APPENDIX 3.4

Biological Resources Documentation

Effects of Changed Water Management Operations on Fisheries and Water Quality Impacts Previously Disclosed in the Water Forum Proposal EIR

SIERRA VISTA SPECIFIC PLAN EIR TECHNICAL MEMORANDUM: EFFECTS OF CHANGED WATER MANAGEMENT OPERATIONS ON FISHERIES AND WATER QUALITY IMPACTS PREVIOUSLY DISCLOSED IN THE WATER FORUM PROPOSAL EIR

Prepared for:

City of Roseville
Environmental Utilities Department

Prepared by:

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Solutions for Progress

and

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1.1 Background

1.1.1 Sierra Vista Specific Plan

The Sierra Vista Specific Plan (SVSP) is an approximately 2,064 acre mixed-use development project plan proposed in Placer County, California, south and west of the City of Roseville (City). The project site is located approximately 5 miles west of downtown Roseville, 6 miles west of Interstate 80 and State Route 65, and 10 miles northeast of the City of Sacramento. The proposed specific plan project (Project) would include development of a mix of land uses, including 6,650 residential units, approximately 216 acres of commercial and office uses, approximately 61 acres of public/quasi-public, 267 acres of open space uses, and 97 acres of parks. The majority of the proposed project site, which is currently undeveloped annual grasslands that were historically used for seasonal cattle grazing, is within the City's Sphere of Influence, which was expanded in 2004, as part of the West Roseville Specific Plan (WRSP) annexation.

1.1.2 Water Supply for the Sierra Vista Development

The City is a signatory to the Water Forum Agreement (WFA), which provides a framework for future surface water and groundwater supplies in the region through the year 2030. The City's WFA specifies the maximum allowable surface water diversions based on unimpaired flows into Folsom Lake with diversions by the City restricted during drier and driest years, with the objective of supporting environmental needs in the lower American River (LAR).

Although the City's water contract entitlements total 66,000 acre-feet per year (AFY), the diversions from the American River are limited by the WFA to 58,900 AFY in normal/wet years. This includes 54,900 AFY of diversion by the City of Roseville plus 4,000 AFY of San Juan Water District water from PCWA's Middle Fork Project that is reallocated to the City during normal/wet years. In critically dry years, the maximum City diversion from the American River is limited to 39,800 AFY with a requirement for an additional 20,000 AFY of water to be made available for release by Placer County Water Agency (PCWA) through re-operation of its Middle Fork project. In drier years, the City may divert an amount between 58,900 and 39,800 AFY from the American River based on unimpaired flow into Folsom Lake with similar release requirements from PCWA.

At buildout of the City's current General Plan, water demands are estimated to reach approximately 58,582 AFY. The Project would include development of new residential, commercial, business professional, and school uses that would require water. The total water demand for the Project is estimated to be 3,612 AFY, which includes 2% for system loss, 4 AFY (with losses) for the Urban Reserve parcels, and a water demand reduction of 729 AFY for water conservation measures. Implementation of the SVSP project in combination with projected water demand for buildout of the City would be 62,194 AFY (58,582 AFY + 3,612 AFY). By subtracting the City's anticipated recycled water usage at buildout of 4,388 AFY (i.e., 563 AFY for SVSP and 3,825 AFY for other City areas) from the City's "with-Project" demand of 62,194 AFY, the net with-SVSP surface water demand is 57,806 AFY.

In a normal water year, the WFA assumes there is 58,900 AFY available from the American River. Although buildout demand are not expected to reach 58,900 AFY (but rather 57,806 AFY), to allow for a conservative CEQA approach, the City assumes a buildout 58,900 AFY, the amount allotted to the City via the WFA, as the City plus Project net buildout water demand.

Based on over 107 years of historical hydrology (and WFA restrictions), the 58,900 AFY contract surface water supply is assumed to be available to the City in about 83 percent of the years. In about 17 percent of the years, quantities from 58,900 AFY to a minimum of 39,800 AFY of surface water would be available per the WFA. Thus, in drought years, supplemental supplies potentially totaling up to 19,100 AFY (the difference between the average/wet year supply and the dry year supply) is needed to make up for the dry year and critically dry year deficiencies.

To meet water supply demands during dry and critically dry years, the City may utilize other supplies like recycled water and groundwater and implement the water conservation strategies outlined in the Roseville Municipal Code (RMC). Recycled water offsets the use of surface water supplies by reducing the City's reliance on American River supplies by filling irrigation demands that would otherwise use surface water supplies. Groundwater is used to make up any additional water supply shortfall. The RMC identifies "stages" of conservation designed to achieve a specific amount of reduction in water use to match available supplies for that year and outlines five drought stages with specific actions a water customer can implement to achieve a 10 to 50 percent water reduction.

Because the City's "with-Project" net buildout water demand is less than the amount of water allotted to the City in the WFA, and because the City can utilize recycled water, groundwater and water conservation strategies to offset potential decreases in American River water during dry and critically dry years, the water supply for the Project falls within the City's 2030 demand as agreed to under the WFA and as assessed, for CEQA purposes, under the Water Forum Proposal Environmental Impact Report (WFP EIR) which was certified in 1999.

1.1.3 Sierra Vista Specific Plan (Project) EIR

Pursuant to CEQA, the City is preparing an EIR for the Project that evaluates the environmental impacts of the Project. The SVSP EIR examines the potential effects of a proposed project that includes: 1) amending a 2,064-acre area, immediately west of the City corporate boundaries, north of Baseline Road, west of Fiddyment Road in unincorporated Placer County into the City's jurisdiction (annexation); 2) expanding approximately 353 acres of the City's sphere of influence (SOI) over a small portion of the western boundary, and 3) adopting the SVSP and associated entitlements. The EIR includes extensive analysis of the potential environmental impacts of the water supply strategy for the Project.

The water supply section of the Administrative Draft SVSP EIR (ADEIR) relies heavily upon the WFP EIR, which was certified in October 1999, for addressing project-specific impacts associated with supplying water to the Sierra Vista development, as discussed above. Although water supply for the City at buildout, including the 3,612 AFY for the Project, still fall within the 58,900 AFY American River demand allocated to the City under the Water Forum Agreement,

the ADEIR needs to include discussion that fully complies with the California Supreme Court's 2007 decision in *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (40 Cal.4th 412) and confirms or updates the impact determinations of the WFP EIR based upon current regional water supply issues/changed conditions.

1.2 Purpose and Intended Use of this Document

This Technical Memorandum (TM) addresses changed water supply/water management conditions in the region and evaluates whether these changed conditions and Central Valley Project (CVP) and State Water Project (SWP) operations would make the impacts to fisheries resources and water quality from the WFA demands (which include diversion of the City's full American River demand) more severe than previously disclosed in the WFP EIR. Specifically, this TM has two main purposes:

- Identify potential and reasonably foreseeable changes in CVP/SWP operations resulting from changed water supply/water management conditions and decisions (such as the recent NOAA Fisheries and USFWS Biological Opinions on the Operations Criteria and Plan (OCAP)), and any associated changes in:
    - system hydrology, and
    - the probable quantity and dry-year reliability of deliveries under the WFA, and Roseville's purveyor-specific agreement in particular.
- Identify, on a qualitative basis, any changes in the severity of the project-specific fisheries and water quality impacts that were identified in the WFP EIR, and identify any new and thus previously undisclosed fisheries or water quality impacts associated with the City's use of its American River supply, part of which will be used to meet the SVSP Project demand.

Findings from these assessments will be used to either validate the reliance of the SVSP EIR on the WFP EIR for assessing the fisheries and water quality impacts of the City's full buildout water supply demand on the American River, lower Sacramento River, and Delta, or determine that updates to the previous WFA project-specific impacts determinations are warranted, due to changed regional hydrologic and water supply conditions.

2 Recent Regulatory Decisions and other Proposed Actions that may Affect Future CVP/SWP Operations

The one constant in the universe of California water is that there is constant change responding to policy, regulatory, and judicial decisions. The ten years that have passed since the WFP EIR was prepared in 1999 have been a particularly dynamic period in the history of Central Valley Project (CVP) water operations. A listing of significant events during this period that affected CVP operations includes the following.

- 1999 - San Joaquin River Agreement; Agreement for providing San Joaquin River flows and exports
- 1999 - Department of Interior (DOI) Final Decision Accounting of Central Valley Improvement Project (CVPIA) 3406 (b)(2); Defined metrics and accounting for CVPIA 3406(b)(2) operations
- 2000 - State Water Resources Control Board (SWRCB) Revised Water Right Decision 1641; Revised order to provide for operations of the CVP and SWP to protect Bay-Delta water quality
- 2000 - CALFED Record of Decision (ROD); Presented a long-term plan and strategy designed to fix the Bay-Delta
- 2000 - Trinity River ROD; Defined minimum flow regime of 369,000 acre-feet in critical dry years ranging up to 816,000 acre-feet in wet years
- 2001 - CVPIA ROD; Implemented provisions of CVPIA including allocating 800,000 acre-feet of CVP yield for environmental purposes
- 2001 - National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries) Biological Opinion for Spring-Run Chinook Salmon and Steelhead; Established criteria for operations to protect spring-run chinook salmon and steelhead
- 2002 - NOAA Fisheries Biological Opinion for Spring-Run Chinook Salmon and Steelhead; Established criteria for operations to protect spring-run chinook salmon and steelhead
- 2003 - Revised DOI Final Decision Accounting of CVPIA 3406 (b)(2); Defined metrics and accounting for CVPIA 3406(b)(2) operations
- 2004 - NOAA Fisheries Biological Opinion for Spring-Run Chinook Salmon and Steelhead; Established criteria for operations to protect spring-run chinook salmon and steelhead
- 2005 - U.S. Fish and Wildlife Service (USFWS) Biological Opinion for Reinitiation of Formal and Early Section 7 Endangered Species Consultation on the Coordinated Operations of the Central Valley Project and State Water Project and the Operational Criteria and Plan to Address Potential Critical Habitat Issues
- 2007 - Judge Wanger issued a summary judgment that invalidated the 2005 USFWS Biological Opinion and ordered a new biological opinion be developed by September 15, 2008
- 2007 - Judge Wanger issued an interim order to direct actions at the export facilities to protect delta smelt until a new biological opinion is completed
- 2008 - USFWS Biological Opinion on the effects of the continued operation of the Federal Central Valley Project and the California State Water Project on the delta smelt and its designated critical habitat
- 2008 - Judge Wanger issued a memorandum decision and order that invalidated the 2004 NOAA Fisheries Biological Opinion and ordered a new biological opinion be developed
- 2009 – NOAA Fisheries Biological Opinion and Conference Opinion on the Long-Term Operations of the Central Valley Project and State Water Project

While this inventory of actions illustrates the many changes affecting operations of the CVP and SWP, implementation of most of them have been shown through quantitative analyses, to be

achievable within the flexibility of CVP/SWP operations contemplated in the WFP EIR. However, effects of the most recent actions, specifically the 2008 and 2009 OCAP Biological Opinions and the 2007 Wanger Decision are not yet quantifiable (at the time this Technical Memorandum was prepared) with existing analysis tools and, therefore, can only be assessed on a qualitative basis at this time.

2.1 USFWS Biological Opinion on the OCAP and Wanger Decisions

The operation of CVP/SWP is described in the OCAP. As updated in 2004, the OCAP provides a detailed description of the coordinated operations of the CVP and SWP based on historical data and serves as a starting point for planning project operations in the future. Under the federal Endangered Species Act (ESA), USFWS must produce formal Biological Opinions analyzing the impact of OCAP implementation on ESA-listed species (including the delta smelt). In effect, the ESA authorizes USFWS to require changes to the OCAP for the protection of the delta smelt and other federally listed species.

In 2005, USFWS issued a Biological Opinion for OCAP, and concluded that CVP/SWP operations did not jeopardize delta smelt populations. However, that opinion was struck down by a federal judge (Judge Wanger) following a lawsuit filed by environmentalists. USFWS was ultimately ordered to revise the Biological Opinion. The court also severely restricted CVP and SWP pumping in the Delta (Wanger Decision) pending the USFWS's completion of the new Biological Opinion. Those restrictions took effect in December 2007.

In December 2008, USFWS released a new Biological Opinion concluding that CVP and SWP operations would jeopardize the continued existence of endangered delta smelt. USFWS further detailed a "reasonable and prudent alternative" (RPA) to the proposed OCAP protocol that would, it claimed, protect the delta smelt and its habitat from the adverse effects of pumping operations. The "reasonable and prudent alternative" would restrict Delta pumping operations and would thus limit deliveries of water to CVP/SWP contractors south of the Delta. Extrapolating from the text of the RPA there are several Actions (1, 2, and 3) that will affect Delta exports by virtue of limitations on Old and Middle River ("OMR") flows, and Action 4 requiring additional X2[1] flows in the fall months that will affect reservoir releases.

2.2 NOAA Fisheries Biological Opinion on the OCAP

Like the USFWS, under the ESA, NOAA Fisheries must produce a formal Biological Opinion analyzing the impact of OCAP implementation on ESA-listed species under NOAA's jurisdiction, in this case including; endangered Sacramento River winter-run chinook salmon, threatened Central Valley spring-run chinook salmon, threatened Central Valley steelhead, and threatened Southern Distinct Population Segment (DPS) of North American green sturgeon. As

[1] X2 is the location of the 2 parts per thousand salinity contour (isohaline), one meter off the bottom of the estuary, as measured in kilometers upstream from the Golden Gate Bridge. The abundance of several estuarine species has been correlated with X2. Maintaining the location of X2 is accomplished via Project reservoir releases that increase inflow to the Delta thus "pushing" X2 towards the Golden Gate Bridge.

stated earlier, in effect, the ESA authorizes NOAA Fisheries to require changes to the OCAP for the protection of the federally listed species identified above.

In October 2004, NOAA Fisheries issued a Biological Opinion for OCAP, and concluded that CVP/SWP operations were not likely to jeopardize the continued existence of the Sacramento River winter-run chinook salmon, spring-run chinook salmon, and Central Valley steelhead populations. In April, 2008, that opinion was struck down by a federal judge (Judge Wanger) following a lawsuit filed by Pacific Coast Federation of Fishermen's Associations, Institute for Fisheries Resources, and others. The court found that NOAA Fisheries failed to analyze multiple factors and the 2004 Biological Opinion was remanded to NOAA Fisheries and the Reclamation for further consultation.

In June 2009, NOAA Fisheries released a new Biological Opinion concluding that CVP and SWP operations would jeopardize the continued existence of endangered Sacramento River winter-run chinook salmon, threatened Central Valley spring-run chinook salmon, threatened Central Valley steelhead, threatened Southern Distinct Population Segment (DPS) of North American green sturgeon, and Southern Resident killer whales. NOAA Fisheries further detailed a "reasonable and prudent alternative" to the proposed OCAP protocol that would, it claimed, protect these species and their habitat from the adverse effects CVP/SWP. The "reasonable and prudent alternative" would restrict Delta pumping operations and NOAA Fisheries estimated that deliveries of water to CVP/SWP contractors south of the Delta would be reduced by 5% to 7% of average annual exports. The RPA includes multiple actions applied to various CVP-influenced watersheds.

2.3 Other Reasonably Foreseeable Actions that may Affect CVP/SWP Operations

The foregoing listed and described actions are primarily the result of federal regulatory requirements. Other, reasonably foreseeable actions and initiatives that can potentially affect CVP/SWP operations include:

- El Dorado Water & Power Authority (EDWPA) Supplemental Water Supply Project. This project proposes to perfect water rights senior to U.S. Bureau of Reclamation (Reclamation) water rights, and would divert 40,000 acre-feet of water upstream of, or directly from Folsom Reservoir, thereby potentially reducing the CVP water supply to others in the American River basin.
- Bay Delta Conservation Plan (BDCP). The Bay Delta Conservation Plan is a planning and environmental permitting process to restore habitat for Delta fisheries in a way that reliably delivers water supplies to 25 million Californians. The BDCP is:
    - identifying conservation strategies to improve the overall ecological health of the Delta;
    - identifying ecologically friendly ways to move fresh water through and/or around the Delta; and
    - addressing toxic pollutants, invasive species, and impairments to water quality.

The BDCP is being developed under the federal ESA and the California Natural Community Conservation Planning Act (NCCPA) and will undergo extensive environmental analysis that will include opportunities for public review and comment. As the BDCP evaluates alternatives necessary to restore the Delta ecosystem while providing water supply reliability, state and federal agencies are developing a joint Environmental Impact Report/Statement (EIR/EIS) to determine the environmental impacts of the BDCP. Presently, the alternatives are being formulated but are not yet public. The draft EIR/EIS is expected to be ready for public review and comment no sooner than early 2010.

- Folsom Flood Control. The Corps of Engineers has been directed by Congress to update the Folsom Dam and Reservoir Water Control Manual to recognize the Auxiliary Spillway presently under construction at Folsom Dam. The implementation of the new spillway will reduce the risk of flooding in Sacramento, compared to the existing interim flood control operation, while potentially increasing water supplies to CVP contractors.

- Climate Change. Two aspects of climate change directly affecting CVP/SWP operations are of concern: 1) sea level rise, and 2) changes to the temporal/spatial/state (rain or snow) distribution of precipitation. The CALFED has a strong science program that assists in narrowing uncertainty in climate impacts so the best information is available on water issues to policy-makers. For example, the CALFED Independent Science Board (ISB) recently prepared a memo recommending which sea level rise projections are most appropriate for ongoing Delta planning. In addition, the CALFED Science Program has funded an effort to develop and apply a model-based approach for evaluating plausible future scenarios of the Bay-Delta-River-Watershed system. The Department of Water Resources (DWR) is developing a policy considering its existing demands in managing water resources for the state with meeting the state's climate policy goals. Despite the numerous on-going activities, this information cannot yet be quantified as effects on the CVP/SWP.

- Interagency Ecological Program (IEP). A consortium of nine state and federal agencies has been monitoring aquatic organisms and water quality in the San Francisco estuary for decades. Since late 2004, scientific and public attention has focused on the unexpected decline of several pelagic (open-water) fishes (delta smelt, longfin smelt, striped bass, and threadfin shad) in the freshwater portion of the estuary known as the Delta.

  This decline has collectively become known as the Pelagic Organism Decline (POD). In 2005, the IEP formed a multi-agency POD Management Team tasked with designing and managing a comprehensive study to evaluate the causes of the decline and to synthesize and report the results. The causes under investigation include stock-recruitment effects, a decline in habitat quality; increased mortality rates; and reduced food availability due to invasive species.

  The SWRCB continues to hold workshops and receive information regarding POD, climate change, and San Joaquin salinity and flows, and will coordinate updates of the Bay-Delta Plan with on-going development of the comprehensive Salinity Management Plan.

The effects of the preceding list of actions and initiatives on the CVP/SWP are, at this time, insufficiently defined to allow quantifiable identification of probable effects on CVP/SWP operations.

3 Implications of Recent Regulatory Decisions and Other Proposed Actions to CVP/SWP Operations and Resulting System Hydrology

3.1 Effects on CVP/SWP Operations

In the years following the certification of the WFP EIR, numerous regulatory and development actions have occurred that altered, to some extent, the operation of the CVP/SWP, and a list of many of those actions is presented in Section 2. This section reviews changes in operations with respect to a baseline consistent with that described as the "Water Forum Agreement" in the WFP EIR.

Defining the changes would be straightforward if unambiguous modeling studies were available to describe the progression of events from 1999 to present. Unfortunately, such is not the case. So many changes have been made to the modeling tools and basic underlying hydrologic input during the last ten years, that quantitative comparisons to identify the effects of a single action are not possible. Consequently, we are left with bits and pieces of information gleaned from previous analyses and inferences based on the opinions of Project operators and professional opinion. Where possible, quantifiable effects are reported in the following sections; however, much of what is expressed is, by necessity, qualitative, though it reflects the professional opinions of sophisticated observers immediately familiar with the CVP/SWP operations.

3.1.1 Key Changes to Existing Condition CVP/SWP Operations Compared to that Used for the WFP EIR

Identifying assumption changes in the modeled Base Condition for the WFP EIR, with those applied in present "Current Condition" modeling, can be achieved by looking at the modeling technical support documents. For this purpose it is appropriate to compare the PROSIM Model WFP EIR assumptions with the CALSIMII 2008 OCAP Biological Assessment Study 7.0 assumptions (**Table 3-1**). Study 7.0 captures all of the intervening regulatory changes occurring between 1999 and 2008, but does not include the Wanger Decision, USFWS 2008 OCAP Biological Opinion, or NOAA Fisheries 2009 OCAP Biological Opinion.

Because this study was prepared during the development of Reclamation's Biological Assessment for the OCAP, it does not contain the subsequent RPAs identified by USFWS and NOAA Fisheries in their respective Biological Opinions. Reclamation in concert with DWR, USFWS, and NOAA Fisheries is presently working on modifying the CALSIMII analytical model to incorporate the RPAs into the modeling code. This activity is not yet complete and is, therefore, unavailable for operations analyses. Thus, the best model information available is that contained in Study 7.0., consequently, this best available information was used in support of this TM.

Table 3-1. Existing Conditions.

	WFP EIR 1999	OCAP BA Study 7.0 2008
Model	PROSIM	CALSIMII
Period of Simulation	1922 - 1991	1922 - 2003
SWP Demands	Variable 3.6 Million Acre Feet (MAF)/Yr	Variable 3.1 - 4.2 MAF/Yr
CVP Demands		
North of Delta	Based on 1995 Land Use & Max Historic Use	Land-use based, limited by contract amounts
American River	WFA Current Use Estimate	Land-use based, limited by contract amounts
EBMUD	0	0
South of Delta	3.1 MAF	3.5 MAF
CVP Water Allocation		
CVP Settlement / Exchange	100% - 75% Based on Shasta Index	100% - 75% Based on Shasta Index
CVP Ag	100% - 10% Based on Supply	100% - 0% Based on Supply
CVP M&I	100% - 50% Based on Supply	100% - 50% Based on Supply
Refuge	100% - 50% Based on Supply	100% - 75% Based on Shasta Index
Instream Flow Requirements		
Trinity River	340 Thousand Acre Feet (TAF)	Trinity EIS Preferred Alternative (369-815 TAF/year)
Sacramento River	November 20, 1997 AFRP	Flows for SWRCB WR 90-5 temperature control, and USFWS discretionary use of CVPIA 3406(b)(2)
Clear Creek	November 20, 1997 AFRP	Downstream water rights, 1963 USBR Proposal to USFWS and NPS, and USFWS discretionary use of CVPIA 3406(b)(2)
Yuba River	Available Yuba River Data	Yuba Accord Adjusted Data
American River	November 20, 1997 AFRP	Minimum Instream Flow Management Standard
Delta Requirements	Delta Accord	SWRCB D-1641
Temperature Modeling		
Optimal Cold Water Pool Management	Yes	Yes
Folsom Lake TCD	No	Yes
Flood Control at Folsom	400/670	400/670
Hydrology	160-98 (PROSIM)	160-98 (CALSIMII)

EBMUD = East Bay Municipal Utility District.
AFRP = USFWS Anadromous Fish Restoration Program.
TCD = Urban water intake temperature control device.
OCAP BA + Operations Criteria and Plan Biological Assessment.

3.1.2 Key Changes to the 2030 Cumulative Condition CVP/SWP Operations Compared to that Used for the WFP EIR

Identifying assumption changes in the modeled Cumulative Condition for the WFP EIR, with those applied in present Future Condition modeling, can be achieved by looking at the modeling technical report descriptions. For this purpose it is appropriate to compare the PROSIM Model WFP EIR assumptions with the CALSIMII 2008 OCAP Biological Assessment Study 8.0 assumptions (**Table 3-2**). Study 8.0 captures all of the intervening regulatory changes occurring between 1999 and 2008, foreseeable future projects, but does not include the Wanger Decision, USFWS 2008 OCAP Biological Opinion, or NOAA Fisheries 2009 OCAP Biological Opinion. This is because the effects of the USWFS Biological Opinion on CVP/SWP operations were not fully understood or integrated into modeling Study 8.0 in 2008 when the modeling was performed, and because the NOAA Fisheries 2009 OCAP Biological Opinion was not available at the time.

Moreover, there are additional anticipated future events/actions that have been identified for which there is no explicit data available to compare, specifically the BDCP, EDWPA Supplemental Water Supply Project, and climate change. Therefore, quantifying their effects on CVP/SWP operations under the future cumulative conditions is not currently possible. **Because the BDCP, EDWPA Supplemental Water Supply Project and climate change would collectively have profound effects on CVP/SWP operations and resulting system hydrology, yet these effects remain unclear at this time, the future cumulative condition that includes these actions/phenomena remains speculative at this time.**

Table 3-2. Cumulative Conditions.

