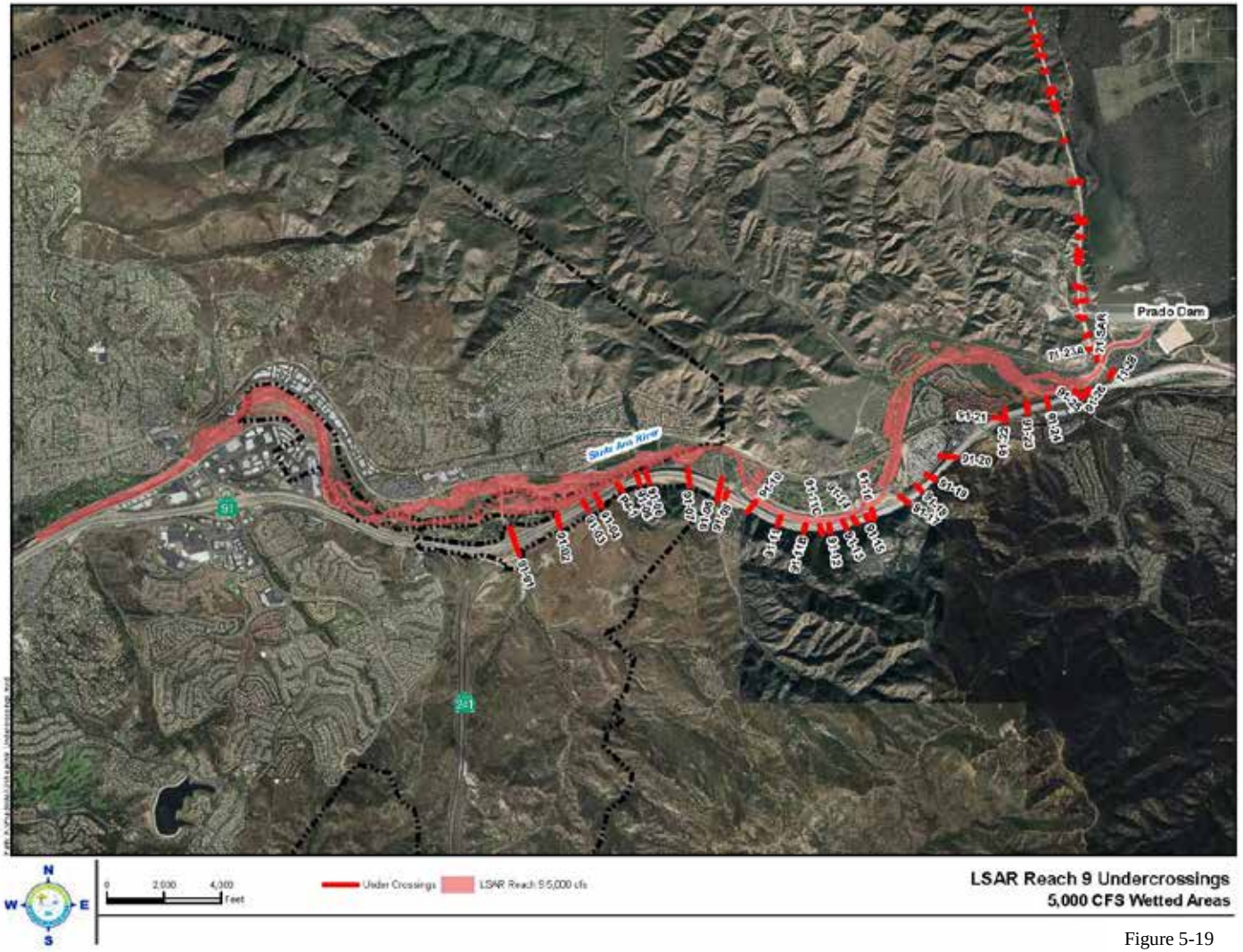

Figure 5-19: 5,000 CFS Wetted Areas

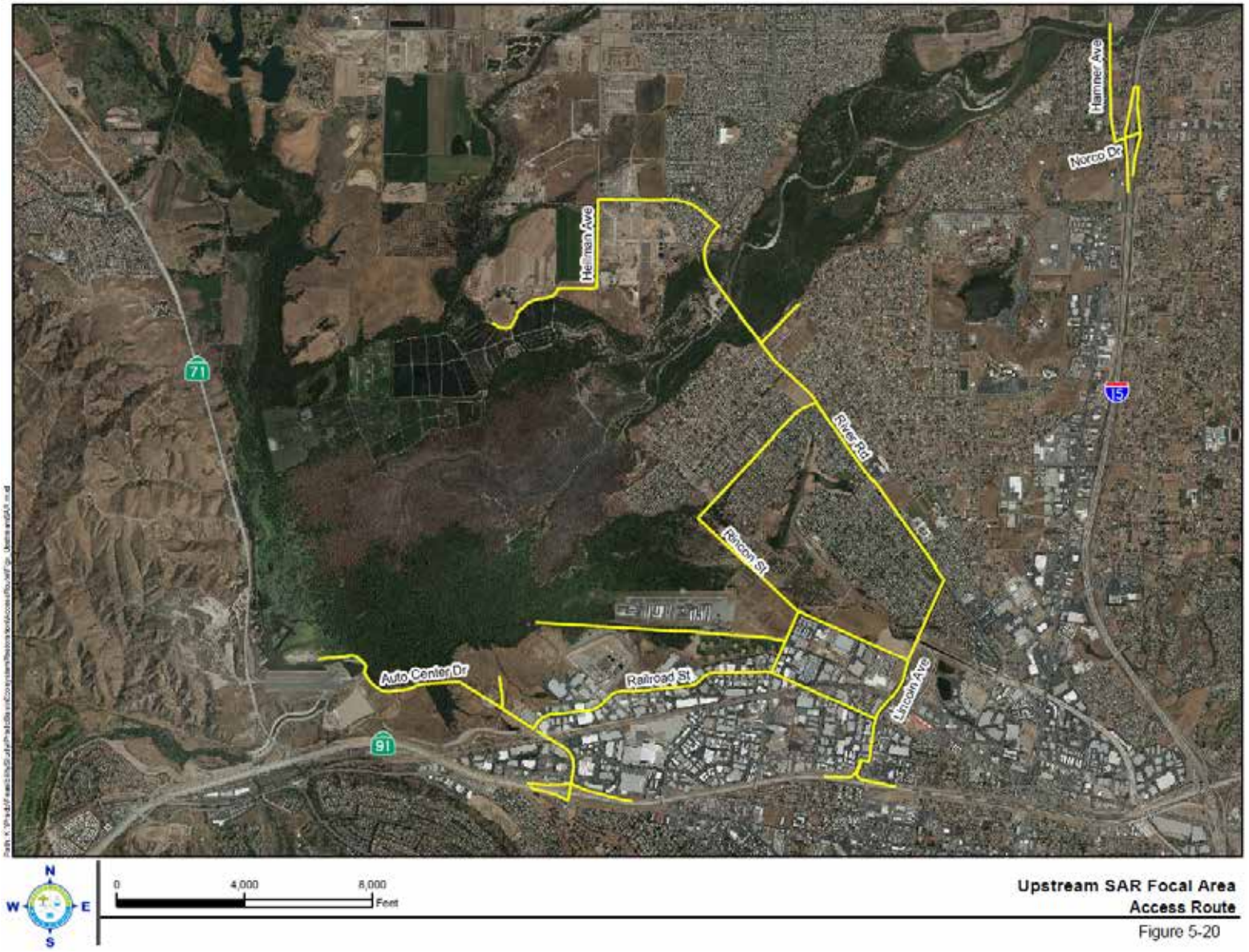

Figure 5-20: Upstream SAR Focal Area – Access Route

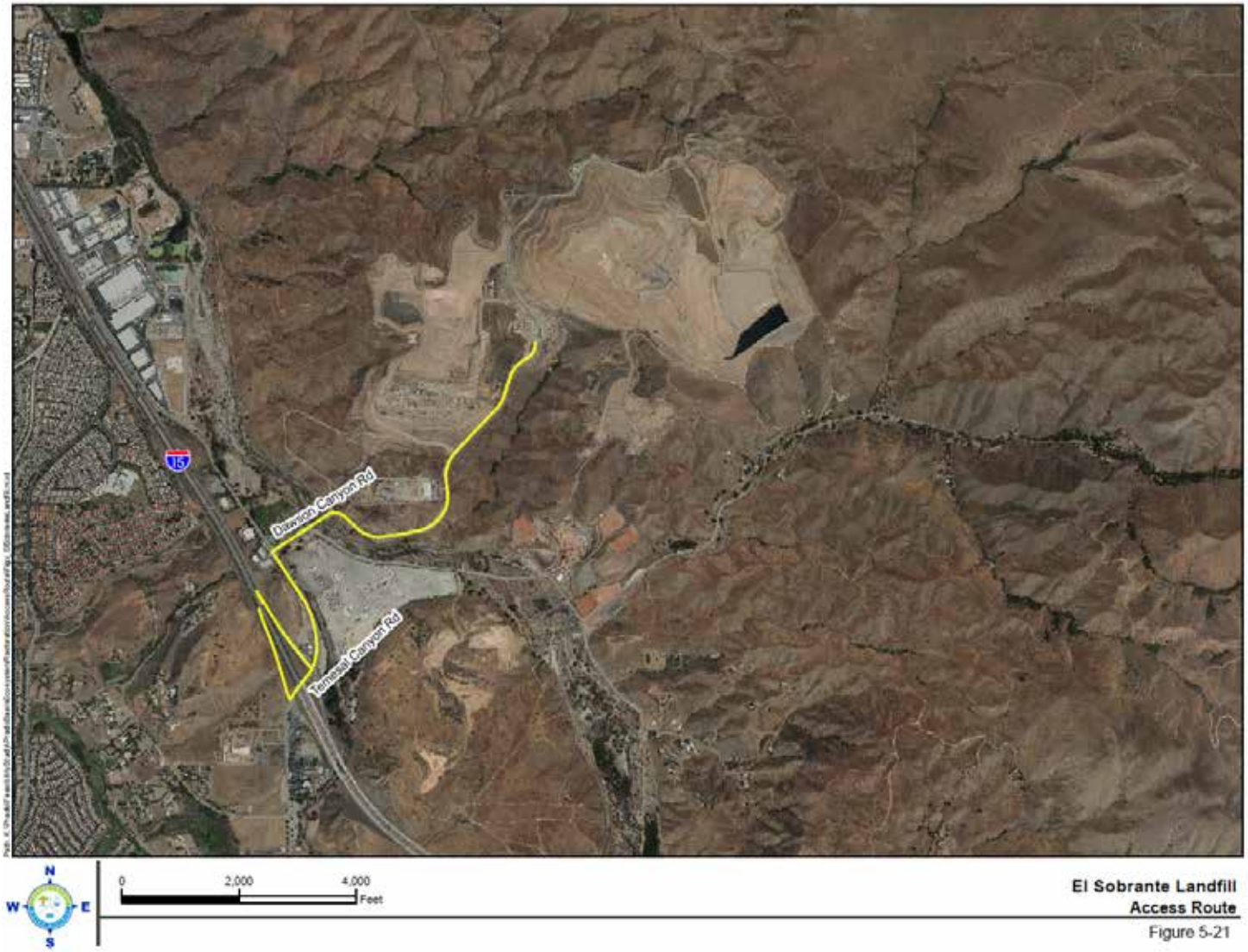

Figure 5-21: El Sobrante Landfill – Access Route

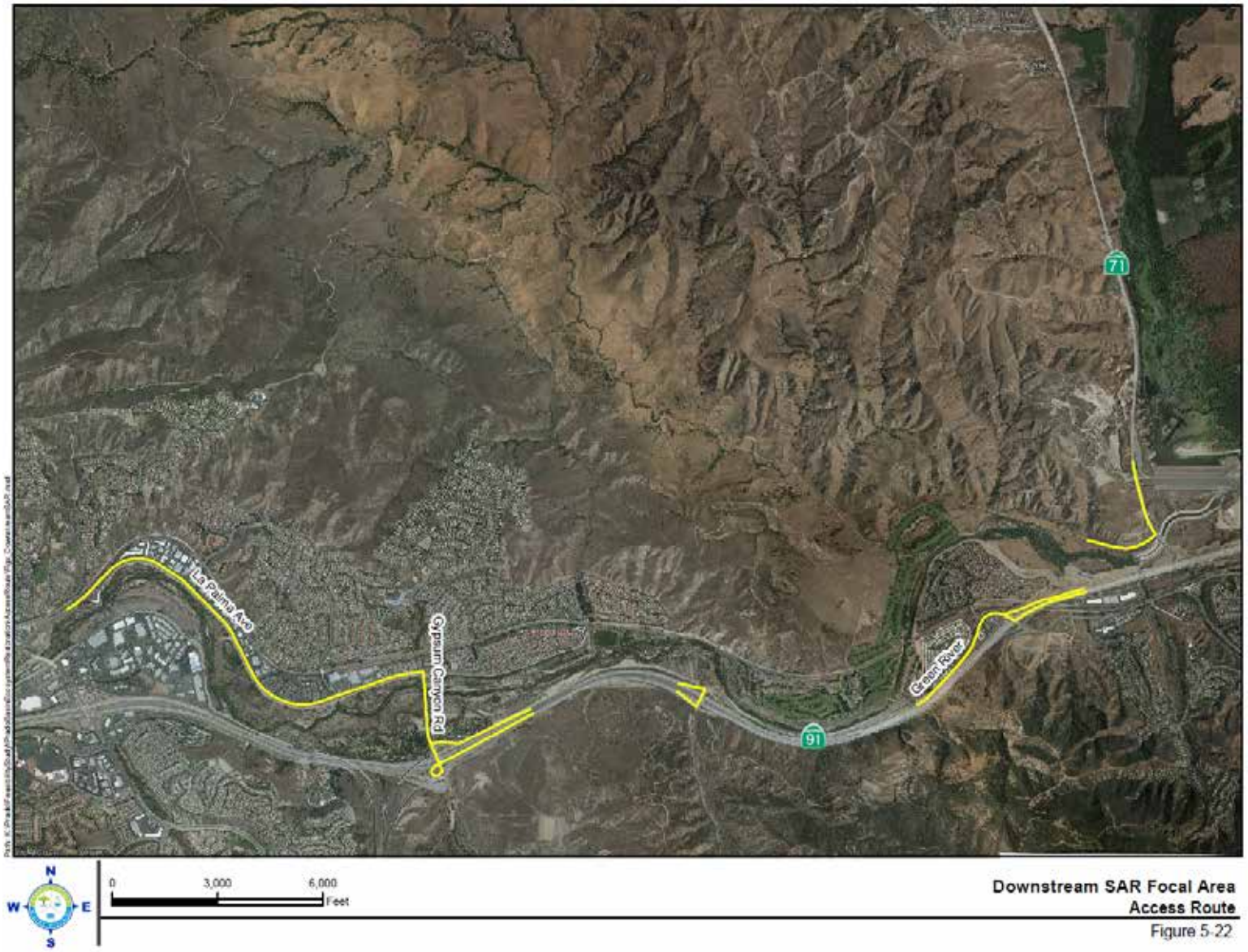

Figure 5-22: Downstream SAR Focal Area – Access Route

Figure 5-23: SAR Lower Reach Focal Area – Access Route

Figure 5-24: Bowerman Landfill – Access Route

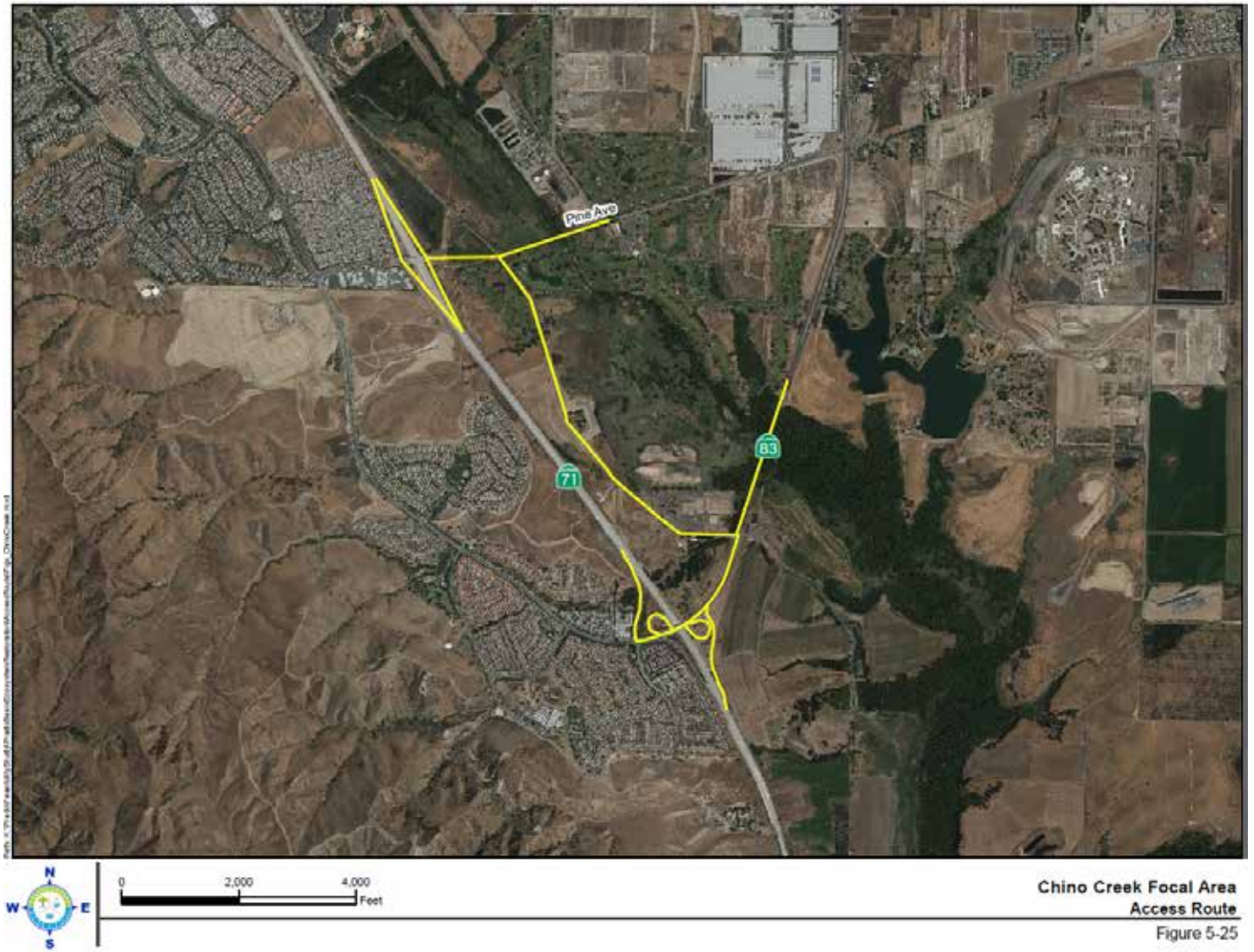

Figure 5-25: Chino Creek Focal Area – Access Route

6.0 COMPARISON OF ALTERNATIVES

Comparison of plan alternatives is an essential step in the evaluation of the alternatives and identification of the National Ecosystem Restoration (NER) Plan, National Economic Development (NED) Plan, and the Tentatively Selected Plan (TSP). Plans are compared by how well they address the project objectives, which is a fundamental measure of the response to the purpose and need for the project. Risks, constraints, and policy issues, national objectives are also compared. Plan benefits and costs are used to identify the combined NED and NER plan.

As described in Chapter 3, plan formulation was conducted to develop the measures for each project purpose. The final array of plans for each study purpose were developed separately, and then combined to form the alternatives in the combined final array. Plan formulation produced three action alternatives for Ecosystem Restoration and an alternative for Water Conservation. The Water Conservation Plan for Alternative 3 includes additional sediment removal to address changes in sediment deposition from water conservation operations. The Water Conservation does not include additional sediment removal for Alternatives 2 and 4. The Sediment Management Measure for Ecosystem Restoration included in those alternatives eliminates the need for additional sediment removal for Water Conservation. A detailed explanation of the evaluation of plan costs and benefits for each project purpose is provided in the Appendix P, Economics. There are no tradeoffs required to implement plans for each project purpose as a Combined Plan.

In evaluating the compatibility of alternatives for Water Conservation and Ecosystem Restoration, it was determined that two variations of the single alternative for Water Conservation would be included in the combined final array. Both versions of the Water Conservation Plan provide for operation of Prado Dam at 505 feet WSE for water conservation on a year-round basis. Similar to the water conservation activity being carried out under an approved deviation to the Prado Dam Water Control Plan, one version of the Water Conservation plan would include incidental sediment removal to address changes in sediment deposition patters in the basin that may have a less than significant effect on the endangered Santa Ana Sucker. That version of the Water Conservation Plan is included in the combined plan final array with Ecosystem Restoration Best Buy Plan 9, which does not include the sediment management measure for Ecosystem Restoration. For the combined plan final array alternatives that include Ecosystem Restoration Best Buy Plans 11 and 14, the Water Conservation plan component does not include incidental removal of sediment from the basin, as the restoration measure for sediment management avoids any changes in sediment deposition in the basin due to Water Conservation Operations. The combined plans for both project purposes in the final array plans are presented in Table 6-1.