	WFP EIR 1999	Study 8.0 2008
Model	PROSIM	CALSIMII
Period of Simulation	1922 - 1991	1922 - 2003
SWP Demands	Variable 4.2 MAF/Yr.	Variable 3.1 - 4.2 MAF/Yr
CVP Demands		
North of Delta	Based on 2020 Land Use & Max Historic Use	Land-use based, full build out of CVP contract amounts
American River	WFA	Land-use based, limited by contract amounts
EBMUD	EBMUD 8/3/98 Proposal	133 TAF
South of Delta	3.1 MAF	3.5 MAF
CVP Water Allocation		
CVP Settlement / Exchange	100% - 75% Based on Shasta Index	100% - 75% Based on Shasta Index
CVP Ag	100% - 10% Based on Supply	100% - 0% Based on Supply
CVP M&I	100% - 50% Based on Supply	100% - 50% Based on Supply
Refuge	100% - 50% Based on Supply	100% - 75% Based on Shasta Index
Instream Flow Requirements		
Trinity River	390 - 750 TAF	Trinity EIS Preferred Alternative (369-815 TAF/year)
Sacramento River	November 20, 1997 AFRP	Flows for SWRCB WR 90-5 temperature control, and USFWS discretionary use of CVPIA 3406(b)(2)
Clear Creek	November 20, 1997 AFRP	Downstream water rights, 1963 USBR Proposal to USFWS and NPS, and USFWS discretionary use of CVPIA 3406(b)(2)
Yuba River	Available Yuba River Data	Yuba Accord Adjusted Data
American River	November 20, 1997 AFRP	Minimum Instream Flow Management Standard
Delta Requirements	Delta Accord	SWRCB D-1641
Temperature Modeling		
Optimal Cold Water Pool Management	Yes	Yes
Folsom Lake TCD	Yes	Yes
Flood Control at Folsom	400/670	400/670
Hydrology	160-98 (PROSIM)	160-98 (CALSIMII)

EBMUD = East Bay Municipal Utility District.
AFRP = USFWS Anadromous Fish Restoration Program.
TCD = Urban water intake temperature control device.
OCAP BA = Operations Criteria and Plan Biological Assessment.
NPS= National Park Service.

3.2 Anticipated Changes to System Hydrology Compared to that Used for the WFP EIR

The information presented in **Table 3.1** identifies significant assumption changes between existing condition studies. Although the assumptions change, the effect on CVP/SWP operations may or may not be recognizable. In this section, quantitative and qualitative effects on current CVP/SWP operations are associated with the various assumption changes.

3.2.1 PROSIM to CALSIMII

Subsequent to the preparation of the 1999 WFP EIR, Reclamation and DWR completed the development and acceptance of a new CVP/SWP system-wide model that replaced the PROSIM model. The new model, now referred to as CALSIMII, incorporated new algorithms for surface and groundwater operations, as well as updated hydrology, which better characterized the CVP/SWP operations. The change in modeling tools affected CVP/SWP performance in a variety of ways due to hydrology and model logic differences. Work performed for the City of Roseville, at the time that the shift to CALSIMII occurred, concluded that:

- Statistically, Folsom Reservoir storage is lower in the PROSIM simulation during all examined periods of the year.
- Statistically, Nimbus Dam release is equivalent in the PROSIM and CALSIMII simulations during the October through November and July through September periods, and PROSIM releases are greater in the December through March and April through June periods.
- The two periods in which PROSIM releases are greater are those in which average monthly flows are greatest for both simulations.
- The frequency and magnitude of potential environmental impacts is typically relatively small during the December through June period.
- Statistically, Watt Avenue water temperature is higher in the PROSIM simulation during the April through June and July through September periods, equivalent to the CALSIMII simulation during the October through November period, and lower than the CALSIMII simulation during the December through March period.
- Every month of the December through March period is less than 54°F in both simulations. Although specific thermal requirements of anadromous salmonids vary by species and life stage, water temperatures $\leq$ 54°F are protective of all the life stages of anadromous salmonids present in the lower American River during this time period (Rich 1987; McCullough et al. 2001; NOAA Fisheries 1993, 2000, 2001, 2002);
- During the hottest months of the year (i.e., April through September), water temperatures are higher in the PROSIM simulation than the CALSIMII simulation. Because anadromous salmonids are coldwater species, the warmer temperatures of the PROSIM simulation suggest an increased number of negative effects on anadromous salmonids than would be identified in the CALSIMII simulation, therefore, providing a more conservative estimation of potential thermal impacts on these species.

In general, the switch from PROSIM to CALSIM affects simulated reservoir storages, reservoir releases and CVP/SWP deliveries to Project contractors. These changes, some of which are identified above, are mostly associated with the frequency for which a given storage/release/delivery parameter might be expected to occur. There is little difference in the

model results at the extremes of these parameters, but over the course of a modeled year or years, the balancing of available reservoir water sources and subsequent project operations are portrayed differently in response to the advances in modeling. CALSIMII best represents the current conditions/simulated operations for planning and assessment purposes.

3.2.2 Period of Simulation

The period of simulation for CALSIMII increased by 12 years by including the years 1992 through 2003. Of these 12 years, 2 years were classified as critical water years, 2 water years were dry, 0 (zero) were below normal, 3 years were above normal, and 5 were wet years. This distribution of year types is somewhat "wetter" than the 1922-1991 period, but the dry years were no drier than those in the 1922-1991 period and the wet years were no wetter than those in the 1922-1992 period.

- *Folsom Reservoir Storage:* not expected to have a significant effect on assumptions drawn from 1922-1991 period.
- *Lower American River Flows at Nimbus Dam:* not expected to have a significant effect on assumptions drawn from 1922-1991 period.
- *Other CVP Reservoir Storage:* not expected to have a significant effect on assumptions drawn from 1922-1991 period.
- *Lower Sacramento River Flow at Freeport:* not expected to have a significant effect on assumptions drawn from 1922-1991 period.
- *Delta Inflow:* not expected to have a significant effect on assumptions drawn from 1922-1991 period.

3.2.3 CVP Demands

CVP demands north of the Delta are essentially equivalent between the studies. South of Delta CVP demands are higher in recent modeling. These higher demands could affect Folsom Reservoir storage in some years by requiring additional release. However, because the inflow to storage ratio for Folsom Reservoir is quite high, Folsom is operated as an annual reservoir, meaning that it is not expected to store water for future years, but rather is operated to maintain at least minimally acceptable storage in the fall months in order to provide minimum levels of instream flows below Nimbus Dam, American River water rights deliveries, and flood protection for each upcoming winter. In nearly all years the storage will recover by the following spring. Other upstream CVP reservoirs do carry over storage as insurance for a following dry year. These reservoirs could experience lower storage but would remain within the range of operations identified in the WFP EIR.

- *Folsom Reservoir Storage:* not be expected to cause Folsom Reservoir storage levels to be outside the range identified in the WFP EIR.
- *Lower American River Flows at Nimbus Dam:* not be expected to cause American river flows outside the range identified in the WFP EIR.
- *Other CVP Reservoir Storage:* not be expected to cause other CVP reservoir storage levels to be outside the range identified in the WFP EIR.
- *Lower Sacramento River Flow at Freeport:* not be expected to cause Sacramento River flows at Freeport outside the range identified in the WFP EIR.

- *Delta Inflow:* not be expected to cause Delta Inflows outside the range identified in the WFP EIR.

3.2.4 SWP Demands

SWP demands south of the Delta are variable in recent modeling studies, being greater in some years and smaller in some years. SWP demands are met from surplus Delta inflow and releases from Oroville Reservoir. Effects of these demand changes on CVP operations are negligible.

- *Folsom Reservoir Storage:* effects on Folsom Reservoir storage are inconsequential.
- *Lower American River Flows at Nimbus Dam:* effects on American River flows are insignificant.
- *Other CVP Reservoir Storage:* effects on other CVP reservoir storages are insignificant.
- *Lower Sacramento River Flow at Freeport:* effects on Sacramento River flows at Freeport are insignificant.
- *Delta Inflow:* effects on Delta Inflow are insignificant.

3.2.5 CVP Water Allocations

CVP water allocations reflect the application of water shortages to CVP customers based on contract type. CVP water shortage policy has evolved through time in response in part to regulatory changes and to increased demands. Studies subsequent to the WFP EIR have assumed different shortage policies for agriculture and refuge water supplies. CVP M&I water shortage criteria has remained within the same 0% to 50% range; however, the frequency for which any given delivery allocation occurs within this range has changed. Generally, CVP allocations are higher in the WFP EIR as the result of the combination of modeling tool and assumption changes used for more recent modeling tends to reduce project flexibility in meeting system wide demands.

- *Folsom Reservoir Storage:* effects on Folsom Reservoir storage are insignificant.
- *Lower American River Flows at Nimbus Dam:* effects on American River flows are insignificant.
- *Other CVP Reservoir Storage:* effects on other CVP reservoir storages are insignificant.
- *Lower Sacramento River Flow at Freeport:* effects on Sacramento River flows at Freeport are insignificant.
- *Delta Inflow:* effects on Delta Inflow are insignificant.

3.2.6 Trinity River Flow Requirements

The Trinity River flows are somewhat lower in the WFP EIR modeling than in recent studies. With higher flow requirements in more recent studies, the availability for cross basin export to the Sacramento River is diminished, creating a potential for increased Shasta reservoir releases. This results in less water available for CVP project purposes. Because of the hierarchy of water user contracts, this would be expected to increase the frequency of export Ag water shortages. The effect on M&I water users is much less pronounced, although some additional shortages would be expected.

- *Folsom Reservoir Storage:* effects on Folsom Reservoir storage are insignificant.

- *Other CVP Reservoir Storage:* effects on other CVP reservoir storage are common but within the range of elevations identified in the WFP EIR.
- *Lower American River Flows at Nimbus Dam:* effects on American River Flows are insignificant.
- *Lower Sacramento River Flow at Freeport:* effects on Sacramento River flows at Freeport are common but within the range of flows identified in the WFP EIR.
- *Delta Inflow:* effects on Delta inflow are common but within the range of inflows identified in the WFP EIR.

3.2.7 Clear Creek Flow Requirements

In the WFP EIR, the USFWS Anadromous Fisheries Restoration Program (AFRP) Clear Creek flows were supported by CVPIA 3406(b)(2) water. These flows were subsequently made more permanent by CVPIA policy and USFWS Biological Opinions. The magnitude of any changes in Clear Creek flow requirements between studies, with respect to Sacramento River operations, is too small to influence overall CVP/SWP operations.

- *Folsom Reservoir Storage:* effects on Folsom Reservoir storage are insignificant.
- *Lower American River Flows at Nimbus Dam:* effects on American River flows are insignificant.
- *Other CVP Reservoir Storage:* effects on other CVP Reservoir storage are insignificant.
- *Lower Sacramento River Flow at Freeport:* effects on Sacramento River flow at Freeport are insignificant.
- *Delta Inflow:* effects on Delta inflows is insignificant.

3.2.8 Sacramento River Flow Requirements

The Sacramento River flow requirements are those necessary to meet a minimum level of flow and temperature performance. Frequently, flows exceed the minimums as a result of flood control, navigation, Delta water quality, or Delta export requirements. Although changes are to be expected in some months, the difference in CVP/SWP operations between the WFP EIR and more recent modeling caused by this assumption change is small.

- *Folsom Reservoir Storage:* effects on Folsom Reservoir storage are insignificant.
- *Lower American River Flows at Nimbus Dam:* effects on American River flows are insignificant.
- *Other CVP Reservoir Storage:* effects on other CVP reservoir storages are small, and within the range of elevations identified in the WFP EIR.
- *Lower Sacramento River Flow at Freeport:* effects on Sacramento River flow at Freeport are small, and within the range of flows identified in the WFP EIR.
- *Delta Inflow:* effects on Sacramento River flow are small, and within the range of inflow identified in the WFP EIR.

3.2.9 Yuba River Flow Requirements

The Yuba Accord combines increased instream fisheries flows with increased supplemental water supplies for export in the Delta. Because the Yuba River Accord was not in existence at

the time of the WFP EIR modeling it was not included. Effects of the accord are focused on the Yuba River, lower Sacramento River and Delta exports.

- *Folsom Reservoir Storage:* the Yuba Accord does not affect Folsom Reservoir operations.
- *Lower American River Flows at Nimbus Dam:* the Yuba Accord does not affect American River flows at Nimbus.
- *Other CVP Reservoir Storage:* the Yuba Accord effects on storage in other CVP reservoirs are occasional, but within the range identified in the WFP EIR.
- *Lower Sacramento River Flow at Freeport:* The Yuba Accord results in higher Sacramento River flows at Freeport.
- *Delta Inflow:* The Yuba Accord results in higher Delta inflow.

3.2.10 American River Flow Requirements

American River minimum flow requirements in the WFP EIR are quite different from current flows. Since the WFP EIR was certified, the Water Forum in conjunction with Reclamation and federal and state resource agencies developed a lower American River Flow Management Standard (FMS). Reclamation has voluntarily operated to the minimum instream flow component[2] of the FMS for the last two years and has represented in its modeling of American River operations for existing conditions, its intention to continue doing so. The FMS has two underlying co-equal objectives, providing a safe and reliable water supply for the region, and preserving the fishery, wildlife, recreational and aesthetic values of the lower American River. While different in magnitude from those flows contemplated in the WFP EIR, present FMS flows provide a level of compliance with the co-equal objectives equivalent to the WFP EIR.

It also is important to note, that just as is the case for Sacramento River flows, frequently meeting other CVP purposes causes flows in excess of the minimums. On the American River this is particularly evident in months outside of the fall (October through December period).

- *Folsom Reservoir Storage*: effects on Folsom storage are occasional, in most years lower storage is restored by reservoir inflow in the spring, and within the range of elevations identified in the WFP EIR.
- *Lower American River Flows at Nimbus Dam:* effects on American River flows are occasional, but within the range of flows identified in the WFP EIR.
- *Other CVP Reservoir Storage:* effects of on Other CVP storages are occasional, but within the range of elevations identified in the WFP EIR.
- *Lower Sacramento River Flow at Freeport:* effects on Sacramento River flows at Freeport are occasional, but within the range of flows identified in the WFP EIR.
- *Delta Inflow:* effects on Delta inflow are occasional, but within the range of flows identified in the WFP EIR.

[2] The flow component of the FMS was included in the 2009 NOAA Fisheries OCAP Biological Opinion RPA and is, therefore, a directive of the ESA process. Further acknowledgement of the FMS may be forthcoming in actions before the SWRCB, although this effort has not yet been initiated.

3.2.11 Delta Water Quality Requirements

The December 1994 Bay-Delta Accord, formally known as the "Principles for Agreement on Bay-Delta Standards Between the State and Federal Governments," brought together urban, agricultural, and environmental interests around a consensus on setting new Bay-Delta water quality standards (including flow requirements for the Sacramento and San Joaquin Rivers). This facilitated coordinating the operations in the SWP and the CVP to help achieve those standards, and developing new long-term approaches to address a variety of fish and wildlife, water supply, and water quality issues involving the Bay-Delta. Among other things, the Bay-Delta Accord was intended to reduce uncertainties in how the ESA would be applied going forward as a tool for managing Bay-Delta water resources.

The accord provided for an integrated ecosystem approach to management of the Bay- Delta that would allow for protection of species without impairing seasonal water supply allocations. In May 1995, the California State Water Resources Control Board (State Water Board) adopted a final Water Quality Control Plan for the Bay-Delta (1995 Bay-Delta Plan). The 1995 Bay-Delta Plan incorporated the basic standards and strategies laid out in the 1994 Bay-Delta Accord. In addition, the State Water Board initiated one of the longest and most complicated water rights proceeding in state history to modify previously issued permits (principally held by the CVP and the SWP) for the long-term appropriation of water from the Delta and to manage that resource in a reliable and environmentally sensitive way. The State Board's water rights proceeding resulted in the adoption of Water Rights Decision 1641 (D-641) on Dec. 29, 1999 (revised on March 15, 2000).

For modeling purposes, D-1641 can be assumed as codifying the Bay-Delta Accord principles. Thus, there is no recognizable change in the modeling.

- *Folsom Reservoir Storage:* effects on Folsom Reservoir storage are insignificant
- *Lower American River Flows at Nimbus Dam:* effects on American River flows are insignificant
- *Other CVP Reservoir Storage:* effects on other CVP Reservoir storage are insignificant
- *Lower Sacramento River Flow at Freeport:* effects on Sacramento River flow at Freeport are insignificant
- *Delta Inflow:* effects on Delta inflows is insignificant

3.2.12 Wanger Decision

The CVP/SWP operational changes required by the Wanger Decision addressing the 2004 OCAP USFWS OCAP Biological Opinion for delta smelt was not in effect at the time of the WFP EIR. Had it been so, the resultant effect in CVP/SWP operations would have been a reduction in CVP/SWP Delta exports associated with not exceeding maximum prescribed net upstream flow in Old and Middle Rivers. This reduction in exports would have affected CVP and SWP delivery allocations and potentially and/or resulted in additional releases from upstream reservoirs.

- *Folsom Reservoir Storage:* effects of the Wanger Decision on Folsom Reservoir storage would likely be occasionally lower storage, in most years restored by reservoir inflow in the spring, but within the range of elevations identified in the WFP EIR.

- *Lower American River Flows at Nimbus Dam:* effects on American River flows at Nimbus would be occasional (+/-), but within the range of flows identified in the WFP EIR.
- *Other CVP Reservoir Storage:* effects of the Wanger Decision on Other CVP reservoir storages would likely be occasionally lower storage, but within the range of elevations identified in the WFP EIR.
- *Lower Sacramento River Flow at Freeport:* effects on Sacramento River flows at Freeport would be occasional (+/-), but within the range of flows identified in the WFP EIR.
- *Delta Inflow:* effects on Delta inflow would be occasional (+/-), but within the range of inflows identified in the WFP EIR.

3.2.13 USFWS 2008 OCAP Biological Opinion for Delta Smelt

The USFWS Biological Opinion is not presently included in current modeling at any level of development. Modelers are in the process of incorporating the Reasonable and Prudent Alternative (RPA) for this Biological Opinion into CALSIMII so that its effects may be quantified. Extrapolating from the text of the RPA there are several Actions (1, 2, and 3) that will affect Delta exports by virtue of limitations on Old and Middle River ("OMR") flows, and Action 4 requiring additional X2 flows in the fall months that will affect reservoir releases. RPA Actions 1 through 4 address the following measures:

- RPA Action 1: limits exports at the Project pumps so that the average daily OMR flow is no more negative than -2,000 cfs for a total duration of 14 days, with a 5-day running average no more negative than -2,500 cfs (within 25 percent). This action would occur at some time within the December – March window.
- RPA Action 2: requires that the range of net daily OMR flows will be no more negative than -1,250 to -5,000 cfs. This action would occur immediately following Action 1.
- RPA Action 3: requires that net daily OMR flow will be no more negative than -1,250 to -5,000 cfs based on a 14-day running average with a simultaneous 5-day running average within 25 percent of the applicable requirement for OMR. This action would occur at the onset of spawning and extending to as late as June 30.
- RPA Action 4: improves fall estuarine habitat for delta smelt by managing of X2 through increasing Delta outflow during fall when the preceding water year was wetter than normal. This action would occur on September 1 through November 30.

Folsom reservoir storage will likely be lower in the fall as a result of these RPAs; however, in most years the storage would recover by spring.

- *Folsom Reservoir Storage:* Folsom Reservoir storage will likely be frequently lower in the fall as a result of the RPAs; however, in most years the storage would recover by spring, and be within the range of elevations identified in the WFP EIR.
- *Lower American River Flows at Nimbus Dam:* effects on American River flows at Nimbus particularly in the fall months could be frequent (+/-), but within the range of flows identified in the WFP EIR.

- *Other CVP Reservoir Storage:* other CVP reservoir storage will likely be frequently lower in the fall as a result of the RPAs; however, it should remain within the range of elevations identified in the WFP EIR .
- *Lower Sacramento River Flow at Freeport:* effects on Sacramento River flows at Freeport, particularly in the fall months, could be frequently higher, but within the range of flows identified in the WFP EIR.
- *Delta Inflow:* effects on Delta inflow, particularly in the fall months could be frequently higher, but within the range of flows identified in the WFP EIR.

3.2.14 NOAA Fisheries 2009 OCAP Biological Opinion

The NOAA Fisheries Biological Opinion is also not presently included in current modeling at any level of development. As with the USFWS Opinion, modelers are in the process of incorporating the Reasonable and Prudent Alternative (RPA) for this Opinion into CALSIMII so that its effects may be quantified. Extrapolating from the text of the RPA there are multiple Actions applied to various CVP-influenced watersheds.

RPA Action I is specific to the Sacramento River, primarily affecting Shasta reservoir storage operations necessary to achieve water temperature requirements in the Sacramento River below Keswick Dam. RPA Action II applies to the American River and is quite similar with respect to flows, to the Flow Management Standard used in recent modeling. RPA Action III applies to the San Joaquin River operations. RPA Action IV applies to Delta operations and includes requirements for Delta Cross Channel Gate operations and OMR flows. Included within the RPA actions are other components dealing with fish passage and physical feature changes. Actions I and IV are those which will have the most effects on CVP operations with respect to reservoir storage and CVP water deliveries.

- *Folsom Reservoir Storage:* Folsom reservoir storage will be lower in the fall as a result of the RPAs; however, it is likely in most years the storage would recover by spring, and be within the range of elevations identified in the WFP EIR.
- *Lower American River Flows at Nimbus Dam:* effects on American River flows at Nimbus particularly in the fall months could be frequently (+/-), but within the range of flows identified in the WFP EIR.
- *Other CVP Reservoir Storage:* other CVP reservoir storage, particularly Shasta, will be frequently higher as a result of the RPAs; however, it is likely in most years the storage would be within the range of elevations identified in the WFP EIR.
- *Lower Sacramento River Flow at Freeport:* effects on Sacramento River flows at Freeport, could frequently be (+/-), but within the range of flows identified in the WFP EIR.
- *Delta Inflow:* effects on Delta inflow, could frequently be (+/-), but within the range of flows identified in the WFP EIR.

3.2.15 Summary of Changes in System Hydrology at Existing Conditions

Table 3-3 shows a summary matrix of the anticipated changes in system hydrology and changes in key storage and flow parameters of importance to the assessment of fisheries resources and

water quality impacts in the WFP EIR. These changes reflect a qualitative assessment of effects promulgated by the identified changed conditions. It may be seen in the table that a given change in condition does not always indicate a "negative" effect on a key parameter, but frequency of effects are variable. In some cases the lack of effect is a function of operational flexibility within the CVP/SWP, while in other cases there are temporal effects that occur but without any overall annual effect.

While the table is indicative of individual parameter effects, it is necessary for the assessment of environmental impacts to combine the individual effects and determine the net effect. Therefore, Table 3-3 includes a final row that provides the estimated net change in the key storage and flow parameters, based on all changed conditions identified and discussed herein.

Overall, the effects of the multiple analytical, regulatory, and hydrologic changes of the past ten years have not radically changed the performance of CVP facilities with respect to American River operations identified in the WFP EIR. Folsom Reservoir levels remain within the WFP EIR limits, as do minimum and typical lower American River flows.

There are many similarities between the operations identified in the WFP EIR and those that presently exist. There are identified increases in water demands by contractors, but these have taken place coincident with regulatory actions intended to maintain or improve conditions for the environment. Consequently, the environmental protections envisioned by the WFP EIR remain.

Today, the operation of the CVP/SWP is significantly guided by the USFWS and NOAA Fisheries OCAP Biological Opinions. The Biological Opinions limit many aspects of CVP/SWP reservoir storage, river release, and contractor diversions. Because there is a finite water supply, and environmental protections are not discretionary, ultimately, these limitations manifest themselves in reduced contractor diversions in some conditions. By virtue of the CVP contract priorities based on a contractor's geographical location and intended use for the water, diversion reductions are applied when water supplies are limited. The majority of the delivery reduction effects will occur to the export contractors south of the Delta who will experience much more frequent reductions and greater cuts to deliveries.

Table 3-3. Summary of Changes and Key CALSIMII Modeling Outputs.

Changed Condition	Key Parameters for Impact Assessment				
	Folsom Reservoir Storage	Lower American River Flows	Other CVP Reservoir Storage	Lower Sacramento River Flow	Delta Inflow
PROSIM to CALSIMII	+	○/-	○	○	○
Period of Simulation	○	○	○	○	○
CVP Demands: (North of Delta/South of Delta)	○/-	○/-	○/-	○/+	○/+
SWP Demands	○	○	○	○	○
CVP Water Allocations	○	○	○	○	○
Trinity River Flow Requirements	○	○	+/-	+/-	+/-
Clear Ck Flow Requirements	○	○	○	○	○
Sacramento River Flow Requirements	○	○	+/-	+/-	+/-
Yuba River Flow Requirements	None	None	+/-	+	+
American River Flow Requirements	+/-	**+/–**	+/-	+/-	+/-
Delta Water Quality Requirements	○	○	○	○	○
Wanger Decision	**–**	+/-	-	+/-	+/-
USFWS 2008 OCAP Biological Opinion	**–**	**+/–**	**–**	**+**	**+**
NOAA Fisheries 2009 OCAP Biological Opinion	**–**	**+/–**	**+**	**+/–**	**+/–**
Overall Net Effects	+/-	+/-	+/-	**+/–**	**+/–**

Notes:
None = The changed condition does not affect the parameter.
○ = No appreciable change.
-, +, and +/- = Overall occasional decreases (-), increases (+), or both (+/-) relative to WFP EIR.
–, **+**, and **+/–** = Overall frequent decreases (**–**), increases (**+**), or both (**+/–**) relative to WFP EIR.