6.1 FINAL ARRAY COMPARISON BY PROJECT OBJECTIVES

The project objectives were developed in the initial stages of the planning process. The project objectives were used to identify outputs and changes in conditions that would t address the problems for the national interests in water resources defined as the mission of the Civil Works Program. Project objectives were developed for both project purposes.

Table 6-1: Combined Alternatives

Study Purpose	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Ecosystem Restoration	No Action	Best Buy Plan 11	Best Buy Plan 9	Best Buy Plan 14
Water Conservation		Water Conservation without additional sediment removal	Water Conservation with additional sediment removal	Water Conservation without additional sediment removal

6.1.1 Ecosystem Restoration Project Objectives

The ecosystem restoration objectives are:

- Improve hydraulic and fluvial geomorphic functions to promote habitat growth and wildlife connectivity to regionally significant core habitats at Prado Basin and associated main watercourses within the project area.
- Restore riparian and riparian associated habitats suitable to native species within the project area.
- Reduce presence and effects of non-native wildlife on habitat suitability and function for native wildlife species.

The final array of plans considered for ecosystem restoration address the project objectives, either directly or indirectly.

6.1.2 Water Conservation Project Objective

The study objective for water conservation is to:

- Provide for increased groundwater capture at downstream OCWD facilities to address regional demand.

Water Conservation at 505 feet water surface elevation has been identified as the National Economic Development plan based on the consideration that the plan provides the most economic benefit without incurring additional costs that would be required for operation at higher water surface elevation, based on consideration of inundation behind the dam, and additional costs and impacts that would be incurred by operation at a higher water surface elevation.

The Water Conservation plan could result in up to 13,000 additional acre-feet of water being recharged on any given year, but on average approximately 6,300 acre-feet would be recharged annually under Base Year conditions. Water provided by the Water Conservation measure would reduce the demand for treated water imported from more expensive sources. Modeling all water sources and demand with uncertainty confirms that this project would only displace treated, uninterruptible water imports, based on expected yields and the expected contributions of other sources and the cost savings that could be achieved by substituting water from increased yield from the proposed project for the most expensive alternate source. Details of the

evaluation of the scenarios for water source substitution and the cost savings under varying conditions are presented in detail in the Economics Appendix (Appendix P). The water conservation value of the Water Conservation Plan is presented in Table 6-3.

Table 6-2: Comparison of Alternatives to Project Objectives for Ecosystem Restoration

Objective	Alternative 2	Alternative 3	Alternative 4
Improve hydraulic and fluvial geomorphic functions that support aquatic habitats	Indirectly and directly contributes to this objective to the same degree as Alternative 3. Directly meets this objective by the sediment management system, and in-stream habitat features in the Downstream Santa Ana River Focal area.	Indirectly contributes to this objective by reducing hydrologic effects of invasive vegetation. Directly contributes to this objective at Chino Creek with channel restoration.	Directly meets this objective by providing features of Alternative 2 and in-stream habitat features at the Santa Ana River upstream focal area.
Restore riparian and associated habitats	Directly meets this objective by providing measures of Alternative 3 plus native plantings for Mill Creek and Riparian edge management in the Santa Ana River Upstream focal area.	Directly meets this objective by addressing invasive vegetation throughout the project area and native plantings at all focal areas except Mill Creek.	Directly meets this objective to same degree as Alternative 2.
Reduce presence and effects of non-native wildlife	Directly meets this objective through cowbird trapping and control of invasive aquatic species at all upstream focal areas.	Meets this objective by providing for Cowbird trapping at all upstream focal areas.	Directly meets this objective by providing the measures of Alternative 2 plus non-native aquatic species management at Downstream Santa Ana River, and Feral Pig Management.

Table 6-3: Economic Output for Water Conservation

	Expected Value – Base Year	Expected Value – Future Year	Equivalent Annual Value
Without Project Aggregate Cost of Water Supply	$260,882,000	$307,305,000	$278,680,000
With Project Aggregate Cost of Water Supply	$255,660,000	$297,238,000	$271,600,000
Project Benefits (reduced cost of water supply)	$5,222,000	$10,067,000	$7,080,000

6.2 COMPARISON BY NATIONAL OBJECTIVES

All plans considered for implementation are required by Corps policy to be compared for how well they address the national objectives. This project addresses the national objectives of National Ecosystem Restoration and National Economic Development.

6.2.1 Comparison of National Ecosystem Restoration Outputs

For National Ecosystem Restoration, outputs were determined based on the output of habitat evaluation modeling using the CHAP method, which provides average annual output units. Outputs were characterized by habitat types, which include:

- Valley Floor Riparian (VFR) – Riparian Forest
- VFR – Riparian Scrub
- VFR – Riparian Transition
- Fresh Emergent Wetlands
- Riverine – Existing Channel
- Riverine – New Channel
- Riverine – Drop Structure

Restoration outputs are quantified as the net increase in CHAP-derived habitat units based on the habitat structure and function provided by the combinations of restoration measures in the final array of alternatives. Summary outputs for ecosystem restoration are presented in Table 6-4. A summary comparison of impacts of action alternatives for significant impacts and major resource elements is provided in Table 6-5.

Table 6-4: Ecosystem Outputs of Alternatives

Plan Characteristics	Alternative 2	Alternative 3	Alternative 4
Output as Average Annual Habitat Units	60,594	38,795	61,246
Output Types	Major: VFR-Riparian Forest, VFR-Riparian Scrub, VFR-Riparian Scrub Transition, VFR-Foothill, Fresh Emergent Wetland, Riverine-New Channel, Riverine-Existing Channel, Riverine-Drop Structure	Major: VFR-Riparian Forest, VFR-Riparian Scrub, VFR-Riparian Scrub Transition, VFR-Foothill, Small Scale: Fresh Emergent Wetland, Riverine-New Channel, Riverine-Existing Channel, Riverine-Drop Structure	Major: VFR-Riparian Forest, VFR-Riparian Scrub, VFR-Riparian Scrub Transition, VFR-Foothill, Fresh Emergent Wetland, Riverine-New Channel, Riverine-Existing Channel, Riverine-Drop Structure
Percentage of available maximum output	98.7%	63%	99.7%

6.2.1.1 Summary of Plan Ecosystem Restoration Plan Outputs and Costs

Alternative 2 – This plan provides a substantial increase in output, generating 60,594 AAHUs. The total first cost is approximately $110.1 million, with an average annual cost of about $10.2 million. The incremental AAC/AAHU of this plan relative to Best Buy Plan 10 is $381, which is a 30% increase, but still low relative to larger scale best buy plans. Relative to Best Buy Plan 9 (Alternative 3), the incremental AAC/AAHU is about $379. This plan is the first to feature the sediment management system along the Santa Ana River Mainstem (SARM), as well as in-stream habitat features in the SARM downstream area and riparian edge management features upstream, which are both dependent upon implementation of the sediment management system. This plan also adds non-native aquatics management in the SARM upstream area. These additional features raise the cost considerably – the first cost is about $83.5 million higher than Alternative 3 and average annual costs are approximately 5.3 times higher than the annual costs for Alternative 3. However, the increase in output of 21,799 AAHUs results in a low incremental cost per AAHU. The incremental AAC/AAHU for this best buy plan is substantially lower than larger scale best buy plans.

Table 6-5: Comparison of Potential Impacts

Resource	Alternative 2	Alternative 3	Alternative 4
Air Quality/Green-house Gas Emissions	***Construction Impacts*** Under NEPA, air emissions from construction activities would be within General Conformity de minimis levels. Under CEQA construction activities air emissions would exceed SCAQMD threshold for NOx and would conflict with SCAQMD Air Quality Management Plan, a significant air quality impact would occur. Environmental Commitments will be implemented to minimize construction-related air quality impacts, but impacts would still be significant under CEQA. ***Operation/Maintenance Impacts*** Under NEPA, air emissions emitted from operation and maintenance activities would be within General Conformity de minimis levels. Under CEQA, operation and maintenance activities would exceed SCAQMD threshold for NOx and would conflict with SCAQMD Air Quality Management Plan, a significant air quality impact would occur. Environmental Commitments will be	***Construction Impacts*** Alternative 3 would involve a reduced amount of construction activities compared to Alternative 2 and a lower amount of NOx air emissions would be emitted. Under NEPA, air emissions from construction activities would be within General Conformity de minimis levels. Under CEQA, NOx emissions would not exceed SCAQMD threshold for NOx and would not conflict with SCAQMD Air Quality Management Plan. Construction-related air quality impacts would be less than significant. ***Operation/Maintenance Impacts*** Under NEPA, air emissions from operation/maintenance activities would be within General Conformity de minimis levels. Under CEQA, operation/maintenance activities would not exceed SCAQMD threshold for NOx and would not conflict with SCAQMD Air Quality Management Plan. Environmental Commitments would be implemented to minimize air quality impacts. Operation and	***Construction Impacts*** Compared to Alternative 2, NOx emissions would be slightly higher. Under NEPA, air emissions from construction activities would be within General Conformity de minimis levels. Under CEQA construction activities would exceed SCAQMD threshold for NOx and would conflict with SCAQMD Air Quality Management Plan, a significant air quality impact would occur. Environmental Commitments have been incorporated into the construction activities to minimize air quality impacts, but the remaining impacts would still be significant under CEQA. ***Operation/Maintenance Impacts*** Under NEPA, air emissions from operation/maintenance activities would be within General Conformity de minimis levels. Under CEQA operation/maintenance activities would exceed SCAQMD threshold for NOx and would conflict with SCAQMD Air Quality Management Plan. Environmental Commitments

Resource	Alternative 2	Alternative 3	Alternative 4
	implemented to minimize operation and maintenance air quality impacts, but impacts would still be significant under CEQA. ***Greenhouse Emissions*** Under NEPA, greenhouse gas emissions would not exceed 25,000 metric tons per year. Under CEQA, greenhouse gas emissions would exceed SCAQMD 3,000 metric tons threshold and a significant impact would occur.	maintenance air quality impacts would be less than significant. ***Greenhouse Emissions*** Alternative 3 would involve a reduced amount of construction activities compared to Alternative 2 and a lower amount of greenhouse gases would be emitted. Under NEPA, greenhouse gas emissions would not exceed 25,000 metric tons per year. Under CEQA greenhouse gas emissions would not exceed SCAQMD 3,000 metric tons threshold. Impacts would be less than significant.	have been incorporated into the construction activities to minimize air quality impacts, but impacts would still be significant under CEQA. ***Greenhouse Emissions*** Compared to Alternative 2, greenhouse gas emission would be higher. Under NEPA, greenhouse gas emissions would not exceed 25,000 metric tons per year. Under CEQA greenhouse gas emissions would exceed SCAQMD 3,000 metric tons threshold and significant impact would occur.
Water Resources	***Construction Impacts*** During construction potential erosion, degraded surface water runoff and instream water quality impacts will be controlled with the implementation of environmental commitments. Construction impacts would be less than significant. ***Operation/Maintenance Impacts*** During operation and maintenance activities potential erosion, degraded surface water runoff and instream water quality impacts will be controlled with the implementation of environmental	***Construction Impacts*** Compared to Alternative 2 there would be a reduced amount of construction activity and less potential for adverse water quality impacts. During construction potential erosion, degraded surface water runoff and instream water quality impacts will be controlled with the implementation of environmental commitments. Construction impacts would be less than significant. ***Operation/Maintenance Impacts*** During operation and maintenance activities potential erosion and	***Construction Impacts*** Compared to Alternative 2, construction impacts would generally be the same. During construction potential erosion, degraded surface water runoff and instream water quality impacts will be controlled with the implementation of environmental commitments. Construction impacts would be less than significant. ***Operation/Maintenance Impacts*** Compared to Alternative 2, operation and maintenance impacts would be the same.

Resource	Alternative 2	Alternative 3	Alternative 4
	commitments. Operation and maintenance impacts would be less than significant.	degraded surface water runoff impacts will be controlled with the implementation of environmental commitments. Operation and maintenance impacts would be less than significant.	During operation and maintenance activities potential erosion, degraded surface water runoff and instream water quality impacts will be controlled with the implementation of environmental commitments. Operation and maintenance impacts would be less than significant.
Biological Resources	***Construction Impacts*** Direct construction impacts to special status species would be avoided. Construction activities would displace existing vireo territories and would remove sensitive vegetation communities including from critical habitat areas. Construction noise impacts could also disrupt nesting patterns special status bird species. Significant impacts to special status species, critical habitat and sensitive vegetation communities would be avoided through the implementation of Environmental Commitments. Construction impacts would be temporary and would be less than significant. ***Operation/Maintenance Impacts*** Operation of the Water Conservation Plan could inundate	***Construction Impacts*** Compared to Alternative 2, Alternative 3 would not displace any know vireo territories and would not involve any construction activities that would occur during nesting season. Additionally, Alternative 3 would result in fewer impacts to critical habitat areas and sensitive vegetation communities. Significant impacts to special status species, critical habitat and sensitive vegetation communities would be avoided through the implementation of Environmental Commitments. Construction impacts would be temporary and would be less than significant. **Operation/Maintenance Impacts** Similar, to Alternative 2, operation of the Water Conservation Plan could inundate existing territories	***Construction Impacts*** Compared to Alternative 2, construction impacts would generally be the same. Significant impacts to special status species, critical habitat and sensitive vegetation communities would be avoided through the implementation of Environmental Commitments. Construction impacts would be temporary and would be less than significant. ***Operation/Maintenance Impacts*** Similar, to Alternative 2, operation of the Water Conservation Plan could inundate existing territories causing nesting birds to redistribute to alternative locations and potentially inundate critical habitat and sensitive vegetation communities. Operation and

Resource	Alternative 2	Alternative 3	Alternative 4
	existing territories causing nesting birds to redistribute to alternative locations and potentially inundating critical habitat and sensitive vegetation communities. Operation and maintenance activities could generate noise impacts that could disrupt nesting patterns of special status bird species. Significant impacts to special status species, critical habitat and sensitive vegetation communities would be avoided through the implementation of Environmental Commitments. Operation and maintenance impacts would be less than significant.	causing nesting birds to redistribute to alternative locations and potentially inundating critical habitat and sensitive vegetation communities. Operation and maintenance activities could generate noise impacts that could disrupt nesting patterns of special status bird species. Significant impacts to special status species, critical habitat and sensitive vegetation communities would be avoided through the implementation of Environmental Commitments. Operation and maintenance impacts would be less than significant.	maintenance activities could generate noise impacts that could disrupt nesting patterns of special status bird species. Significant impacts to special status species, critical habitat and sensitive vegetation communities would be avoided through the implementation of Environmental Commitments. Operation and maintenance impacts would be less than significant.
Cultural Resources	***Construction Impacts*** Excavation activities would occur in areas where several feet of sediment as accumulated behind Prado Dam. Excavation activities would not impact native soils and would not directly impact recorded cultural resource sites. Environmental commitments would be implemented to avoid indirect impacts to cultural resources within the vicinity of the construction activities or in areas that have the potential to contain	***Construction Impacts*** Similar, to Alternative 3, excavation activities would occur in areas where several feet of sediment as accumulated behind Prado Dam and would not impact native soils and would not directly impact and recorded cultural resource sites. Environmental commitments would be implemented to avoid indirect impacts to cultural resources within the vicinity of the construction activities or in areas that have the potential to contain buried cultural	***Construction Impacts,*** Compared to Alternative 2, construction impacts would be the same. Environmental commitments would be implemented to avoid indirect impacts to cultural resources within the vicinity of the construction activities or in areas that have the potential to contain buried cultural resources. Construction impacts would be less than significant. ***Operation/Maintenance Impacts*** Compared to Alternative 2,

Resource	Alternative 2	Alternative 3	Alternative 4
	buried cultural resources. Construction impacts would be less than significant. ***Operation/Maintenance Impacts*** Operation and maintenance activities would not extend beyond where excavation activities would occur. No direct or indirect impacts to cultural resources would occur. Operation and maintenance impacts would be less than significant.	resources. Construction impacts would be less than significant. ***Operation/Maintenance Impacts*** Operation and maintenance activities would not extend beyond where excavation activities would occur. No direct or indirect impacts to cultural resources would occur. Operation and maintenance impacts would be less than significant.	operation and maintenance impacts would be the same. Operation and maintenance impacts would be less than significant.
Traffic/Circulation	***Construction Impacts*** Construction activities would generate a maximum of 1,103 daily vehicle trips. Construction traffic would occur during non-peak traffic periods. There would be no study area roadway segments or intersections that are projected to be at or near capacity with the additional construction traffic. Construction impacts would be less than significant. ***Operation/Maintenance Impacts*** Operation and maintenance activities would generate 559 daily vehicle trips. Operation and maintenance traffic would occur during non-peak traffic periods. There would be no study area roadway segments or intersections	***Construction Impacts*** Construction activities would generate a maximum of 630 daily vehicle trips. Construction traffic would occur during non-peak traffic periods. There would be no study area roadway segments or intersections that are projected to be at or near capacity with the additional construction traffic. Construction impacts would be less than significant. ***Operation/Maintenance Impacts*** Operation and maintenance activities would generate 310 daily vehicle trips. Operation and maintenance traffic would occur during non-peak traffic periods. There would be no study area roadway segments or intersections	***Construction Impacts*** Construction activities would generate a maximum of 1,222 daily vehicle trips. Construction traffic would occur during non-peak traffic periods. There would be no study area roadway segments or intersections that are projected to be at or near capacity with the additional construction traffic. Construction impacts would be less than significant. ***Operation/Maintenance Impacts*** Operation and maintenance activities would generate 559 daily vehicle trips. Operation and maintenance traffic would occur during non-peak traffic periods. There would be no study area roadway segments or

Resource	Alternative 2	Alternative 3	Alternative 4
	that are projected to be at or near capacity with the additional traffic. Operation and maintenance impacts would be less than significant.	that are projected to be at or near capacity with the additional traffic. Operation and maintenance impacts would be less than significant.	intersections that are projected to be at or near capacity with the additional traffic. Operation and maintenance impacts would be less than significant.
Noise	***Construction Impacts*** Construction activities would temporarily increase ambient noise levels within the study area. Construction activities would occur during the hours of the day, when construction noise would be exempt under local noise ordinances. Construction noise impacts would be less than significant. ***Operation/Maintenance Impacts*** Sediment re-entrainment activities would temporarily exceed the City of Corona night time noise standard. With implementation of environmental commitments, operation and maintenance noise impacts will be below the City of Corona night time noise standard. All other operation and maintenance activities would occur during the day when operation and maintenance noise impacts would be exempt under local noise ordinances. Operation	***Construction Impacts*** Construction activities would temporarily increase ambient noise levels within the study area. Construction activities would occur during the hours of the day, when construction noise would be exempt under local noise ordinances. Construction noise impacts would be less than significant. ***Operation/Maintenance Impacts*** All operation and maintenance activities would occur during the day when operation and maintenance noise impacts would be exempt under local noise ordinances. Operation and maintenance impacts would be less than significant.	***Construction Impacts*** Compared to Alternative 2, construction noise impacts would be the same. Construction activities would occur during the hours of the day, when construction noise would be exempt under local noise ordinances. Construction noise impacts would be less than significant. ***Operation/Maintenance Impacts*** Compared to Alternative 2, operation and maintenance impacts would be the same. Similar, to Alternative 2, with implementation of environmental commitments, operation and maintenance noise impacts will be below the City of Corona night time noise standard. All other operation and maintenance activities would occur during the day when operation and maintenance noise impacts would be exempt under local noise ordinances. Operation and

Resource	Alternative 2	Alternative 3	Alternative 4
	and maintenance impacts would be less than significant.		maintenance impacts would be less than significant.

Alternative 3 – This plan was the plan determined to minimally meet planning objectives. It provides 38,795 AAHUs. The total first cost is approximately $26.7 million, with an average annual cost of about $1.9 million. The incremental AAC/AAHU of this alternative relative to Best Buy Plan 8 is $206, which represents a substantial increase over some smaller Best Buy Plans, but still low compared to larger scale plans. Relative to the No Action Plan, the incremental AAC/AAHU is about $49. The plan features invasive plant management and native plantings throughout the project areas, which are the most cost effective restoration measures, and also includes raising the invert and cutting a new channel through Chino Creek. Cowbird trapping was determined to be a critical feature for all Final Array action plans, based upon output that was not captured in the CHAP results.

Alternative 4 – This is the largest plan in the Final Array and is projected to generate 61,246 AAHUs. This represents an increase of 652 AAHUs relative to Alternative 2. The total first cost of Alternative 4 is approximately $116.3 million, with an average annual cost of about $10.7 million. The incremental first cost and annual cost of this alternative relative to Alternative 2 are about $6.2 million and $522,000, respectively. This plan adds non-native aquatics management in the SARM downstream area, in-stream habitat features in the SARM upstream area, and feral pig management in the SARM Upstream, Chino Creek and Mill Creek project areas. These measures, while not adding a significant amount of output based upon the CHAP analysis, do provide important restoration benefits. The feral pig management measure in particular was identified as an important to help achieve restoration success throughout the project areas. The incremental AAC/AAHU of this plan relative to Best Buy Plan 13 is $877. Relative to Alternative 2, the incremental AAC/AAHU of this plan is about $800. While the incremental AAC/AAHU for this final array plan is larger than smaller scale plans, it is still less than $900, which is substantially lower than larger scale best buy plans that were not carried forward to the final array.