4 Evaluation of Fisheries and Water Quality Impacts Identified in the Water Forum EIR in light of Anticipated CVP/SWP System Hydrologic Changes

This section provides an assessment to determine whether the fisheries and water quality impact determinations disclosed in the WFP EIR would differ today, due to changes in current baseline conditions as a result of changed CVP/SWP operations and system hydrological conditions described in Section 3, that were not present when the WFP EIR was prepared. As indicated in Section 3, the potential changes in CVP operations and system hydrological conditions have not been assessed quantitatively through revised CALSIMII modeling. Likewise, related modeling with Reclamation's reservoir and river temperature models, or early life-stage salmon mortality, has not been conducted. A key reason for this is because the resource agencies, including Reclamation and DWR, have not yet determined how CVP/SWP operations are to be modified to adequately address the USFWS and NOAA Fisheries Biological Opinions on OCAP discussed above, nor has Reclamation or any other party codified the "Reasonable and Prudent Alternatives" of the 2008 and 2009 Biological Opinions into CALSIMII. In other words, CALSIMII, the standard tool used to model the effects of a project on CVP/SWP system operations and resulting system-wide hydrologic conditions has not been updated to account for implementation by the agencies of the USFWS and NOAA Fisheries Biological Opinions on OCAP. Therefore, this evaluation, by necessity, was performed in a qualitative manner by leading experts.

Based on the anticipated changes to system operations and hydrology, the key factors upon which the WFP EIR impact determinations were based were reevaluated to determine whether there would be any new previously undisclosed significant impacts requiring mitigation, or whether the impacts would be substantially more severe than previously disclosed. Lastly, the assessment considered whether any new significant impacts rise to the level that would warrant new quantitative analyses with the CALSIMII model (or Reclamation's related models) to provide and adequate impact assessment for the purposes of assessing the effects of the SVSP Project's 3,612 AFY water supply, which is part of the City's overall American River water supply previously assessed under the WFP EIR.

4.1 Fisheries Impacts

The WFP EIR, Chapter 4.5, "Fisheries Resources and Aquatic Habitat," addressed a total of seventeen individual numbered impacts. This section provides a qualitative assessment of each numbered impact based on the present understanding of CVP/SWP operations and resulting system hydrology upon which WFA demands, including the City of Roseville's American River demands, would be imposed. The impact discussions are organized by the general location where the primary effects would occur, which are Folsom Reservoir and Lake Natoma, Lower American River, Upper CVP Reservoirs, Sacramento River, and the Delta.

4.1.1 Folsom Reservoir and Lake Natoma

Impacts to Folsom Reservoir Coldwater and Warmwater Species (WFP EIR Impacts 4.5-1 and 4.5-2). The WFP EIR found the impacts in Folsom Reservoir to coldwater fisheries to be less than significant, and impacts to warmwater species to be potentially significant due to reduced availability of littoral habitat. Mitigation for the impact to warmwater fisheries was identified in the WFP EIR. However, it was determined that due to uncertainty regarding future conditions, the impact would remain significant and unavoidable following mitigation.

Based on the assessment of changes to CVP/SWP operations and anticipated resultant changes to hydrologic conditions identified in Table 3.3 above, the seasonal reductions in Folsom Reservoir storage levels would be more frequent and occasionally of greater magnitude, relative to conditions modeled in the WFP EIR. Minimum storage levels in late fall, and storage levels in the spring following reservoir refilling during the winter, are expected to change minimally. Under current conditions and system operations, WFA demands would be anticipated to result in a similar pattern of seasonal reductions in Folsom Reservoir storage as previously determined in the WFP EIR.

Anticipated changes in seasonal storage levels within the reservoir's normal operational range would not cause substantial adverse effects on habitat quality or quantity or prey availability for coldwater species. Thus, the anticipated incremental changes to Folsom Reservoir storage, due to changed conditions and WFA demands, would not change the impact determination for Folsom Reservoir coldwater fisheries, relative to that made in the WFP EIR. Likewise, the anticipated seasonal changes to reservoir storage and surface elevations would result in similar reductions to littoral habitat for warmwater species as previously determined in the WFP EIR. Therefore, the reduced reservoir storage and elevations would not be expected to cause new or substantially more severe impacts to Folsom Reservoir warmwater fisheries, relative to that determined in the WFP EIR, and thus this impact would remain potentially significant under current conditions as originally characterized in the WFP EIR.

Impact to Coldwater and Warmwater Species in Lake Natoma (Impact 4.5-3) and Temperature Impacts to Nimbus Fish Hatchery Operations and Fish Production (Impact 4.5-4). The WFP EIR found the impacts to coldwater and warmwater fish populations in Lake Natoma to be less than significant. The impacts to operations and fish production of the Nimbus Fish Hatchery also were less than significant.

Based on the assessment of changes to CVP/SWP operations and anticipated resultant changes to hydrologic conditions identified in Table 3.3 above, the seasonal reservoir storage, elevations, and flows through Lake Natoma would not change appreciably from those defined in the WFP EIR. As a regulating after bay for power production at Folsom Dam, Lake Natoma storage and surface elevation fluctuations would remain similar under current conditions and operations, and any changes in Lake Natoma operations as a result of WFA demands would be negligible, as previously determined in the WFP EIR. The WFP EIR found that water temperature patterns within Lake Natoma would be somewhat cooler during the June through September period as a result of a new temperature control device (TCD) for the Folsom Dam urban water intake structure and optimal coldwater pool management. The TCD was installed in 2003 and thus represents a new baseline for thermal conditions within the lake.

Based on the anticipated minimal changes to Lake Natoma storage, surface elevation fluctuations, and temperatures that may occur, due to changed conditions and system operations, WFA demands imposed on the changed conditions and system operations would not be expected to cause any new significant impacts to Lake Natoma's coldwater and warmwater fish populations or Nimbus Fish Hatchery operations and fish production, relative to those determined in the WFP EIR. Therefore, these impacts would remain less than significant under current conditions and operations as originally characterized in the WFP EIR.

4.1.2 Lower American River

Impact to Fall-run Chinook Salmon (WFP EIR Impact 4.5-5). The WFP EIR found the impacts to fall-run chinook salmon to be potentially significant, primarily as a result of frequent reductions in lower American River (LAR) flows during October through December. Mitigation for the impact was identified in the WFP EIR. However, it was determined that due to uncertainty regarding future conditions, the impact would remain significant and unavoidable following mitigation.

Based on the assessment of changes to CVP/SWP operations and anticipated resultant changes to hydrologic conditions identified in Table 3.3 above, seasonal LAR flows would be occasionally different (either higher or lower) relative to conditions modeled in the WFP EIR. CVP's implementation of the LAR Flow Management Standard (FMS) and the NOAA Fisheries 2009 OCAP Biological Opinion are specifically for the purpose of modifying operations to benefit LAR coldwater fish resources. Under current conditions and system operations, WFA demands would be anticipated to result in a similar pattern of seasonal reductions in LAR flows as previously determined in the WFP EIR. Therefore, the seasonal LAR flows would be expected to be similar to that assessed in the WFP EIR and there may be some flow improvement related to meeting the life-cycle needs of the fall-run chinook salmon resulting from the FMS and NOAA Fisheries 2009 OCAP Biological Opinion.

When imposed on the changed conditions, WFA demands are anticipated to result in reduced LAR flows in October through December period, as previously determined in the WFP EIR, which may reduce available spawning habitat and lead to redd superimposition and reduced size of the initial year-class. The anticipated incremental changes to LAR flows, due to changed conditions and WFA demands, would be expected to result in similar, or possibly lesser, seasonal reductions in spawning habitat availability. The changes in LAR flows would not be expected to result in new or substantially more severe impacts to fall-run chinook salmon, relative to those determined in the WFP EIR. Therefore, this impact would remain potentially significant under current conditions and operations as originally characterized in the WFP EIR.

Impact to Steelhead (WFP EIR Impacts 4.5-6). The WFP EIR found the impact to steelhead to be less than significant.

Based on the assessment of changes to CVP/SWP operations and anticipated resultant changes to hydrologic conditions identified in Table 3.3 above, the seasonal LAR flows would occasionally be both higher and lower, relative to conditions modeled in the WFP EIR. As noted for the discussion of fall-run chinook salmon, the seasonal LAR flows would be similar to those

assessed in the WFP EIR and there may be some flow improvement related to meet the life-cycle needs (including thermal needs) of the steelhead population as a result of CVP's implementation of requirements in the NOAA Fisheries 2009 OCAP Biological Opinion and/or the FMS. The WFA demands would be anticipated to result in similar seasonal reductions in LAR flows and increases in LAR water temperatures as previously determined in the WFP EIR.

The WFP EIR found that the TCD and optimal coldwater pool management would reduce temperatures in the juvenile steelhead rearing period of June through September and offset potential flow-related effects (e.g., reduced juvenile rearing habitat). Based on the anticipated occasional changes to LAR flows, due to changed conditions and system operations, and implementation of the TCD at Folsom Dam and optimal coldwater pool management, WFA demands would not be expected to cause any new significant impacts to steelhead. Therefore, these impacts would remain less than significant under current conditions and operations as originally characterized in the WFP EIR.

Flow- and Temperature-Related Impacts to Splittail (Impact 4.5-7). The WFP EIR found flow-related impacts to splittail to be potentially significant as a result of reductions in inundated riparian spawning habitat in the LAR during the February through May period. Mitigation for the significant impact was identified in the WFP EIR. However, it was determined that due to uncertainty regarding future conditions, the impact would remain significant and unavoidable following mitigation.

Based on the assessment of changes to CVP/SWP operations and anticipated resultant changes to hydrologic conditions identified in Table 3.3 above, the seasonal LAR flows would occasionally be both higher and lower relative to conditions modeled in the WFP EIR. As noted above, the seasonal LAR flows would be similar to those assessed in the WFP EIR and the WFA demands would be anticipated to result in similar seasonal reductions in LAR flows, particularly during the February through May period, which is a period of flood-control operations.

WFA demands would be anticipated to result in reduced LAR flows in the February through May period, as previously determined in the WFP EIR, which may reduce available spawning habitat for splittail. The anticipated incremental reduction in spawning habitat availability for splittail is not expected to change substantially under current conditions and operations, relative to that identified under the WFP EIR. Consequently, WFA demands imposed on the changed conditions and system operations would not be expected to result in new or substantially more severe impacts to splittail, relative to those determined in the WFP EIR. Therefore, this impact would remain potentially significant under current conditions as originally characterized in the WFP EIR.

Flow- and Temperature-Related Impacts to American Shad (Impact 4.5-8) and Striped Bass (Impact 4.5-9). The WFP EIR found the impacts to shad and striped bass to be less than significant.

Based on the assessment of changes to CVP/SWP operations and anticipated resultant changes to hydrologic conditions identified in Table 3.3 above, the seasonal LAR flows would occasionally be both higher and lower, relative to conditions modeled in the WFP EIR. As noted above, the

May and June LAR flows are not expected to be substantially reduced, relative to those identified in the WFP EIR, due to changed conditions and system operations. The WFA demands would be anticipated to result in similar seasonal reductions in LAR flows.

When imposed on the changed conditions, WFA demands would be anticipated to result in only minimal reductions in the suitable range of LAR flows in the May and June period for attraction and spawning of American shad, as previously determined in the WFP EIR. Likewise, the minimal changes in LAR flows in May and June would not substantially reduce striped bass spawning and rearing activity within the LAR. Based on the anticipated occasional changes to LAR flows, due to changed conditions and system operations, WFA demands imposed on the changed conditions and system operations would not be expected to cause any new significant impacts to American shad or striped bass. Therefore, these impacts would remain less than significant under current conditions and operations as originally characterized in the WFP EIR.

4.1.3 Other CVP Reservoir Storage

Impacts to Coldwater and Warmwater Species in Shasta Reservoir (WFP EIR Impacts 4.5-10 and 4.5-11), Trinity Reservoir (WFP EIR Impacts 4.5-12 and 4.5-13), and Keswick Reservoir (WFP EIR Impacts 4.5-14). The WFP EIR found the impacts to coldwater and warmwater fisheries in Shasta Reservoir, Trinity Reservoir, and Keswick Reservoir to be less than significant.

Based on the assessment of changes to CVP/SWP operations and anticipated resultant changes to hydrologic conditions identified in Table 3.3 above, the seasonal reductions in storage levels at Trinity Reservoir would be more frequent and generally of greater magnitude, relative to conditions modeled in the WFP EIR. Likewise, CVP operations in response to some changed conditions may result in more frequent seasonal reductions in storage levels at Shasta Reservoir. However, as a result of the NOAA Fisheries 2009 OCAP Biological Opinion, seasonal Shasta Reservoir storage may be maintained at higher levels relative to conditions assessed in the WFP EIR. Overall, the minimum storage levels in late fall and storage levels in the spring following reservoir refilling during the winter are often expected to be similar in upper CVP reservoirs relative to that identified in the WFP EIR. No measurable changes would be expected to occur in Keswick Reservoir storage or elevation because, as a regulating afterbay of Shasta Reservoir, its operations would not change notably. Additionally, under current conditions and system operations, WFA demands would be anticipated to result in a similar pattern of generally small and infrequent reductions in seasonal Shasta Reservoir and Trinity Reservoir storage levels, as previously determined in the WFP EIR.

Anticipated minimal WFA-related changes in seasonal storage levels within the normal operational range of Shasta Reservoir and Trinity Reservoir would not adversely affect the habitat or prey for coldwater species. Likewise, the incremental effects of WFA demands would not substantially reduce seasonal near-shore habitat availability in the March through September period, or spring nest-building activity, of warmwater species. Thus, the anticipated incremental changes to upper CVP reservoir storage, due to changed conditions and WFA demands, would not change the impact determination for coldwater or warmwater fisheries in upper Shasta Reservoir and Trinity Reservoir, relative to that made in the WFP EIR. As disclosed in the WFP EIR, potential flow and temperature effects in Keswick Reservoir would not be expected to

occur because its operations as a regulating reservoir would not change. Therefore, the potential impacts to upper CVP reservoirs would remain less than significant under current conditions and operations as originally characterized in the WFP EIR.

4.1.4 Sacramento River

Flow-Related Impacts to Sacramento River Fisheries (WFP EIR Impacts 4.5-15). The WFP EIR found the flow-related impacts to fisheries resources in the upper and lower Sacramento River to be less than significant.

Based on the assessment of changes to CVP/SWP operations and anticipated resultant changes to hydrologic conditions identified in Table 3.3 above, the seasonal flows in the upper and lower Sacramento River would frequently be both higher and lower, relative to conditions modeled in the WFP EIR. In particular, flows may frequently be higher in the fall months as a result of CVP's implementation of requirements in the USFWS 2008 OCAP Biological Opinion, which requires additional Delta inflows for improved habitat quality as reflected by the "X2" location objectives. The WFA demands would be anticipated to result in generally small and infrequent reductions in seasonal Sacramento River flows as previously determined in the WFP EIR.

As previously determined in the WFP EIR, flows in the upper Sacramento River would not be expected to be reduced below levels for protection of winter-run chinook salmon rearing and downstream passage in the October through March period as a result of WFA demands. WFA demands would be anticipated to result in only minimal and occasional flow reductions in the lower Sacramento River, such that there would be no substantial reductions in physical habitat availability, or reduced immigration of adult or emigration of juvenile anadromous fishes. Based on the anticipated occasional changes to Sacramento River flows, due to changed conditions and system operations, WFA demands imposed on the changed conditions and system operations would not be expected to cause any new significant impacts to Sacramento River fisheries resources. Therefore, this impact would remain less than significant under current conditions and operations as originally characterized in the WFP EIR.

Temperature-Related Impacts to Sacramento River Fisheries (WFP EIR Impacts 4.5-16). The WFP EIR found the temperature-related impacts to fish resources in the lower Sacramento River to be less than significant.

Based on the assessment of changes to CVP/SWP operations and anticipated resultant changes to hydrologic conditions identified in Table 3.3 above, the seasonal flows in the Sacramento River would frequently be both higher and lower, relative to conditions modeled in the WFP EIR. In particular, flows may frequently be higher in the fall months as a result of CVP's implementation of X2 requirements in the USFWS 2008 OCAP Biological Opinion. Additionally, there may be some flow- and temperature-related improvements associated with CVP requirements for the winter-run chinook salmon populations in the NOAA Fisheries 2009 OCAP Biological Opinion. The WFA demands would be anticipated to result in generally small and infrequent reductions in seasonal Sacramento River flows, and thus temperatures, as previously determined in the WFP EIR.

As previously determined in the WFP EIR, there would be no substantial changes to average temperature below Keswick Dam for any month of the year, for the number of years exceeding 56ºF in the upper Sacramento River during the April through September period. Additionally, there would be no substantial decreases in annual early life stage survival of fall-run, late fall-run, winter-run, or spring-run chinook salmon in any individual year. Based on the anticipated occasional changes to Sacramento River flows, due to changed conditions and system operations, WFA demands imposed on the changed conditions and system operations would not be expected to cause any new significant temperature-related impacts to fish resources of the Sacramento River. Therefore, this impact would remain less than significant under current conditions and operations as originally characterized in the WFP EIR.

4.1.5 Delta

Impacts to Delta Fish Populations (WFP EIR Impacts 4.5-17). The WFP EIR found the impacts to Delta fish resources to be less than significant.

Based on the assessment of changes to CVP/SWP operations and anticipated resultant changes to hydrologic conditions identified in Table 3.3 above, the seasonal Delta inflows would frequently be both higher and lower, relative to conditions modeled in the WFP EIR. In particular, Delta inflows may frequently be higher in the fall months as a result of CVP's implementation of X2 requirements in the USFWS 2008 OCAP Biological Opinion. Additionally, there may be some Delta operations-related improvements to meet the life-cycle needs of ESA-listed fish species as a result of CVP's implementation of requirements in the USFWS 2008 OCAP Biological Opinion and NOAA Fisheries 2009 OCAP Biological Opinion. The WFA demands would be anticipated to result in generally small and relatively infrequent reductions in Delta inflows as previously determined in the WFP EIR.

As previously determined in the WFP EIR, there would be no substantial flow-related upstream shifts in the X2 position during the February through June period. Additionally, there would be no anticipated substantial changes in CVP's Delta export-to-inflow ratio. Based on the anticipated occasional changes to Delta inflows, due to changed conditions and system operations, WFA demands imposed on the changed conditions and system operations would not be expected to cause any new significant habitat-related impacts to fish resources in the Delta. Therefore, this impact would remain less than significant under current conditions and operations as originally characterized in the WFP EIR.

4.2 Water Quality Impacts

The WFP EIR, Chapter 4.4, "Water Quality," addressed a total of two individual numbered impacts. This section provides a qualitative assessment of each numbered impact based on the present understanding of CVP/SWP operations and resulting system hydrology upon which WFA demands, including the City of Roseville's American River demands, would be imposed.

4.2.1 Lower American River and Folsom Reservoir Water Quality (WFP EIR Impact 4.4-1)

The WFP EIR found the WFA-related impacts to water quality in Folsom Reservoir and the LAR to be less than significant.

Based on the assessment of changes to CVP/SWP operations and anticipated resultant changes to hydrologic conditions identified in Table 3.3 above, seasonal reductions in Folsom Reservoir storage levels would be more frequent, and seasonal LAR flows would be occasionally different (both higher and lower), relative to conditions modeled in the WFP EIR. Under current conditions and system operations, WFA demands would be anticipated to result in a similar pattern of seasonal reductions in Folsom Reservoir storage and LAR flows as previously determined in the WFP EIR.

As previously determined in the WFP EIR, reduced reservoir storage and LAR flows would be expected to result in minor increases in concentrations of contaminants (e.g., nutrients, pathogens, turbidity, or priority trace metal and organic compounds) due to reduced dilution capacity. Based on the anticipated reductions to Folsom Reservoir storage and LAR flows, due to changed conditions and system operations, WFA demands imposed on the changed conditions and system operations would not be expected to cause any new significant impacts to water quality. Therefore, this impact would remain less than significant under current conditions and operations as originally characterized in the WFP EIR.

4.2.2 Lower Sacramento River and Delta Water Quality (WFP EIR Impact 4.4-2)

The WFP EIR found the indirect water quality impacts to the lower Sacramento River to be potentially significant, primarily as a result of increased urban runoff and domestic wastewater discharge from the Sacramento Regional County Sanitation District's Sacramento Region Wastewater Treatment Plant (SRWTP) associated with the development and growth supported by increased WFA deliveries. Mitigation for the impact was identified in the WFP EIR. However, it was determined that due to uncertainty regarding future conditions, namely uncertainty in level of treatment of the additional urban runoff and municipal wastewater flows, the impact would remain significant and unavoidable following mitigation.

Based on the assessment of changes to CVP/SWP operations and anticipated resultant changes to hydrologic conditions identified in Table 3.3 above, the lower Sacramento River flows and Delta inflows would frequently be both higher and lower, relative to conditions modeled in the WFP EIR. Flows would be frequently higher in the fall months as a result of CVP's implementation of X2 requirements in the USFWS 2008 OCAP Biological Opinion. The WFA demands imposed on the changed conditions would be anticipated to result in generally small and occasional reductions in lower Sacramento River flows and Delta inflows as previously determined in the WFP EIR.

As previously determined in the WFP EIR, increased urbanization in the area served by WFA purveyors would indirectly result in substantial increases in the amount of treated effluent discharged from the SRWTP into the Sacramento River at Freeport. Coupled with seasonal flows, minor increases in concentrations of contaminants (e.g., nutrients, pathogens, turbidity, or

priority trace metal and organic compounds) could occur due to reduced dilution capacity. The imposing of WFA demands on current conditions and operations would be expected to result in similar water quality effects as those disclosed under the WFP EIR. The changed system conditions and operations would not be expected to result in new or substantially more severe water quality impacts, relative to that determined in the WFP EIR. Therefore, this impact would remain potentially significant under current conditions as originally characterized in the WFP EIR.

5 Evaluation of Roseville's Water Supply and Reliability in light of Anticipated CVP/SWP System Operational Changes

In general, with the progression of time and imposition of new and revised regulatory actions affecting CVP/SWP operations, the ability to "flex" project operations to maintain historical performance and hydrologic conditions has been eroded. There is now, virtually no action that does not precipitate some effect on water storage, reservoir releases, and/or water deliveries. Given that most often, storage or releases are requirements for complying with regulatory standards, the "give" in the systems becomes water deliveries.

Even when there was more flexibility in the CVP/SWP systems than exists today, increased demands on project water resources created occasional change in the frequency and/or magnitude of annual water deliveries. The magnitude of annual water diversions on the American River is still increasing. However, CVP operations can still honor senior American River water rights in all years and meet full American River CVP water contractor diversions in many years.

What has changed on the American River is the frequency of water shortages (years with less than full CVP contract deliveries). Compared to those identified in the WFP EIR, modeled future CVP deliveries will be less than full more frequently and shortages in those years may be greater, but the range of annual deliveries can be expected to comport with that shown in the WFP EIR.

In short, the City of Roseville's 58,900 AFY water supply from the American River remains highly reliable under the WFA and anticipated current and future CVP operations. However, the percent of time under dry and critical water year conditions that deliveries from the American River may be reduced below the City's full demand may occur somewhat more often in the future than previously identified, and as identified in the WFP EIR.

Based on over 82 years of historical hydrology (and WFA restrictions), the 58,900 AFY contract surface water supply is assumed to be available to the City in about 83 percent of the years. In about 17 percent of the years, quantities from 58,900 AFY to a minimum of 39,800 AFY of surface water would be available per the WFA. Thus, in drought years, supplemental supplies potentially totaling up to 19,100 AFY (the difference between the average/wet year supply and the dry year supply) are needed to make up for the dry year and critical year deficiencies

To meet water supply demands during dry and critical water years, the City may utilize other supplies like recycled water and groundwater and implement the water conservation strategies outlined in the Roseville Municipal Code (RMC). Recycled water offsets the use of surface

water supplies by reducing the City's reliance on American River supplies by filling irrigation demands that would otherwise use surface water supplies. Groundwater is used to make up any additional water supply shortfall.

Based on the above, the City's water supply reliability for the SVSP Project remains very high.