Table 6-6: Significant Unavoidable Impacts of Alternatives

Environmental Resource	Alternative 2	Alternative 3	Alternative 4
Air Quality	CEQA: NO_x emissions, Year 5 construction CEQA: GHG Emissions – Significant Unavoidable Impact	none	CEQA: NO_x emissions, Year 2 and Year 5 construction CEQA GHG Emissions – Significant Unavoidable Impact

6.2.2 Comparison of National Economic Development Net Benefits

Based on the projected costs savings from additional water made available to OCWD under the most likely supply scenario, the Water Conservation plan produces annual economic benefits of $7.08 million. Net benefits are positive under all reliability scenarios, as described in Appendix P. Thus, the conclusion that investment in this water conservation project is economically justified remains valid under a range of scenarios that address how local supply deficits are met and how project benefits are calculated.

Table 6-7 displays project benefits, costs, net benefits, and benefit-to-cost ratios for the Water Conservation Plan as a component of the final array of combined alternatives. Both versions of the Water Conservation plan are justified by their net positive benefits.

Table 6-7: Net Benefits of Water Conservation Plan Alternatives in the Final Array

	Water Conservation with Additional Sediment Removal (Alternatives 2 and 4)	**Water Conservation without Additional Sediment Removal (Alternative 3)**
Equivalent Annual Benefits	$7,080,000	$7,080,000
Equivalent Annual Costs	$231,000	$107,000
Net Benefits	$6,848,000	$6,973,000
Benefit/Cost Ratio	30.6	66.2

6.3 ECOSYSTEM RESTORATION FINAL ARRAY COST ESTIMATES

Cost estimates for ecosystem restoration plans in the final array are presented in Table 6-8. Pre-construction engineering and design, supervision and administration costs are based on a percentage of the construction cost estimate. This value represents the anticipated costs for development of detailed design documents that can be used as a basis for bidding and award of construction contracts, and the required level of effort to administer the construction work. Monitoring and Adaptive Management costs are based on the estimated level of effort and technical needs for monitoring the measures to determine success, along with contingency requirements for adaptive management actions that are expected to adjust the measures to achieve success criteria. These elements of the alternatives are documented in the Monitoring and Adaptive Management Plan (Appendix E).

Required investments for real estate and related items are included in the Lands, Easements, Rights-of-Way, Relocation and Disposal (LERRD) category. These are the costs for acquisition of property or access agreements needed for project construction and operation, including relocations of existing infrastructure that must be compensated by the project.

Total first costs are the cost for construction of the project, including pre-construction engineering and design, supervision and administration of the construction contracts, monitoring and adaptive management, LERRDs, and interest accrued during construction, which represents the opportunity cost of the funds committed to constructing the project.

Operation and Maintenance, Repair, Replacement and Rehabilitation (OMRR&R) costs are the costs required to operate and maintain the project so that it will continue to deliver planned benefits over the life of the authorized projects. These costs are the responsibility of the non-federal sponsor.

Table 6-8: Ecosystem Restoration Costs of Final Array Plans

	Alternative 2	Alternative 3	Alternative 4
Construction	$96,715,632	$20,492,543	$102,800,088
PED/S&A	$24,011,459	$5,287,668	$25,275,153
Monitoring & Adaptive Mgt.	$13,857,527	$8,682,943	$14,621,329
LERRD	$3,200,725	$2,382,029	$3,450,725
Total First Cost	**$137,785,000**	**$36,845,000**	**$146,147,000**
IDC	$9,615,313	$2,571,225	$10,198,855
Investment Cost	$147,400,313	$39,416,225	$156,345,855
Annualized Investment Cost	$5,460,000	$1,460,000	$5,791,000
OMRR&R	$7,735,000	$522,000	$8,012,000
Total Annual Cost	**$13,195,000**	**$1,982,000**	**$13,803,000**

6.4 FINAL ARRAY POLICY ISSUES, RISKS, AND CONSTRAINTS

6.4.1 Final Array Policy Issues

The water conservation component of the TSP has a different authority and delegated approval process than the ecosystem restoration plan component. These decision-making processes for plan selection and implementation are discussed in Section 7.4 of this report.

6.4.2 Final Array Risks and Constraints

Climate change, in particular increases risk of severe or extended drought in the project area pose risks to the project performance for both project purposes. The ecosystem restoration component has been designed for resiliency with respect to dry conditions by focusing the great majority of the investment in aquatic restoration features on the upstream and downstream focal areas of the Santa Ana River. Because it is the largest river and has permanent flow conditions, aquatic habitat restoration benefits will be provided regardless of the presence of severe or exceptional drought conditions. Adaptive management measures for native plantings includes the capability to irrigate planted areas during the first five years post-construction to ensure native vegetation has had time to mature and develop drought resistance compared to immature vegetation, which is more vulnerable to drought due to less developed root systems. (Construction includes initial irrigation to establish initial viability of native plantings.) Native plantings have also adapted to the climate of the project area, which includes typically dry, warm summers and frequent periods of less severe drought, along with less frequent severe drought conditions.

Sediment management, particularly downstream re-entrainment to address channel incision, is based on sediment transport models that do not have the capability to present refined estimates of the spatial distribution of sediment accumulation in three dimensions. Based on this limitation in the analysis, there may be sediment accumulations downstream that require removal to address

undesired effects on the flood risk management function of downstream reaches of the Santa Ana River. The sediment management measures include O&M costs to address the contingency of possible sediment accumulation impacts. It is expected that additional studies conducted prior to PED will help inform refinements in operating parameters of sediment re-entrainment prior to project implementation.

For water conservation, dry conditions may reduce yields from the water conservation component, however, the net value may increase under such conditions, as the costs of imported water would be expected to increase substantially during periods of drought.

The Water Conservation and Ecosystem Restoration components will also be subject to dam safety considerations. Currently Prado Dam is being upgraded by additional components of the Santa Ana River Mainstem Project for Flood Risk Management. It is anticipated that these features will be completed by 2023 and will support an improvement in the DSAC rating for the dam that would support a permanent change to the Water Control Manual to allow for the water conservation to be incorporated into dam operations. Investigations and design work will also be carried out during PED to ensure that final designs of the TSP would not adversely affect the flood risk management provided by the Santa Ana River Mainstem project.

6.5 NER AND NED PLAN IDENTIFICATION AND SUMMARY OF THE FOUR ACCOUNTS

6.5.1 NER Plan Identification

Alternative 2 has been identified as the NER Plan for the following reasons:

1. Efficiency: It is a Best Buy Plan per the CE/ICA analysis. All of the plan features are cost effective and efficient.
2. The slight modification to Best Buy Plan 11 includes the addition of the Cowbird Trapping measure. This measure is included in larger scale Best Buy Plans, so it is considered cost effective and efficient. Further, the benefits for this measure are not fully captured in the CHAP ecosystem output model, and therefore the efficiency of this measure is greater than indicated in the CE/ICA analysis.
3. The incremental AAC/AAHU of this plan is less than $400, which is low compared to larger scale best buy plans and is not significantly higher than smaller best buy plans.
4. This plan includes the Sediment Management System measure – a key restoration measure that provides more habitat benefits than any other measure – especially when combined with other measures that depend on it (e.g., riparian edge management and in-stream habitat features). This plan generates 21,421 more AAHUs than Best Buy Plan 10, and 21,799 more AAHUs than Alternative 3.
5. Effectiveness: This plan meets ecosystem restoration objectives and achieves nearly 99% of the restoration outputs of the largest best buy plan. It is also the most efficient and cost-effective plan that provides for restoration of the Santa Ana River mainstem upstream and downstream of Prado Dam to restore aquatic habitats by addressing the altered geomorphology of the stream channel and floodplain to provide channel features, physical conditions and flow dynamics that provide restored habitats for native aquatic species, including the Santa Ana Sucker in its designated critical and for other native

aquatic species in the Santa Ana River. In addition, because the Santa Ana River is the largest river by flow volume in Southern California, it is projected to have perennial flow conditions in the future, even during periods of extended drought, such as that observed from 2012 through 2016. Therefore, the benefits provided by implementing sediment management on the Santa Ana River Mainstem would be resilient with respect to the anticipated increasing severity of drought conditions that may be associated with climate change over the period of analysis.

6. Based upon the criteria of effectiveness and efficiency described above, it has been determined that this plan maximizes ecosystem restoration benefits relative to costs. While each of the plans in the final array meet the requirements for acceptability, completeness, efficiency and cost effectiveness. Alternative 2 addresses the problems and opportunities present in the study area at the scale and types of water resources effects documented in this study.

6.5.2 NED Plan Identification

As described in Section 6.4.2, the projected costs savings from additional water made available to OCWD under the most likely supply scenario, the Water Conservation plan produces annual economic benefits of $7.08 million. Thus, the conclusion that investment in this water conservation project is economically justified if implemented as part of the combined plan for Water Conservation and Ecosystem Restoration.

Regional Economic Development – Construction
Overall, construction of the NER should lead to about $135 million in gross regional product (GRP) and about 1,802 additional jobs within the region during construction. The impact to the state would be of greater magnitude although less relative importance due to the large size of the California economy. Approximately $140 million in GRP and about 1,878 jobs would be supported state-wide over the period of construction.

Regional Economic Development – Operations and Maintenance
Overall, OMRR&R expenditures for the TSP are projected to lead to about $7.18 million in gross regional product (GRP) and about 96 additional jobs annually within the region throughout the period of analysis. Approximately $7.43 million in GRP and about 100 jobs would be created state-wide from annual OMRR&R expenditures.

Other Social Effects
The TSP is primarily composed of ecosystem restoration features within and along the Santa Ana River and Chino and Mill Creeks. The most significant restoration feature includes a sediment management system along the Santa Ana River, which, in addition to a large initial investment, will require substantial future operation and maintenance. The TSP also includes reoperation of Prado Dam to increase water conservation.

Urban & Community Impacts
Urban and community impacts address changes in the following categories.

- Effects on employment distribution, especially the share to minorities
- Effects on population distribution and composition

- Effects on the fiscal condition of the State and local sponsor

The combined NED/NER plan is not expected to have a significant urban and community impacts, either positive or negative. There will be increases in regional income and employment associated with the combined NED/NER plan, both during and after construction (as addressed in the Regional Economic Development analysis). These income and employment impacts will be positive for the community, including minorities employed by these businesses. However, most of these employment impacts will be concentrated during the period of construction. The combined plan will not impact population distribution and composition. The cost sharing requirements for the combined plan are not anticipated to have a significant impact on the fiscal condition of the non-federal sponsor. The reduced cost of supplying water to the OCWD service area, while positive, is not expected to result in a significant change in the cost per customer or the amounts charged to customers.

Effects on educational, cultural and recreational opportunities

The combined NED/NER plan is expected to provide both positive and negative impacts to educational and recreation opportunities in the Study Area. As noted earlier in this report, increasing the target elevation for water conservation at Prado Dam is expected to result in increased inundation of areas behind the dam that have recreational uses, including a dog park and duck and pheasant hunting. However, there will also be positive recreational impacts for those visiting the area associated with the enhanced environmental setting resulting from the TSP ecosystem restoration features. These positive impacts are expected to be limited, since the TSP does not include any specific recreational features formulated to compliment the restoration plan.

Life, Health, and Safety Impacts

The combined NED/NER plan is not expected to have any significant impacts on life, health and safety. Engineering analysis indicates that there will not be any increase in flood risk associated with the change in Prado Dam operations to implement increased water conservation.

Displacement effects (people, businesses)

The combined NED/NER plan is not anticipated to result in the displacement of people or businesses. As noted, it is expected that there will be some reduction in the days of availability for areas within the basin that are used for some recreational activities.

Other (e.g., social connectedness, long term productivity)

Beyond the impacts described above, the combined NED/NER plan is expected to result in positive OSE impacts, primarily in terms of the value placed by society on the creation/existence of a restored ecosystem. The impact of the combined NED/NER plan on other OSE factors, such as social connectedness, social vulnerability, community resilience, is expected to be minimal.

6.6 NATIONAL ECOSYSTEM RESTORATION NATIONAL ECONOMIC DEVELOPMENT (NER/NED) PLAN SUMMARY

The combined NER/NED Plan is Alternative 2. As described in the previous sections, the NED Plan for water conservation is identified as water conservation to elevation 505', while the NER Plan is identified as Best Buy Plan 11. There are no tradeoffs required to implement both of

these plans as a Combined Plan. There are, however, incidental benefits from combining the plans. These are outlines as follows:

The incidental ecosystem restoration outputs associated with the NED water conservation plan are higher if implemented in conjunction with the NER Plan. Specifically, under the NED water conservation plan, the increase in average annual habitat units over the period of analysis is estimated at 6,219. If the water conservation alternative is implemented in conjunction with the sediment management system on the Santa Ana River upstream and downstream of Prado Dam (a key component of the NER Plan), the incidental benefits increase to 8,208 average annual habitat units.

If the NED and NER Plans are combined and implemented concurrently, the sediment mitigation requirements for the NED water conservation plan are not required. This reduces the total first costs corresponding with the NED Plan by about $2.86 million (at FY 2018 price levels), and average annual costs by about $130,700.

Table 6-9 summarizes the total benefits and costs for the Combined Plan. Note that all benefits and costs are presented at FY 2018 price levels and the FY 18 federal discount rate of 2.75%.

The Combined Plan has a total first cost of about $137.8 million (all related to ecosystem restoration features), an annual cost of about $13.3 million (including NER and NED costs). Note again that the NED costs for the water conservation plan are reduced, since mitigation costs are not required when the plan is implemented in conjunction with the sediment management system component of the NER Plan.

Including incidental NER outputs associated with the NED Plan, total AAHUs are estimated at about 68,802, with an average annual cost per AAHU of about $193 (based upon total annual costs for the Combined Plan).

The NED water conservation plan generates $7.37 million in annual benefits, with only about $104,400 in annual costs, resulting in net benefits of about $7.27 million and a benefit/cost ratio of about 71.

Table 6-9: Combined Plan Summary of Benefits and Costs

	NER Plan	NED Plan	Total
NED/NER Costs			
Construction	$96,715,632	$0	$96,715,632
PED/S&A	$24,011,459	$0	$24,011,459
Monitoring & Adaptive Mgt.	$13,857,527	$0	$13,857,527
LERRD	$3,200,725	$0	$3,200,725
Total First Cost (Rounded)	$137,785,000	$0	$137,785,000
IDC	$9,615,313	$0	$9,615,313
Investment Cost	$147,400,313	$0	$147,400,313
Annualized Investment Cost (Rounded)	$5,460,000	$0	$5,460,000
OMRR&R	$7,735,000	$100,000	$7,835,000
NED Losses (Rec & Cleanup)	$0	$4,400	$4,400
Total Annual Cost	$13,195,000	$104,400	$13,299,400
NER Benefits			
AAHU (NER Plan)	60,594	0	60,594
AAHU (Incidental - NED Plan)	0	8,208	8,208
Total AAHUs	60,594	8,208	68,802
AAC/AAHU	$218		$193
NED Benefit/Cost Analysis			
Average Annual Benefits	$0	$7,370,000	$7,370,000
Average Annual Costs	$0	$104,400	$104,400
Net Benefits	$0	$7,265,600	$7,265,600
Benefit/Cost Ratio	NA	71	71

7.0 TENTATIVELY SELECTED PLAN

The tentatively selected plan (TSP) is the combined NER plan for Ecosystem Restoration and NED plan for Water Conservation, which are components of the combined plan in Alternative 2. The combined plan generates savings for Water Conservation and incidental outputs for Water Conservation. These complementary effects of the combined plan are included in this section. The following table summarizes the total benefits and costs for the combined plan.

Table 7-1: Combined Plan Summary of Benefits and Costs (FY 2018 Price Level)

	NER Plan	NED Plan	Total
NED/NER Costs			
Construction	$96,715,632	$0	$96,715,632
PED/S&A	$24,011,459	$0	$24,011,459
Monitoring & Adaptive Mgt.	$13,857,527	$0	$13,857,527
LERRD	$3,200,725	$0	$3,200,725
Total First Cost (Rounded)	$137,785,000	$0	$137,785,000
IDC	$9,615,313	$0	$9,615,313
Investment Cost	$147,400,313	$0	$147,400,313
Annualized Investment Cost (Rounded)	$5,460,000	$0	$5,460,000
OMRR&R	$7,735,000	$100,000	$7,835,000
NED Losses (Rec & Cleanup)	$0	$4,400	$4,400
Total Annual Cost	$13,195,000	$104,400	$13,299,400
NER Benefits			
AAHU (NER Plan)	60,594	0	60,594
AAHU (Incidental - NED Plan)	0	8,208	8,208
Total AAHUs	60,594	8,208	68,802
AAC/AAHU	$218		$193
NED Benefit/Cost Analysis			
Average Annual Benefits	$0	$7,370,000	$7,370,000
Average Annual Costs	$0	$104,400	$104,400
Net Benefits	$0	$7,265,600	$7,265,600
Benefit/Cost Ratio	NA	71	71

7.1 WATER CONSERVATION AND ECOSYSTEM RESTORATION MEASURES OF THE TSP

Combined plan measures for the TSP and their focal area locations are presented in Table 7-2.

Table 7-2: Combined Plan Measures by Focal Area

SARM Upstream of Prado Dam (US)	SARM Downstream of Prado Dam (DS)	Chino Creek	Mill Creek
Ecosystem Restoration Plan Measures			
Sediment Management	Sediment Management		
Invasive Plant Management	Invasive Plant Management	Invasive Plant Management	Invasive Plant Management
Native Plantings	In-stream habitat features	Native Plantings	Native Plantings
Riparian Edge Management		Chino Creek Channel Restoration	
Cowbird Trapping		Cowbird Trapping	Cowbird Trapping
Non-native aquatic fauna management			
Water Conservation Plan Measures			
Water Conservation at 505’ WSE year round without additional sediment removal			

The individual measures for the combined plan are summarized below.

Water Conservation: The Water Conservation Plan would be implemented at the SARM Upstream Focal Area. The plan would permit the surface water elevation at Prado Dam to operate up to elevation 505 ft. year-round for water conservation. The Water Conservation plan for this alternative would not include sediment removal for water conservation operations conducted concurrently with the ecosystem restoration plan, as there would be no accumulation of sediment due to water conservation operations under the combined plan. Additional sediment removal would be carried out on an interim basis if phased implementation of the project resulted in water conservation operations prior to operation of the sediment management system.

Invasive Plant Management: The Invasive Plant Management Measure includes activities to remove the initial biomass of invasive plants and follow on herbicide application and biomass removal techniques for a period of five years. A phased approach to implementation will have to be used given the areal extent and density of non-native plants present within the areas identified for management. The measure also includes the planting and management of native species to promote the re-establishment of native vegetation communities in areas that have been treated to remove invasive plants. Once the initial biomass of invasive vegetation has been removed from a target area, native plantings have been established and the adaptive management program has achieved success, then regular inspection and maintenance would occur for 10 years to ensure that invasive plants are not re-established in treated areas. Invasive Plant Management would occur at SARM Up-Stream, SARM Downstream, Mill Creek and Chino Creek Focal Areas. Within all four Focal Areas, invasive plants would be removed from locations that are not part of existing mitigation programs in the proposed project area. Currently, there are approximately 390 acres of the focal areas where invasive plants would be removed.

Native Plantings: The Native Plantings Measure will be carried out at locations identified for restoration of native vegetation where removal of invasive plants would not be required prior to revegetation with native plants. Plantings would include seeding, pole staking, and planting of nursery-grown plants at areas that have reduced vegetative cover. The plantings would restore riparian forest, generally composed of black willow (*Salix gooddingii*) nearest water's edge. Other willow species (*Salix* spp.), Fremont's cottonwood (*Populus fremontii*) and mulefat (*Baccharis salicifolia*) would dominate the riparian forest further from water's edge. Riparian scrub habitat would generally have more mulefat than in the riparian forest, but also have willow species including arroyo willow (*Salix lasiolepis*). The native plantings would occur at SARM Upstream, Chino Creek and Mill Creek Focal Areas. Once native plantings have been established and the adaptive management program has achieved success, then regular inspection and maintenance would occur for 10 years to ensure that native plantings continue to provide habitat benefits. Within all three Focal Areas, suitable open areas that are not part of existing mitigation projects in the focal areas would be prepared and planted with native plantings. The latest information on site conditions indicates that 104 acres are available that would be planted with native plants.

Chino Creek Channel Restoration: The Channel Restoration measure would be implemented at the Chino Creek Focal Area. Under this measure, the project would construct a new shallow channel along the west side of Chino Creek between Euclid Avenue and Pine Avenue. The shallow channel would promote riparian habitat growth over areas that currently do not receive enough water to support riparian habitat. A portion of Chino Creek would be filled in order to force the water into the new shallow channel. This measure includes the construction of a diversion pipe and bio-engineered invert stabilizers and would have an overall restored area of 170 acres.

Cowbird Trapping: The Cowbird Trapping Measure would provide control for this non-native avian species. The components of the measure would include trapping and other population control measure and would be implemented at the SARM Upstream, Chino Creek and Mill Creek Focal Areas. Within all three upstream Focal Areas approximately 10 cow bird traps

would be deployed and maintained to extirpate cowbirds from target control areas of approximately 5,707 acres.

Non-Native Aquatic Species Management – SARM Upstream: The Non-Native Aquatic Species Management Measure includes activities to control and/or remove invasive aquatic fish species. The focus would be on large predatory fish species, such as carp, bass, and catfish that prey on native fish such as the Santa Ana sucker and arroyo chub. A combination of removal techniques such as netting, seining or electroshocking could be used. Non-Native Aquatic Species Management would occur at SARM Upstream Focal Area. Approximately 67 acres of open water habitat at the SARM Upstream Focal Area has been proposed for Non-Native Aquatic Species Management. Management activities may include the implementation of seining, trapping, and electroshocking to remove invasive aquatic species.

Sediment Management: This alternative includes the Sediment Management Measure with features located upstream and downstream along the mainstem of the Santa Ana River. Sediment would be removed from Prado Basin and re-entrained into the lower Santa Ana River below Prado Dam by a combination of an entrainment groin fore bay to guide mainstem Santa Ana River stream flow to an entrainment groin, which would be formed of sheet pile, rip rap and derrick stone, a transition channel upstream of the trap with instream habitat features, the sediment trap, two sediment storage and processing areas, a bicycle path flyover bridge, and a sediment re-entrainment system. Sediment re-entrainment would be accomplished by mixing sorted sand with water that would then be pumped as a slurry around the Auxiliary Dike of the Prado Dam and then discharged at the end of the downstream outlet channel structure. Pumps would be used to deliver the slurry via two 24-inch diameter pipes over a length of 2,600 feet each. Using the sediment trap, approximately 2,552,000 cubic yards of material would be removed from Prado Basin over 50-year period. During years 2 to 5, a total of approximately 1,149,652 cubic yards would be re-entrained and during years 6 to 50, approximately 600,000 cubic yards of material would be re-entrained annually into the lower Santa Ana River.

In-Stream Habitat Features – SARM Downstream: The general intent of In-Stream Habitat Feature Measure would be to enhance habitat for native fish such as the Santa Ana sucker and arroyo chub. In-Stream Habitat Features would be implemented at the SARM downstream focal area. At the SARM Downstream Focal Area, 15 in-stream habitat features, measuring 70 ft. x 100 ft. (7,000 sq. ft.) each would be constructed. These features would induce upstream sediment deposition and localized downstream scour. These features would expose coarser grained sediment in localized scour areas to serve as fish habitat and would also sequester sediment that is being re-entrained into Reach 9 as a part of the sediment management measure to help combat observed and expected channel incision.

Riparian Edge Management – SARM Upstream: The Riparian Edge Management measure would be carried out at the SARM Upstream Focal Area and would involve invasive plant removal, native plantings, vegetation trimming and maintenance to maintain a thriving riparian edge habitat for neo-tropical migratory birds and to provide a buffer to more interior habitats from potential road effects. Riparian edge management would be conducted along the proposed sediment removal trap channels and OCWD diversion channel. Approximately 44 acres of new

riparian edge habitat would be created and would be located along the edge of the additional riparian zone created by open-water features of the sediment trap and its transition channel.

7.2 COMBINED PLAN COSTS AND INCIDENTAL BENEFITS

First costs and annualized costs for the recommended plan are presented in Table 7-1. Projects which produce both National Economic Development (NED) benefits and National Ecosystem Restoration (NER) benefits will result in a "best" recommended plan so that no alternative plan or scale has a higher excess of NED benefits plus NER benefits over total project costs. This plan shall attempt to maximize the sum of net NED and NER benefits, and to offer the best balance between two Federal objectives. Recommendations for multipurpose projects will be based on a combination of NED benefit-cost analysis, and NER benefits analysis, including cost effectiveness and incremental cost analysis.

There are no tradeoffs required to implement the two plans as a Combined Plan. There are, however, incidental benefits from combining the plans. These are outlined as follows:

- The incidental ecosystem restoration outputs associated with the NED water conservation plan are higher if implemented in conjunction with the NER Plan. Specifically, under the NED water conservation plan, the increase in average annual habitat units over the period of analysis is estimated at 8,208. If the water conservation alternative is implemented in conjunction with the sediment management system on the Santa Ana River upstream and downstream of Prado Dam (a key component of the NER Plan), the incidental benefits increase to 68,802 average annual habitat units.
- As discussed in Section 6.1, the combined NED and NER Plans, eliminate the need for additional sediment removal as part of the Water Conservation plan. This reduces the total first costs corresponding with the NED Plan by about $2.7 million, and average annual costs by about $124,100.

Table 7-1 summarizes the total benefits and costs for the TSP as a combined plan for Ecosystem Restoration and Water Conservation. As shown in the table, the Combined Plan has a total first cost of about $110 million (all related to ecosystem restoration features), an annual cost of about $10.28 million (including NER and NED costs).

7.3 TSP OPERATION AND MAINTENANCE

The description of features and activities for individual measures is provided in Section 3.1.4, including descriptions of the operation and maintenance activities required for implementation of each measure considered in the final array of alternatives. A summary of operations and maintenance requirements and quantities are provided in Table 7-3.

Water Conservation Without Additional Sediment Removal for Water Conservation implemented with Ecosystem Restoration Sediment Management System (Upstream SARM)

Prado Dam would be operated year round with a buffer pool at a maximum water elevation of 505 ft. The average non-storm outflow release rate from Prado Dam from March 1 to August 30 from would be 350 cfs to maximize groundwater recharge potential. All worker parking, and

ongoing operations activities will occur at the dam operations center. Scheduling and determination of release rates for Prado Dam would be determined by Corps operations personnel and would be determined based on judgment informed by precipitation and inflow forecasts as well as real time measurements of rainfall and stream flow data.

Invasive Plant Management (All Focal Areas)
Maintenance would include routine inspections to detect re-infestation by invasive plants and spot treatments to prevent re-establishment of invasive plants in treated areas. Access to and from the invasive plant removal sites would occur from State Highways 71 and 91, with primary access occurring from State Highway 71, utilizing the Euclid Avenue access ramps. Pomona Rincon Road would be used to access the site and once on-site, existing maintenance roads and trails would be used for access to invasive plant removal areas. Some invasive plant zones would be accessed across previously cleared areas prior to native plant regrowth or new plantings. All worker parking, biomass processing and ongoing maintenance activities would be staged from within the footprints of the removal areas, at the Chino Creek Native Planting Area or at the OCWD Prado Field office. Invasive Plant Management activities would start in September of 2022 and would generally proceed from the northwest to the southeast across the focal areas. After each year of removal five years of herbicide treatment would occur to ensure that non-native plant communities do not reestablish. Upon completion of adaptive management, maintenance would continue for five years in the focal area.

Native Plantings (Chino Creek)
Maintenance activities will occur annually after the initial construction period is complete, during low flow periods in the creek and during periods outside of peak nesting season. Biologists will inspect the work areas prior to maintenance activities to avoid impacts to wildlife. The schedule of the maintenance activities will be driven by environmental and climatological conditions and will vary from year to year as conditions change. Maintenance activities may be performed in 2 separate phases.

Phase 1 maintenance activities include those required to trim and maintain vegetation along the maintenance road, staging/parking area and within the 42.17 acre native planting area. Any new growth of invasive plants will also be removed from the site. Maintenance work will be done under the direction and supervision of a biologists to insure the maintenance activities result in a positive habitat impact. Extensive use of mechanized equipment will be avoided during peak nesting season and hand labor may be used at times to avoid negative impacts to nesting birds and to avoid damage to high value habitat. In general, the majority of the maintenance activities will occur from September through March in any given year.

Phase 2 maintenance activities include grading to reshape or restore the maintenance road and staging/parking area. Debris from storm events will be removed from the road and minor grading will occur to reshape the road where damage has occurred from storm flows or normal wear-and-tear. Minor amounts (approximately 17 C.Y.) of DG will be imported annually to re-dress the top of the road and staging/parking area. This phase of maintenance would start in the early spring (typically late February) once storm flows have receded, and prior to springtime nesting activity. Wildlife monitoring will occur during road maintenance to avoid impacts to nesting birds and other wildlife.

Native Planting Measure activities will start in September of 2022 (Year 2) in the Chino Creek Focal Area. Construction of the native planting area, maintenance roads and storage area will take approximately 3 months. Monitoring and adaptive management of the measure will begin in February of 2023 and continue for 5 years. Maintenance would continue for 10 years beyond completion of the adaptive management period. Access to and from the native planting site will occur via State Highways 71, with primary access utilizing the Euclid Avenue access ramps. Once on-site, the footprint of the native planting area will be used to access all areas of the site. All worker parking, construction deliveries and long-term maintenance activities will be staged from within the footprint of the native planting area, the maintenance road and/or the staging area.

Native Plantings (SARM Upstream)

Maintenance activities will occur annually after the initial construction period is complete, during low flow periods in the Santa Ana River and during periods outside of peak nesting season. Biologists will inspect the work areas prior to maintenance activities to avoid impacts to wildlife. The schedule of the maintenance activities will be driven by environmental and climatological conditions and will vary from year to year as conditions change.
Maintenance activities include those required to encourage the development of native vegetation. New growth of invasive plants will also be removed from the site annually. Maintenance work will be done under the direction and supervision of a biologists to insure the maintenance activities result in a positive habitat impact. Extensive use of mechanized equipment will be avoided during peak nesting season and hand labor may be used at times to avoid negative impacts to nesting birds and to avoid damage to high value habitat. In general, the majority of the maintenance activities will occur from September through March in any given year.
Native Planting Measure activities will start in September of 2021 (Year 1) in the Upstream SARM Focal Area. Construction of the native planting area will take approximately 3 months. Monitoring and adaptive management would be conducted for 5 years. Once success is declared, long-term maintenance of the measure would continue for 10 years. Access to and from the native planting site will occur via SR 91, with primary access utilizing the North Lincoln Avenue access ramps. Construction traffic will use Lincoln Avenue to River Road and then to Hellman Ave. Once on-site, the footprint of the native planting area will be used to access all areas of the site. All worker parking, construction deliveries and long-term maintenance activities will be staged from within the footprint of the native planting area and from the OCWD Prado Field Office.

Native Plantings (Mill Creek)

Maintenance activities will occur annually after the initial construction period is complete and during periods outside of peak nesting season. Biologists will inspect the work area prior to maintenance activities to avoid impacts to wildlife. The schedule of the maintenance activities will be driven by environmental and climatological conditions and will vary from year to year as conditions change.

Maintenance activities include those required to encourage the development of native vegetation. New growth of invasive plants will also be removed from the site annually. Maintenance work will be done under the direction and supervision of a biologists to insure the maintenance activities result in a positive habitat impact. Extensive use of mechanized equipment will be

avoided during peak nesting season and hand labor may be used at times to avoid negative impacts to nesting birds and to avoid damage to higher value habitat. In general, the majority of the maintenance activities will occur from September through March in any given year.

Maintenance would continue for 10 years after declaration of success through monitoring and adaptive management. Access to and from the native planting site will occur via State Highways 91, with primary access utilizing the North Lincoln Avenue access ramps. Construction traffic will use Lincoln Avenue to River Road and then to Hellman Ave. Once on-site, the footprint of the native planting area will be used to access all areas of the site. All worker parking and construction activities will be staged from within the footprint of the native planting area and from the OCWD Prado Field Office. Long-term maintenance activities will be staged from the OCWD Prado Field Office.

Chino Creek Channel Restoration – Raised Invert and New Cut Channel
Maintenance activities would occur annually after the initial construction period would be completed, during low flow periods in the creek and during periods outside of peak nesting season. Biologists would inspect the work areas prior to maintenance activities to avoid impacts to wildlife. The schedule of the maintenance activities would be driven by environmental and climatological conditions and would vary from year-to-year as conditions change.
Biomass and debris generated form storm flows would be removed as needed from the channel annually, if needed. The maintenance road and seasonal/temporary trails through the braided channel area would be used to provide access to remove sediment and debris. Annual trimming and mowing of vegetation would provide access to areas in need of maintenance. The maintenance activities would be performed under the direction and supervision of biologists to insure that maintenance activities do not diminish the habitat value of the channel and creek areas.

Habitat maintenance activities include those required to trim and maintain vegetation around the channel, maintenance road, berms and in-channel structures. Invasive plants would also be removed from the area on an annual basis. These activities would be performed at various times throughout the year as conditions allow and the work would be done under the direction and supervision of a biologists to insure no wildlife are disturbed and to insure the activities result in a positive habitat impact. Native vegetation would be managed, and if necessary re-planted, in areas significantly damaged by storm flows or in areas where significant disturbance to native plants occur.

Access to and from the Chino Creek site would occur from State Highway 71, with primary access utilizing the Euclid Avenue access ramps. Construction traffic would use Euclid Avenue to Pomona Rincon Road to the project site. Once on-site, the footprint of the Raise Invert and Cut New Channel Measure area would be used to access all areas of the site. All worker parking and construction activities would be staged from within the footprint of the Raise Invert and New Cut Channel Measure area. Long-term maintenance activities would be staged from the maintenance road within the footprint of the measure area. Long-term maintenance of the measure would begin in September of 2024 and occur annually from year 5 through year 50.

Cowbird Trapping (Santa Ana River Mainstem Upstream, Mill Creek, Chino Creek)
Regular inspection and maintenance of the cowbird traps, including adjusting trap locations based on monitoring results would be performed for the 50-year life of the project to ensure cowbirds do not re-populate the focal areas. Access to and from the project area would occur from Interstate 15, State Highway 91 and State Highway 71. Primary access to the staging areas would occur off of State Highway 91 to Auto Center Drive. Once at the staging areas, access would occur along existing trails, newly constructed maintenance roads associated with other measures, across footprints of invasive plant stands or along temporary trails. The staging areas for this measure would be located at the OCWD Prado Wetlands Field office and the USACE Prado Field Office. All worker, worker traffic and disposal transfer operations would be based out of these 2 locations. Management activities areas would move around within the focal areas as needed to respond to cowbird population movements. Years 6 – 50 would include activities to perform regular inspection, trap maintenance and cowbird removal from the focal areas. Management efforts would fluctuate during the operation and maintenance period as environmental conditions change and as cowbird populations move and adapt.

Non-Native Aquatic Species Management (SARM Upstream)
Once the initial populations of non-native species have been removed, regular inspection and maintenance of the focal areas would be performed for the 50-year life of the project to ensure non-native species do not re-populate the focal area. Access to and from the project area would occur from Interstate 15 and State Highway 91. Primary access to the staging area would occur off of State Highway 91 to North Lincoln Avenue to River Road to Hellman Avenue. Once at the staging area, access would occur along existing trails, newly constructed trails associated with other ecosystem restoration measures, across footprints of invasive plant stands or from temporary trails. The staging area for this measure would be located at the OCWD Prado Wetlands Field office. All worker, worker traffic and disposal transfer operations would be based out of this location. Years 6-50 would include activities to perform regular inspection and maintenance of the focal area. Management efforts would fluctuate during the operation and maintenance period as environmental conditions change and new non-native aquatic populations develop.

Sediment Management (Upstream and Downstream Santa Ana River Mainstem)
Maintenance activities would occur annually after the initial construction period would be completed during low flow periods in the river and during periods outside of peak nesting season. Biologists would inspect the work areas prior to maintenance activities to avoid impacts to wildlife. The schedule of the maintenance activities would be driven by environmental and climatological conditions and would vary from year-to-year as conditions change. The primary maintenance activities would include vegetation/debris and sediment removal from all of the features. The maintenance roads around the features would be used to provide access to remove sediment and debris. Annual trimming and mowing of vegetation would provide access to the areas in need of maintenance. The maintenance activities would be performed under the direction and supervision of a biologist to ensure that maintenance activities do not diminish the habitat value of the areas affected. An operational item consistent across all project features includes the removal and disposal of vegetation and biomass imported to the project area by storm flows. Heavy equipment would be used each year to collect and transport vegetation to sediment storage Site B. Once at the storage site the vegetation would be processed and trucked

off-site for disposal. Some vegetation could be processed and used as mulch on-site. Additional sediment removal operations beyond dredging/excavating the trap would include reconfiguring and/or removing sediment from the other project features. Maintenance roads around each of the features would provide access for equipment to perform sediment management operations. In general, sediment management operations would occur outside of nesting season with the exception of trap removal operations. Sediment removal from the trap area could occur during nesting season with the use of sound attenuation devices and/or under the supervision of a biologist.

Sediment accumulation from around the entrainment groin could be loaded and scraper hauled to the storage site or it could be re-graded in-place to encourage it to travel down the transition channel and into the trap area for collection and removal. Sediment accumulated in the OCWD Wetlands Pilot Channel and the Transition Channel would be loaded and scraper hauled directly to the storage site. Channel slopes would be re-graded regularly to fix erosion and maintain the hydraulic capacity of the channels.

Access to and from the sediment management site would occur from State Highway 91, with primary access utilizing the Auto Center Drive access ramps. Construction traffic would use Auto Center Drive to the project site. Once on-site, the footprint of the features and maintenance roads built for the project would be used to access all areas of the site. All worker parking and construction activities would be staged from within the footprint of sediment storage Site B or at the Corps' Prado Field Office. Long-term maintenance activities would be staged from these same two locations. Sediment re-entrainment would start in year 3 and continue through year 50.

In-Stream Habitat Features (SARM Downstream)

Maintenance of this feature includes periodic repair to the in-stream habitat features due to damage from high flows. Long-term maintenance of the measure will begin in March of 2024 and occur annually from year 4 through year 50. Access to and from the upper in-stream habitat sites would occur from State Highway 91 and State Highway 71, with primary access utilizing the Green River Road access ramps. Construction traffic would use Green River Road to get to the trails leading to the in-stream habitat sites. Existing trails would be used to access the in-stream habitat work areas. Vehicle access to and from the lower in-stream habitat sites would occur from State Highway 91, with primary access utilizing the Gypsum Canyon Road access ramps. Once on-site the existing trails would be used to access in-stream habitat work areas. All worker parking and construction activities would be staged from within the footprints of each site specific staging area. Long-term monitoring and maintenance of the measure would begin immediately after construction and occur regularly during sediment re-entrainment.

Riparian Edge Management (SARM Upstream)

Biologists would inspect the work areas prior to maintenance activities to avoid impacts to wildlife. The schedule of the maintenance activities would be driven by environmental and climatological conditions and would vary from year to year as conditions change. Maintenance activities would include those required to encourage the development of riparian vegetation. New growth of invasive plants would also be removed from the site annually. Extensive use of mechanized equipment would be avoided during peak nesting season and hand labor could be

used at times to avoid negative impacts to nesting birds and to avoid damage to higher value habitat. Maintenance activities would occur annually after the initial construction period is complete, during low flow periods in the Santa Ana River and during periods outside of peak nesting season.

Access to and from the native planting site would occur from State Highways 91, with primary access utilizing the Auto Center Drive access ramps. Construction traffic would use Auto Center Drive to get to the west sediment storage site. Once on-site, the prosed maintenance roads would be used to access all areas of the site. All worker parking and long-term maintenance activities would be staged from the west sediment storage site located near the Corps Prado Dam Field Office. The Riparian Edge Management Measure activities would start in March of 2022 (Year 1) in the SARM Upstream Focal Area. Construction of the Riparian Edge Management Measure would occur every September and March thereafter for a total of 3 years. Long-term maintenance of the measure would begin in September of 2024 and occur every September and March annually from year 4 through year 50.