5.1 Water Supply Reliability Under Future Cumulative Conditions

As described in Section 3.1.2, quantifying the effects of future cumulative conditions and related CVP/SWP operations, in consideration of the future implementation of the BDCP, EDWPA Supplemental Water Supply Project, and implementation of the USFWS 2008 OCAP Biological Opinion and the NOAA Fisheries 2009 OCAP Biological Opinion, is not currently possible. The effects of these future projects are not fully understood and, thus, have not been fully integrated into the current versions of DWR's CALSIMII water supply operations model. In addition to the new regulatory requirements and future projects that may arise under the BDCP, climate change also may affect water supply conditions. Future climate change will affect the characteristics of runoff into CVP reservoirs (both in timing and volume) as well as exacerbate water quality conditions in the Delta as a result of sea level rise. Climate change without infrastructure changes will certainly lead to additional reductions in CVP water supplies. Consequently, the future cumulative conditions may have profound effects on CVP/SWP operations and resulting system hydrology, yet these effects remain unclear at this time.

History has shown that the availability of unused surface water supplies suitable for beneficial uses has diminished with time. In the American River basin, the contracted CVP surface water supplies that the City of Roseville depends on have been affected by this reduction in unused surface water. Water supplies that were believed to exist and be available for contractor deliveries when water supply contracts were initially signed, and subsequently renewed, are now insufficient to meet 100% deliveries as frequently as once assumed. Allocation reductions to Delta exports already are more frequent than in the past, and deliveries to these contractors are most tenuous because they are at the furthest extreme of the CVP delivery system, and can receive supplies only after all of the environmental requirements are met upstream of their location. At Roseville's location in the system, deliveries are indirectly affected by Reclamation's reservation of American River (Folsom) water to serve a portion of downstream flow, water quality, and environmental requirements placed on the CVP, but Roseville's diversions are not dependent on the American River meeting all of the downstream needs.

CVP's obligations to ongoing changes in environmental protections, changes to CVP water supply obligations, increased demand for previously unused surface water supplies, and climate change, collectively will affect Roseville's water supply. Compared to historical deliveries, there will be fewer years in the future when the CVP will be able to deliver 100% of Roseville's contract supply. At this moment in time, the environmental actions designed to maintain or restore historical ecological values in the American River will continue (i.e., through the OCAP Biological Opinions), while at the same time viable CVP water supplies will be available to the City of Roseville.

Summary of Impacts and Mitigation Measures in the Water Forum Proposal EIR

2. EXECUTIVE SUMMARY

2.1 INTRODUCTION

The ***Water Forum***, a diverse group of water agencies, business groups, agricultural interests, environmentalists, citizen groups, and local governments (also known as stakeholders), has been working since the fall of 1993 evaluating future water needs and supplies in the Sacramento area, including parts of Sacramento, Placer and El Dorado counties. The Water Forum has formulated a ***Water Forum Proposal*** (WFP) for the effective long-term management of the region's water resources. This proposal is incorporated in the Water Forum Action Plan which is being circulated concurrently with this document. The WFP was formulated based on the two coequal objectives of the Water Forum: 1) provide a reliable and safe water supply for the region's economic health and planned development through the year 2030; and 2) preserve the fishery, wildlife, recreational, and aesthetic values of the Lower American River.

The environmental analysis in this EIR is based on an evaluation of how environmental conditions would be expected to change as a result of implementing the WFP. As a first-tier, Program EIR of the WFP, the impact analysis addresses both the impacts resulting from the WFP and a cumulative evaluation of all the participating purveyors' water resource actions in the region, along with many other water management actions outside the region.

Public response to the Draft EIR will be important input for the Water Forum. Based on comments and final negotiations, the stakeholder representatives will finalize the Water Forum EIR and revise their recommendations for the WFP accordingly. These will be presented to stakeholder boards for their approval as a Memorandum of Understanding in the summer of 1999.

This section summarizes information contained in the ***Draft Environmental Impact Report*** on the WFP, including elements of the WFP, environmental impacts, mitigation measures, and alternatives.

2.2 THE EIR PROCESS

The ***Lead Agencies***, or public agencies that have responsibility for certifying the WFP EIR, are the City and County of Sacramento. Other public agency stakeholders may rely on the EIR when considering their approval of the WFP, and if so, are considered ***Responsible Agencies***. The purpose of a Program EIR is to identify and assess the environmental impacts of a series of actions that comprise an overall program, such as the WFP. The EIR has been prepared pursuant to the California Environmental Quality Act (CEQA), Public Resources Code §21000, *et seq.*, and State CEQA Guidelines, California Code of Regulations §15000, *et seq.* It is anticipated that subsequent actions by Lead and Responsible Agencies to implement the WFP will be reviewed in light of the Program EIR to determine what additional environmental documentation must be prepared, pursuant to the tiering provisions of the State CEQA Guidelines (§15152).

The Draft EIR has been released for public review to receive comments from interested parties on its completeness and adequacy in disclosing the environmental effects of the WFP. Written responses to significant environmental points raised in the comments will be prepared and published. Together, the Draft EIR and the responses to comments will constitute the Final EIR, which will be forwarded to the Sacramento City Council and Sacramento County Board of Supervisors for certification with regard to CEQA adequacy.

2.3 SUMMARY OF THE WATER FORUM PROPOSAL

2.3.1 Location of EIR Study Areas

Water Forum stakeholders represent water-related interests in the cities of Sacramento, Folsom, Galt, and Citrus Heights; the County of Sacramento; the City of Roseville, South Placer County and western El Dorado County (see Exhibit 3-1). For purposes of the EIR, three study areas are considered: the direct effect study area, the indirect effect study area, and the water service study area.

Preservation of the Lower American River is one of the coequal objectives of the WFP. The direct effect study area, therefore, consists of those areas that would be directly affected by additional surface water diversions from the American River. Such diversions would occur above Folsom Reservoir, from Folsom Reservoir proper, Lake Natoma, and from the Lower American River, defined as the reach from Nimbus Dam to the confluence with the Sacramento River. Therefore, the direct effect study area consists of the in-stream and riparian areas of these surface water resources (see Exhibit 3-2).

The indirect effect study area is the broader geographic area that encompasses the surface water resources and facilities outside of the Lower American River that may be affected by the WFP. This area includes the Central Valley Project (CVP) and State Water Project (SWP) systems both upstream of the confluence of the Sacramento and American rivers (exclusive of the direct effect study area), along with associated reservoirs and rivers, and downstream of the confluence, into and including the Sacramento-San Joaquin Delta (see Exhibit 3-3).

The water service study area consists of the communities served by Water Forum stakeholders, and is coincident with the boundaries of stakeholder purveyors in the cities of Sacramento, Folsom, Citrus Heights, and Galt; County of Sacramento (excluding the Delta); the City of Roseville; South Placer County and western El Dorado County (refer to Exhibit 3-1).

2.3.2 Elements of the Water Forum Proposal

To achieve the Water Forum's coequal objectives, a comprehensive package of linked actions has been developed to make more water available for consumption while protecting the natural resources of the Lower American River from environmental damage. This approach requires the support and participation of each of the Water Forum stakeholders. The WFP was developed

over a period of years by representatives of the Water Forum stakeholder groups, and includes seven elements:

Element	
I	**Increased Surface Water Diversions**
II	**Actions to Meet Customers 'Needs While Reducing Diversion Impacts on the Lower American River in Drier Years**
III	**Support for an Improved Pattern of Fishery Flow Releases from Folsom Reservoir**
IV	**Lower American River Habitat Management Element**
V	**Water Conservation**
VI	**Groundwater Management**
VII	**Water Forum Successor Effort**

Element I: Increased Surface Water Diversions

This element provides for increased surface water diversions. These increased diversions will be needed to serve planned growth through the year 2030 even with the active conservation programs and the recommended sustainable use of the groundwater which are also part of the WFP. As part of the WFP, all signatory organizations would support the diversions agreed to for each supplier as summarized in Table 3-1. All signatory organizations would also support the facilities needed to divert, treat and distribute this water. Support for increased diversions is linked to the suppliers' endorsement and, where appropriate, participation in each of the seven elements.

Element II: Actions to Meet Customers 'Needs While Reducing Diversion Impacts on the Lower American River in Drier Years

This element is to ensure that sufficient water supplies will be available to customers in dry years as well as wet years, and that suppliers continue to meet their customers' needs to the year 2030 while minimizing diversion impacts on the Lower American River in the drier and driest years. It is envisioned that Lower American River diversions above the H Street Bridge in average and wetter years will increase from the current level of about 216,500 acre-feet (AF) annually to about 481,000 AF annually. This represents a significant portion of the total annual flow of the American River which averages about 2.6 million AF with a range of less than 400,000 AF to greater than 6.3 million AF. Actions to meet customers 'needs while reducing diversion impacts on the Lower American River in drier years include: conjunctive use of groundwater basins consistent with the sustainable yield objectives; utilizing other surface water resources; reoperation of reservoirs on the Middle Fork of the American River; increased conservation during drier and driest years; and reclamation. Some of these actions would also help reduce impacts outside of the American River watershed.

Element III: Support for an Improved Pattern of Fishery Flow Releases from Folsom Reservoir

This element supports needed assurances for continued implementation of a pattern of water releases from Folsom Reservoir that more closely matches the needs of anadromous fish, in particular fall run chinook salmon, which need more cool water in the fall and are not present in the American River in the summer.

Beginning in December 1994, the Water Forum convened a Fish Biologists' Working Session of fish experts with special knowledge of the Lower American River. Their charge was to develop recommendations for an improved pattern of releases from Folsom Reservoir. Participants included representatives from the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), State Water Resources Control Board (SWRCB), U.S. Bureau of Reclamation (USBR), and representatives from the Water Forum. The group came to general agreement regarding which fish species in the Lower American River should be given priority when there are constraints in water availability and developed an Improved Pattern by which available water can be released from Folsom Reservoir in a "fish friendly" manner consistent with the reservoir's flood control objectives.

The Central Valley Project Improvement Act was passed in 1992. This law authorized fish and wildlife restoration as an additional purpose of the Central Valley Project. It also required the federal government to develop an Anadromous Fish Restoration Program (AFRP) plan including implementation of an improved pattern of fishery flow releases from Folsom Reservoir to benefit anadromous fish. The Water Forum recommendations were considered by the U.S. Department of the Interior when it developed its recommendations for AFRP flows for the Lower American River.

Since 1995 USBR, in consultation with the USFWS and CDFG, has attempted on a voluntary basis to release water from Folsom Reservoir in a manner consistent with the flow objectives for the Lower American River to the extent USBR's available water supply has permitted it to do so. Their AFRP flow objectives for the Lower American River are set forth in the November 20, 1997 "Department of the Interior Final Administrative Proposal on the Management of Section 3406 (b) (2) Water." They are essentially the same as the Improved Pattern of Fishery Flow Releases developed by the Fish Biologists' Working Session which was convened by the Water Forum. It is recognized that as additional information becomes available in the future it could be beneficial to further refine this Improved Pattern.

For purposes of the Water Forum Proposal, the Improved Pattern of Fishery Flow Releases is defined as the AFRP flow objective for the Lower American River as set forth in the November 20, 1997 "Department of the Interior Final Administrative Proposal on the Management of Section 3406 (b) (2) Water."

Signatories agree to recommend that the updated Lower American River standard be included in the USBR's permit for operation of Folsom and Nimbus dams. It will incorporate two of the Water Forum Proposal provisions:

(1) Agreement on water diversions upstream of Nimbus Dam under varying hydrologic conditions; and

(2) The Improved Pattern of Fishery Flow Releases which would be implemented essentially the same as the AFRP Lower American River flow objectives in the November 20, 1997 Final Administrative Proposal.

Element IV: Lower American River Habitat Management Element

This element, combined with an "Improved Pattern of Fishery Flow Releases from Folsom Reservoir" and "Actions to Meet Customers' Needs While Reducing Diversion Impacts on the Lower American River in the Drier Years," is included to mitigate the impacts of the increased diversions on the Lower American River. The Water Forum Habitat Management Element (HME) will be part of a coordinated multi-agency Lower American River ecosystem partnership established by a Memorandum of Understanding. Agencies expected to participate include: the Water Forum Successor Effort (legally administered by the City of Sacramento under the auspices of the City-County Office of Metropolitan Water Planning); the Sacramento Area Flood Control Agency (SAFCA); CALFED (or its successor); USBR (responsible for administering the Central Valley Project [CVP] and the Central Valley Project Improvement Act [CVPIA]); USFWS; National Marine Fisheries Service (NMFS); CDFG; and the Sacramento County Parks Department (which administers the Lower American River Parkway Plan). The multi-agency program will contain four components that together will address flow, temperature, and physical habitat issues for the Lower American River:

, Habitat Management Plan Development, Updating, and Technical Assistance;

, Projects that benefit the Lower American River Ecosystem;

, Monitoring and Evaluation Program; and

, Project-Specific Mitigation (which will remain the responsibility of each supplier).

In addition, because summertime recreation flows in the Lower American River are expected to be adversely affected by increased diversions, the Water Forum Proposal also includes commitments to fund projects to mitigate recreational impacts.

Element V: Water Conservation

The Water Conservation Element of the WFP promotes more efficient use of limited water resources. This element is essential to meeting both of the coequal objectives of the Water Forum. Conserved water will be available to help supply the region's water needs and will

minimize the need for increased groundwater pumping and increased use of surface water, including water diverted from the American River.

Major components of the Water Conservation Element include: residential water meters; other water conservation programs similar to the Best Management Practices included in the statewide Memorandum of Understanding Regarding Urban Water Conservation; public involvement; water conservation plans; and agricultural water conservation. The water conservation practices in the element have been defined considering the specific circumstances of the Water Forum stakeholders. The element does not preclude implementing other, more aggressive conservation approaches to the extent additional, feasible measures become available in the future.

Element VI: Groundwater Management

This element provides a framework by which the groundwater resource in Sacramento County can be protected and used in a sustainable manner and a mechanism for coordination with those adjacent counties that share the groundwater basin. A key provision of the element includes recommendations on "sustainable yield," which is the amount of water that can be safely pumped from the basin over a long period of time without damaging the aquifer. Estimated average annual sustainable yield recommendations for each of the three sub-areas of the basin are: North Area: 131,000 AF; South Area: 273,000 AF; and Galt Area: 115,000 AF. Recommendations for locally controlled groundwater management include monitoring groundwater withdrawal and "conjunctive use", or the planned use of surface water in conjunction with groundwater.

The Sacramento North Area Groundwater Management Authority was established in August, 1998 through adoption of a joint powers authority using the existing authority of the City of Sacramento, the City of Folsom, the City of Citrus Heights, and the County of Sacramento. The Authority will be charged with facilitating conjunctive use programs and maintaining long-term sustainable yield. Discussions about groundwater management in the South Area and the Galt Area will be undertaken by the Water Forum Successor Effort.

The groundwater management governance structure should facilitate participation by water agencies with specific and relevant interest in the groundwater governance structure outside of Sacramento County and encourage cooperation and collaboration with such agencies.

Element VII: Water Forum Successor Effort

In order to ensure implementation of the WFP, a Water Forum Successor Effort will be created with membership consisting of those organizations signatory to the WFP. Its responsibilities will be to oversee, monitor, and report on implementation of the WFP. The Water Forum Successor Effort will not have any authority to govern or regulate.

2.3.3 Essential Actions to be Carried Out by Other Agencies

Three projects anticipated to be carried out by other agencies are essential for the overall WFP:

- Temperature Control Device for the urban water intake from Folsom Dam;
- Optimal use of the cold water pool in Folsom Reservoir; and
- Improved Pattern of Fishery Flow Releases from Folsom Reservoir.

In the analysis of the WFP impacts, each of these projects is assumed to be in place in the future.

2.3.4 Process for Environmental Review and Adoption of the Water Forum Agreement

The environmental review process and the WFP process are taking place concurrently in a manner that allows the integration of public and agency comments into the planning process. The public and agency review of the Draft EIR and the stakeholders' review of the Agreement will provide comments that will be used in refining the WFP. As the CEQA Lead Agencies, the City and County of Sacramento each have the authority to certify the Final EIR. After Final EIR certification, the stakeholders of the Water Forum will be asked to approve the Agreement and agree to participate in its implementation. If the public agency stakeholders rely on the EIR in deciding whether to approve the Agreement they will act as Responsible Agencies under CEQA. The Agreement will be implemented by the Water Forum Successor Effort representing the stakeholders who adopt the proposal.

After approval of the Agreement by the Water Forum stakeholders, the Final EIR will be forwarded to other agencies for their consideration in connection with (1) their responsibilities as State Trustee Agencies, as defined by State CEQA Guidelines §15386 and/or (2) separate, subsequent actions potentially needed for the plan's implementation. State Trustee Agencies and other affected state agencies include: California Department of Water Resources (DWR), State Water Resources Control Board (SWRCB), State Lands Commission (S.C.), CDFG, California Department of Parks and Recreation, and State Historic Preservation Office (SHPO). Federal agencies which may have separate, subsequent actions related to the plan's implementation include the USBR, USFWS, NMFS, and U. S. Army Corps of Engineers (USACE). The Final EIR will provide program-level technical analysis which may support environmental review of implementation actions and their project-level environmental documents.

2.3.5 Approach for Environmental Analysis Recognizing Mitigating Features of the Water Forum Proposal

In reviewing the environmental impacts and mitigation measures described in this document, it is important to understand the context in which the WFP was developed. Because one of the Water Forum's coequal objectives is the preservation of the fishery, wildlife, recreational and aesthetic values of the Lower American River, the WFP is designed to minimize adverse environmental impacts to the extent feasible. The WFP contains seven elements, each integral

to the overall agreement. Element I, Increased Surface Water Diversions, provides for increased diversions from the Lower American River. The remaining six elements all, in one way or another, are intended to reduce the adverse impacts of those increased diversions. Therefore, the project itself reduces the impacts to the environment, through negotiated measures throughout the proposal.

For example, Element II, Actions to Meet Customers 'Needs While Reducing Diversion Impacts on the Lower American River in Drier Years, contains provisions by which purveyors agree to reduce their diversions from the Lower American River by specified levels in defined drier years. These actions include extraordinary conservation during the driest years beyond that included in Element V of the WFP. These cutbacks will decrease the severity of the adverse impacts to the river in drier years. These reduced levels of diversions are an integral part of the WFP, and the modeling of impacts in this EIR assumes these reductions. In addition, in defined "driest" years (also known as "conference years"), the WFP signatories will meet and confer regarding diversions and river flows.

Similarly, Element III, Support for a Improved Pattern of Fishery Flow Releases From Folsom Reservoir, provides for the operation of Folsom in a manner that more closely matches the needs of anadromous fish, particularly fall run chinook salmon. One of the essential requirements of the WFP is that this improved flow standard be incorporated into the long-term management of Folsom and Nimbus Dams.

Element IV, the Habitat Management Element (HME), provides for Water Forum participation and funding of a multi-agency Habitat Management Program (HMP) for the Lower American River. The WFP supports habitat improvements and other ecosystem-enhancing projects for the river, which are to be contained in the Implementation Plan of the HMP, described in more detail in Appendix B to this EIR. The HME also includes commitments to fund projects to mitigate adverse recreational impacts of the WFP identified in this Draft EIR.

However, because the details of the Water Forum Successor Effort's Implementation Plan for the Habitat Management Program are still being worked out, this Draft EIR, in identifying the adverse impacts of the WFP, does *not* include the benefits of the habitat improvement components of the HMP.

It does, however, assume the implementation of an Improved Pattern of Fishery Flow Releases, the Folsom Dam Temperature Control Device, and Folsom Reservoir Optimal Cold Water Pool Management all of which are necessary for the WFP to be effective. Therefore, this EIR describes aspects of the proposed HMP that will provide additional benefit to the Lower American River beyond what is the basis of impact analysis of the EIR.

Element V, the Water Conservation Element of the WFP, commits purveyors to specified water conservation programs. The diversions identified in the WFP reflect the reduced demand resulting from these conservation programs.

Element VI, the Groundwater Management Element, includes conjunctive use programs that provide for storing water in the wet years so that groundwater can safely be used in dry years, conserving surface water supplies.

Several of the elements in the WFP would reduce impacts on, CVP and State Water Project (SWP) water deliveries, CVP hydropower generation, Shasta Reservoir, and Folsom Reservoir. These elements of the WFP include Water Conservation, Groundwater Management, and some of the Actions That Meet Customers 'Needs While Reducing Diversion Impacts on the Lower American River in Drier Years. The analysis on this Draft EIR reflects implementation of all of the elements.

Based on the State CEQA Guidelines, the impact assessment approach is focused on identifying potential impacts due to implementation of the WFP. It is important to note that there are numerous programs underway or planned to improve fishery conditions for Sacramento River Valley fisheries, particularly salmonid fisheries, including the AFRP of the CVPIA and the Ecosystem Restoration Program Plan of the CALFED Bay-Delta Program.

When implemented over the next several decades, these and other future programs are expected to improve fishery conditions. However, it is not possible at this time to quantify all the benefits of those programs. **This means that the quantitative analyses and impact determinations in the Water Forum Proposal EIR do not reflect anticipated benefits of those programs.**

The EIR identifies environmental impacts and additional mitigation measures, to further reduce adverse impacts, for consideration by the Water Forum stakeholders. As described below, certain impacts are considered significant and unavoidable.

2.3.6 Response to Impacts on the Sacramento River and the Bay-Delta

As discussed previously, the WFP already includes many provisions that would reduce impacts. These include potential aquatic impacts of increased diversions on the Sacramento River and the Bay-Delta. Even with these actions, unless additional water supplies are developed or diversions are reduced, there would still be remaining impacts on the Sacramento River and the Bay-Delta, especially under cumulative conditions, based on the scenario addressed in this EIR (refer to Table 2-3 and Chapter 6).

When purveyors in the American River watershed exercise area-of-origin water rights, it will reduce the amount of water available from Folsom Reservoir for use by USBR in meeting Sacramento River and Bay-Delta environmental and water delivery obligations. The USBR will have to operate its entire system, including Shasta and Folsom Reservoirs, differently in order to meet those obligations. Unless additional supplies are developed or diversions are reduced, this would result in impacts on the Sacramento River, above and below the American River, and the Bay-Delta.

The USBR will be involved in almost all of the diversion projects included in the WFP. In some cases the USBR needs to issue a contract for a new water supply. In other cases, it has to sign a Warren Act agreement or grant a right-of-way.

In order to take any of these actions, the USBR is required to consult with the resource agencies under Section 7 of the Endangered Species Act (ESA). In addition to Water Forum actions, the consultation will also cover the USBR's entire Operational Criteria and Plan (OCAP) for the CVP.

Under the ESA, the USBR is prohibited from taking any actions that will jeopardize the continued existence of threatened or endangered species. Resource agencies participate in the ESA process by developing biologic objectives for species listed or proposed for listing. Biological objectives serve as specific performance criteria which are included in the biological opinions under the ESA. The USBR is required by the ESA to operate the CVP in a way that meets the biologic objectives set for each species listed or proposed for listing.

Because resource agencies are in the process of developing these biological objectives, it is impossible to specify performance criteria at this time. That uncertainty is combined with uncertainty over the extent and effectiveness of several future actions to protect Sacramento River and Bay-Delta resources. Therefore, it is impossible at this time to formulate specific mitigation measures for Sacramento River or Bay-Delta aquatic impacts or to assign responsibility for the mitigation.

The Water Forum Proposal EIR is a Program EIR and it is recognized that individual projects included in the WFP will need to comply with CEQA and, where applicable, the National Environmental Policy Act (NEPA) and the state and federal Endangered Species Acts. Compliance with the state and federal Endangered Species Acts may result in diversion restrictions or other conditions beyond those that are included in the WFP.

2.4 SUMMARY OF IMPACTS AND MITIGATION MEASURES

Table 2-1, beginning on page 2-13 contains a list of WFP impacts by issue. Table 2-2, beginning on page 2-16, contains a more detailed summary of environmental impacts identified in the EIR, mitigation measures, and level of significance after mitigation. Key impact conclusions are summarized below.

2.4.1 Lower American River and Folsom Reservoir Impacts

As described above, the WFP includes features that help preserve the values of the Lower American River, and also serve to reduce impacts on other resources, including Folsom Reservoir. These features, such as water conservation, dry-year diversion restrictions, revised pattern of releases for fisheries, and conjunctive use of surface and groundwater, reduce many environmental impacts of proposed diversions; however, they cannot entirely avoid significant

effects. The environmental analysis of the direct effect study area identified significant and potentially significant impacts within the Lower American River and Folsom Reservoir, including effects to certain fisheries recreational opportunities, and cultural resources.

Effects to fisheries include flow-related impacts to chinook salmon in the Lower American River which are proposed as threatened under the federal ESA. These impacts are considered potentially significant and mitigation is suggested as a part of the Habitat Mitigation Element. Potentially significant effects to Sacramento splittail of the Lower American River also occur.

In Folsom Reservoir, a potentially significant effect to warmwater fisheries is expected because of the reduction of littoral habitat and spawning success caused by more frequent declines in lake levels; mitigation measures to improve littoral habitat are identified. Coldwater fisheries in the reservoir are not significantly affected.

Effects to recreation opportunities include more frequent periods of inadequate recreation flows in the Lower American River during the summer which affects rafting and boating. In Folsom Reservoir, more frequent lake level declines result in significant impacts to boat ramp operations, use of marina wet slips, and opportunities for swimming at designated beaches.

The EIR also identifies adverse effects on cultural resources of Folsom Reservoir due varying water levels and increased cycles of inundation and exposure of cultural resources sites.

Potential mitigation is identified for each of these impacts. These and other impacts to the Lower American River and Folsom Reservoir identified in this EIR are presented in Tables 2-1 and 2-2.

2.4.2 Out-of-Area Impacts

The Draft EIR identifies that, under future (2030) conditions which include the WFP and other potential future system-wide actions (e.g., 2030 out-of-basin CVP/SWP demands, increased Sacramento Valley demands, and increased Trinity River flows), impacts outside the American River system would occur. These include impacts to water supply, water quality, and power supply.

The USBR may have to operate the CVP differently under a revised CVP-OCAP in the future when purveyors in the Water Forum exercise their water entitlements including water rights and CVP-contracted entitlements. DWR may also need to modify operation of the SWP, and, together with the USBR, may revise their Coordinated Operations Agreement (COA) in response to these changing conditions. The changed operation could affect their ability to meet their environmental and water supply obligations, including protection of the Sacramento River and Bay-Delta. For instance, deliveries to some CVP contractors, including some Water Forum purveyors, could be subject to greater and more frequent deficiencies being imposed by the USBR. It is also recognized that under some conditions, and depending on certain operational assumption, the analysis might indicate that there is an over-allocation of specific CVP resources.

CVP and SWP contractors north and south of the Delta would be affected to varying degrees. Modeling analysis of 2030 conditions with the WFP diversions showed reduced water available for delivery to municipal and industrial, and agricultural contractors north and south of the Delta, in some years and in varying magnitudes. Statutory and policy protections for the areas of origin, however, allow for implementation of the WFP (see Section 4.3, Water Supply). The assumptions on which these modeling results are based are explained in Appendix G.

Potentially significant impacts to Sacramento River and Delta water quality were also identified due to reduced flows in the Sacramento River in some years with implementation of the WFP. Reduced flows could cause seasonal elevations in river water temperatures and increased pollutant concentrations due to reduced dilution capacity.

Minor power supply impacts would also occur as a result of implementation of the WFP. Modeling indicates an overall reduction of less than 1% of annual average CVP energy production.

2.4.3 Water Service Study Area Impacts

Implementation of the WFP would not directly alter land uses in the water service study area. It would, however, allow water purveyors in the Sacramento region to provide a safe and reliable water supply for the region's planned development through the year 2030. Land use decisions would continue to be made by city and county government decision-makers. The WFP would accommodate substantial development, however, as it would remove water supply as an obstacle to growth. Therefore, the WFP is considered to be growth inducing in the water service study area, as defined by the State CEQA Guidelines.

This EIR cannot assess the precise impacts of the regional growth that may be facilitated by the WFP because of the many variables involved. With respect to land use designations already approved in adopted general plans, environmental analysis has already been completed in the general plan EIRs. Under the provisions of the State CEQA Guidelines (§15152[b]), the analysis in already certified general plan EIRs need not be repeated in a later EIR. For future development projects, more project-specific environmental review and analysis of impacts and mitigation measures will be required before such projects are approved.

Table 2-1
Water Forum Proposal Impact Summary

Resource Category	WFP Impact After Mitigation
GROUNDWATER RESOURCES	
Groundwater Quality	LESS THAN SIGNIFICANT
Movement of Groundwater Contaminants	LESS THAN SIGNIFICANT
Land Subsidence	LESS THAN SIGNIFICANT
Efficiency of Wells	LESS THAN SIGNIFICANT
WATER SUPPLY	
Decrease in Deliveries to SWP Customers	SIGNIFICANT
Decrease in Deliveries to CVP Customers	SIGNIFICANT
WATER QUALITY	
Lower American River and Folsom Reservoir Water Quality	LESS THAN SIGNIFICANT
Sacramento River and Delta Water Quality	POTENTIALLY SIGNIFICANT
FISHERIES RESOURCES AND AQUATIC HABITAT	
Impacts to Folsom Reservoir ś Coldwater Fisheries	LESS THAN SIGNIFICANT
Impacts to Folsom Reservoir ś Warmwater Fisheries	POTENTIALLY SIGNIFICANT
Impacts to the Warmwater and Coldwater Fisheries of Lake Natoma	LESS THAN SIGNIFICANT
Temperature Impacts to Nimbus Fisheries Hatchery Operations and Fish Production	LESS THAN SIGNIFICANT
Fall-run Chinook Salmon	POTENTIALLY SIGNIFICANT
Lower American River Steelhead	LESS THAN SIGNIFICANT
Flow- and Temperature-Related Impacts to Splittail (February Through May)	POTENTIALLY SIGNIFICANT
Flow- and Temperature-Related Impacts to American Shad (May and June)	LESS THAN SIGNIFICANT
Flow- and Temperature-Related Impacts to the Striped Bass Sport Fishery (May and June)	LESS THAN SIGNIFICANT
Impacts to Shasta Reservoir ś Coldwater Fisheries	LESS THAN SIGNIFICANT
Impacts to Trinity Reservoir ś Coldwater Fisheries	LESS THAN SIGNIFICANT
Impacts to Shasta Reservoir ś Warmwater Fisheries	LESS THAN SIGNIFICANT
Impacts to Trinity Reservoir ś Warmwater Fisheries	LESS THAN SIGNIFICANT
Impacts to Keswick Reservoir Fisheries	LESS THAN SIGNIFICANT
Flow-related Impacts to Sacramento River Fisheries	LESS THAN SIGNIFICANT
Temperature-Related Impacts to Sacramento River Fisheries Resources	LESS THAN SIGNIFICANT
Delta Fish Populations	LESS THAN SIGNIFICANT

Table 2-1
Water Forum Proposal Impact Summary

Resource Category	WFP Impact After Mitigation
FLOOD CONTROL	
Ability to Meet Flood Control Diagrams of CVP/SWP Reservoirs	LESS THAN SIGNIFICANT
Increased Stress on Lower American River Flood Control Structures	LESS THAN SIGNIFICANT
Increased Exposure to Flood Hazards	LESS THAN SIGNIFICANT
Substantial Change in Floodplain Characteristics	LESS THAN SIGNIFICANT
Changes in River Channel Geometry or Gradients Leading to Changes in Bank Erosion, Aggradation, Segradation, or Meander Processes	LESS THAN SIGNIFICANT
HYDROPOWER SUPPLY	
CVP Hydropower Capacity and Generation	LESS THAN SIGNIFICANT
Increased Energy Requirements for Diverters Pumping From Folsom Reservoir	LESS THAN SIGNIFICANT (ECONOMICALLY SIGNIFICANT)
VEGETATION AND WILDLIFE	
Lower American River Riparian Vegetation	LESS THAN SIGNIFICANT
Lower American River Backwater Ponds	LESS THAN SIGNIFICANT
Vegetation Associated With Reservoirs	LESS THAN SIGNIFICANT
Vegetation Associated With the Upper Sacramento River	LESS THAN SIGNIFICANT
Vegetation Associated With the Lower Sacramento and the Delta	LESS THAN SIGNIFICANT
Special-Status Species of Riparian and Open Water Habitats	LESS THAN SIGNIFICANT
Special-Status Species Dependent on Lower American River Backwater Pond/Marsh Habitats	LESS THAN SIGNIFICANT
Elderberry Shrubs and Valley Elderberry Longhorn Beetle	LESS THAN SIGNIFICANT
Sacramento-San Joaquin Delta Habitats of Special-Status Species (Non-fish)	LESS THAN SIGNIFICANT
RECREATION	
Reduced Rafting and Boating Opportunities on the Lower American River	SIGNIFICANT
Lake Natoma Recreation Opportunities	LESS THAN SIGNIFICANT
Reduced Folsom Reservoir Boating Opportunities	SIGNIFICANT
Reduced Availability of Folsom Reservoir Swimming Beaches	SIGNIFICANT
Shasta Lake Recreational Opportunities	LESS THAN SIGNIFICANT
Trinity Reservoir Recreation Opportunities	LESS THAN SIGNIFICANT
Recreation Opportunities on Whiskeytown and Keswick Reservoirs	LESS THAN SIGNIFICANT
Recreation Impacts on the Upper Sacramento River	LESS THAN SIGNIFICANT

Table 2-1
Water Forum Proposal Impact Summary

Resource Category	WFP Impact After Mitigation
Lower Sacramento River Recreation Opportunities	LESS THAN SIGNIFICANT
Delta Recreation Opportunities	LESS THAN SIGNIFICANT
Consistency With the American River Parkway Plan	LESS THAN SIGNIFICANT
Consistency With the Lower American River's Recreational River Designations	LESS THAN SIGNIFICANT
LAND USE AND GROWTH-INDUCING IMPACTS	
Land Use Impacts on Direct and Indirect Effect Study Areas	LESS THAN SIGNIFICANT
Land Use and Growth-Inducing Impact in the Water Service Study Area	SIGNIFICANT
Consistency With General Plan	LESS THAN SIGNIFICANT
Consistency With General Plan Water Supply and Conservation Policies	LESS THAN SIGNIFICANT
AESTHETICS	
Aesthetic Value of the Lower American River	LESS THAN SIGNIFICANT
Aesthetic Value of the Upper Sacramento River, Lower Sacramento River, and Sacramento-San Joaquin Delta	LESS THAN SIGNIFICANT
Aesthetic Value of Lake Natoma, Whiskeytown, and Keswick Reservoirs	LESS THAN SIGNIFICANT
Aesthetic Value of Folsom Reservoir	LESS THAN SIGNIFICANT
Aesthetic Value of Trinity and Shasta Reservoirs	LESS THAN SIGNIFICANT
CULTURAL RESOURCES	
Effect of Varying Water Levels on Cultural Resources in Folsom Reservoir	SIGNIFICANT
Effect of Varying Flows/River Stage on Cultural Resources Along the Lower American River Bank Near Nimbus Dam	LESS THAN SIGNIFICANT
Effect of Varying Flows/River Stage on Cultural Resources Along the Lower American River Bank Near the Mouth	LESS THAN SIGNIFICANT
Effect of Varying Flows/River Stage on Cultural Resources Along the Lower American River Bank Near Freeport	LESS THAN SIGNIFICANT
SOILS AND GEOLOGY	
Changes in Geologic Substructures	LESS THAN SIGNIFICANT
Exposure to Major Geologic Hazards	LESS THAN SIGNIFICANT
Increased Soil Erosion by Wind or Water	LESS THAN SIGNIFICANT
Loss of Soil Cover	LESS THAN SIGNIFICANT

Table 2-2
SUMMARY OF PROJECT IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
GROUNDWATER (Section 4.2)		
4.2-1: Groundwater Quality. Further lowering of groundwater levels is anticipated to occur until the elevation of the groundwater table would stabilize under the groundwater yield recommendations of the WFP. This lowering may result in continued deterioration of groundwater quality in the South Sacramento and Galt areas due to up-rising of poorer quality water from the lower aquifer zone. In the future, elevated manganese and iron levels may occur in groundwater but at levels that would represent an aesthetic, rather than health-related impact. Continued treatment of manganese and iron is expected for municipal wells in the future. Additionally, arsenic levels are not anticipated to exceed current Title 22 standards, and those for radon have yet to be established. This would be considered a less-than-significant impact.	No mitigation measures are required.	**less-than-significant**
4.2-2: Movement of Groundwater Contaminants. Further lowering of the groundwater levels is anticipated to occur until the elevation of the groundwater table would stabilize under the groundwater yield recommendations of the WFP. This lowering would result in no substantial increase in the rate of groundwater contaminant movement. This is a less-than-significant impact because of the small magnitude of increase expected and because the contaminated sites are currently undergoing remediation.	No mitigation measures are required.	**less-than-significant**
4.2-3: Land Subsidence. Further lowering of groundwater levels is anticipated to occur until the elevation of the groundwater table would stabilize under the groundwater yield recommendations of the WFP. This lowering of groundwater levels is unlikely to result in substantial land subsidence. Historical data on subsidence in relation to past groundwater decline indicate that the area is not susceptible to substantial land subsidence given the anticipated level of groundwater level decline in the future. The range of land	No mitigation measures are required.	**less-than-significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
subsidence estimated to occur with the projected groundwater decline is 0.13 to 0.35 feet, and would occur over the course of several decades. Since no substantial land subsidence is expected to occur, this would be considered a less-than-significant impact.		
4.2-4: Efficiency of Wells. Further lowering of groundwater elevations is anticipated to occur until the elevation of the groundwater table stabilizes under the recommended sustainable yields of the WFP. This further lowering may result in reduced efficiency of existing groundwater wells due to the need to: 1) deepen many existing wells, and 2) increase pumping at deepened wells. This reduced efficiency, however, would translate into an economic, rather than environmental impact, as the volume of groundwater available and its quality are not anticipated to be substantially affected following well deepening or increased pumping. The economic effects would be the increased costs associated with the implementation of these actions. This is considered a less-than-significant impact.	No mitigation measures are required.	**less-than-significant**
WATER SUPPLY (Section 4.3)		
4.3-1: Decrease in Deliveries to SWP Customers. Implementation of the WFP could result in decreased water deliveries to SWP customers in 6 years of the 70-year record, ranging between 15 and 173 thousand acre-feet. This would represent a significant impact.	Development of additional water supplies by the SWP could reduce impacts to SWP deliveries.	**significant**
4.3-2: Decrease in Deliveries to CVP Customers. Implementation of WFP could result in a decrease in water deliveries to CVP customers in up to 27 years of the 70-year record, depending on the type of CVP contractor. This would represent a significant impact.	Development of additional water supplies by the CVP could reduce impacts to CVP deliveries.	**significant**

Table 2-2
SUMMARY OF PROJECT IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
WATER QUALITY (Section 4.4)		
4.4-1: Seasonal Changes to Water Quality in Folsom Reservoir, Lake Natoma, and the Lower American River. Implementation of the WFP would directly result in seasonal reductions in Folsom Reservoir storage and Lower American River flows during most years, but would have little effect on the volume of water maintained in Lake Natoma. Volume reductions in Folsom Reservoir and the Lower American River would be expected to alter water temperatures and could increase concentrations/levels of nutrients, pathogens, TDS, TOC, turbidity, and/or priority pollutants due to reduced dilution capacity. With the exception of water temperature (see Section 4.5.3, Fisheries Resources and Aquatic Habitat, for a discussion of temperature impacts to these waterbodies), program-level assessment indicated that any direct impacts to water quality in these waterbodies resulting from seasonal reductions in Folsom Reservoir storage and/or Lower American River flows would be less than significant. No mitigation measures are required.	No mitigation measure are required.	**less-than-significant**
4.4-2: Seasonal Changes to Sacramento River and Delta Water Quality. Implementation of the WFP would result in seasonal reductions in Shasta Reservoir storage and Sacramento River flow during some years. Such hydrologic changes would be expected to cause seasonal elevations in river water temperatures in some years, and could increase concentrations/levels of nutrients, pathogens, TDS, TOC, turbidity, and/or priority pollutants in the Sacramento River due to reduced dilution capacity. Reduced river flows would reduce Delta inflow which, if sufficiently large, could alter various water quality parameters in portions of the Delta. With the possible exception of water temperature (see Section 4.5, Fisheries Resources and Aquatic Habitat, for a discussion of temperature impacts to the Sacramento River), program-level assessments indicated that any direct impacts to Sacramento River or Delta	Changes to Sacramento River and Delta water quality would be an indirect impact of increased urban development facilitated, in part, by the additional diversions of surface and groundwater defined in the WFP. Water quality mitigation measures will be developed for specific projects as they occur in the future. Responsibility for this mitigation lies with the land use planning authorities and individual project proponents, and is beyond the Water Forum's control. Water quality mitigation anticipated to occur with planned growth is addressed in the Sacramento County and other regional General Plans. In addition, the Sacramento County Regional Sanitation District, which operates the SRWTP, is currently updating its Sacramento Regional Wastewater Treatment	**potentially significant**

Table 2-2
SUMMARY OF PROJECT IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
water quality, resulting from seasonal reductions in Sacramento River flow associated with the WFP, would be potentially significant.	Plan Master Plan, and plans to update this document every 5 years in the future.	
FISHERIES RESOURCES and AQUATIC HABITAT (Section 4.5)		
4.5-1: Impacts to Folsom Reservoir's Coldwater Fisheries. Additional diversions from Folsom Reservoir under the WFP would reduce reservoir storage by 10% or more, relative to the Base Condition, infrequently during the period April through August and occasionally during the period September through November. However, anticipated reductions in reservoir storage would not be expected to adversely affect the reservoir's coldwater fisheries because: 1) coldwater habitat would remain available within the reservoir during all months of all years; 2) physical habitat availability is not believed to be among the primary factors limiting coldwater fish populations; and 3) anticipated seasonal reductions in storage would not be expected to adversely affect the primary prey species utilized by coldwater fishes. This would be a less-than-significant impact.	No mitigation measures are required.	**less-than-significant**
4.5-2: Impacts to Folsom Reservoir's Warmwater Fisheries. Additional diversions from Folsom Reservoir under the WFP would frequently reduce reservoir storage (and thus water levels) during the critical spawning and rearing period (i.e., March through September), which could reduce the availability of littoral (nearshore) habitat containing vegetation. Modeling output indicates that long-term average reductions in littoral habitat availability of up to 34% could occur in September. Average reductions in littoral habitat availability of this magnitude could result in increased predation on young-of-the-year warmwater fishes, thereby reducing initial year-class strength of warmwater fishes in many years. Unless willows and other nearshore vegetation	Through plantings and related activities, encourage existing willow and other terrestrial vegetative communities to become established at lower reservoir elevations. Doing so would provide greater availability of physical structure for warmwater fish spawning and rearing in the future when spring reservoir elevations are lower than under current conditions. Artificial habitat structures (e.g., artificial synthetic structures, submerged brush and debris, fish cribs, etc.) would provide structure in littoral habitats used by warmwater fishes for spawning and early lifestage rearing. Because the majority	**potentially significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
become established at lower reservoir elevations in the future in response to seasonal reductions in water levels, population declines for largemouth bass and other warmwater species could be expected to occur. Reduced littoral habitat availability would be a potentially significant impact to Folsom Reservoir warmwater fisheries.	of the reservoir's warmwater fishes spawn in shallow water habitats (i.e., generally less than 10 feet deep), artificial structures would be placed at reservoir elevations that would likely be used by these fishes for spawning and rearing. The location and number of artificial structures placed within the reservoir would increase in proportion to the loss of littoral habitat over time. Implementing habitat structures would help minimize the effects to Folsom Reservoir's warmwater fisheries that would be expected to result from increased diversions and resultant reduced water surface elevations in Folsom Reservoir. While acknowledging operational constraints due to flood control, power production and diversions, work cooperatively with USBR operators to minimize the frequency with which reservoir elevation changes potentially resulting in nest flooding/dewatering events would occur. Monthly/weekly rates of reservoir elevation change will be documented. This information will be compared to timing and average depth of spawning for key nest-building warmwater species in Folsom Reservoir to estimate probabilities of nest flooding/dewatering events. This measure will be implemented to the degree reasonable and feasible based on its integration into the Habitat Management Program. Place artificial structures in the reservoir to compensate for loss of littoral habitats containing natural structure (e.g., inundated willows). The abundance of representative warmwater species will be monitored periodically through creel surveys and/or through catch-per-unit effort (CPUE) rates for tournament anglers to determine the extent to which warmwater fish utilize the structures. The extent to which	

Table 2-2
SUMMARY OF PROJECT IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
	this mitigation is to be implemented will be based on the results of these surveys. Frequency and timing of potential nest flooding/dewatering events that facilitate meeting current and future warmwater fish management goals will be determined by CDFG reservoir biologists. More specific performance criteria will be developed in the Habitat Management Program Plan. All three activities described above would, to the degree reasonable and feasible, be implemented, monitored, and maintained throughout the effective period of the Water Forum Agreement	
4.5-3: Impacts to The Warmwater and Coldwater Fisheries of Lake Natoma. Operations of Folsom Dam and Reservoir under the WFP would have minimal, if any, impact to Lake Natoma's seasonal storage, rates of elevation fluctuation, or temperature. Any changes to these lake parameters that could occur under the WFP would be expected to be minor and, therefore, would not adversely affect the lake's warmwater or coldwater fisheries. This would be a less-than-significant impact.	No mitigation measures are required.	**less-than-significant**
4.5-4: Temperature Impacts to Nimbus Fish Hatchery Operations and Fish Production. Operations of Folsom Dam and Reservoir under the WFP would generally have little effect on May temperatures below Nimbus Dam, and would typically result in equivalent or colder temperatures during the June through September period, relative to the Base Condition. Improved water temperatures would result from a Folsom Dam urban water intake structure temperature control device, and optimal coldwater pool management. On a long-term basis, the frequent and substantial temperature reductions that would occur during the June through September period (when hatchery temperatures reach seasonal highs annually) would more than offset the less frequent adverse	No mitigation measures are required.	**less-than-significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
impacts that would occur in some years. This would potentially benefit hatchery operations and resultant fish production in most years. Overall, this would be a less-than-significant impact.		
4.5-5: Fall-run Chinook Salmon. Operations of Folsom Dam and Reservoir under the WFP would result in periods of reduced flows in the lower American River during the October through December spawning period, when flows under the Base Condition would be 2,500 cfs or less. Further flow reductions occurring at already low flow levels could result in increased redd superimposition and eventual lower year-class strength. Improved water temperatures (resulting from a Folsom Dam urban water intake structure temperature control device and optimal coldwater pool management) and improved early life-stage survival, will benefit chinook salmon spawning success, as well as other life-stages. However, because of the broad, programmatic nature of the WFP, the extent to which these actions (combined with other future actions such as spawning gravel management, revised flow ramping rate criteria, etc.) will interact to counterbalance flow reductions is uncertain, as is the manner in which these actions will be implemented, managed, and coordinated. Consequently, the overall effects of the WFP on chinook salmon year-class strength also is uncertain, and therefore, is considered to represent a potentially significant impact.	The following actions would be implemented as part of the HME, which will be adopted as an integral component of the Water Forum Agreement. a) Dry Year Flow Augmentation. The Water Forum Successor Effort and the USBR would work together with Placer County Water Agency (PCWA) and the USFWS to augment Lower American River flows, particularly during the spawning period during years when impacts would occur. This measure would be implemented (within the constraints of water availability) during dry and critically dry years. The primary source of water for augmenting flows would be the purchase of American River water from upstream reservoirs operated by PCWA. b) Flow Fluctuation Criteria. Develop and implement flow fluctuation (i.e., ramping) criteria for the operation of Folsom and Nimbus dams that would reduce the frequency with which rapid flow fluctuations occur in the river. Reducing the occurrence of large, rapid flow reductions would help to minimize losses of chinook salmon due to redd dewatering (fall and winter) and fry and juvenile stranding (winter and spring), especially during periods of low flow. Flow fluctuation criteria would contribute to improving spawning and incubation success, which, in turn, would lead to an overall increase in annual production of chinook salmon. This action would off-set, in part, potential flow-related impacts to chinook salmon.	**potentially significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
	c) Wetland/Slough Complex Restoration/Maintenance. Restore wetland/slough complexes occurring within habitat transitional zones between river channels, shoreline, and upland habitats. Restoration would involve grading areas for the appropriate elevations and hydrology, as well as planting appropriate vegetation, to achieve desired habitat characteristics. Because wetland/slough complexes are used by juvenile chinook salmon for rearing prior to emigration, restoration and maintenance of these complexes would increase the quantity, and possibly the quality, of rearing habitat available to juvenile chinook salmon. Thus, this action could improve juvenile rearing success prior to emigration, thereby contributing to an overall increase in annual production of chinook salmon. This action would off-set, in part, potential temperature-related impacts to juvenile steelhead. d) Instream Cover (woody debris). Most large woody debris has been, and continues to be, removed from the Lower American River by the U.S. Army Corps of Engineers to reduce potential hazards to recreationists. Discontinuation of this action in select reaches of the river would allow woody debris to accumulate. Instream woody cover is important for juvenile chinook salmon rearing as it provides structure that can be utilized to escape fish and avian predators. It also provides microhabitats with reduced current velocities where juvenile chinook salmon can feed more effectively. Increasing the amount of instream woody debris at specific sites could improve juvenile rearing success prior to emigration, thereby contributing to an overall increase in annual production. This action would off-set, in part, potential flow-related impacts to juvenile chinook salmon.	