Table 7-3: Combined Plan Summary of Operations and Maintenance Annual Requirements

Measure ID	Measure Name	Measure Component	Quantity	Unit of Measure	Unit Description
WC-1	Water Conservation, Only changes in Operations	Additional Staff for Operations	1.00	YR	
SU-1A	Sediment Management				
		Rough Grading (Cut, Fill & Compaction)	496,809.00	CY	Earthwork - Excavate and Place Material
		Slurry Material Downstream	200,000.00	CY	Sediment Transport System - Pump Material Downstream
		Down strem sediment removal	17,292.00	CY	Earthwork - Excavate and Place Material
		Clearing and Grubbing (Light)	26.50	AC	Clearing - Light Vegetation, With Heavy Equipment
		Sed Accumulation Mmonitoring	1.00	EA	Annual Monitoring and Data Evaluation costs
SU-2	Invasive Plant Management				
		Invasive Plant Management (Small Scale)	39.20	CY	Clearing - Light Vegetation, By Hand
SU-3	Riparian Edge Management				
		Invasive Plant Management (Small Scale)	2.20	CY	Clearing - Light Vegetation, By Hand
SU-4	Feral Pig Management				
		Feral Pigs Management	1.00	YR	Species Removal - Feral Pig
SU-5	In-Stream Habitat Features				
		Rough Grading (Cut, Fill & Compaction)	102.00	CY	Earthwork - Excavate and Place Material
SU-6	Non-Native Aquatic Species Management				
		Non-Native Aquatic Species Management	1.00	YR	Species Removal - Non-Native Aquatic
SU-7	Cow Bird Trapping				
		Cow Bird Trapping	1.00	YR	Species Remove - Cow Bird
SU-8	Native Plantings				
		Invasive Plant Management (Small Scale)	2.10	CY	Clearing - Light Vegetation, By Hand
SD-2	In-Stream Habitat Features				
SD-3	Invasive Plant Management				
		Invasive Plant Management (Small Scale)	5.90	AC	Clearing - Light Vegetation, By Hand
SD-4	Non-Native Aquatic Species Management				
		Non-Native Aquatic Species Management	1.00	YR	Species Removal - Non-Native Aquatic
CC-1	Invasive Plant Management				
		Invasive Plant Management (Small Scale)	24.00	AC	Clearing - Light Vegetation, By Hand
CC-2C	Raise existing invert and cut new channel				
		Rough Grading (Cut, Fill & Compaction)	200.00	CY	Earthwork - Excavate and Place Material
		Invasive Plant Management (Small Scale)	6.10	AC	Clearing - Light Vegetation, By Hand
CC-5	Non-Native Aquatic Species Management				
		Non-Native Aquatic Species Management	1.00	YR	Species Removal - Non-Native Aquatic
CC-8	Cow Bird Trapping				
		Cow Bird Trapping	1.00	YR	Species Remove - Cow Bird
CC-10	Native Plantings				
		Invasive Plant Management (Small Scale)	2.14	AC	Clearing - Light Vegetation, By Hand
MC-1	Invasive Plant Management				
		Invasive Plant Management (Small Scale)	2.36	AC	Clearing - Light Vegetation, By Hand
MC-2	Non-Native Aquatic Species Management				
		Non-Native Aquatic Species Management	1.00	YR	Species Removal - Non-Native Aquatic
MC-5	Cow Bird Trapping				
		Cow Bird Trapping	1.00	YR	Species Remove - Cow Bird
MC-7	Native Plantings				
		Invasive Plant Management (Small Scale)	1.00	AC	Clearing - Light Vegetation, By Hand

7.4 TSP MONITORING AND ADAPTIVE MANAGEMENT

The Monitoring and Adaptive Management Plan (MAMP) for the TSP is provided in Appendix E of this report. The general purpose of the MAMP is to provide a systematic approach for improving resource management outcomes and a structured process for recommending decisions, with an emphasis on uncertainty about resources response to management actions and the value of reducing that uncertainty to improve management.

More specifically, the MAMP will:

- Establish the framework for effective monitoring, assessment of monitoring data, and decision making for implementation of adaptive management activities in the project focal areas.
- Provide the process for identifying adaptive management actions if monitoring demonstrates that restoration measures are not achieving established success criteria in the project focal areas.
- Establish decision criteria for vegetation and wildlife evaluation and modification of adaptive management activities.
- Establish decision criteria for the habitat or in-stream management measures evaluation and modification of adaptive management activities.
- Provide estimated cost and duration of the monitoring and adaptive management measures.

The MAMP will be reviewed and revised as needed during the Preconstruction, Engineering, and Design (PED) phase as specific design details are made available.

Section 2039 of WRDA 2007, as amended, directs the Secretary to ensure that, when conducting a feasibility study for a project (or component of a project) for ecosystem restoration, the recommended project includes a plan for monitoring the success of the ecosystem restoration. The monitoring plan shall include a description of:

1. Types and number of restoration activities to be carried out;
2. Physical actions to be undertaken to achieve project objectives;
3. Functions and values that will result from the restoration plan;
4. Monitoring activities to be carried out;
5. Criteria for ecosystem restoration success;
6. Estimated cost and duration of the monitoring; and
7. A contingency plan (adaptive management plan) for taking corrective actions in cases in which the monitoring demonstrates that restoration measures are not achieving ecological success in accordance with criteria described in the monitoring plan.

Recommendations for adaptive management should be based on:

- Monitoring data from previous years
- Consideration of current habitat conditions
- Consideration of current and potential threats to habitat establishment success
- Past and predicted response by target species

Upon completion of construction of each phase or feature of the project, the non-federal sponsor will begin OMRR&R and the Corps will initiate cost-shared monitoring for ecological success and adaptive management, which will continue until ecological success criteria are met. Cost shared monitoring and adaptive management will be initiated and will continue for a period of up to 5 to 10 years, depending on the restoration measure, until restoration success is achieved, for no longer than ten years. The monitoring and adaptive management period requirement would vary based on the data needs of the site specific monitoring programs to assess a particular measure and/or focal area.

Monitoring will be carried out to evaluate performance measures related to the ecological objectives of the restoration plan for the TSP. The objectives and performance measures are summarized below.

Objective 1: Improve hydraulic and fluvial geomorphic functions to promote habitat growth and wildlife connectivity to regionally significant core habitats at Prado Basin and associated main watercourses within the proposed project area.

Performance Measure 1: In-stream hydrologic, geomorphic, and topographic conditions

Desired Outcomes:

1. Increase structure and diversity of in-channel form and microhabitats as compared to reference sites and target physical parameters for microhabitats for Santa Ana Sucker.
2. Increase and maintain availability of gravel and cobble substrates as compared to reference sites.

Objective 2: Restore riparian and riparian associated habitats suitable to native species within the proposed project area.

Performance Measure 2: Vegetative community, cover, and structure

Desired Outcomes:

1. Increase percent cover of native riparian and riparian-associated habitat, including but not limited to: riparian woodland, riparian scrub, and transitional riparian habitats.
2. Maintain appropriate structural diversity of native riparian habitats to support survival and reproductive requirements for riparian obligate species and to support regional wildlife movement.
3. Increase percent native vegetative cover over water to reduce water temperatures to support native fish such as the Santa Ana sucker and Arroyo chub.
4. Decrease percent cover of non-native invasive vegetative species that out-compete natives.

Objective 3: Reduce presence and effects of non-native wildlife on habitat suitability and function for native wildlife species.

Performance measure 3: Non-native wildlife and non-native aquatic species populations

Desired Outcomes:

1. Reduce brown-headed cowbird population and vireo nest parasitism to support use and occupation of riparian habitats by endangered vireos and flycatcher.
2. Reduction in populations and class size of non-native aquatic species, particularly large predatory fish species such as carp, bass, and catfish, to support use and occupation of riverine habitats by endangered native fish.

The MAMP provides the monitoring design and rationale for each objective and related desired outcomes. The MAMP also identifies the roles and responsibilities of the Adaptive Management Team in implementing the Adaptive Management Program. Corrective Actions and performance thresholds for their implementation are also documented in the MAMP.

7.5 FEDERAL AND NON-FEDERAL COST APPORTIONMENT FOR IMPLEMENTATION; TIMING OF IMPLEMENTATION

The non-Federal sponsor for project implementation is OCWD, the non-Federal sponsor for the feasibility study. The cost sharing requirements for the TSP are provided in Table 7-4.

Although the TSP is presented as the combined NED/NER Plan, the NED Plan could potentially be implemented prior to the NER Plan based on consideration of the existing authorities and approval processes for each project purpose. Implementation costs of water conservation are a 100% responsibility of the non-Federal Sponsor, and the Chief of Engineers has delegated authority for approval of water conservation operations at Corps facilities to the Major Subordinate Command, in the case the South Pacific Division office in San Francisco. There may also be additional agreements required for implementation of the Water Conservation component of the TSP prior to Congressional authorization. It is anticipated that this approval may occur prior to Congressional authorization for the ecosystem restoration plan.

If the different approvals for the Water Conservation and Ecosystem Restoration plan components allow for earlier implementation of Water Conservation, then additional sediment removal would be performed for Water Conservation carried out prior to the construction of the Ecosystem Restoration component of the TSP. The additional sediment removal activity for Water Conservation would no longer be needed once ecosystem restoration component of the TSP has been constructed and placed in operation. The timing and implementation of Water Conservation and additional sediment removal on an interim basis would follow the requirements developed in consultation with the U.S. Fish and Wildlife Service for the Major Deviation to the Prado Dam Water Control Plan adopted in September 2018. The measures for both approaches to water conservation have been evaluated for their environmental impacts in this study, and are considered separable elements of the combined plans, as described in Chapter 3 of this document. The implementation process is illustrated in the flow chart presented in Figure 7-1.

Table 7-4: Prado Basin Ecosystem Restoration and Water Conservation Cost Sharing
(FY 2018 Price Level)

Item	Federal Cost	%	Non-Federal Cost	%	Total Cost
Ecosystem Restoration (ER)					
PED	$ 11,817,612	65%	$ 6,363,329	35%	$ 18,180,941
LERRDs (100% Non-Federal)	$ -	0%	$ 3,200,725	2%	$ 3,200,725
Construction	$ 74,547,931	65%	$ 36,940,465.25	33%	$ 111,488,397
Construction Management	$ 3,789,825	65%	$ 2,040,675	35%	$ 5,830,500
Total Project Cost	$ 90,155,368	65%	$ 48,545,195	35%	$ 138,700,563
Water Conservation (WC)[1]					
PED	$ -		$ -		$ -
LERRDs (100% Non-Federal)	$ -		$ -		$ -
Construction	$ -		$ -		$ -
Construction Management	$ -		$ -		$ -
WC Subtotal	$ -		$ -		$ -
Total Project	$ 90,155,368		$ 48,545,195		$ 138,700,563

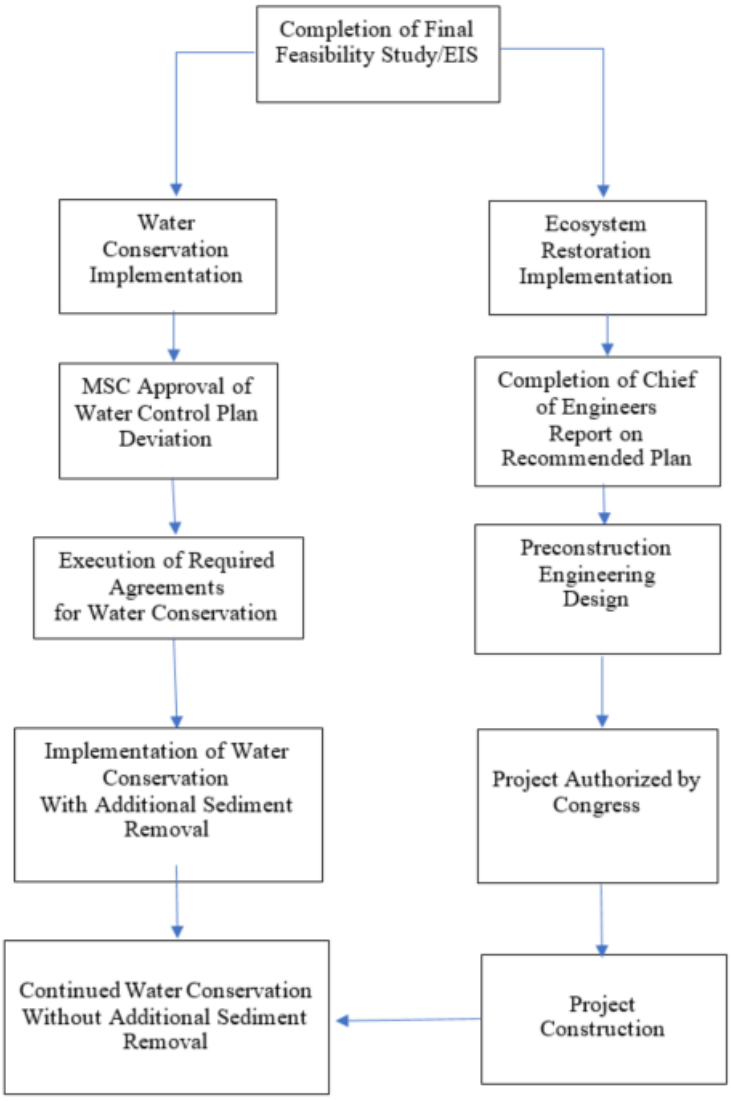

Figure 7-1: Implementation of Water Conservation and Ecosystem Restoration Plan Components of Prado Basin TSP

8.0 PUBLIC INVOLVEMENT AND COLLABORATION

8.1 PUBLIC INVOLVEMENT PROCESS

A NEPA scoping meeting was held at the Inland Empire Utilities Agency (IEUA) on November 28, 2012. Presentations were presented once in the afternoon and another in the evening to encourage the maximum amount of public participation. This NEPA scoping meeting was advertised in the Federal Register on November 16, 2012 (Fed. Reg. 77[222]). Several members of the public participated in this meeting. Representatives from a variety of Federal, State, and local agencies also participated, including the U.S. Fish and Wildlife Service (USFWS), the Regional Water Quality Control Board (RWQCB), California Department of Fish and Game (CDFG), Santa Ana Watershed Association (SAWA), and the City of Ontario. Interested parties that were physically present at the scoping meeting presented comments, concerns and ideas as did others who were not able to make the meeting. These comments, concerns and ideas are discussed in the next section. Future opportunities to engage the public in the planning process will occur when the Draft EIS/ EIR is put out for public review, after the Final EIS/EIR is opened up for comment, and during the public certification hearing.

Comments, concerns and ideas from the public covered a wide range of interests. Topics ranged from land ownership and land use, to whether or not the dual purposes of the project were mutually exclusive, to restoration ideas for specific species and habitat in general.

8.2 AGENCY AND TRIBAL GOVERNMENT CONSULTATION AND COORDINATION PROCESS

A feasibility study kickoff meeting and plan formulation workshop was held for this study by USACE Los Angeles District and OCWD on December 10 and 11, 2012. Participants from other agencies included representative from the U.S. Fish and Wildlife Service, California Department of Fish and Wildlife (then California Department of Fish and Game), the California Regional Water Quality Control, Santa Ana Water Authority, City of Ontario and Riverside County Resource Conservation District. This two-day conference provided an overview of the planning process, study objectives and issues in the project area, and initial evaluation of planning steps for study execution.

OCWD sponsored a Value Engineering workshop from June 30 through July 2, 2014 to refine management measures and restoration strategies in order to further refine the potential alternatives for the study. Participants in this workshop included PDT members, other representatives of USACE Los Angeles District, the U.S. Fish and Wildlife Service and USACE South Pacific Division. Additional coordination meetings have been held with U.S. Fish and Wildlife Service and the California Department of Fish and Wildlife on the TSP, including anticipated benefits, construction requirements, monitoring and adaptive management of the combined Water Conservation and Ecosystem Restoration plan.

8.3 ADDITIONAL COORDINATION AND CONSULTATION

During the public review of the Draft IFR, a public meeting will be conducted to present the findings of the draft IFR and to provide the public the opportunity to comment on the draft study and the recommended plan. In addition, written comments will be sought during the comment period, with instructions for commenting and dates of the public comment period provided in the Federal Register Notice of Availability for the IFR and the CEQA Notices of Availability and Completion for the IFR.. The Corps will also continue the Fish and Wildlife Coordination Act process with the U.S. Fish and Wildlife Service, who will provide the final Coordination Act Report once the consultation process has been completed. The Corps will also consult with the SHPO under Section 106 of the NHPA.- Ongoing coordination will include consultation with the U.S. Fish and Wildlife Service under the Endangered Species Act to ensure compliance with the act. Additional reviews and coordination requirements for the draft IFR and completion of the final document are discussed in Chapter 10 of this document.

8.4 PEER REVIEW PROCESS

Concurrent review of this draft Integrated Feasibility Report (IFR) includes public, technical, legal, and policy reviews, and an Independent External Peer Review (IEPR). The Project Delivery Team (PDT), USACE Los Angeles District management, and USACE vertical team representatives throughout the agency will consider comments provided during the review period prior to providing feedback to a USACE Headquarters Senior Leaders Panel. This panel will consider the evaluation of the significant public, technical, legal, policy and IEPR comments on the TSPand other alternatives to determine the corporate endorsement of a recommended plan and proposed way forward to complete feasibility-level design and the final IFR.

9.0 REMAINING REVIEWS, APPROVALS, IMPLEMENTATION AND SCHEDULE

9.1 REVIEWS, APPROVALS AND IMPLEMENTATION STEPS AFTER CIRCULATION OF THE DRAFT IFR

The necessary reviews and activities after circulation of the Draft IFR of the Tentatively Selected Plan are listed below:

a. Review comments will be accepted from the public, agencies, the state where the project is located, and others for a minimum of 45 days for the Draft IFR.
b. Professional peer reviews, including the USACE Agency Technical Review and the Independent External Peer Review to validate the sufficiency of the feasibility report analyses and conclusions.
c. Concurrent technical legal and policy review by Headquarters USACE and the Office of Water Project Review for technical sufficiency, legal and policy compliance to support the final Agency decision on the project.
d. Completion of a Review Summary that highlights significant comments and potential risks associated with agency endorsement of the TSP in preparation for the Agency Decision Milestone.

9.2 REVIEWS, APPROVALS AND IMPLEMENTATION STEPS AFTER COMPLETION OF STATE AND AGENCY REVIEWS

The necessary reviews and activities leading to approval after reviews of the Draft IFR of the Tentatively Selected Plan are listed below:

a. Environmental Impact Statement Filing – after circulation of the Final IFR for state and agency review, as well as public review, the District will file the Final IFR together with the proposed Report of the Chief of Engineers (Chief's Report) with EPA.
b. Environmental Impact Report Certification (OCWD) – The Final IFR will be circulated for public and agency review and comment a minimum of 10 days before consideration by OCWD. At a public hearing, the OCWD will decide whether to recommend approval of the EIR and forward the document to OCWD for certification. If adopted, a Notice of Completion is filed with OCWD.
c. Chief of Engineers Approval – Chief of Engineers signs the Chief's Report signifying approval of the project recommendation and submits the following to ASA (CW): the Chief's Report, the Final IFR, and the unsigned ROD.
d. Assistant Secretary of the Army for Civil Works [ASA (CW)] Approval – The ASA (CW) will review the documents to determine the level of administration support for the Chief of Engineers recommendation. The ASA (CW) will formally submit the report to the Office of Management and Budget (OMB). OMB will review the recommendation to determine its relationship to the program of the President. OMB may clear the release of the report to Congress. (Upon approval by the ASA (CW), the MSC may approve implementation of the Water Conservation plan component for the project under delegated authority for approving modification of USACE Dam Water Control Plans. Supporting agreements for implementation may require approval by the Director of Civil Works.)

e. Project requires congressional approval for construction. (Congressional approval is required for construction of the Ecosystem Restoration plan component.)
f. Funds could be provided, when appropriated in the budget, for preconstruction, engineering and design (PED), upon issuance of the Division Commander's public notice announcing the completion of the final report and pending project authorization for construction. Surveys, model studies, and detailed engineering and design for PED studies will be accomplished first, and then plans and specifications will be completed, upon receipt of funds.
g. Construction would be performed with Federal and non-Federal funds, once the construction project was advertised and awarded.

9.3 REQUIRED AGREEMENTS FOR PROJECT IMPLEMENTATION

Before implementation, the OCWD will, in addition to the general requirements of law for this type of project, agree to the following requirements:

a. Provide 35 percent of initial project costs assigned to ecosystem restoration as further specified below:
    (1) Enter into an agreement that provides, prior to construction, 35 percent of design costs;
    (2) Provide all lands, easements, and rights-of-way, and perform or ensure the performance of any relocations determined by the federal government to be necessary for the initial construction, operation and maintenance of the project;
    (3) Provide, during construction, any additional amounts as are necessary to make their total contribution equal to 35 percent of initial project costs assigned to ecosystem restoration;
b. For so long as the project remains authorized, operate, maintain, repair, rehabilitate, and replace the project, or functional portion of the project, at no cost to the federal government, in a manner compatible with the project's authorized purposes and in accordance with applicable federal and state laws and regulations and any specific directions prescribed by the federal government;
c. Give the federal government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-federal now or hereafter, own or control for access to the project for the purpose of inspecting, operating, maintaining, repairing, replacing, rehabilitating, or completing the project. No completion, operation, maintenance, repair, replacement, or rehabilitation by the federal government shall relieve the non-federal sponsors of responsibility to meet the non-federal sponsors' obligations, or to preclude the federal government from pursuing any other remedy at law or equity to ensure faithful performance;
d. Hold and save the United States free from all damages arising from the initial construction, periodic nourishment, operation, maintenance, repair, replacement, and rehabilitation of the project and any project-related betterments, except for damages due to the fault or negligence of the United States or its contractors;
e. Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants

and Cooperative Agreements to State and Local Governments at 32 Code of Federal Regulations (CFR) Section 33.20;

f. 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), Public Law 96-510, as amended, 42 U.S.C. 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way that the federal government determines to be required for the initial construction, operation, and maintenance of the project. However, for lands that the federal government determines to be subject to the navigation servitude, only the federal government shall perform such investigations unless the federal government provides the non-federal with prior specific written direction, in which case the non-federal sponsors shall perform such investigations in accordance with such written direction;

g. Assume, as between the federal government and the non-federal sponsors 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 Federal Government determines to be necessary for the initial construction, operation, or maintenance of the project;

h. Agree, as between the federal government and the non-federal sponsors that the non-federal sponsors shall be considered the operator of the project for the purpose of CERCLA liability, and to the maximum extent practicable, operate, maintain, and repair the project in a manner that will not cause liability to arise under CERCLA;

i. If applicable, comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended 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, required for the initial construction, operation, and maintenance of the project, including those necessary for relocations, borrow materials, and dredged or excavated material disposal, and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act;

j. Comply with all applicable federal and state laws and regulations, including, but not limited to: Section 601 of the Civil Rights Act of 1964 (42 U.S.C. 2000d) and Department of Defense Directive 5500.11 issued pursuant thereto; the Age Discrimination Act of 1975 (42 U.S.C. 6102); the Rehabilitation Act of 1973, as amended (29 U.S.C. 794) and Army Regulation 600-7 issued pursuant thereto; and 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 (labor standards originally enacted as the Davis-Bacon Act, the Contract Work Hours and Safety Standards Act, and the Copeland Anti-Kickback Act);

k. Provide the non-federal share of that portion of the costs of data recovery activities associated with historic preservation, that are in excess of 1 percent of the total amount authorized to be appropriated for the project, in accordance with the cost sharing provisions of the agreement;

l. Do not use federal funds to meet the non-federal sponsors' share of total project costs unless the federal granting agency verifies in writing that the expenditure of such funds is authorized;

m. Comply with Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended, and Section 103 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, which provides that the Secretary of the Army shall not commence the construction of any water resources project or separable element thereof, until the Non-Federal Sponsors has entered into a written agreement to furnish their required cooperation for the project or separable element.

10.0 ENVIRONMENTAL COMPLIANCE

The status of the project's compliance with applicable Federal, State, and local environmental requirements is summarized below. Prior to initiation of construction, the project will be in compliance with all applicable laws, regulations, and Executive Orders.

10.1 NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321, et seq.) and California Environmental Quality Act. NEPA applies to all Federal agencies and most of the activities they manage, regulate, or fund that affect the environment. This act requires full disclosure of the environmental effects, alternatives, potential mitigation, and environmental compliance procedures of proposed actions. NEPA requires the preparation of an appropriate document to ensure that Federal agencies accomplish the law's purposes. Full compliance with NEPA is achieved with the filing of the final EIS/EIR with USEPA and with the Corps' issuance of a Record of Decision.

The Integrated Feasibility Report (IFR) has been prepared in accordance with both the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The non-federal sponsor for the project, Orange County Water District, is the CEQA lead and is responsible for compliance with the State laws. Full compliance with CEQA is achieved with the Certification of the Final EIR.

CEQ Regulations for Implementing the Procedural Provision of NEPA (40 CFR Part 1500 et seq.)
The Council on Environmental Quality has prepared regulations for implementing NEPA, including those pertinent to NEPA and agency planning, preparation and distribution of an EIS, procedures for the open comment period, resolution of environmentally unsatisfactory actions, agency responsibilities, and other requirements of NEPA. This document has been prepared in compliance with these regulations.

U.S. Army Corps of Engineers Procedures for Implementing NEPA (33 C.F.R., part 230, ER 200-2-2)
This regulation provides guidance for implementation of the procedural provisions of the National Environmental Policy Act (NEPA) for the Civil Works Program of the U.S. Army Corps of Engineers. It supplements Council on Environmental Quality (CEQ) regulations 40 CFR 1500-1508, in accordance with 40 CFR 1507.3, and is intended to be used in conjunction with the CEQ regulations. This regulation is applicable to all HQUSACE elements and all Field Operating Activities (FOAs) having responsibility for preparing and processing environmental documents in support of Civil Works functions. This IFR has been prepared in compliance with ER 200-2-2.

10.2 ENDANGERED SPECIES ACT OF 1973

The Endangered Species Act (ESA) and subsequent amendments provide guidance for the conservation of endangered and threatened species and the ecosystems upon which they depend.

Section 7 requires federal agencies, in consultation with, and with the assistance of the Secretary of the Interior or the Secretary of Commerce, as appropriate, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of critical habitat for these species. Potential effects of the proposed action on federally-listed species and on designated and proposed critical habitat will be addressed in consultation with USFWS.

Based on the analyses completed to date, it is anticipated that the proposed action would have mostly temporary, adverse effects to Federally-listed species, primarily from water conservation, construction and operation of the sediment management measure, non-native biomass removal, construction of the Chino Creek restoration measure, and other activities as described in the Biological Assessment (Appendix G) and summarized below. These effects would occur to least Bell's vireo, southwestern willow flycatcher, yellow-billed cuckoo, coastal California gnatcatcher, Santa Ana sucker, and critical habitat for these species. However, the ecosystem restoration measures would have substantial and long-term beneficial effects to these same species and their habitats. Additionally, biological conservation/environmental commitment measures would be implemented to minimize affects to the species and critical habitats during construction of the various features.

The Corps has determined that the proposed change in water conservation may adversely affect species by increasing the duration and amount of inundation which can change vegetation characteristics within the pool area. There may also be a redistribution of nesting territories to higher ground, and a minor amount of sediment that deposits in the basin on an annual basis due to increased pooling of water, which also could affect vegetation. OCWD will continue to monitor riparian vegetation and least Bell's vireo (the species that would potentially be most affected), and will restore any habitat that is degraded due to water conservation activities.

The Corps has determined that the least Bell's vireo, southwestern willow flycatcher, western yellow-billed cuckoo and the Santa Ana sucker would be affected by the proposed sediment management measure on the SARM Upstream and Downstream Prado Dam focal areas from the removal of suitable habitat, noise exposure to the listed birds, and increased suspended sediment levels. Designated critical habitat for vireo and flycatcher and proposed critical habitat for the yellow-billed cuckoo would be permanently affected. The sediment transition channel would be constructed in designated critical for the sucker although no primary constituent elements (PCEs) would be removed. Implementation of the proposed sediment management measure through re-entrainment of sediment would in the long term provide beneficial effects to the sucker, vireo and gnatcatcher and critical habitats for the sucker and gnatcatcher due to a reduction in the incision of the SAR downstream of the dam, reconnecting the river to its floodplain and restoring natural and beneficial floodplain functions. The sediment transition channel and sediment basin would encourage sediments to flow into Prado Basin and restore a steeper gradient within the channel upstream establishing cobble and gravel substrates. Management of the riparian edge created through construction of the sediment trap and transition channel would also result in beneficial effects to the listed bird species and their designated critical habitat in the Basin.

The Corps has determined that the Chino Creek Channel Restoration would have temporary affects to vireo, flycatcher, and sucker through habitat removal. This temporary affect, however,

would be far outweighed by habitat restoration, expansion of open water area and the creation of additional creek paths to benefit the species. Designated critical habitat for the flycatcher and proposed critical habitat for the cuckoo exist in Chino Creek and would be temporarily affected by the channel restoration measure, but this area would be replaced with native vegetation to provide an overall benefit.

Implementation of the proposed Invasive Plant Management and Native Planting Measures implemented on all four focal areas would have temporary adverse effects to vireo, flycatcher, and cuckoo during the initial construction phase from biomass removal of invasive plants, clearing/grubbing and rough grading activities. These activities would take place primarily within degraded habitat. The non-native vegetation removal would be followed up with native vegetation planting (i.e., seeding, pole staking, and container plantings) and natural recruitment providing long-term beneficial affects to the three species. The same temporary impacts and long-term benefits would apply to designated critical habitat for the vireo and flycatcher and to proposed critical habitat for the cuckoo.

Riparian Edge Management feature would take place in the SAR Upstream in the creation of a transition channel and widening of the floodplain. The widened floodplain would remove existing low value native vegetation and replace it with native vegetation. The widened floodplain footprint would be excavated down an average of approximately 4 feet to allow storm flows to inundate the area more frequently and help create higher value riparian habitat in an area that has traditionally been lower value. Overall, implementation of this management measure would provide beneficial effects to the vireo, flycatcher, and cuckoo, and their respective designated and proposed critical habitats.

In-stream Habitat Features Measure would take place in the SAR Downstream focal area to modify local hydrology in a way that would improve habitat conditions for Santa Ana sucker. This could also help reverse channel incision and increase the frequency of water spreading out from the incised, low flow, channel thereby enhancing the habitat along the Lower Santa Ana River through Reach 9 to benefit vireo and gnatcatcher. To avoid impacts to the bird species, this measure would take place within the wetted channel and outside of the nesting season. The designated critical habitat for the gnatcatcher within this project focal area would benefit as well. Santa Ana sucker are occasionally present in this project focal area. To avoid adverse effects to the sucker, construction would take place outside the spawning season. In the event suckers are present when construction is implemented, it is likely that they would disperse downstream to avoid the construction activities. Implementation of the in-stream management measure would require the operation of heavy equipment in waters that are designated sucker critical habitat. This activity would not reduce or adversely modify the critical habitat. Habitat features would have beneficial effects of enhancing the quality of sucker critical habitat.

Cowbird Management Measure implemented on the SARM upstream of Prado Dam, Chino and Mill Creeks would have beneficial effects to the vireo, flycatcher, cuckoo, and gnatcatcher and their critical habitats (designated or proposed). Management would focus on cowbird removal and would not have any adverse effects on the listed species and critical habitats. In fact, cowbird removal historically represents a beneficial effect on the listed species through increases in their population.

Non-native Species Aquatic Control Measure on the SARM upstream of Prado Dam would be implemented to benefit sucker using approved methods of removal to minimize impacts to the species. This measure would also be implemented outside the spawning season. Impacts or modifications to sucker critical habitat are not anticipated.

The Biological Assessment and the IFR will be sent to the USFWS during the public review period along with a request for formal consultation on the Tentatively Selected Plan. A Biological Opinion will be provided for the proposed action prior to finalizing this document.

10.3 FISH AND WILDLIFE COORDINATION ACT OF 1934

Federal agencies undertaking water projects are required to fully consider recommendations made by the USFWS in the provided Coordination Act Report (CAR) or Planning Aid Letter associated with the project. USFWS has had full participation in planning and evaluating the proposed project, and was funded to prepare a CAR. That document is still in development but will be included in the Final IFR, along with the Corps' responses to any recommendations made therein.

The Corps coordinated with USFWS during plan formulation and development of the habitat evaluation. Meetings took place between summer of 2013 and fall of 2015. Subsequent meetings have also occurred since 2015. The most recent occurring in May 2018.

10.4 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT OF 1976

The purpose of the Act is to conserve and protect the fisheries resources of the coasts of the United States, the anadromous species, and Continental Shelf species of the U.S. The Project is not located within an area designated as essential fish habitat, therefore the Act is not applicable.

10.5 MIGRATORY BIRD TREATY ACT

The proposed project is in compliance. The Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711) makes it unlawful to possess, buy, sell, purchase, barter or "take" any migratory bird listed in Title 50 of the Code of Federal Regulations Part 10. "Take" is defined as possession or destruction of migratory birds, their nests or eggs. To ensure that the project does not result in take of migratory birds, their eggs, or nests, to the maximum extent practicable vegetation clearing activities would not occur during the breeding season. If vegetation removal must occur during the breeding season, a qualified biologist would perform nesting bird surveys following established protocol prior to construction. If nests are detected during these surveys, a construction buffer would be delineated around the nest. The take of Cowbirds is also protected by the Migratory Bird Treaty Act. Prior to implementing the Cowbird Trapping Measure, a Federal Migratory Bird Depredation Permit would be obtained from the U.S. Fish & Wildlife Service.

10.6 BALD AND GOLDEN EAGLE PROTECTION ACT

The proposed project is in compliance. The Bald and Golden Eagle Protection Act of 1940 protects bald and golden eagles by prohibiting the taking, possession, and commerce of such birds and establishes civil penalties for violation of this Act. Take of bald and golden eagles is defined as follows: "disturb means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior'' (72 FR 31132; 50 CFR 22.3).

On 10 November 2009, the USFWS implemented new rules (74 FR 46835) governing the "take" of golden and bald eagles. The new rules were released under the existing Bald and Golden Eagle Act which has been the primary regulation protection unlisted eagle populations since 1940. All activities that may disturb or incidentally take an eagle or its nest as a result of an otherwise legal activity must be permitted by the USFWS under this act. The definition of disturb (72 FR 31132) includes interfering with normal breeding, feeding, or sheltering behavior to the degree that it causes or is likely to cause decreased productivity or nest abandonment.

No eagles or nests will be directly disturbed through implementation of this project. Golden eagles may occasionally forage within upland habitats within Prado Basin, as do other raptors. However, no nesting habitat will be affected and no nests are known to occur in the vicinity. Temporarily impacted areas will be revegetated following construction. The project will result in an increase in habitat quality within most potential foraging areas. Sediment stockpiling and handling will limit vegetation within the areas affected by those activities, although foraging would still be expected as small mammals move through the site.

10.7 CLEAN AIR ACT OF 1972

The proposed project is in compliance. Impacts of this project were thoroughly analyzed in Chapter 5.2 of the IFR. The full technical report is presented in its entirety in Appendix ---. Under the Proposed Action, no General Conformity de minimis thresholds would be exceeded except for NOx emissions as shown in Table 16 for Years 1, 2, 3, 4, and 6 through 50. With implementation of Mitigation Measure AIR-1, requiring all diesel-powered off-road equipment utilized as part of implementation of the Proposed Action meet Tier 4 Final emission standards and Mitigation Measure AIR-2, requiring all haul trucks utilized as part of the implementation of the Proposed Action meet the Model Year 2010 (Tier 4 Final) or newer emission standards, thereby reducing NOx emissions to within the General Conformity de minimis levels. As a result, preparation of a General Conformity Determination would not be required for the Proposed Action. The contractor will be responsible for complying with all federal, State, and local laws and regulations regarding air quality.

10.8 CLEAN WATER ACT OF 1972

The potential effects of the proposed project on water quality have been evaluated and are discussed in Section 5.4. Those sections of the CWA most relevant to this project are described as follows:
Section 401 requires compliance with water quality standards. The Corps will submit an application to the Santa Ana Regional Water Quality Control Board (RWQCB) for Section 401 certification, pursuant to 33 CFR 336.1(a)(1). The Corps will continue to coordinate with the RWQCB throughout the remaining study, design and construction phases of this project. This IFR contains sufficient information regarding water quality effects, including consideration of the Section 404(b)(1) Guidelines, to meet the EIS content requirements of Section 404(r), should that exemption be invoked.

Section 404 addresses discharges of dredged or fill material to waters of the United States. The Corps does not issue itself permits for Corps Civil Works projects but must comply with the 404(b)(1) guidelines. A Section 404(b)(1) evaluation has been prepared and is found in Appendix B. With implementation of the avoidance and minimization measures listed therein, the proposed discharges of fill will be in compliance with Section 404 of the Clean Water Act.

The Corps' contractor will obtain a National Pollution Discharge Elimination System (NPDES) construction stormwater permit (Section 402) prior to construction. A Stormwater Pollution Prevention Plan (SWPPP) including Best Management Practices (BMPs) and Erosion and Sedimentation Control Plan would be developed and implemented by the construction contractor prior to and during construction to minimize site erosion.

10.9 COASTAL ZONE MANAGEMENT ACT OF 1972

The purpose of the Act is to preserve, protect, develop where possible, and restore and enhance the Nations' coastal zone resources. The Project is not located in the coastal zone, therefore the Act is not applicable.

10.10 NATIONAL HISTORIC PRESERVATION ACT OF 1966

The National Historic Preservation Act (NHPA) and its implementing regulations 36 CFR Part 800 provide a regulatory framework for the identification, documentation, and evaluation of cultural resources that may be affected by Federal undertakings. Under the Act, Federal agencies must take into account the effects of their undertakings on historic properties (cultural resources that have been found to be eligible for listing or which are listed in the National Register of Historic Places) and afford the Advisory Council on Historic Properties a reasonable opportunity to comment on such undertaking.

Pursuant to 36 C.F.R. 800.4, the Corps has determined and documented the APE in consultation with the SHPO (Appendix X) and has reviewed existing information on historic properties within the APE, including data concerning possible historic properties not yet identified. The Corps requested a Sacred Land File Search from the Native American Heritage Commission (NAHC) in May of 2018 for the APE. On May 7, 2018, the NAHC responded that the results of

the file search were negative and provided a list of Tribes culturally affiliated to the APE (Appendix X). The Corps contacted the Tribes via letter dated June 4, 2018, provided a brief project description, requested their comments on the appropriateness of the APE and sought their assistance in identifying properties of religious or cultural significance (Appendix X).

The following Federally recognized Tribes were contacted: Agua Caliente Band of Cahuilla Indians, Campo Band of Mission Indians, Ewiiaapaayp Band of Kumeyaay Indians, Jamul Indian Village, La Jolla Band of Luiseno Indians, La Posta Band of Mission Indians, Manzanita Band of Kumeyaay Nation, Pala Band of Mission Indians, Pauma Band of Luiseno Indians, Pechanga Band of Mission Indians, San Pasqual Band of Mission Indians, Soboba Band of Luiseno Indians, Sycuan Band of the Kumeyaay Nation, and the Viejas Band of Kumeyaay Indians (Capitan Grande Band of Diegueno Mission Indians of California).

Additionally, the following non-federally recognized Tribes were contacted: Gabrieleno Band of Mission Indians-Kizh Nation, Gabrieleno/Tongva San Gabriel Band of Mission Indians, Gabrielino/Tongva Nation, Gabrielino Tongva Indians of California Tribal Council, Gabrielino-Tongva Tribe, Juaneno Band of Mission Indians, Juaneno Band of Mission Indians Acjachemen Nation-Belardes, and the Rincon Band of Mission Indians.

The Corps is currently coordinating with SHPO to identify an appropriate strategy for the phased identification and evaluation of historic properties. The Corps is in compliance with the Act.

10.11 EXECUTIVE ORDER 13175 CONSULTATION AND COORDINATION WITH INDIAN ACT OF 1978

Executive Order 13175 reaffirms the Federal government's commitment to tribal sovereignty, The EO is intended to ensure agencies consult with tribes on policies and projects effecting tribal resources. On May 7, 2018, the NAHC responded that the results of the file search were negative and provided a list of Tribes culturally affiliated to the APE (Appendix X). The Corps contacted the Tribes via letter dated June 4, 2018, provided a brief project description, requested their comments on the appropriateness of the APE and sought their assistance in identifying properties of religious or cultural significance (Appendix X).

The following Federally recognized Tribes were contacted: Agua Caliente Band of Cahuilla Indians, Campo Band of Mission Indians, Ewiiaapaayp Band of Kumeyaay Indians, Jamul Indian Village, La Jolla Band of Luiseno Indians, La Posta Band of Mission Indians, Manzanita Band of Kumeyaay Nation, Pala Band of Mission Indians, Pauma Band of Luiseno Indians, Pechanga Band of Mission Indians, San Pasqual Band of Mission Indians, Soboba Band of Luiseno Indians, Sycuan Band of the Kumeyaay Nation, and the Viejas Band of Kumeyaay Indians (Capitan Grande Band of Diegueno Mission Indians of California).

Additionally, the following non-federally recognized Tribes were contacted: Gabrieleno Band of Mission Indians-Kizh Nation, Gabrieleno/Tongva San Gabriel Band of Mission Indians, Gabrielino/Tongva Nation, Gabrielino Tongva Indians of California Tribal Council, Gabrielino-Tongva Tribe, Juaneno Band of Mission Indians, Juaneno Band of Mission Indians Acjachemen

Nation-Belardes, and the Rincon Band of Mission Indians. The Corps is continuing tribal consultation through letters and meetings, and is in compliance of the Act.

10.12 EXECUTIVE ORDER 11988 AND AMENDMENT 13690

The objective of this Executive Order is the avoidance, to the extent possible, of long- and short-term adverse effects associated with the occupancy and modification of the base floodplain (1 in 100 annual event) and the avoidance of direct and indirect support of development in the base floodplain wherever there is a practicable alternative. Under the Order, the Corps is required to provide leadership and take action to:

a. Avoid development in the base flood plain unless it is the only practicable alternative;
b. Reduce the hazard and risk associated with floods;
c. Minimize the impact of floods on human safety, health and welfare; and
d. Restore and preserve the natural and beneficial values of the base flood plain.

The proposed project does not contribute to increased development in the floodplain and does not increase flood risk, but rather it restores "natural and beneficial values" and thus, is in compliance with the executive order.

The Water Resources Council Floodplain Management Guidelines for implementation of EO 11988, as referenced in USACE ER 1165-2-26, require an eight-step process that agencies should carry out as part of their decision-making on projects that have potential impacts to or within the floodplain. The eight steps reflect the decision-making process required in Section 2(a) of the EO. The eight steps and project-specific responses to them are summarized below.

1. Determine if a proposed action is in the base floodplain (that area which has a one percent or greater chance of flooding in any given year). The proposed action is located within the Santa Ana River channel, tributaries and overbank areas and therefore is largely within the base floodplain.

2. If the action is in the base flood plain, identify and evaluate practicable alternatives to the action or to location of the action in the base flood plain. Chapter 3 of this document presents an analysis of alternatives. Practicable measures and alternatives were formulated, and potential impacts and benefits were evaluated in Chapter 5. As the primary objective of the project is aquatic ecosystem restoration, there are no practicable alternatives completely outside of the base floodplain that would achieve this objective.

3. If the action must be in the flood plain, advise the general public in the affected area and obtain their views and comments. Because the primary objectives of the project are aquatic ecosystem restoration and water conservation, the action must be in the flood plain. The proposed project has been fully coordinated with the general public, governmental agencies, organizations and interested stakeholders. As described in Chapter 8 of this document, public outreach on restoration and water conservation concepts began in 2012. Agency and stakeholder representatives have been involved in developing the goals, objectives, problems, opportunities, analysis, value engineering, and design of the measures and alternatives. Public and agency comments will be solicited during the review of the Draft IFR which contains the CEQA and NEPA

requirements. The public and agencies will be involved throughout the phases of implementation.