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
	e) Shaded Riverine Aquatic Habitat Protection/Management. SRA habitat can be restored along the Lower American River by constructing terraces along shorelines and planting terraces with appropriate herbaceous and woody vegetation. SRA habitat provides feeding and holding areas, escape cover, and local temperature refugia for juvenile chinook salmon. Development and implementation of a shaded riverine aquatic habitat protection/management program would facilitate improving rearing habitat. Thus, protecting and restoring SRA habitat could improve juvenile rearing success, thereby contributing to an overall increase in annual production. This action would off-set, in part, potential flow-related impacts to juvenile chinook salmon. f) Spawning Habitat Management/Maintenance. Improve spawning habitat in the Lower American River by breaking up and redistributing coarse subsurface deposits and reducing compaction and embeddedness which reduces gravel permeability. Development and implementation of a gravel management program for the Lower American River would facilitate improving spawning habitat for chinook salmon and reducing the deterioration of existing spawning gravel. This habitat improvement would be expected to increase the amount of available spawning habitat, thereby contributing to higher overall spawning and incubation success, and therefore chinook salmon production, annually. This action would off-set, in part, flow-related impacts to juvenile chinook salmon. Performance Criteria: a) Dry Year Flow Augmentation. Increase flows particularly during the period during dry and critically dry years to the maximum extent feasible, relative to non-augmented conditions. To assess whether flow augmentation is reducing	

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
	flow-related impacts, flows would be monitored in the Lower American River. b) Flow Fluctuation Criteria. Reduce the frequency of large, rapid flow-reduction events throughout the year, particularly during the fall spawning and incubation period. c) Wetland/Slough Complex Restoration/Maintenance. Increase the amount of wetland/slough complex habitat in the Lower American River that is used by early life stages of chinook salmon for rearing prior to emigration. d) Instream Cover (woody debris). Increase the amount of woody debris within areas of the Lower American River channel that is used by early life stages of chinook salmon for rearing prior to emigration. e) Shaded Riverine Aquatic Habitat Protection/Management. Protect existing, and increase to the extent feasible, the amount of shaded riverine aquatic habitat within the Lower American River. f) Spawning Habitat Management. Restore armored gravels to conditions that will encourage chinook salmon to use restored areas for spawning. Timing: a) Dry Year Flow Augmentation. Flow augmentation would occur during the spawning period October through December, during dry and critically dry years. This measure would be implemented, as necessary, throughout the effective period of the Water Forum Agreement.	

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
	b) Flow Fluctuation Criteria. Flow fluctuation criteria would be developed and implemented for the effective period of the Water Forum Agreement. c) Wetland/Slough Complex Restoration/Maintenance. Wetland/Slough complex restoration/management would be conducted throughout the effective period of the Water Forum Agreement, as warranted by the success of initial projects to be initiated during the first two years of the Agreement. d) Instream Cover (woody debris). Instream cover (woody debris) would be allowed to accumulate in the Lower American River throughout the effective period of the Water Forum Agreement. e) Shaded Riverine Aquatic Habitat Protection/Management. Shaded riverine aquatic habitat protection/management would be conducted throughout the effective period of the Water Forum Agreement, as warranted by the success of initial projects to be implemented within the first two years of the Agreement. f) Spawning Habitat Management. Spawning habitat management would be conducted throughout the effective period of the Water Forum Agreement.	
4.5-6: Lower American River Steelhead. Operations of Folsom Dam and Reservoir under the WFP would, on a long-term average basis, measurably reduce river temperatures during all months of the June through September rearing period. Reductions in the 69-year average temperature at Watt Avenue of 0.5EF would occur during June, August, and September, with a reduction of 0.8EF expected during July. This would provide significant thermal	No mitigation measures are required.	**less-than-significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
benefits to steelhead over-summering in the Lower American River during most years. Conversely, flow reductions of 20% or greater, when flows under the Base Condition would be at or below the maximum AFRP requirement for the month, would occur approximately 4% to 33% of the time during one or more months of the April through September period. Such flow reductions could reduce the quantity and/or quality of juvenile rearing habitat in some of these years. Because steelhead in the Lower American River are believed to be more limited by over-summering temperatures than flows, the frequent and substantial temperature reductions would be expected to offset the flow reductions, on a long-term basis. Consequently, the combined temperature and flow changes under the WFP would not be expected to adversely affect the long-term population trends of steelhead in the Lower American River. This would be a less-than-significant impact.		
4.5-7: Flow- and Temperature-Related Impacts to Splittail (February through May). Operations of Folsom Dam and Reservoir under the WFP would typically reduce, to some degree, the amount of riparian vegetation inundated between RM 8 and 9 (which serves as an index for the lower portion of the river) under the Base Condition. However, with few exceptions, substantial amounts of inundated riparian vegetation would remain under the WFP in years when such habitat would occur under the Base Condition. In addition, flow changes under the WFP would have little effect on the availability of in-channel spawning habitat availability, or the amount of potential spawning habitat available from the mouth up to RM 5 - the reach of the river influenced by Sacramento River stage. Also, the frequency with which suitable temperatures for splittail spawning below Watt Avenue would not change substantially under the WFP, relative to the Base Condition. Given the uncertainty as to the magnitude and extent of splittail spawning in the Lower American River, and the actual amount of potential spawning habitat a specific flow rates	The following actions would be implemented as part of the HME, which will be adopted as an integral component of the Water Forum Agreement. a) Wetland/Slough Complex Restoration/Maintenance. Restore wetland/slough complexes occurring within habitat transitional zones between river channels, shoreline, and upland habitats. Restoration would involve grading areas for the appropriate elevations and hydrology, as well as planting appropriate vegetation, to achieve desired habitat characteristics. Because wetland/slough complexes are used by splittail for spawning, restoration and maintenance of these complexes would increase the quantity, and possibly the quality, of spawning habitat available to splittail. Wetland/slough complex restoration/maintenance would reduce flow-related impacts to splittail spawning.	**potentially significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
throughout the river, the effects of flow reductions from the February through May period also are uncertain and, therefore, represent a potentially significant impact.	b) Shaded Riverine Aquatic Habitat Protection/Management. SRA habitat can be restored along the Lower American River by constructing terraces along shorelines and planting terraces with appropriate herbaceous and woody vegetation. SRA habitat provides spawning and rearing areas for splittail. Development and implementation of a shaded riverine aquatic habitat protection/management program would facilitate increasing splittail spawning and rearing habitat availability within the Lower American River. Thus, protecting and restoring SRA habitat could improve splittail spawning and juvenile rearing success, thereby contributing to an overall increase in annual production of splittail. This action would off-set, in part, potential flow-related impacts to splittail. c) Flow Fluctuation Criteria. Develop and implement flow fluctuation (i.e., ramping) criteria for the operation of Folsom and Nimbus dams that would reduce the frequency with which rapid flow fluctuations occur in the river. Reducing the occurrence of large, rapid flow reductions would help to minimize losses of splittail due to fry and juvenile stranding during the February through May period. Flow fluctuation criteria would contribute to improving early life-stage rearing success, thereby contributing to an overall increase in annual production of splittail. This action would off-set, in part, potential flow-related impacts to splittail. Performance Criteria: a) Wetland/Slough Complex Restoration/Maintenance. Increase the amount of wetland/slough complex habitat in the Lower American River that is used by splittail for spawning and rearing.	

Table 2-2
SUMMARY OF PROJECT IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
	b) Shaded Riverine Aquatic Habitat Protection/Management. Protect existing, and increase to the extent feasible, the amount of shaded riverine aquatic habitat within the Lower American River. c) Flow Fluctuation Criteria. Develop and implement flow fluctuation (i.e., ramping) criteria for the operation of Folsom and Nimbus dams that would reduce the frequency with which rapid flow fluctuations occur in the river. Reducing the occurrence of large, rapid flow reductions would help to minimize losses of splittail due to fry and juvenile stranding during the February through May period. Flow fluctuation criteria would contribute to improving early life-stage rearing success, thereby contributing to an overall increase in annual production of splittail. This action would off-set, in part, potential flow-related impacts to splittail.	
4.5-8: Flow- and Temperature-Related Impacts to American Shad (May and June). Operations of Folsom Dam and Reservoir under the WFP would increase the frequency with which mean monthly flows at the mouth would be below the target attraction flow of 3,000 cfs by 3% in May and 4% in June. Because American shad spawn opportunistically where suitable conditions are found, potentially attracting fewer adult spawners into the Lower American River in a few years would not be expected to adversely impact annual American shad production within the Sacramento River system. Flow reductions under the WFP in May and June could reduce the number of adult shad attracted into the river during some years. Because annual production of American shad within the Sacramento River system would not be affected, and because direct impacts to the Lower American River sport fishery would be less than substantial in most years, any flow-related impacts to American shad are considered to be less than significant. In addition, because the frequency with which suitable	No mitigation measures are required.	**less-than-significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
temperatures for American shad spawning would not differ substantially between the WFP and the Base Condition, and because river temperatures under the WFP would nearly always remain suitable for American shad rearing, temperature-related impacts to American shad also are considered to be less than significant. Overall, this would be a less-than-significant impact.		
4.5-9: Flow- and Temperature-Related Impacts to the Striped Bass Sport Fishery (May and June). Operations of Folsom Dam and Reservoir under the WFP would increase the frequency with which mean monthly flows at the mouth would be below the target flow of 1,500 cfs by 1% in May and 10% in June. Because flows at the mouth that are believed to be sufficient to maintain the striped bass fishery would be met or exceeded in most years during both May and June, and because substantial changes in the strength of the striped bass fishery would not be expected to occur in all years when mean May and/or June flows fall below 1,500 cfs, flow-related impacts to the striped bass fishery that could potentially occur under the WFP are considered to be less than significant. In addition, because the frequency with which suitable temperatures for juvenile striped bass rearing in the Lower American River would differ little between the WFP and the Base Condition during May and June, temperature-related impacts to juvenile striped bass rearing are also considered to be less than significant.	No mitigation measures are required.	**less-than-significant**
4.5-10: Impacts to Shasta Reservoir's Coldwater Fisheries. Hydrologic conditions with the WFP would not result in substantial reductions in reservoir storage throughout the April through November period of the year. Because changes to Shasta Reservoir storage would not be substantial, because physical habitat availability is not believed to be among the primary factors limiting coldwater fish populations within the reservoir, and because anticipated changes in seasonal storage would not be expected to result in substantial adverse effects on the primary prey base utilized	No mitigation measures are required.	**less-than-significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
by the reservoir's coldwater fish populations, seasonal reductions in storage expected to occur under WFP would have less-than-significant impacts to Shasta Reservoir's coldwater fisheries.		
4.5-11: Impacts to Trinity Reservoir's Coldwater Fisheries. Hydrologic conditions with the WFP would not result in substantial reductions in reservoir storage throughout the April through November period of the year. Because changes to Trinity Reservoir storage would not be substantial, because physical habitat availability is not believed to be among the primary factors limiting coldwater fish populations within the reservoir, and because anticipated changes in seasonal storage would not be expected to result in substantial adverse effects on the primary prey base utilized by the reservoir's coldwater fish populations, seasonal reductions in storage expected to occur under WFP would have less-than-significant impacts to Trinity Reservoir's coldwater fisheries.	No mitigation measures are required.	**less-than-significant**
4.5-12: Impacts to Shasta Reservoir's Warmwater Fisheries. Seasonal changes in reservoir surface elevation under the WFP could result in substantial reductions in reservoir littoral habitat availability in a few years during the period March through September. However, seasonal changes in reservoir surface elevation under the WFP would generally not result in substantial reductions in long-term average reservoir littoral habitat availability during the period March through September (which are the primary spawning and initial rearing months for the reservoir's warmwater fishes of management concern). Thus, these reductions would not be of sufficient magnitude to substantially reduce long-term, average initial year-class strength of the warmwater fish populations of management concern. Consequently, seasonal reductions in littoral habitat availability would constitute a less-than-significant impact to Shasta Reservoir's warmwater	No mitigation measures are required.	**less-than-significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
Fisheries. Because the frequency with which potential nest dewatering events could occur in Shasta Reservoir under the WFP would not change during any month of the March through July warmwater fish spawning period, impacts to warmwater fish nesting success under the WFP are considered to be less than significant Overall, this would constitute a less-than-significant impact.		
4.5-13: Impacts to Trinity Reservoir's Warmwater Fisheries. Under the WFP, substantial reductions in littoral habitat availability would occur infrequently throughout the March through September period. Similarly, the potential for nest dewatering events to occur in Trinity Reservoir would not change under the WFP during the March through July spawning period. Thus, additional surface water diversions under the WFP would result in less-than-significant impacts to the spawning and initial rearing success of Trinity Reservoir's nest-building, warmwater fishes. Based on these findings, implementation of the WFP would result in less-than-significant impacts to Trinity Reservoir warmwater fisheries.	No mitigation measures are required.	**less-than-significant**
4.5-14: Impacts to Keswick Reservoir Fisheries. Hydrologic conditions with the WFP would have little, if any, effect on seasonal storage, elevation, and temperature of Keswick Reservoir. Any minor changes in storage, elevation, or temperature that could occur would constitute a less-than-significant impact to Keswick Reservoir fishery resources.	No mitigation measures are required.	**less-than-significant**
4.5-15: Flow-Related Impacts to Sacramento River Fisheries. Flow reductions of more than 20% would not occur during any month under the WFP, relative to the Base Condition. Measurable reductions in the 70-year average flows released from Keswick Dam would not occur during any month of the year. In addition, flows released from Keswick Dam would never be below the 3,250 cfs minimum stipulated in the NMFS Biological Opinion for	No mitigation measures are required.	**less-than-significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
winter-run chinook salmon during the period October through March under the WFP. These findings indicate that flow changes below Keswick Dam that would occur under the WFP would result in less-than-significant impacts to upper Sacramento River fisheries resources. Under the WFP, substantial reductions in lower Sacramento River Flows at Freeport would occur infrequently during all months of the year. Consequently, any flow-related impacts to lower Sacramento River fisheries or migrating anadromous fishes that could occur under WFP are considered to be less than significant. Overall, this constitutes a less-than-significant impact.		
4.5-16: Temperature-Related Impacts to Sacramento River Fisheries Resources. Hydrologic conditions with the WFP would not result in substantial changes to the 69-year average temperature at Keswick Dam or Bend Bridge for any month of the year. Their would also be no change in the number of years exceeding 56EF at Keswick Dam under the WFP during the April through September period. Conversely, increases in water temperatures would result in temperatures at Bend Bridge to exceed 56EF in one additional year during September. However, there would be no change in winter-run chinook salmon early lifestage survival during this year. In addition, their would be no substantial decreases in annual early lifestage survival of fall-run, late fall-run, winter-run, or spring-run chinook salmon in any individual year under the WFP, relative to that under the Base Condition. Therefore, the temperature changes that would occur would not be expected to result in substantial adverse impacts to chinook salmon, or other fish species using the upper Sacramento River. Temperatures in the lower Sacramento River would not be expected to change substantially under the WFP. The number of years that mean monthly temperatures at this location would exceed 56EF, 60EF, and 70EF would be similar under the WFP and the Base Condition during the period March through November.	No mitigation measures are required.	**less-than-significant**

Table 2-2
SUMMARY OF PROJECT IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
Thus, potential impacts to fish species within the lower Sacramento River would be considered less than significant. Overall, this would be considered a less-than-significant impact.		
4.5-17: Delta Fish Populations. Under the WFP, substantial reductions in Delta outflow would occur infrequently during the February through June period. Likewise, under the WFP, substantial upstream shifts in the mean monthly position of X2 also would occur infrequently during this period. Finally, Delta export to inflow ratios under the WFP would not exceed the maximum export limits for either the February through June (35% of Delta inflow) or the July through January periods (65% of Delta inflow). Overall this is considered to be a less-than-significant impact to Delta fish populations.	No mitigation measures are required.	**less-than-significant**
FLOOD CONTROL (Section 4.6)		
4.6-1: Ability to Meet Flood Control Diagrams of CVP/SWP Reservoirs. The USBR is obligated to meet the flood control diagram for Folsom and Shasta reservoirs and the Department of Water Resources (DWR) has the similar responsibility for Oroville Reservoir. Any reduction in the ability of either the USBR or DWR to meet their flood control obligations for these reservoirs would constitute a significant impact. Since implementation of the Water Forum Proposal would increase water diversions from Folsom Reservoir, thereby allowing Folsom Reservoir to start the flood control season with less water in storage than under existing conditions, and since the integrated nature of CVP/SWP operations would also result in lowered reservoir storage in Shasta and Oroville reservoirs, none of the flood control diagrams for these reservoirs would be compromised. This is considered to represent a less-than-significant impact.	No mitigation measures are required.	**less-than-significant**

Table 2-2
SUMMARY OF PROJECT IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
4.6-2: Increased Stress on Lower American River Flood Control Structures. Increased releases from Nimbus Dam and hence, flows in the Lower American River, during the flood control season could affect the stability of flood control structures on the Lower American River. Higher flows could increase stress on levees and other flood control structures. However, under the Water Forum Proposal, 70-year average mean monthly flows would always be lower than the Base Condition. Therefore, downstream structures on the Lower American River would remain unaffected. This is a less than significant impact.	No mitigation measures are required.	**less-than-significant**
4.6-3: Increased Exposure to Flood Hazards. Implementation of the Water Forum Proposal would not compromise the flood protection provided by Folsom Dam or structures along the Lower American River. Future projects, undertaken by Water Forum stakeholders, and their associated construction activities, may, however, affect local flood control efforts and/or structures. New projects having the potential to affect flood control structures will have to conduct flood control analysis and comply with flood control regulations before approval. Since these future projects are not part of the Water Forum Proposal, specific project-level analysis for flood control protection would be undertaken prior to their approval, and the fact that the flood control protection provided by Folsom Dam would not be compromised, increased exposure to flood hazards is considered to be a less-than-significant impact.	No mitigation measures are required.	**less-than-significant**
4.6-4: Substantial Change in Floodplain Characteristics. No specific construction activities are associated with the Water Forum Proposal, which would affect Sacramento or American River floodplain characteristics. Any new future projects requiring construction of facilities would be required to evaluate their specific and individual impacts on flood control in a project-level study. Since the Water Forum Proposal does not include implementation of specific projects, impacts to floodplain	No mitigation measures are required.	**less-than-significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
characteristics as a result of the Water Forum Proposal are considered to be less than significant.		
4.6-5: Changes in River Channel Geometry or Gradients Leading to Changes in Bank Erosion, Aggradation, Segradation, or Meander Processes. While the Water Forum Proposal does not contain construction or improvement of instream structures, future projects might include such actions. These types of actions could ultimately affect the structural integrity of levees. Any such impacts would be addressed in future design plans and, therefore, are considered to represent a less-than-significant impact under the Water Forum Proposal.	No mitigation measures are required.	**less-than-significant**
POWER SUPPLY (Section 4.7)		
4.7-1: Reduced CVP Hydropower Capacity and Generation. Implementation of the WFP would not result in reduced capacity for use by WAPA's preference customers or reduce average annual surplus capacity available for WAPA's sale. Although under the WFP, WAPA's capacity peak maximum of 1,152 megawatts would not be met in 41 of the 828 months studied, the Base Condition would also fall short of the maximum in 42 of the 828 months. Implementation of the WFP would reduce average annual CVP energy production, however. With the WFP, an average annual reduction of 30 Gwh would occur, as compared to the Base Condition. This reduction when compared to the annual average CVP energy production of 3,650 Gwh is considered a less-than-significant impact.	No mitigation measures are required.	**less-than-significant**
4.7-2: Increased Energy Requirements for Diverters Pumping From Folsom Reservoir. Implementation of the WFP would result in changes in pumping requirements for those who pump water from Folsom Reservoir. Under the WFP, it is anticipated that an increase in average annual pumping energy would be required.	No mitigation measures are required.	**less than significant (economically significant)**

Table 2-2
SUMMARY OF PROJECT IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
While this impact would be environmentally less than significant, it represents an economically significant impact.		
VEGETATION and WILDLIFE (Section 4.8)		
4.8-1: Lower American River Riparian Vegetation. Compared to existing conditions, the WFP would result in lower mean monthly flows below Nimbus Dam and at the H Street bridge during the critical growing season months of April through July; however, these flows would not be reduced with sufficient magnitude and frequency to significantly alter existing riparian vegetation dependent on flows in the Lower American River. Also, the higher flows needed for seed dispersal would occur with sufficient frequency to maintain the riparian forest community. For example, during a majority of the growing season months (April - July), flows would be above the minimum flow requirement of 1765 cfs between 61% and 83% of the time, depending on the month. Because WFP conditions would not result in the thinning of the riparian corridor, or the loss of valuable border zone vegetation and habitat, this impact would be considered less than significant.	No mitigation measures are required.	**less-than-significant**
4.8-2: Lower American River Backwater Ponds. Compared to existing conditions, the WFP would result in lower mean monthly flows below Nimbus Dam and the H Street bridge during the summer; however, these flows would not be reduced with sufficient magnitude and frequency to significantly alter existing backwater habitats dependent on the Lower American River flows. For example, the overall effects of the WFP would result in a greater number of years during the 70-year hydrologic record that flows are within the minimum/optimum range of 1,300 to 4,000 cfs (between 2 and 14 years, more often in the 70-year record between March and September, depending on the month). Because flows high enough to promote recharge of the ponds would continue during	No mitigation measures are required.	**less-than-significant**

Table 2-2
SUMMARY OF PROJECT IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
the winter and/or spring, this impact would be considered less than significant.		
4.8-3: Vegetation Associated with Reservoirs. Compared to existing conditions, the WFP would result in lower mean monthly flows and, in many years, lower surface water elevations of reservoirs; however, because the draw down zone is vegetated with non-native herbaceous plants and scattered willow shrubs that do not form a contiguous riparian community, are not considered of high wildlife value, and will likely reestablish as water levels fluctuate, important habitat values are not adversely affected. For these reasons, this impact would be considered less than significant.	No mitigation measures are required.	**less-than-significant**
4.8-4: Vegetation Associated with the Upper Sacramento River. Compared to existing conditions, the WFP would result in some years with higher and some years with lower mean monthly flows on the Upper Sacramento River during the spring and summer growing season for riparian vegetation; in years with lower flows, they would not be reduced by sufficient magnitude and frequency to significantly alter existing riparian vegetation dependent on the Upper Sacramento River flows. For example, spring and summer flows on the Upper Sacramento River, under WFP conditions, vary from base conditions by less than one percent. Consequently, this impact would be considered less than significant.	No mitigation measures are required.	**less-than-significant**
4.8-5: Vegetation Associated with the Lower Sacramento River and the Delta. Compared to existing conditions, Lower Sacramento River flows would be reduced during the growing season months of some years. However, in years with lower flows, they would not be reduced by sufficient magnitude and frequency to significantly alter existing riparian habitats dependent on the Lower Sacramento River flows and Delta inflows. For example, average decreases in mean monthly flows during the peak growing	No mitigation measures are required.	**less-than-significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
season (March-July) between the base and WFP conditions range from 159.9 cfs to 492.0 cfs. As it relates to riparian vegetation effects, these reductions in flow are not considered substantial. This impact would less than significant.		
4.8-6: Special-Status Species of Riparian and Open Water Habitats. As discussed in Impacts 4.8-1 and 4.8-5, when compared to existing conditions, the WFP would result in reduced mean monthly flows during certain periods in the year. However, these flows would not be reduced by sufficient magnitude and frequency to significantly alter existing riparian vegetation dependent on the Lower American River. Because cottonwood forest vegetation would not be adversely affected and open water (river) habitat would be available, the special-status species dependent on riparian habitat would not be expected to be adversely affected; therefore, this impact would be considered less than significant.	No mitigation measures are required.	**less-than-significant**
4.8-7: Special-Status Species Dependent on Lower American River Backwater Pond/Marsh Habitats. As discussed in Impact 4.8-2, when compared to existing conditions the WFP would result in reduced mean monthly flows during certain times of the year. However, these flows would not be reduced by sufficient magnitude and frequency to significantly alter existing backwater habitats dependent on the Lower American River. Because backwater habitats would not be adversely affected, the special-status species dependent on these habitats would not be expected to be adversely affected; therefore, this impact would be considered less than significant.	No mitigation measures are required.	**less-than-significant**
4.8-8: Elderberry Shrubs and Valley Elderberry Longhorn Beetle. As discussed in Impact 4.8-2 (backwater recharge), when compared to existing conditions the WFP would result in reduced mean monthly flows during certain months of the growing season. However, these flows would not be reduced by sufficient magnitude	No mitigation measures are required.	**less-than-significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
and frequency to significantly alter existing water fluctuations (pond levels) and vegetation dependent on these ponds. For these reasons, elderberries dependent on these habitats are not expected to be adversely affected. This impact would be considered less than significant.		
4.8-9: Sacramento-San Joaquin Delta Habitats of Special-Status Species (Non-Fish). As discussed in Impact 4.8-6, when compared to existing conditions the WFP would result in reduced mean monthly flows in the Sacramento River during certain times of the year. However, these flows would not be reduced by sufficient magnitude and frequency to significantly alter existing habitats dependent on the Delta. Because Delta habitats would not be adversely affected, the special-status species dependent on these habitats would not be expected to be adversely affected; therefore, this impact would be considered less than significant.	No mitigation measures are required.	**less-than-significant**
RECREATION (Section 4.9)		
4.9-1: Reduced Rafting and Boating Opportunities on the Lower American River. Compared to base conditions, additional diversions under the WFP would result in reduced summertime mean monthly flows below Nimbus Dam with a sufficient magnitude and frequency to diminish flows available for Lower American River rafting and boating during some high rafting and boating use months of the year (June, July, and September). For instance, in these months, flows would be within the minimum/maximum flow range for rafting and boating between 3 to 4 fewer years of the 70-year record. Reduced flows would result in a significant effect to rafting and boating opportunities on the Lower American River.	The WFP includes features intended to lessen potential environmental impacts to the American River, consistent with the coequal objective to protect its natural values. These mitigating features include water conservation, dry-year diversion restrictions, and conjunctive use of ground water and surface water. Adoption of the WFP with these features would reduce flow effects on Lower American River recreation opportunities. In addition, improvements to recreation facilities in the American River Parkway are identified to compensate for the reduction in quality of and opportunity for rafting/boating on the Lower American River. Actions would occur in cooperation with the Sacramento County Department of Parks and Recreation and could include one or both of the following: (A) contributing to the purchase and development of the Uruttia property to provide	**significant**

water-dependent recreation opportunities and (B) developing recreation facilities to improve water-dependent and water-enhanced recreation opportunities in the American River Parkway. The improvements would involve projects that are consistent with the American River Parkway Plan, or that would be implemented subject to an amendment to the parkway plan by Sacramento County.