4. Identify beneficial and adverse impacts due to the action and any expected losses of natural and beneficial flood plain values. Where actions proposed to be located outside the base flood plain but will affect the base flood plain, impacts resulting from these actions should also be identified. The anticipated impacts associated with Alternative 2 Proposed Action are summarized in Chapters 5, 6, 7, and 11 of this report. While construction of project features would result in mostly minor and temporary adverse impacts to the natural environment, the proposed restoration would result in a substantial and long-term increase in habitat values, including an increase in the quantity and quality of riparian and aquatic habitat. The project will also result in a widening or expansion of the existing floodplain within the project footprint in certain focal areas, restoring natural and beneficial floodplain functions which had been lost due to development and flood control activities.

5. If the action is likely to induce development in the base flood plain, determine if a practicable non-flood plain alternative for the development exists. An evaluation of practicable measures and alternatives is presented in Chapter 6of this report. The project will not induce development in the floodplain. There are no or very limited opportunities for additional development within the historic floodplain due to the existing "full buildout" condition along most of the study area. In addition, Prado Basin and Reach 9 are in public ownership and are precluded from development due to flood risk considerations.

6. As part of the planning process under the Principles and Guidelines, determine viable methods to minimize any adverse impacts of the action including any likely induced development for which there is no practicable alternative and methods to restore and preserve the natural and beneficial flood plain values. This should include reevaluation of the "no action" alternative. For each resource analyzed in Chapter 5, wherever there is a potential for adverse impacts, appropriate Best Management Practices or other environmental commitments were identified and listed at the end of each section. As there is a net benefit to biological resources, no biological mitigation is required for the Proposed Action. However, should Water Conservation be implemented prior to Ecosystem Restoration, mitigation would be required for the Proposed Action until Ecosystem Restoration in implemented. The mitigation would consist of habitat monitoring within the 505-foot inundation pool and replanting on a 1:1 ratio if signs of degradation of habitat are determined and removal of approximately 3500 cubic yards of sediment per year. The project would not induce development in the flood plain. The project would restore natural and beneficial flood plain values within the project footprint without increasing flood risk to adjacent areas. Chapter 3 of this report summarizes the alternative identification, screening and selection process. The "no action" alternative was carried through the entire assessment and selection process.

7. If the final determination is made that no practicable alternative exists to locating the action in the flood plain, advise the general public in the affected area of the findings.

The Draft IFR will be released for public review and provided to the EPA for posting in the Federal Register, and a public meeting will be held during the public review period. Any comments received on the Draft IFR will be included and responded to in the Final IFR.

8. Recommend the plan most responsive to the planning objectives established by the study and consistent with the requirements of the Executive Order. The Tentatively Selected Plan (Alternative 2 Proposed Action is responsive to all of the study objectives described in Chapter 2, and is consistent with the requirements of EO 11988. Alternative 2 Proposed Action achieves 100 % of the objectives. Alternative 4 achieves 100 % of the objectives.

10.13 EXECUTIVE ORDER 11990, PROTECTION OF WETLANDS

This Executive Order directs Federal agencies, in carrying out their responsibilities, to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. Wetland vegetation within the study area would be disturbed during construction but much more wetland habitat would be established as a result of the proposed project; therefore, the project is in compliance with the executive order.

10.14 EXECUTIVE ORDER 12898, FEDERAL ACTIONS TO ADDRESS ENVIRONMENTAL JUSTICE IN MINORITY POPULATIONS AND LOW-INCOME POPULATIONS

This Executive Order states that Federal agencies are responsible for conducting their programs, policies, and activities that substantially effect human health or the environment in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons from participation in, denying persons the benefits of, or subjecting persons to discrimination under such programs, policies, and activities because of their race, color, or national origin. The required analysis has been conducted, and impacts have been avoided to the extent possible. Significant impacts to environmental justice communities are not anticipated with the project. The project is in compliance with the Executive Order.

10.15 FARMLAND PROTECTION POLICY ACT

There are no designated prime or unique farmlands within the study area; therefore, there would be no adverse effects to farmland and the project is in compliance with this Act.

10.16 EXECUTIVE ORDER 13112 INVASIVE SPECIES

This EO states that each Federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law, use relevant programs and authorities to: (i) prevent the introduction of invasive species; (ii) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner; (iii) monitor invasive species populations accurately and reliably; (iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded; (v) conduct research on invasive

species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species; and (vi) promote public education on invasive species and the means to address them. This project includes removal of invasive species and establishment of native habitat to increase populations and habitat, and is therefore in compliance with this Executive Order.

10.17 CALIFORNIA CLEAN AIR ACT

Section 5.2 of this document discusses the effects of the proposed project on the local and regional air quality. SCAQMD determines whether project emissions sources and emissions levels significantly affect air quality based on Federal Standards established by the U.S. EPA and State standards set by the California Air Resource Board.

Under the Proposed Action, no General Conformity de minimis thresholds would be exceeded except for NOx emissions as shown in Table 16 for Years 1, 2, 3, 4, and 6 through 50. With implementation of Mitigation Measure AIR-1, requiring all diesel-powered off-road equipment utilized as part of implementation of the Proposed Action meet Tier 4 Final emission standards and Mitigation Measure AIR-2, requiring all haul trucks utilized as part of the implementation of the Proposed Action meet the Model Year 2010 (Tier 4 Final) or newer emission standards, thereby reducing NOx emissions to within the General Conformity de minimis levels. As a result, preparation of a General Conformity Determination would not be required for the Proposed Action. The contractor will be responsible for complying with all federal, State, and local laws and regulations regarding air quality.

Total GHG emissions for construction and operations would exceed the SCAQMD GHG threshold. Alternative 2 Proposed Action would exceed the annual 3,000 MTCO2e threshold and would result in a significant greenhouse gas emission impact. The greenhouse gas emissions would be primarily created from emissions associated with off-road equipment and on-road haul trucks.

Implementation of the Proposed Action would reduce greenhouse gas emissions by increasing water storage capacity within the Prado Basin that would increase the amount of local water supplies that could be stored in the local groundwater basin which would reduce the amount of water imported to Orange County. The Alternative 2 Proposed Action would also increase the long-term carbon storage capacity of the Prado Basin by increasing the acreage of native wetland vegetation. However, the greenhouse gas emission reductions achieved by implementation of the Alternative 2 Proposed Action would be nominal when compared to the greenhouse gases that would be created and that there would be no feasible mitigation available to reduce the greenhouse gases emissions to a less than significant level. Therefore, implementation of the Alternative 2 Proposed Action would exceed the SCAQMD adopted threshold of 3,000 MTCO2e and would result in conflict with an applicable plan adopted for the purpose of reducing the emissions of greenhouse gases.

10.18 PORTER-COLOGNE WATER QUALITY CONTROL ACT

The potential effects of the proposed project on water quality have been evaluated and are discussed in Section 5.4x. This project expects to achieve full compliance with the Water Quality Control Act by achieving compliance with RWQCB certification mandates for Section 401.

10.19 CALIFORNIA ENDANGERED SPECIES ACT

The Proposed Action is or would be in compliance. Effects of the Proposed Action on state-listed species would be addressed in consultations by OCWD with CDFW, if necessary. Previous coordination with CDFW on other cost-shared projects indicated that neither CESA nor a Streambed Alteration Agreement are generally required when construction will be overseen by the federal government, and routine OMMR&R conducted by the non-federal sponsors would not result in additional effects to state-listed species or state-jurisdictional waters. The same situation exists for the Proposed Action. Any non-routine OMMR&R conducted by the non-federal sponsors that may result in additional effects to state-listed species would require them to first consult with CDFW before taking action, except in emergency situations.

10.20 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE CODES SECTION 1600-1607

The California Department of Fish and Wildlife, under California Fish and Game Code Sections 1600 through 1607, regulates work that would substantially divert, obstruct, or change the natural flow of a river, stream, or lake; that would substantially change the bed, channel, or bank of a river, stream, or lake; or that would use material from a streambed. The Proposed Action is, or would be in compliance. OCWD is responsible for coordinating with CDFW to obtain any necessary agreements. Previous coordination with CDFW on other cost-shared projects indicated that neither CESA nor a Streambed Alteration Agreement are generally required when construction will be overseen by the federal government, and routine OMMR&R conducted by the non-federal sponsors would not result in additional effects to state-listed species or state-jurisdictional waters. The same situation exists for the proposed action. Any non-routine OMMR&R conducted by the non-federal sponsors that may result in additional effects to state-jurisdictional waters would require them to first coordinate with CDFW before taking action, except in emergency situations.

10.21 NATIVE PLANT PROTECTION ACT

The proposed project is in compliance. California's Native Plant Protection Act (NPPA) requiring all State agencies to utilize their authority to carry out programs to conserve endangered and rare native plants. Provisions of NPPA prohibit the taking of listed plants from the wild and require notification of the CDFW at least 10 days in advance of any change in land use. This allows CDFW to salvage listed plant species that would otherwise be destroyed. The Applicant is required to conduct botanical inventories and consult with CDFW during and planning to comply with the provisions of this act and sections of CEQA that apply to rare or endangered plants. Such surveys will be conducted prior to construction of the proposed restoration features, although impacts to endangered and rare plants are not anticipated.

10.22 LOCAL AIR QUALITY

The proposed project is within SCAQMD jurisdiction. The SCAQMD is responsible for planning, implementing, and enforcing federal and State ambient standards within this portion of the South Coast Air Basin. The regulations of this agency are primarily focused on stationary sources; therefore, most of the local agency regulations are not relevant to this Project.
The SCAQMD has visible emissions, nuisance, and fugitive dust emissions regulations with which the Project's construction will need to comply. The specific regulations are as follows:

- SCAQMD Rule 401 – Visible Emissions
- SCAQMD Rule 402 – Nuisance Dust
- SCQMD Rule 403 – Fugitive Dust

These rules limit the visible dust emissions from the project construction sites, prohibit emissions that can cause a public nuisance and require the prevention and reduction of fugitive dust emissions to the extent possible. Best management practices will be put in place during construction and operation of the proposed project to reduce emissions and fugitive dust.

10.23 WESTERN RIVERSIDE COUNTY MULTIPLE SPECIES HABITAT CONSERVATION PLAN (MSHCP)

The proposed project is consistent with this Plan, although Endangered Species Act compliance is being achieved through Section 7 consultation with the USFWS. The MSHCP is a comprehensive, multi-jurisdictional Habitat Conservation Plan (HCP) focusing on conservation of species and their associated habitats in Western Riverside County that is carried out in accordance with Section 10 of the ESA. This HCP is one of several large, multi-jurisdictional habitat-planning efforts in Southern California with the overall goal of maintaining biological and ecological diversity within a rapidly urbanizing region. The MSHCP is intended to allow Riverside County and its cities to better control local land-use decisions and maintain a strong economic climate in the region while addressing the requirements of the state and federal Endangered Species Acts.

10.24 RIVERSIDE COUNTY INTEGRATED PROJECT GENERAL PLAN

The proposed project is in compliance. This plan also directs policy towards the conservation of native vegetation in Riverside County. These policies are based on maintaining the ecological diversity in Riverside County through the management of native vegetation. Policies that are intended to protect superior examples of native vegetation resources in conjunction with permitted uses include: (1) update the vegetation map for western Riverside County in consultation with the California Department of Fish and Game, the Natural Diversity Data Base, the United States Forest Service, and other knowledgeable agencies and the County shall also provide these agencies with data as needed; (2) expand vegetation mapping to include the eastern portion of the County of Riverside; (3) maintain and conserve superior examples of native trees, natural vegetation, stands of established trees, and other features for ecosystem, aesthetic, and water conservation purposes; (4) conserve the oak tree resources in the County; and (5) encourage research and education on the effects of smog and other forms of pollution on human health and on natural vegetation.

10.25 LOCAL NOISE ORDINANCES

As long as construction activities occur during 7:00 a.m. to 6:00 p.m., Monday through Saturday, which are the exempted time periods per County of Riverside Municipal Code and City of Corona Municipal Code, the proposed construction would be in compliance with local (city and county) noise ordinances; any changes to that schedule, including occasional overtime work, would require obtaining a variance from local authorities.

10.26 SUMMARY OF ENVIRONMENTAL COMMITMENTS AND MONITORING

10.26.1 Aesthetics

A-1: Construction lighting fixtures would be shielded by providing side flap on lights. Onsite construction lighting would be arranged so that direct rays would not shine in or produce glares to nearby residential uses.

A-2: If the onsite construction lighting creates a lighting or glare problem for residential properties, OCWD would implement corrective measures to resolve the problem. Such corrective measures would include raising height of temporary construction walls or other shielding for lighting, providing additional shielding on the light fixtures, and relocating light fixtures.

10.26.2 Air Quality

AIR-1: The project applicant will require that all off-road diesel-powered equipment that is greater than 50 horsepower and utilized during implementation of the Proposed Action will be registered with ARB and labelled detailing that the equipment meets Tier 4 Final emissions standards.

AIR-2: The project applicant will require that all haul trucks utilized during implementation of the Proposed Action will be licensed in California and will meet the model year 2010 (Tier 4 Final) or newer emissions standards.

AIR-3: BMPs for controlling fugitive dust and pollutant emissions include the following techniques. These mitigation measures can reduce PM10 and PM2.5 emissions up to 50 percent.

- Water active construction sites to reduce fugitive dust, including locations where grading is to occur;
- All trucks hauling dirt, sand, soil, or other loose materials are to be covered or should maintain at least two feet of freeboard, according to the requirements of California Vehicle Code (CVC) 7 Section 23114;
- During construction, the off-road equipment, vehicles, and trucks shall not idle more than five minutes in any one hour;
- The off-road construction equipment drivers shall have proper training in operating the equipment 11 efficiently, taking into account ways to reduce the hours of equipment operation and/or operating 12 the equipment at a lower load factor; Pave construction access roads at least 100 feet onto the site from main road; and

- Reduce construction traffic speeds to 15 mph or less on unpaved surfaces.

10.26.3 Biological Resources

BIO-1: If the Habitat Monitoring Program indicates substantial and prolonged degradation of vegetation between 498 ft. and 505 ft., the degraded habitat would be replaced at a 1:1 ratio on OCWD property.

BIO-2: All vegetation removing and clearing activities and the operation of heavy construction equipment will be conducted between September 16 and February 28, outside of bird nesting season. Vegetation removal and the operation of heavy equipment may begin in the month of August provided the area is surveyed by a qualified biologist in advance of vegetation removals and the qualified biologist determines that no nesting birds are present within 500 feet of the activities.

BIO-3: To minimize noise impacts the following measures will be implemented. Construction of an earthen berm around the sediment storage site. During the nesting season portable acoustical panels will be placed along perimeter of the sediment removal channel where the floating dredge and/or heavy equipment is operating to minimize construction noise levels. If needed during the nesting season portable acoustical panels will be placed along the earthen berm around the perimeter of the sediment storage site and around the sediment re-entrainment work area to reduce construction noise levels. All construction equipment will be equipped with noise reduction features, such as mufflers and engine shrouds. Onsite generators and booster pumps will be enclosed entirely.

BIO- 4: Prior to the start of grading activities at the Sediment Storage Site, focused gnatcatcher surveys will be conducted beginning to determine the presence of California Gnatcatcher territories.

- Surveys will include the identification of nearby habitat that gnatcatchers may move to or utilize once construction activities start. The qualified biologist will report on whether this nearby habitat is already occupied by gnatcatchers.
- Surveys shall also be conducted three days before the start of grading to determine if individual foraging gnatcatchers are present.
- Additional nesting season surveys will be conducted annually through the duration of sediment removal activities.
- Results of pre-construction, nesting, and pre-grading surveys will be reported to the Service in a quarterly report.

EC-BIO-5: To minimize impacts to wildlife species, a biologist that meets USFWS standard qualifications will conduct a biological resource sweep of the work area prior to any ground disturbing activities, during project operation and during demobilization of construction equipment. The biological resource sweep will include the following activities;

- Inspect the work area, including along access roads, for any wildlife species and prepare a list of species observed and record their activity during construction and operation of the project.

- Implement exclusionary or avoidance measures and, or relocate sensitive species if possible, and ensure that the quality of adjacent habitat outside of the construction zone is maintained.

In the event that sensitive (protected) wildlife species are present, determine if the activity would cause adverse impacts that have not been previously considered and evaluated. If it is determined that the activity could have the potential to adversely affect wildlife species in a manner not authorized by Federal or State permits, the activity will cease until the species is no longer in harm's way or is relocated outside of the construction activity impact area.

BIO-6: During vegetation removal activities, trees that are removed will be inspected to determine if nests are present. If nests are present, the nests would either be relocated and if not feasible to be relocated, a new substitute nest will be created and located outside of the work area.

BIO-7: Sediment management activities and ecosystem restoration activities conducted within Santa Ana River, Chino Creek and Mill Creek between August 1 and January 15, outside of the spawning season.

BIO- 8: During construction and operation of the sediment removal channel a qualified biologist will be present to monitor the activities. A qualified biologist is defined as an individual that holds a current 10(a)(1)(A) recovery permit for the Santa Ana Sucker. This individual or any other project biologist can stop dredging activities at any time if impacts to native aquatic species are observed. If impacts to Santa Ana Sucker occur, the Service will be contacted immediately to determine if additional measures to further minimize project impacts are needed or if re-initiation of consultation is necessary. Suction dredging will not proceed until the Service is contacted and a determination is made on how to proceed. The qualified biologist will prepare weekly reports describing the sediment removal activities. These reports will:

- Document any sucker that is observed in the sediment removal channel.
- Document behavior of any fish observed in the project area, not only sucker, before and during sediment removal activities.
- Record the circumstances and numbers of any fish observed to be wounded or killed during sediment removal activities. Any sucker killed or found dead will be preserved in 95 percent ethanol and submitted to an approved depository.

BIO-9: Floating dredge equipment and heavy construction equipment operating in the wetted channel shall warm up (run idle) for a minimum of 10 minutes before initiating the suction dredge to begin removing sediment from the river. During this time the qualified biologist will record observations of any fish in the work area and when complete, but not less than 10 minutes after initiating startup noise, will signal the dredge operator to initiate suction dredging activities.

BIO-10: Prior to and during operation of floating dredge equipment and heavy construction equipment, a spill prevention and contingency plan will be prepared and implemented. The plan will include measures to prevent or avoid and incidental leak or spill, including identification of materials necessary for containment and clean up.

BIO-11: Vehicles and other equipment will be fueled, cleaned and maintained in designated areas, located away from the Santa Ana River, Chino Creek and Mill Creek to eliminate risk of pollution from spills and contamination.

BIO-12: Construction personnel will utilize designated access roads or previously disturbed areas for vehicle access and staging of construction equipment.

BIO-13: Prior to removal of vegetation access routes in and out of the project area will be flagged.

BIO-14: Unpaved areas will be watered as needed to control dust on a continual basis.

BIO-15: All construction, site disturbance and vegetation removal will be located within the delineated construction boundaries. The storage of equipment and materials, temporary stockpiling of soil would be located within designated areas outside of habitat areas.

BIO-16: Areas to remain undisturbed will be clearly flagged or otherwise delineated prior to construction activities and would be monitored to ensure that all activities do not encroach into the delineated protected areas. Onsite biologist will have the authority to halt the Sediment Management Demonstration Project activities if occurring inside delineated areas.

BIO-17: The configuration of the work area of the sediment trap, conveyance channels and the sediment storage site will be designed so when it is not in operation it will allow for wildlife movement.

BIO-18: A liter control program will be implemented during construction to eliminate the accumulation of trash. Trash will be removed from trash receptacles at the end of each work day to discourage wildlife movement into work areas.

BIO-19: Speed limits of 15 miles per hour or less will be required at all times to avoid potential injury to wildlife in the area.

BIO-20: A qualified biologist approved by the USACE will monitor access roads to ensure wildlife is not impacted by construction equipment.

BIO-21: Construction lighting at the sediment re-entrainment area will be directed onto the work site to prevent spill-over lighting impacts to wildlife. Construction lighting fixtures will be shielded by providing a side flap on the lights or providing temporary drape/wall so that illumination is confined to the work area.

10.26.4 Cultural Resources

EC-CR-1: In consultation with the SHPO, OCWD, and any affected Indian Tribes, the Corps shall ensure that any areas within the project footprint with the potential to encounter historic properties/historic resources that have either not been surveyed or have not been surveyed in the past ten years, are (re)surveyed by an archaeologist meeting the Secretary of the Interior's

Qualification Standards. The Corps shall follow the steps outlined at 36 C.F.R. 800.4 thru 36 C.F.R. 800.6.

EC-CR-2: An archaeologist meeting the Secretary of the Interior's Qualification Standards shall monitor all construction activities in areas where there is a potential for buried resources. The monitor shall immediately notify the Corps' on-site construction supervisor of any discovery. The Corps on-site construction supervisor shall temporarily stop construction in the area of the discovery. The discovery area and a surrounding buffer zone shall then be clearly delineated. Ground disturbing activities can resume outside the delineated buffer zone. Should previously unknown historic or archaeological remains be discovered, the Corps would comply with 36 C.F.R. § 800.13 or alternative procedures if agreed to under an executed programmatic agreement or memorandum of agreement.