The measures described below could be implemented in cooperation with the Sacramento County Department of Parks and Recreation, the agency responsible for implementing the American River Parkway Plan. The measures could be part of the Habitat Management Plan adopted by the Water Forum participants as an implementation tool for the Habitat Management Element of the Water Forum Proposal. Funding for the recreation measures may include money from within or outside the Water Forum Successor Effort. Because activities by a number of agencies are underway to restore and enhance the Lower American River, this recreation mitigation should be coordinated with the broader ecosystem partnership efforts. Other agencies involved in the Lower American River may participate in funding and/or implementation of recreation mitigation, as appropriate, to promote a well-coordinated program of restoration and enhancement of the river.

a) Uruttia Property. The Uruttia Property, located on the north side of the Lower American River near CalExpo, could be acquired and/or developed to provide public access, opportunities for water-dependent recreation activity related to the river (such as canoe and kayak use and instruction), and enhanced environmental values which can provide opportunities for water-enhanced recreation, such as sightseeing and nature study. The property and facilities would be incorporated into the

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation

American River Parkway and reflected by amendment in the American River Parkway Plan.

b) Recreation Facility Improvements to the American River Parkway. The American River Parkway Plan describes in several Area Plans the resources and facilities intended to provide for water-dependent and water-enhanced recreation, including river access, trails, parking, swimming areas, and other facilities. The facilities could include improvement of river access for rafting/boating in the less intensively used sections of the river, such as downstream of Goethe Park; trail improvements to increase the opportunity for water-enhanced recreation, such as a linkage between the Fairbairn plant and the Sutter's Landing Park site; or interpretive resources to improve water-enhanced nature study and appreciation of the Parkway.

c) Update of the American River Parkway Plan. The update could consider the flow regime resulting from the WFP and appropriate actions to take in the Parkway to support improvement of both recreation opportunities and riparian habitat.

d) Enhancement of the Condition and Quality of Existing Recreation Facilities. Past and current budget constraints have limited the County's ability to maintain some existing recreation facilities. Enhancement of the condition and quality of existing facilities could improve the attraction of the Parkway for both water-dependent and water-enhanced recreation activity.

The improvements to recreation facilities in the American River Parkway would accomplish the following criteria:

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
	C Facilities would improve opportunities for water-dependent recreation, particularly rafting/boating, such that the river is made more accessible when flows are appropriate and/or the quality of rafting/boating is improved; or facilities would improve opportunities for water-enhanced recreation, such that the quality and visitation associated with recreation activity in the Parkway is increased. C Improvements would be consistent with the American River Parkway Plan. The final selection of facilities for improvement would occur during the 18-month preparation period of the Habitat Management Plan. Facilities would be developed as soon as feasible after completion of that plan, recognizing the need to assemble funding, secure facility approvals, and prepare designs.	
4.9-2: Lake Natoma Recreation Opportunities. Additional diversions under the WFP would not result in a different pattern of lake elevation fluctuations than under base conditions, because Lake Natoma would continue to serve as a regulating reservoir below Folsom Dam. Typically, lake elevation fluctuation stays within a range of 4 to 7 feet and does not substantially affect recreation. Therefore, effects on Lake Natoma recreation opportunities would be less than significant.	No mitigation measures are required.	**less-than-significant**
4.9-3: Reduced Folsom Reservoir Boating Opportunities. Compared to base conditions, additional diversions by purveyors taking water from Folsom Reservoir and downstream under the WFP conditions would result in lower elevations of Folsom Reservoir. The declines would occur in more years than under base conditions, reducing the availability of boat ramps and marina wet	The WFP includes features intended to lessen potential environmental impacts on the Lower American River, which would also serve to decrease environmental effects to other resources. These mitigating features include water conservation, dry-year diversion restrictions, and conjunctive use of ground water and surface water. Adoption of the WFP	**significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
slips more often during the primary boating season (March - September). For instance, lake levels would decline below the 412-foot elevation necessary for marina wet slips 4 to 6 more years of the 70-year record in the summer (June through September), depending on the month. More frequently reduced lake elevations would result in a significant effect to boating opportunities on Folsom Reservoir.	with these features would reduce water surface elevation effects on Folsom Reservoir recreation. In addition, boating facility improvements would enhance boating access during periods of higher water to compensate for reduced availability of boat ramp and marina facilities from Water Forum Proposal diversions. Actions would occur in cooperation with the California Department of Parks and Recreation (CDPR) and would be consistent with the General Plan for Folsom Lake State Recreation Area (CDPR, 1978). Mitigation should also be consistent with the objectives of CDPR proposals for measures to mitigate lower lake levels from flood storage reoperation (Kranz, 1997). The actions could be added into the recreation section of the Habitat Management Plan as a means to implement them. One or more of the following recreation measures described below could be implemented in cooperation with the CDPR. Funding for the recreation measures may include money from within or outside the Water Forum Successor Effort. A number of agencies are involved in water resources and recreation facility decisions affecting Folsom Reservoir, so this recreation mitigation should be coordinated with other actions, as appropriate. Consequently, other agencies involved in Folsom Reservoir may participate in funding and/or implementation of recreation mitigation. e) <u>Boating Facilities to Increase Access and Use During Higher Water Periods</u>. Construction of boating facilities, consistent with the General Plan for Folsom Lake State Recreation Area would increase boating access and use of the reservoir during higher water periods. To compensate for reduced availability of boating facilities during lower water periods, this measure would improve boating facilities for use when higher water conditions allow for	

high-quality water recreation and the greater reservoir surface area availability; at higher water levels, visitation can be increased when the larger reservoir surface area can support more intensive use. Examples of potential boating facility improvements suggested by CDPR staff include boat parking and shore facilities at Dyke 8 or a launch ramp and dock at New York Cove (on the east side of the reservoir, north of Brown's Ravine). The final selection of facilities would occur in cooperation between the Water Forum Successor Effort and the CDPR.

f) Improvement to the Marina Area. Construction of facility improvements in the Brown's Ravine area would enhance the operation of the marina. Improvements would be consistent with the Folsom Lake State Recreation Area General Plan. The intent of these improvements would be to help enhance marina operations during periods of sufficiently high water to offset the reduced availability of wet slips. The final selection of facilities would occur in cooperation between the Water Forum Successor Effort, the operator of the marina, and the CDPR.

The improvements to recreation facilities on Folsom Reservoir will accomplish the following criteria:

- Facilities serving higher water conditions will increase boating visitation to Folsom Reservoir when the surface area is large enough to support the increased use.
- Marina facility improvements will help enhance operation of the marina when water level is high enough to support the wet slips.
- Improvements are consistent with the General Plan for Folsom Lake State Recreation Area.

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
	The final selection of facilities for improvement would occur during an period following adoption of the Water Forum Proposal. Facilities would be developed as soon as feasible after completion of that plan, recognizing the need to assemble funding, secure facility approvals, and prepare designs.	
4.9-4: Reduced Availability of Folsom Reservoir Swimming Beaches. Compared to the base conditions, additional diversions under the WFP would result in more frequent declines in lake elevation below useable swim beach levels during most of the primary swimming season (June, August, September). For example, in those months lake elevations remain within the 420 to 455-foot range where swim beaches are usable in 2 to 4 fewer years of the 70-year period with the WFP. Although the availability of beaches during the remaining months of the swim season (May and July) would not be affected, the overall effect of reduced lake elevations on the availability of Folsom Reservoir swim beaches would be significant.	The WFP includes features intended to lessen potential environmental impacts on the Lower American River, which would also serve to decrease environmental effects to other resources. These mitigating features include water conservation, dry-year diversion restrictions, and conjunctive use of ground water and surface water. Adoption of the WFP with these features would reduce lake level effects on shoreline recreation and swimming. In addition, improvements to swimming or other shore recreation facilities that attract increased visitation to landside recreation areas around the reservoir should be implemented. Actions would occur in cooperation with the CDPR and would be consistent with the General Plan for Folsom Lake State Recreation Area. Mitigation should also be consistent with the objectives of CDPR proposals for measures to mitigate lower lake levels for flood storage reoperation (Krantz, 1997). The actions could be added into the recreation section of the Habitat Management Plan as a means to implement them. One or more of the following landside recreation measures described below could be implemented in cooperation with the CDPR. Funding for the recreation measures may include money from within or outside the Water Forum Successor Effort. A number of agencies are involved in water resources and recreation facility decisions affecting Folsom Reservoir, so this recreation mitigation would be coordinated with other	**significant**

actions, as appropriate. Consequently, other agencies involved in Folsom Reservoir may participate in funding and/or implementation of recreation mitigation.

a) Impoundments for Swimming. Construction of earthen dams at approximately 450 feet elevation at Beal's Point, Dyke 8, and/or Granite Bay would impound water for swimming opportunities close to day-use parking and concessionaires regardless of reservoir elevation. The CDPR has considered this concept as a way to provide dependable swimming opportunities throughout the summer. Water would need to be drained and replenished by pumps weekly. Because this concept would involve considerable engineering and construction, it could cause environmental effects and would be subject its own environmental review. The impoundments would also have to comply with health regulations for water contact use. As such, it is not yet certain whether this concept could be feasibly implemented at Folsom Reservoir.

b) Landside Recreation Improvements. Construction of landside facilities supporting other recreation uses would help offset reduction in swimming opportunities. Facilities could include a bicycle trail connection included in the General Plan between Beal's Point and Granite Bay. Construction of this three-mile paved trail connection would substantially increase bicycle use, and therefore visitation, regardless of reservoir level, according to CDPR staff. The bicycle trail would improve access to shore facilities and remote beach areas. Also, the Water Forum Successor Effort could contribute to other shoreline recreation facility improvements, such as temporary parking, beach areas, or concession facilities

for low-water access or other facilities consistent with the General Plan.

c) Update of the Folsom Lake State Recreation Area General Plan. With changes in future reservoir levels, the General Plan could be updated to reflect the expected pattern of reservoir elevations. This could help update the recreation area's approach to attract and serve local and non-local recreation users. This effort would need to be led by CDPR with support of the Water Forum Successor participants.

The improvements to landside recreation facilities on Folsom Reservoir would accomplish the following criteria:

- Facilities could provide opportunities for swimming in low-water conditions below an elevation of 435 feet (approximate optimum swimming beach level); or facilities would increase landside recreation visitation to Folsom Reservoir with activities.
- Improvements would be consistent with the General Plan for Folsom Lake State Recreation Area.
- Recreation facility improvements would not conflict with habitat enhancement actions of the Habitat Management Plan.

The final selection of facilities for improvement would occur during a period following adoption of the Water Forum Proposal. Facilities would be developed as soon as feasible after completion of that plan, recognizing the need to assemble funding, secure facility approvals, and prepare designs.

Table 2-2
SUMMARY OF PROJECT IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
4.9-5: Shasta Lake Recreation Opportunities. Compared to the base conditions, additional diversions under the WFP would result in some more frequent declines in lake elevation during the summer recreation season (May - September) which would decrease shoreline recreation use more often in late summer (August and September); however, the declines would not substantially reduce boat ramp availability or hinder boat-in camping activities. For instance, the number of years when all boat ramps are available would not be changed in any of the summer recreation season months. Altogether, the effect of WFP conditions on recreation opportunities of Shasta Lake during the May - September season are less than significant, compared to base conditions.	No mitigation measures are required.	**less-than-significant**
4.9-6: Trinity Reservoir Recreation Opportunities. Compared to the base conditions, additional diversions under the WFP would result in minimal declines in lake elevations in Trinity Reservoir during the summer recreation season (May - September). For example, reductions in mean monthly lake elevations would be no greater than 0.1 to 0.2 feet, depending on the month, which would not affect the availability of boat ramps at the reservoir. Consequently, with the minimal changes in lake elevations resulting from WFP diversions, no significant effect on Trinity Reservoir's recreation opportunities would occur.	No mitigation measures are required.	**less-than-significant**
4.9-7: Recreation Opportunities on Whiskeytown and Keswick Reservoirs. Whiskeytown and Keswick Reservoirs serve as regulating reservoirs, so while releases under WFP conditions would differ from base conditions, these differences would not substantially alter the existing seasonal pattern of lake elevations. Therefore, no substantial changes in recreation opportunities on Whiskeytown and Keswick Reservoirs would occur, resulting in a less-than-significant effect.	No mitigation measures are required.	**less-than-significant**

Table 2-2
SUMMARY OF PROJECT IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
4.9-8: Recreation Impacts on the Upper Sacramento River. Compared to base conditions, in most years additional diversions under the WFP would not result in decreased flows in the upper Sacramento River during the summer recreation season (May through September). For example, during these months, flow downstream of Keswick Reservoir would be equal to or greater than the base condition in 59, 55, 41, 59, and 66 years of the 70-year record in May, June, July, August, and September, respectively. In years when flows are less than base conditions in these months, the difference would be insufficient to substantially reduce recreation opportunities. Therefore, changes in flow on the upper Sacramento River during summer recreation season would result in a less-than-significant effect on recreation opportunities.	No mitigation measures are required.	**less-than-significant**
4.9-9: Lower Sacramento River Recreation Opportunities. Compared to base conditions, in most years additional diversions under the WFP would not result in decreased flows in the lower Sacramento River during the summer recreation season (May through September). For example, during these months, flows at Freeport would be equal to or greater than the base condition in 40, 38, 43, 51, and 48 years of the 70-record in May, June, July, August, and September, respectively. In years when flows are less than base conditions in these months, the reduction in flow would seldom be more than 1.0 percent, which would be insufficient to substantially reduce recreation opportunities. Also, substantial flow would remain in the river and tidal action would diminish the influence of the reduced flows on boating, fishing, and other water-dependent recreation activities. Therefore, changes in flow on the lower Sacramento River during summer recreation season would result in a less-than-significant effect on recreation opportunities.	No mitigation measures are required.	**less-than-significant**
4.9-10: Delta Recreation Opportunities. Compared to base conditions, in most years additional diversions under the WFP	No mitigation measures are required.	**less-than-significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
would not result in decreased inflows in the Delta during the summer recreation season (May through September). For example, during these months, flows at Freeport would be equal to or greater than the base condition in 40, 38, 43, 51, and 48 years of the 70-record in May, June, July, August, and September, respectively. In years when inflows are less than base conditions in these months, the reduction in flow would seldom be more than 1.0 percent, which would be insufficient to substantially reduce recreation opportunities. Also, substantial inflow to the Delta would remain and tidal action would diminish or overshadow the influence of the reduced flows on boating, fishing, and other water-dependent recreation activities. Therefore, changes in inflow to the Delta during summer recreation season would result in a less-than-significant effect on recreation opportunities.		
4.9-11: Consistency with the American River Parkway Plan. The WFP would be consistent with the American River Parkway Plan and no significant environmental impact related to conflict with plans and policies for the avoidance of environmental effects would occur. This would be a less-than-significant impact.	No mitigation measures are required.	**less-than-significant**
4.9-12: Consistency with Lower American River's Recreational River Designations. While the WFP conditions would reduce flows available for recreation on the Lower American River during the summer months in a some additional years, adopting Mitigation Measure 4.9-1 would minimize the effect on recreation opportunities for rafting or boating during high recreation use periods. The Lower American River would retain substantial recreation value. The recreation values of the Lower American River would be protected to the maximum extent feasible and the WFP would be consistent with the State and Federal recreational river designations, resulting in a less-than-significant impact.	No mitigation measures are required.	**less-than-significant**

Table 2-2
SUMMARY OF PROJECT IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
LAND USE and GROWTH-INDUCING IMPACTS (Section 4.10)		
4.10-1: Land Use Impacts on Direct and Indirect Effect Study Areas (i.e., in-stream and adjacent areas of Folsom Reservoir, Lake Natoma, the Lower American River, and water bodies on the CVP and SWP systems). The WFP does not define specific projects (e.g., diversion or conveyance structures, treatment facilities) that would affect land uses in the direct or indirect effect study areas. It does identify a list of projects (some of which are conceptual) required to implement the WFP, and these projects will be subject to independent project and environmental review. The WFP would not grant land use authority, nor does the Water Forum possess any power over land use decisions. Therefore, adoption of the WFP would result in less-than-significant land use impacts *within the direct and indirect effect study areas.*	No mitigation measures are required.	**less-than-significant**
4.10-2: Land Use and Growth-Inducing Impact in the Water Service Study Area. Implementation of the WFP would not directly alter land uses in the water service study area. The WFP is intended to provide a safe and reliable water supply for the region's economic health and planned development through the year 2030. Land use decisions would continue to be made by city and county government decision-makers with guidance provided by adopted General Plans. The WFP would accommodate substantial development, however, as it would remove water supplies as an obstacle to growth. Therefore, the WFP is considered to be growth-inducing, as defined by CEQA, and the resulting land use and growth impacts would be significant.	The water supply included in the WFP has been determined considering the planned growth for each jurisdiction within the water service study area; as such, the WFP is consistent with the growth parameters described each city and county General Plan. The General Plan of each jurisdiction includes policies and programs for the protection of the environment and, to the extent feasible, the avoidance or mitigation of significant effects on the environment from planned growth and development. During the normal course of each jurisdiction's implementation of its General Plan policies, feasible mitigation of significant impacts from planned growth and development would occur. Because mitigation of growth-related environmental impacts is in the purview of each city and county, through their existing land use authority, and because the Water Forum itself has no such authority, the WFP cannot feasibly provide for additional mitigation of	**significant**

Table 2-2
SUMMARY OF PROJECT IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
	growth-related land use and development environmental impacts.	
4.10-3: Consistency with General Plan Agricultural Land Use Policies. The WFP would not result in the reduction or forfeiture of existing surface water entitlements, the reduction or diminution of any existing groundwater rights, nor would it provide water purveyors, the Water Forum, or the Water Forum Successor Effort with any land use authority. Water Forum Proposal would not alter (i.e., reduce) agricultural lands within the jurisdictions of the water service study area and, consequently, would result in a less-than-significant impact to agriculture.	No mitigation measures are required.	**less-than-significant**
4.10-4: Consistency with General Plan Water Supply and Conservation Policies. The Water Forum Proposal would not conflict with adopted environmental plans and goals of local jurisdictions, as stated in their general plans and community plans. Rather, the WFP implements many of the General Plan policies directed at the provision of water within the water service study area jurisdictions. Consequently, the WFP would result in less-than-significant impacts to adopted environmental plans and goals of local jurisdictions.	No mitigation measures are required.	**less-than-significant**
AESTHETICS (Section 4.11)		
4.11-1: Aesthetic Value of the Lower American River. Compared to existing conditions, diversions accommodated by the WFP would not result in substantially reduced flows such that adverse visual impacts would occur. Nor would flows be reduced below that necessary to support riparian vegetation and wildlife habitat within the Lower American River corridor. Because WFP conditions would not result in the thinning of the riparian corridor, or the loss of valuable border zone vegetation and habitat, the	No mitigation measures are required.	**less-than-significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
aesthetic effects of WFP conditions on the Lower American River are considered less than significant.		
4.11-2: Aesthetic Value of the Upper Sacramento River, Lower Sacramento River, and Sacramento-San Joaquin Delta. Compared to existing conditions, additional diversions under the WFP would not result in a substantial reductions in water flows such that adverse visual impacts would occur. Nor would flows be reduced below that necessary to support riparian vegetation and wildlife habitat within the upper and lower Sacramento River and the Sacramento-San Joaquin River Delta. For example, reductions in Sacramento River flows, under WFP conditions, would vary from base conditions by approximately 3% or less during the growing season months (March - October). Consequently, this impact is considered less than significant.	No mitigation measures are required.	**less-than-significant**
4.11-3: Aesthetic Value of Lake Natoma, Whiskeytown, and Keswick Reservoirs. Compared to existing conditions, implementation of the WFP would not result in substantial changes in the frequency or magnitude of surface water elevation changes at these reservoirs. Consequently, the aesthetic quality of these reservoirs would not be expected to change substantially, relative to existing conditions. This impact is considered less than significant.	No mitigation measures are required.	**less-than-significant**
4.11-4: Aesthetic Value of Folsom Reservoir. Compared to existing conditions, implementation of the WFP would result in mean monthly surface water elevation decreases of greater than 10 feet at Folsom Reservoir. However, because the frequency of such reductions would be minimal (less than 3 percent during a seventy year hydrologic cycle),the aesthetic effect of the WFP's reduction in surface water elevations at Folsom Reservoir is considered less than significant.	No mitigation measures are required.	**less-than-significant**

Table 2-2
SUMMARY OF PROJECT IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
4.11-5: Aesthetic Value of Trinity and Shasta Reservoirs. Compared to existing conditions, implementation of the WFP would result in mean monthly surface water elevation decreases of less than 10 feet at Trinity and Shasta reservoirs. For example, during the 70-year hydrologic period of record, surface water elevation reductions would range from 3.3 to 4.8 feet at Trinity Reservoir and from 2.6 to 4.6 feet Shasta Reservoir. Because reduction in surface water elevations at Trinity and Shasta Reservoirs would be less than 10 feet, this impact is considered less than significant.	No mitigation measures are required.	**less-than-significant**
CULTURAL RESOURCES (Section 4.12)		
4.12-1: Effect of Varying Water Levels on Cultural Resources in Folsom Reservoir. Implementation of the WFP would result in some variation in Folsom Reservoir elevations as compared to the Base Condition. This variation would not result in increased reservoir levels of sufficient magnitude to cause either inundation of previously exposed areas, or exposure of previously inundated sites, beyond that which is occurring under the Base Condition. However, implementation of the WFP would result in significantly more cycles of inundation and drawdown in the area between 360 and 395 ft msl; this increase would constitute a significant impact to sites within that zone.	The WFP hydrologic modeling data indicates that the project would have a significant impact on cultural sites and features within the reservoir pool, especially those located between the 360 ft msl and 395 ft msl elevations. Significant impacts would include the potential exposure of previously submerged sites to increased vandalism, recreation use, wave action, and the effects of repeated inundation and drawdown. Many prehistoric and historic sites have been recorded within the reservoir basin, most of which remain unevaluated. Only about half of the reservoir has been surveyed, and many other sites undoubtedly exist in the unsurveyed areas. In 1994, Far Western and JRP Historical Consultants prepared a Research Design as part of SAFCA's Folsom Re-operation Study. That document included all of the reservoir basin between the 390-foot and the 466-foot contours. The Research Design provides, among other components, summaries of the known cultural resources within the study area; research issues applicable to those resources; and recommendations for evaluating the sites, protecting them from further damage, and mitigating unavoidable impacts.	**significant**

Table 2-2
SUMMARY OF PROJECT IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
	Checklists are included for evaluation of various types of sites. All unevaluated sites within the reservoir that fall within the direct impact zone of the WFP could be given additional study, using this Research Design as a guideline. Also, unsurveyed portions of the direct impact zone could be surveyed for cultural resources, as water levels permit; any additional sites and features also may require evaluation and mitigation. The appropriate agencies (i.e., Bureau of Reclamation, US Army Corp of Engineers, and the State Office of Historic Preservation) could decide that evaluation and mitigation of a *representative sample* of the sites is sufficient, although this cannot be determined without comprehensive consultation with those agencies. Recent conversations with archaeologists at the Bureau of Reclamation's Sacramento office suggest that such sampling would be acceptable to that agency.	
4.12-2: Effect of Varying Flows/River Stage on Cultural Resources Along the Lower American River Bank Near Nimbus Dam. Implementation of the WFP would result in American River flows downstream of Nimbus Dam that differ somewhat from those under the Base Condition. For nearly all months of the year, mean monthly river flows under the WFP would be lower than under the Base Condition, meaning that no new areas of the riverbank would be inundated. Because no significant sites are expected to have survived within the riverbed itself, these lower flows would not expose previously submerged (and intact) cultural resources. Therefore, changes in river flows from the WFP would have a less-than-significant impact to cultural resources along the river near Nimbus Dam.	No mitigation measures are required.	**less-than-significant**
4.12-3: Effect of Varying Flows/River Stage on Cultural Resources Along the Lower American River Near the Mouth. Implementation of the WFP would result in American River flows	No mitigation measures are required.	**less-than-significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
at the mouth that differ somewhat from those under the Base Condition. For nearly all months of the year, mean monthly river flows under the WFP would be the same as or lower than under the Base Condition, meaning that no new areas of the riverbank would be submerged. Because no significant sites are expected to have survived historically within the riverbed itself, these lower flows would not expose previously submerged (and intact) cultural resources. Therefore, changes in river flows from the WFP would have a less-than-significant impact to cultural resources along the river near the mouth.		
4.12-4: Effect of Varying Flows/River Stage on Cultural Resources Along the Lower Sacramento River Bank Near Freeport. Implementation of the WFP would result in Sacramento River flows at Freeport that differ slightly from those under the Base Condition. However, these variations are not of sufficient frequency or magnitude to cause either significant exposure or inundation of cultural resources and thus represent a less-than-significant impact to cultural resources.	No mitigation measures are required.	**less-than-significant**
SOILS and GEOLOGY (Section 4.13)		
4.13-1: Changes in Geologic Substructures. While the WFP itself would not require ground disturbing activities, implementation of the WFP over time, has the potential to substantially change geologic substructures through future construction activities associated with new water facilities (i.e., river intakes, water treatment plants, pump stations, well fields and conveyance pipelines). With the construction of these facilities, potential changes to subsurface geology could affect human safety. However, development and planning of future water facilities projects would consider geotechnical studies and implement design recommendations, as appropriate, in order to minimize any hazardous geologic changes to the underlying substrata. Therefore,	No mitigation measures are required.	**less-than-significant**

Table 2-2
SUMMARY OF PROJECT IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
changes in geologic substructures are considered less than significant.		
4.13-2: Exposure to Major Geologic Hazards. While implementation of the WFP would not result in any undue exposure to major geologic hazards, construction of future projects associated with the implementation of the WFP , has the potential to expose people or property to major geologic hazards, including unstable slopes, ground failure, subsidence, liquefaction, and lateral spreading. Given the relative stability of the geologic subsurface environment in the greater Sacramento area, and the necessary geotechnical/soils studies and proper design practices that would be required in all future projects, exposure to geologic hazards is considered to be a less-than-significant impact.	No mitigation measures are required.	**less-than-significant**
4.13-3: Increased Soil Erosion by Wind or Water. The WFP itself would not involve any construction activities that would disturb surface soils and thereby induce either wind or water erosion. However, construction activities related to future water projects associated with the implementation of the WFP could lead to short-term soil disturbing activities. With the availability of project-specific siting investigations, soils/geotechnical studies and the implementation of any necessary project-specific mitigation measures, and increased soil erosion is considered to represent a less-than-significant impact.	No mitigation measures are required.	**less-than-significant**
4.13-4: Loss of Soil Cover. While the WFP itself would not include activities that would promote soil loss, future projects could result in land conversion and subsequent soil loss. Certain project facilities where situated in open terrain, may result in the permanent loss of some soil cover. However, future projects would have to evaluate potential soil loss impacts and mitigate for any identified significant effects. Soil loss associated with the WFP is considered to represent a less-than-significant impact.	No mitigation measures are required.	**less-than-significant**

2.5 summary of CUMULATIVE impacts

An analysis of cumulative impacts considers the combined effects of the proposed project, other past and present projects, and "reasonably foreseeable probable future projects" (State CEQA Guidelines §15355). In the case of the Water Forum Proposal, this involves attempting to foresee related projects occurring over the long-term future. The Water Forum Proposal would be implemented over the next three decades. During this same time period, it is expected that many other actions will be implemented that will affect the environmental conditions of the project's direct and indirect study areas.