EC-CR-3: When construction crews are working within 50 meters of an eligible or unevaluated cultural resource, the edge of the site, including a 25-meter site buffer will be fenced off, thus ensuring that no construction equipment inadvertently strays into the culturally sensitive area.

EC-CR-4: (*California Health and Safety Code,* Section 7050.5). If the landowner rejects the MLD's recommendations, the landowner shall rebury the remains with appropriate dignity on the property in a location that would not be subject to further subsurface disturbance (*California Public Resources Code,* Section 5097.98).

10.26.5 Paleontological Resources

PR-1: A qualified paleontologist would be notified and retained when earth-moving activities are anticipated to impact undisturbed deposits in the Older Quaternary Alluvium on the project site. The designated Paleontologist should be present during the pre-grade meeting to discuss paleontological sensitivity and to assess whether scientifically important fossils have the potential to be encountered. The extent of monitoring activities would be determined at the meeting in consultation with the OCWD. If any scientifically important large fossil remains are uncovered during earth-moving activities, the Paleontological Monitor would divert heavy equipment away from the fossil site until s/he has had an opportunity to examine the remains. Samples of Older Quaternary Alluvium should be collected for processing and examination for very small vertebrate fossils.

10.26.6 Geology/Soils

GEO-1: Prior to the start of construction the applicant would obtain coverage under the General Construction Permit by the State Water Resources Control Board and in compliance with the permit would file a Notice of Intent with the Regional Water Quality Control Board and prepare and implement a Storm Water Pollution Prevention Plan.

GEO-2: Uncovered stockpiles of sediment material shall be regularly watered to minimize water and wind erosion.

10.26.7 Hazards

HAZ-1: During construction and operation of the project all local, state and federal regulations would be complied with regarding to the transportation, handling, and storage of hazardous substances.

HAZ-2: At each work area involving the operation of heavy equipment and handling and storage of hazardous substances, a Hazardous Material Spill Prevention Plan would be prepared. The hazardous Material Spill Prevention Plan shall contain contingency plans in the event of an accidental release into the environment.

HAZ-3: Prior to the start of construction the applicant would prepare an Emergency Evacuation Plan that contains procedures for the demobilization of construction equipment and evacuation of personnel from the study area in the event of a pending significant storm event or other emergency that jeopardizes the safety of personnel or equipment.

10.26.8 Hydrology/Water Quality

EC-HWQ-1: The Sediment Management Measure shall implement an ongoing Water Quality Monitoring Program that would monitor for organic chemicals, including pesticides, PCBs, PAHs and hydrocarbons, metals, total dissolved solids, indicator bacteria and dissolved oxygen upstream in the Prado Basin reservoir pool and downstream within waters where sediment re-entrainment would occur. Sediment that is used for re-entrainment would be processed by using a washing and settlement process to remove the fine-grained sediment from the sediment prior to re-entrainment downstream to reduce any nutrient, organic chemicals, and potential bacteria/pathogen constituents. The monitoring program would be implemented before construction, during sediment re-entrainment and after sediment re-entrainment. If significant differences between upstream and downstream samples are observed during sediment re-entrainment activities, the rate of sediment re-entrainment would be adjusted per the adaptive management measures included in the Water Quality Monitoring Program to ensure they are within acceptable thresholds of the Regional Water Quality Control Board Basin Plan.

EC-HWQ-2: The Corps and OCWD will implement water quality monitoring as needed to fulfill permit requirements for measure construction and discharge of re-entrained sediment below the dam. In addition, the Corps and OCWD will process sediment for re-entrainment using washing and settlement to remove the fine-grained sediment fraction (less than 0.05 mm particle diameter) from the sediment prior to re-entrainment downstream. The sediment processing will be carried out at the stockpile areas located near the spillway (Areas A and B on the sediment measure map, Figure 5-2). Sediment processing will address potential turbidity associated with the re-entrainment, as sand-size sediment does not contribute to turbidity due to rapid settlement from the water column, along with pollutants that are preferentially adsorbed onto fine-grained sediment. The predominance of sand in the grain-size distribution of Santa Ana River sediments upstream of the dam is illustrated in Figure 5-3, which shows sediment sampling results at upstream locations.

EC-HWQ-3: A Sediment Movement Monitoring Program would be implemented to determine sediment profile changes in the Prado Basin and along segments of the lower Santa Ana River and upstream of sediment removal channel. For additional sediment accumulation that would occur upstream of the Dam under Alternative 3 (Plan 9), OCWD would operate a small-scale sediment trap to accumulate and remove sediment deposited in Prado Basin under this alternative, which would implement Water Conservation, but would not include the Sediment Management System measure.

EC-HWQ-4: OCWD would coordinate with the Orange County Flood Control District on the fair share responsibility to remove sediment that builds up near the Santa Ana River outlet reach to the ocean. As part of the coordination, the timing, frequency and resource agency permitting requirements would be determined.

10.26.9 Land Use/Planning

EC-LU-1: Notices of Construction will be provided to adjacent home owners and business prior to initiating construction activities. Notices of construction will include a contact and telephone number that will information about construction activities.

EC-LU-2: To minimize disruption to adjacent businesses during construction, temporary signage will be provided indicating business are open.

10.26.10 Noise

N-1: All booster pumps and generators would be contained in sound attenuation enclosures.

N-2: Construction contractors would be required to use only construction equipment that has noise-reduction features, such as mufflers and engine shrouds.

N-3: During sediment re-entrainment activities sound attenuation measures would be provided to minimize noise impacts to meet local night time noise standards.

10.26.11 Traffic/Transportation

EC-T-1: Construction equipment mobilization, demobilization, truck deliveries and truck hauling activities will occur between 9:00 AM and 3:00 PM.

EC-T-2: Wherever possible the project haul route trips will use designated truck routes to and from the freeways which include I-5, I-15, I-405, SR-71, and SR-91.

EC-T-3: Construction equipment mobilization, demobilization, truck deliveries and truck hauling activities will occur between 9:00 AM and 3:00 PM.

EC-T-2: Wherever possible the project haul route trips will use designated truck routes to and from the freeways which include I-5, I-15, I-405, SR-71, and SR-91.

EC-T-3: The project will require the construction workers to park on the predetermined off-street parking area.

EC-T-4: The project will work with the City Engineer and Public Works Department Traffic Engineering Division to identify lane closure time limitations on roadways within the Cities of Chino, Corona, Costa Mesa, Fountain Valley, Irvine, Norco, and Yorba Linda, and unincorporated areas of Orange and Riverside Counties. A description of project activities will be given to each jurisdiction that includes:

a. Identified hours of construction and hours for deliveries.
b. Identified haul routes.
c. Identify location of staff parking for the construction period.
d. Identify the location of material storage.

EC-T-5: Two months prior to the beginning of construction and periodically throughout the construction duration, if needed, the project will notify Emergency Services within the study area of possible travel lane and the potential for traffic delays during construction (see listing below).

EC-T-6: Two months prior to the beginning of construction and periodically throughout the construction duration, the project will notify the City Public Works Department Traffic Engineering Division of construction activities on a regular basis.

EC-T-7: Two months prior to the beginning of construction and periodically throughout the construction duration, the project will notify the School District of possible travel lane closures and the potential for traffic delays during construction. This is to allow the District to alter bus routing when possible and review the need for crosswalk assistance as necessary during the construction duration.

EC-T-8: Two months prior to the beginning of construction, the project will notify the community-at-large of potential roadway lane closure(s). The written notification will include the construction schedule, the approximate location and duration of activities within each section of roadway, and a toll-free telephone number for receiving questions or complaints. The notification program will consist of a local newspaper notice and signage posted prior to the limits of construction. Notification prior to the intersections affected by the construction will also be placed on either side of the intersection at intersection crossings. The signage will reflect the current construction activity and precede the construction to allow traffic the opportunity to find alternative routes.

EC-T-9: One month prior to specific roadway lane closure(s), the project will implement a notification program to notify the public of the closure(s). The written notification will include the construction schedule, the exact location and duration of activities within each street (i.e., which travel lanes and access point/driveways would be blocked on which days and for how long), and a toll-free telephone number for receiving questions or complaints. The notification program will consist of a local newspaper notice, mailed information to residents and businesses in the study area and signage posted at the construction limits. The notification will provide alternate routes around the temporary closure that direct traffic to utilize alternative routes when possible.

Design Recommendations

EC-T-10: The primary access entry to the site is proposed to be located on the north side of Pomona-Rincon Road approximately 3,000 feet east of Prado Dam and 2,750 feet north of Railroad Street. The width of improved access at this location will be a minimum of 35-feet. The truck turning movements at the proposed site will be reviewed to ensure adequate clearance exists on the proposed access driveway to/from the public roadway, such that truck-trailer combination vehicles can adequately enter and leave the site without any required access restrictions.

EC-T-11: Fire apparatus accessible roadways will be designed and constructed to maintain, and support emergency vehicle loads and dimensions on an all-weather drivable surface. In general, the minimum width and vertical clearance of emergency roadways is 13 feet in width for one-way access and 20 feet in width for two-way access with 13.5 feet vertical clearance. For emergency access, cross-section of 36 feet or greater parallel parking is typically allowed on both sides of the street. For emergency access, cross-section of less than 36 feet in width consult local fire authority for minimum width and parking restrictions. Fire apparatus accessible maximum cross-sectional slope grade of two percent (2%) or a maximum cross-sectional slope grade change of five percent (5%). Fire apparatus accessible preferred maximum longitudinal slope grade of ten percent (10%) or where grades exceeding 10% are necessary because of topographical conditions, the grade percentage allowable for a maximum approved length should be obtained from the local fire authority**.**

11.0 RECOMMENDATIONS

At this phase of the study, prior to concurrent review of the draft document, the USACE has identified Alternative 2, Ecosystem Restoration Best Buy Plan 11 and Water Conservation as the combined (NER and NED) Plan, and the TSP for future recommendation for authorization as a Federal project, with such modifications thereof as in the discretion of the Commander, Headquarters, U.S. Army Corps of Engineers, may be advisable. The USACE recognizes that the non-Federal sponsor, OCWD, supports the current identification of the TSP but is also subsequent to concurrent review of the Draft IFR.

Concurrent review of this draft IFR includes public, technical, legal, and policy reviews, as well as a Type I IEPR. The PDT, USACE Los Angeles District management, and USACE vertical team representatives throughout the agency will consider comments provided during the review period prior to providing feedback to a USACE Headquarters Senior Leaders Panel. This panel will consider the evaluation of the significant public, technical, legal, policy and IEPR comments on the TSP and other alternatives to determine the endorsement of a recommended plan and proposed way forward to complete feasibility-level design and the final IFR.

The final IFR will include recommendations from the USACE, Los Angeles District Commander, and reflecting information available at that time. The final IFR shall also include recommendations on proceeding with the separate approval processes for implementation of Ecosystem Restoration and Water Conservation Plans that takes into account the delegated authority for approval of changes to Prado Dam Water Control Plan for Water Conservation. Recommendations will not reflect program and budgeting priorities inherent in the formulation of a national Civil Works construction program nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are transmitted to Congress as proposals for authorization and implementation funding. However, prior to transmittal to the Congress, the non-Federal sponsor, the States, interested Federal agencies, and other parties will be advised of any modifications and will be afforded an opportunity to comment further.

Aaron C. Barta
Colonel, US Army
Commander and District Engineer
Los Angeles District

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RIT review members include: Charles Wilson and Bradd Schwichtenberg.
Other HQ reviewers include: Tab Brown, Wes Coleman, and Jodi Creswell (Planning).

13.0 LIST OF ACRONYMS/ABBREVIATIONS

AAHUs	Average Annual Habitat Units
ac	acre(s)
ACHP	Advisory Council on Historic Preservation
ACRA	Abbreviated Cost Risk Analysis
af	acre/ft
afy	acre-feet per year
Air Basin	South Coast Air Basin
a.m.	Ante meridiem, before noon
AMSL	Above Mean Sea Level
ANSI	American National Standards Institute
APE	Area of Potential Effects
AQMPs	Air Quality Management Plan
ARB	Air Resources Board
ASA CW	Assistant Secretary of the Army - Civil Works
ASTM	American Society for Testing and materials
BA	Biological Assessment
BMPs	Best Management Practices
BOR	Bureau of Reclamation
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEEmod	California Emissions Estimator Model
Caltrans	California Department of Transportation
CAR	Coordination Act Report
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCC	California Coastal Commission
CCD	Coastal Consistency Determination
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CDPR	California Department of Parks and Recreation
^{o}C	degrees Celsius
CE/ICA	Cost Effectiveness and Incremental Cost Analysis
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act of 1970
CFCs	Chlorofluorocarbons
CFR	Code of Federal Regulations
cfs	cubic feet/second
CH_4	methane

CHAP	Combined Habitat Assessment Protocol
CMP	Congestion Management Program
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CNRA	California National Resources Agency
CO	carbon monoxide
CO-CAT	Coastal & Ocean Climate Working Group of the California Climate Action Team
CO_2	carbon dioxide
CO_2e	CO_2-equivalency
CPUC	California Public Utilities Commission
CRHP	California Register of Historical Places
CSC	California Species of Special Concern
CSLC	California State Lands Commission
CWA	Clean Water Act
cy	cubic yard(s)
dB	decibels
dBA	decibels (A-weighted)
DEIS	Draft Environmental Impact Statement
DDT	dichlorodiphenyltrichloroethane
CDPR	State of California, Department of Parks and Recreation
DPM	Diesel Particulate Matters
DPS	District Population Segment
DSAC	Dam Safety Action Classification System
DSOD	Department of Water Resources' Division of Safety of Dams
DTSC	Department of Toxic Substances
DWR	Department of Water Resources
ECO-PCX	Ecosystem Restoration Plng. Center of Expertise
EFH	Essential Fish Habitat
EIC	Eastern Information Center
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EO	Executive Order
EOP	Environmental Operating Principle
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
EQ	Environmental Quality
ER	Engineer Regulation
ESA	Environmental Site Assessments
ESAs	Environmental Site Assessments Standards
ESU	Evolutionarily Significant Units

ºF	degrees Fahrenheit
FCSA	Feasibility Cost Sharing Agreement
FE	Federal-listed, endangered species
FEMA	Federal Emergency Management Act
FESA	Federal Endangered Species Act
FHWA	Federal Highway Administration
FMPs	Fishery Management Plans
FPE	Federally proposed for listing as endangered species
FT	Federal-listed, threatened species
ft	ft/foot
ft/sec	ft/foot per second
ft^2	square ft
GCP	General Construction Permit
GHG	greenhouse gas
GIS	Geographic Information System
GRP	Gross regional product
GWP	Global Warming Potential
HAER	Historic American Engineering Record
HCM	Highway Capacity Manual
HCP	Habitat Conservation Plan
HDPE	high-density polyethylene
HE	Habitat Evaluation
HEC-FDA	Hydrologic Engineering Center Flood Damage Analysis
HEC-FFA	Hydrologic Engineering Center Flood Frequency Analysis
HEC-6T	Sedimentation in Stream Networks Software
HEC-RAS	Hydrologic Engineering Center River Analysis
HMP	County of Santa Ana Habitat Management Plan
hp	horsepower
HPDF	Historic Property Data File
HSI	Habitat Suitability Index
HTB	Heal the Bay
HTRW	hazardous, toxic, or radioactive waste
HU	habitat units
Hwy 101	Highway 101
ICU	Intersection Capacity Utilization
IEAU	Inland Empire Utilities Agency
IEBL/SARI	Inland Empire Brine Line / Santa Ana River Interceptor Line
IEPR	Independent External Peer Review
IFR	Integrated Feasibility Report
in	inch(es)
in/yr	inch(es)/year

IPCC	Intergovernmental Panel on Climate Change
kg	kilograms
kHz	kilohertz
km	kilometer(s)
km^2	square kilometer(s)
km^3	cubic kilometer(s)
lbs	pounds
LEPC	Local Emergency Planning Committee
L_{dn}	Day-night average noise level
L_{eq}	Average equivalent noise level
LERRD	Land, Easements, Rights-Of-Way, Relocation, and Disposal Areas
LOS	Level of Service
LPP	Locally Preferred Plan
LSTs	Localized Significance Thresholds
LVMWD	Las Virgenes Municipal Water District
m	meter(s)
m^2	square meter(s)
m^3	cubic meter(s)
MBTA	Migratory Bird Treaty Act
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MGD	million gallons per day
MHHW	mean higher high water
MHW	mean high water
mi	mile(s)
mi^2	square mile(s)
mL	milliliter(s)
MLD	Most likely descendent
MLLW	mean lower low water
mm	millimeter(s)
MMT	million metric tons
MPN	most probable number
MSHCP	Western Riverside County Multiple Species Habitat Conservation Plan
MSL	Mean Sea Level
MTL	Mean Tide Level
MUTCD	Manual on Uniform Traffic Control Devices
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NED	National Economic Development
NEPA	National Environmental Policy Act of 1969
NER	National Ecosystem Restoration

NER/NED	National Ecosystem Restoration Plan and Locally Preferred Plan
NFS	Non- Federal Sponsor
NPPA	California's Native Plant Protection Act
NRC	National Research Council
NRHP	National Register of Historic Places
NHPA	National Historic Preservation Act
NHTSA	Department of Transportation' National Highway Traffic Safety Administration
NMFS	National Marine Fisheries Service
N_2O	nitrous oxide
NO_2	nitrogen dioxide
NOAA	National Oceanographic and Atmospheric Administration
NOI	Notice of Intent
NOP	Notice of Preparation
NOx	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NPS	National Parks Service
NRCS	National Resources Conservation Service
NRHP	National Register of Historic Places
NTU	Nephelometric Turbidity Unit(s)
N_2O	Nitrous Oxide
O&M	Operation and Maintenance
OCWD	Orange County Water District
OHP	Office of Historic Preservation
OMB	Office of Management and Budget
OMRRR	Operations, Maintenance, Repair, Replacement, and Rehabilitation
OPR	California Office of Planning and Research
OSE	Other Social Effects
O_3	Ozone
OWTS	Onsite Wastewater Treatment Systems
PaHs	*Polycyclic Aromatic Hydrocarbons*
Pb	lead
PCBs	polychlorinated biphenyls
PCE	Passenger Car Equivalents
PCEs	Primary constituent elements
PCX	Water Conservation Planning Centers of Expertise
PDT	Project Delivery Team
PED	Pre-Construction Engineering Design
P&G	Principles and Guidance
p.m.	Post meridiem, after noon
PM	Particulate Matter
PM_{10}	particulate matter equal to or less than 10 microns in size

$PM_{2.5}$	fine particulate matter equal to or less than 2.5 microns in size
POTWs	Publicly owned treatment works
ppb	parts per billion
ppt	parts per thousand
PPV	Peak Particle Velocity
PRC	Public Resources Code
RBA	Risked-based Analysis
RCDH	Riverside County Department of Environmental Health
RCRA	Resource Conservation & Recovery Act
RED	Regional Economic Development
ROD	Record of Decision
ROG	reactive organic gases
RWQCB	California Regional Water Quality Control Board
SAR	Santa Ana River
SAS	Santa Ana Sucker
SARA	Superfund Amendments and Reauthorization
SARM	Santa Ana River Mainstem Project
SARWQB	Santa Ana Regional Water Quality Control Board
SAWPA	Santa Ana River Watershed Project Authority
SAWA	Santa Ana Watershed Association
SCAQMD	South Coast Air Quality Management District
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCC	California State Coastal Conservancy
SCCIC	South Central Coastal Information Center
SC-DMMT	Southern California Dredged Material Management Team
SE	State-listed, endangered species
SEIR	Supplemental Environmental Impact Report
SEMS	Standardized Emergency Management System
SERC	State Emergency Response Commission
SF_6	sulfur hexafluoride
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SLR	Sea Level Rise
SMART	Specific, Measurable, Attainable, Risk-Informed and Timely
SO_2	sulfur dioxide
SOx	oxides of sulfur
SQG	Sediment Quality Guidelines
SRA	Sediment Removal Area
SSA	Storage Site A
SSB	Storage Site B

ST	State-listed, threatened species
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	California State Water Resources Control Board
TAC	Technical Advisory Committee
TACs	Toxic Air Containments
TCP	Traditional Cultural Properties
TDS	total dissolved solids
TMDL	Total Maximum Daily Load
TMP	Transportation Management Plan
TOC	total organic carbon
TSP	total suspended particulates
TSP	Tentatively Selected Plan
TSP	Transaction Screen Process
TSS	total suspended solids
UBC	Uniform building codes
UCR	University of California, Riverside
USACE	U.S. Army Corps of Engineers, Los Angeles District
USACE DQC	USACE District Quality Control Team
USACE ATF	USACE Agency Technical Review Team
USACE RIT	USACE Regional Integration Team
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USTs	Underground Storage Tanks
V/C	Volume to capacity
VFR	Valley Floor Riparian
VCS	Vandermost Consulting Services
VOCs	volatile organic compounds
VRAP	Visual Resources Assessment Procedure
WRCMSHCP	Western Riverside County Multiple Species Conservation Plan
WDRs	Waste Discharge Requirements
WOP	without project
WSE	Water surface elevation
yd	yard(s)
yd^2	square yard(s)
yd^3	cubic yard(s)
yd^3/ft	cubic yard(s) per foot
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
%	percent
%o	parts per thousand

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