2.5.1 ANALYSIS OF ONE FUTURE SCENARIO FOR CUMULATIVE CONDITIONS

A large degree of speculation and uncertainty exists when attempting to characterize the study area 30 years into the future, particularly recognizing the dynamic nature of decisions about water supply and resource protection in the Sacramento and San Joaquin River system. Therefore, it is difficult to define any one scenario as the reasonably foreseeable probable future. Nonetheless, to fulfill the requirements of State CEQA Guidelines §15355 to address future cumulative conditions, the programmatic analysis of this WFP uses one scenario as a good faith effort to assess future cumulative potential effects. The scenario was developed after a year of extensive discussions between the Water Forum technical consultants and the USBR and USFWS. Given all of the competing demands for water and water resource limitations, one outcome that is not speculative is the occurrence of significant impacts of some type in the future.

The future scenario for this EIR consists of past, present, and possible future projects producing related or cumulative impacts. The cumulative condition, therefore, is defined for this EIR as the WFP and three other possible future actions or sets of actions that could be quantified, including:

> ***Increased Trinity River Flows.*** For modeling and analysis purposes, the Water Forum EIR assumes that Trinity River flows will be increased in accordance with the U.S. Bureau of Reclamation's (USBR) recent policy direction. Flows are proposed to be increased from existing levels to 390,000 acre-feet per year in drier years to 750,000 acre-feet per year in wetter years, thereby reducing exports to the Sacramento River.
>
> ***East Bay Municipal Utility District (EBMUD) Supplemental Water Supply Project.*** EBMUD's proposed project, for this analysis includes diversion of up to 112,000 acre-feet per year of American River water subject to deficiencies imposed by the Central Valley Project.
>
> ***Increased Water Demands.*** For modeling and analysis purposes, the Water Forum EIR assumes that increased water demands by State Water Project (SWP) contractors, Central Valley Project (CVP) contractors, and other Sacramento Valley water users will occur. Increased demand volumes are based on projections by USBR and the California Department of Water Resources (DWR).

The WFP EIR does not serve as the environmental document for the above actions. The impacts of each of these actions would be evaluated in project-specific environmental documentation and, where appropriate, alternatives and mitigation measures recommended to reduce significant effects.

2.5.2 UNQUANTIFIABLE ASPECTS OF FUTURE CONDITIONS

In addition to uncertainty surrounding the volume of diversions in the future (i.e., 2030), many efforts are currently underway to address unfavorable conditions in the Sacramento River and Bay-Delta that cannot currently be quantified. Populations of fish species such as Delta smelt, steelhead and winter-run chinook salmon have declined over the past decades to the point that they have been listed as threatened or endangered, and other species such as fall-run and spring-run chinook salmon have been proposed for listing. At the same time, variable water availabilities, and environmental requirements have resulted in water delivery deficiencies imposed on SWP and CVP on water contractors.

For these reasons the state and federal governments, in cooperation with local organizations, have begun implementing environmental restoration programs to reverse these biological declines. Since 1996, approximately $100 million has been expended on restoration projects, such as improving fish screens and restoring habitat. Over the next 30 years over $1.5 billion will be spent on additional improvements.

Programs underway or planned to improve Sacramento River system and Bay-Delta fisheries and habitats include the Central Valley Project Improvement Act (CVPIA) Anadromous Fish Restoration Program (AFRP), and Ecosystem Restoration Program Plan (ERPP) of the CALFED Bay-Delta Program.

The effectiveness of these programs to improve Sacramento River and Bay-Delta conditions, however, is not guaranteed. In addition, there could be future environmental stressors that cannot be predicted. For instance, introduction of non-native species into aquatic habitats could have additional adverse impacts. It is not possible to speculate in the analysis how any of these considerations could affect cumulative impacts.

Prospects for Additional or Reallocated Water Supply

Section 3406(b)(3) of the CVPIA directs the Department of the Interior to acquire additional water supplies. Specific options identified in that section include: improvements in or modifications to the operations of the project; water banking; conservation; transfers; conjunctive use; and temporary and permanent land fallowing, including purchase, lease, and option of water rights, and associated agricultural land. In addition, water bank operations can reallocate water in drier years to alleviate water delivery and environmental impacts. It is speculative at this time to predict the success of projects to acquire additional or reallocate existing water resources. It is also recognized that in the future USBR and other agencies outside the Water Forum will make numerous operational decisions based on conditions existing at the time. Therefore, the cumulative impacts analyses in this EIR are based on one set of assumptions

as to how USBR would operate CVP facilities if no additional water supply is developed, and no water is reallocated.

Insufficiency of Water Supply for Cumulative Future Needs

The cumulative impact analysis indicates that unless new water is developed or water is reallocated, there will be insufficient water for USBR to meet some of its contractual and environmental obligations in the future.

The decrease in Shasta Reservoir storage and reduction in flow below Keswick Dam is a surrogate for the volume of additional water that would have to be available in the future for environmental purposes to approximate Base Conditions. A decrease in Shasta Reservoir storage results in a reduced flow requirement below Keswick Dam, because flow requirements are based on Shasta Reservoir storage levels. Over the simulated 70-year hydrologic period Shasta Reservoir carryover storage was reduced by about 75,000 AF and flow below Keswick Dam was reduced by about 30,000 AF on an average annual basis. Combined, this represents an approximate average annual deficit of 105,000 AF, relative to the Base Condition. During the 1928 to 1934 critical period, Shasta Reservoir storage declined an average of 75,000 AF per year, resulting in a total critical period storage deficit of about one-half million AF. As a consequence of lower storage, the future cumulative simulation prescribes an average annual reduction in flow volume below Keswick Dam of about 15,000 AF, or about 100,000 AF over the critical period. Combined, the decrease in Shasta Reservoir storage and reduction in flow volume below Keswick Dam represent an annual average water deficit of about 90,000 AF and a total deficit approximating 600,000 AF for the future cumulative critical period relative to the Base Condition.

Due to the increased overall demands on the system, future cumulative condition hydrologic modeling indicates that lower deliveries to all categories of CVP contractors could occur in the future, and be most significant in the dry and driest years. Compared to the Base Condition, less water would be delivered to CVP contractors in about 30% of the years, and to SWP contractors in about 30% of the years.

CVP and SWP contract demands associated with future development will be higher than current demands. Even under the Base Condition full demands frequently are not met. One method to generally illustrate the water supply deficit to water contractors under the future cumulative condition is to estimate the amount of water associated with future delivery deficiencies if the same percentage of full demand was delivered in the future as was delivered under the Base Condition. This estimation indicates that over the 70-year hydrologic period simulated, combined CVP/SWP water delivery deficits could exceed 400,000 AF on an average annual basis. During the 1928 to 1934 critical period, combined CVP/SWP water delivery deficits approach an average of nearly 400,000 AF per year, representing a total critical period deficit of nearly 2½ million AF.

USBR remains committed to taking all necessary actions that will allow water delivery and environmental obligations to be met. The Water Forum does not recommend or advocate not meeting any environmental or water delivery obligations. Again, the analysis in this EIR is based

on a reasonable set of assumptions as to how the system would be operated if no additional water supply is developed or no water is reallocated. The EIR discusses potential cumulative effects, given the uncertainties recognized above.

Table 2-3
SUMMARY OF CUMULATIVE IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
GROUNDWATER (Section 6.2)		
6.2-1: Groundwater Quality. Because groundwater pumping within Sacramento County does not change between the two comparative future conditions, the impacts identified with the implementation of the WFP do not change from those described in Section 4.2. Under the future cumulative condition, deterioration of groundwater quality would represent a less-than-significant impact.	No mitigation measures are required.	**less-than-significant**
6.2-2: Movement of Groundwater Contaminants. Under the future cumulative condition, movement of groundwater contaminants would not increase beyond that described for the WFP. This would be a less-than-significant cumulative effect.	No mitigation measures are required.	**less-than-significant**
6.2-3: Land Subsidence . Under the future cumulative condition, land subsidence would not occur beyond that described for the WFP. This would be a less-than-significant impact.	No mitigation measures are required.	**less-than-significant**
6.2-4: Reduced Efficiency of Wells. Under the future cumulative condition, efficiency of wells would not change beyond that described for the WFP. This would be a less-than-significant impact.	No mitigation measures are required.	**less-than-significant**
WATER SUPPLY (Section 6.3)		
6.3-1: Decrease in Deliveries to SWP Customers. Under the set of assumptions for future conditions used in the EIR, the cumulative impact analysis indicates that increased deliveries to SWP customers of between 20,000 and 1,240,000 acre-feet would occur in about 49 years; and, decreased water deliveries to SWP customers of between 110,000 and 1,210,000 acre-feet would occur in about 20 years of the 70-year record. Average annual SWP	Development of additional water supplies by the SWP could reduce impacts to SWP deliveries.	**significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
deliveries would increase by about 350,000 acre-feet. The delivery reduction in 20 years would represent a significant cumulative impact.		
6.3-2: Decrease in Deliveries to CVP Customers. Under the set of assumptions for future conditions used in the EIR, the cumulative impact analysis indicates that increased deliveries to CVP contractors of up to 670,000 acre-feet would occur in about 49 years of the 70-year record; and, decreased water deliveries of between 10,000 and 520,000 acre-feet in about 20 years of the 70-year record. Average annual CVP deliveries would increase by about 110,000 acre-feet. The delivery reduction in 20 years would represent a **significant cumulative impact**.	Development of additional water supplies by the CVP could reduce impacts to CVP deliveries.	**significant**
WATER QUALITY (Section 6.4)		
6.4-1: Seasonal Changes to Water Quality in Folsom Reservoir, Lake Natoma, and the Lower American River. Under the set of assumptions for future conditions used in the EIR, the cumulative impact analysis indicates that Folsom Reservoir storage and Lower American River flows would be reduced more frequently and/or by greater magnitudes as compared to the WFP alone, while constituent loading to these waterbodies would be expected to increase somewhat. Project-level urban runoff and stormwater discharge mitigation measures pursuant to federal, state, and local regulations are expected to continue to be required for new growth to occur. With the exception of water temperature (see Section 6.5.3), program-level assessment indicated that any impacts to water quality from reduced dilution and increased constituent loading would be minor, and would not be expected to cause State or federal water quality standards, objectives or criteria to be more frequently exceeded, relative to existing conditions. This would be a **less-than-significant cumulative impact**.	No mitigation measures are required.	**less-than-significant**

Table 2-3
SUMMARY OF CUMULATIVE IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
6.4-2: Seasonal Changes to Sacramento River and Delta Water Quality. Under the set of assumptions for future conditions used in the EIR, the cumulative impact analysis indicates that Sacramento River flows would be reduced more frequently and/or by greater magnitudes compared to that which would occur due to the additional diversions under the WFP alone, and constituent loading to the Sacramento River also would be expected to increase. Project-level water quality mitigation and ongoing water quality management plans and programs are expected to continue to be required such that State and federal water quality standards, objectives and criteria would not be exceeded on a more frequent basis than under existing conditions. However, substantial uncertainty exists with regard to seasonal changes in Sacramento River flow, constituent loading, and the extent and effectiveness of project-level water quality mitigation and management measures in the future, all of which are beyond the Water Forum ' s control. Because the potential for degradation of water quality in the future depends on uncertain future policy decisions and actions, this would be a potentially significant cumulative impact.	Changes to Sacramento River and Delta water quality would be an indirect impact of increased urban development facilitated, in part, by the additional diversions of surface and groundwater defined in the WFP. Water quality mitigation measures will be developed for specific projects as they occur in the future. Responsibility for this mitigation lies with the land use planning authorities and individual project proponents, and is beyond the Water Forum ' s control. Water quality mitigation anticipated to occur with planned growth is addressed in the Sacramento County and other regional General Plans. In addition, the Sacramento County Regional Sanitation District, which operates the SRWTP, is currently updating its Sacramento Regional Wastewater Treatment Plan Master Plan, and plans to update this document every 5 years in the future.	**potentially significant**
FISHERIES RESOURCES AND AQUATIC HABITAT (Section 6.5)		
6.5-1: Impacts to Folsom Reservoir ' s Coldwater Fisheries The cumulative impacts analysis is based on a set of assumptions about future cumulative conditions and does not assume any development of additional Sacramento River water supplies. Under this set of assumptions, the analysis indicates that Folsom Reservoir storage would be reduced by 10% or more, relative to the Base Condition, occasionally during some months of the April through November period. However, anticipated reductions in reservoir storage would not be expected to adversely affect the reservoir ' s coldwater fisheries because: 1) coldwater habitat would remain	No mitigation measures are required.	**less-than-significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
available within the reservoir during all months of all years; 2) physical habitat availability is not believed to be among the primary factors limiting coldwater fish populations; and 3) anticipated seasonal reductions in storage would not be expected to adversely affect the primary prey species utilized by coldwater fishes. This would be a less-than-significant future cumulative impact.		
6.5-2: Impacts to Folsom Reservoir ' s Warmwater Fisheries. Under the set of assumptions used for the cumulative impacts analysis, Folsom Reservoir storage (and thus water levels) could frequently be reduced during the critical warmwater fish spawning and rearing period (i.e., March through September), which could reduce the availability of littoral (nearshore) habitat containing vegetation. Modeling output indicates that long-term average reductions in littoral habitat availability of up to approximately 50% could occur in September. Reductions in littoral habitat availability of this magnitude could result in increased predation on young-of-the-year warmwater fishes, thereby reducing long-term initial year-class strength of warmwater fishes. Unless willows and other nearshore vegetation become established at lower reservoir elevations in the future in response to seasonal reductions in water levels, long-term year class production of warmwater fishes would be reduced. Reduced littoral habitat availability would be a potentially significant future cumulative impact to Folsom Reservoir warmwater fisheries.	Through plantings and related activities, encourage existing willow and other terrestrial vegetative communities to become established at lower reservoir elevations. Doing so would provide greater availability of physical structure for warmwater fish spawning and rearing in the future when spring reservoir elevations are lower than under current conditions. Artificial habitat structures (e.g., artificial synthetic structures, submerged brush and debris, fish cribs, etc.) would provide structure in littoral habitats used by warmwater fishes for spawning and early lifestage rearing. Because the majority of the reservoir ' s warmwater fishes spawn in shallow water habitats (i.e., generally less than 10 feet deep), artificial structures would be placed at reservoir elevations that would likely be used by these fishes for spawning and rearing. The location and number of artificial structures placed within the reservoir would increase in proportion to the loss of littoral habitat over time. Implementing habitat structures would help minimize the effects to Folsom Reservoir ' s warmwater fisheries that would be expected to result from increased diversions and resultant reduced water surface elevations in Folsom Reservoir. While acknowledging operational constraints due to flood control, power production and diversions, work cooperatively with USBR operators to minimize the frequency with which	**potentially significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
	reservoir elevation changes potentially resulting in nest flooding/dewatering events would occur. Monthly/weekly rates of reservoir elevation change will be documented. This information will be compared to timing and average depth of spawning for key nest-building warmwater species in Folsom Reservoir to estimate probabilities of nest flooding/dewatering events. This measure will be implemented to the degree reasonable and feasible based on its integration into the Habitat Management Program. Place artificial structures in the reservoir to compensate for loss of littoral habitats containing natural structure (e.g., inundated willows). The abundance of representative warmwater species will be monitored periodically through creel surveys and/or through catch-per-unit effort (CPUE) rates for tournament anglers to determine the extent to which warmwater fish utilize the structures. The extent to which this mitigation is to be implemented will be based on the results of these surveys. Frequency and timing of potential nest flooding/dewatering events that facilitate meeting current and future warmwater fish management goals will be determined by CDFG reservoir biologists. More specific performance criteria will be developed in the Habitat Management Program Plan. All three activities described above would, to the degree reasonable and feasible, be implemented, monitored, and maintained throughout the effective period of the Water Forum Agreement	
6.5-3: Impacts to The Warmwater and Coldwater Fisheries of Lake Natoma. Under the specific set of cumulative assumptions, the analysis indicates that operations of Folsom Dam and Reservoir	No mitigation measures are required.	**less-than-significant**

Table 2-3
SUMMARY OF CUMULATIVE IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
would have minimal, if any, impact to Lake Natoma ' s seasonal storage, rates of elevation fluctuation, or temperature. Any changes to these lake parameters that could occur under the future cumulative condition would not adversely affect the lake ' s warmwater or coldwater fisheries. This would be a less-than-significant future cumulative impact.		
6.5-4: Temperature Impacts to Nimbus Fish Hatchery Operations and Fish Production. Under the specific set of cumulative assumptions, the analysis indicates that operations of Folsom Dam and Reservoir would generally have little effect on May temperatures below Nimbus Dam, but would typically result in equivalent or colder temperatures during the June through September period, relative to the Base Condition. On a long-term basis, the frequent and measurable temperature reductions that would occur during the June through September period (when hatchery temperatures reach seasonal highs annually) would more than offset the infrequent adverse impacts resulting from increased temperature. This would potentially benefit long-term hatchery operations and resultant fish production. Overall, this would be a less-than-significant future cumulative impact.	No mitigation measures are required.	**less-than-significant**
6.5-5: Fall-run Chinook Salmon. The cumulative impacts analysis is based on a set of assumptions about future cumulative conditions and does not assume any development of additional Sacramento River water supplies. Under this set of assumptions, operations of Folsom Dam and Reservoir would result in periods of reduced flows in the lower American River during the October through December spawning period, when flows under the Base Condition would be 2,500 cfs or less. Further flow reductions occurring at already low flow levels could result in increased redd superimposition and eventual lower year-class strength. Improved water temperatures (resulting from a Folsom Dam urban water intake structure and optimal coldwater pool management) and	The following actions would be implemented as part of the HME, which will be adopted as an integral component of the Water Forum Agreement. a) Dry Year Flow Augmentation. The Water Forum Successor Effort and the USBR would work together with Placer County Water Agency (PCWA) and the USFWS to augment Lower American River flows, particularly during the spawning period during years when impacts would occur. This measure would be implemented (within the constraints of water availability) during dry and critically dry years. The primary source of water for augmenting flows would be the	**potentially significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
improved early lifestage survival will benefit chinook salmon spawning success, as well as other lifestages. However, because of the broad, programmatic nature of the WFP, the extent to which these actions (combined with other future actions such as spawning gravel management, revised flow ramping rate criteria, etc.) will interact to counterbalance flow reductions is uncertain, as is the manner in which these actions will be implemented, managed and coordinated without a comprehensive Habitat Management Program Plan for the Lower American River. Consequently, the overall effect of 2030 w/ WFP on chinook salmon year-class strength also is uncertain and, therefore, is considered to represent a potentially significant impact.	purchase of American River water from upstream reservoirs operated by PCWA. b) Flow Fluctuation Criteria. Develop and implement flow fluctuation (i.e., ramping) criteria for the operation of Folsom and Nimbus dams that would reduce the frequency with which rapid flow fluctuations occur in the river. Reducing the occurrence of large, rapid flow reductions would help to minimize losses of chinook salmon due to redd dewatering (fall and winter) and fry and juvenile stranding (winter and spring), especially during periods of low flow. Flow fluctuation criteria would contribute to improving spawning and incubation success, which, in turn, would lead to an overall increase in annual production of chinook salmon. This action would off-set, in part, potential flow-related impacts to chinook salmon. c) Wetland/Slough Complex Restoration/Maintenance. Restore wetland/slough complexes occurring within habitat transitional zones between river channels, shoreline, and upland habitats. Restoration would involve grading areas for the appropriate elevations and hydrology, as well as planting appropriate vegetation, to achieve desired habitat characteristics. Because wetland/slough complexes are used by juvenile chinook salmon for rearing prior to emigration, restoration and maintenance of these complexes would increase the quantity, and possibly the quality, of rearing habitat available to juvenile chinook salmon. Thus, this action could improve juvenile rearing success prior to emigration, thereby contributing to an overall increase in annual production of chinook salmon. This action would off-set, in part, potential temperature-related impacts to juvenile steelhead.	

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
	d) Instream Cover (woody debris). Most large woody debris has been, and continues to be, removed from the Lower American River by the U.S. Army Corps of Engineers to reduce potential hazards to recreationists. Discontinuation of this action in select reaches of the river would allow woody debris to accumulate. Instream woody cover is important for juvenile chinook salmon rearing as it provides structure that can be utilized to escape fish and avian predators. It also provides microhabitats with reduced current velocities where juvenile chinook salmon can feed more effectively. Increasing the amount of instream woody debris at specific sites could improve juvenile rearing success prior to emigration, thereby contributing to an overall increase in annual production. This action would off-set, in part, potential flow-related impacts to juvenile chinook salmon. e) Shaded Riverine Aquatic Habitat Protection/Management. SRA habitat can be restored along the Lower American River by constructing terraces along shorelines and planting terraces with appropriate herbaceous and woody vegetation. SRA habitat provides feeding and holding areas, escape cover, and local temperature refugia for juvenile chinook salmon. Development and implementation of a shaded riverine aquatic habitat protection/management program would facilitate improving rearing habitat. Thus, protecting and restoring SRA habitat could improve juvenile rearing success, thereby contributing to an overall increase in annual production. This action would off-set, in part, potential flow-related impacts to juvenile chinook salmon. f) Spawning Habitat Management/Maintenance. Improve spawning habitat in the Lower American River by breaking up and redistributing coarse subsurface deposits and reducing compaction and embeddedness which reduces gravel	

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
	permeability. Development and implementation of a gravel management program for the Lower American River would facilitate improving spawning habitat for chinook salmon and reducing the deterioration of existing spawning gravel. This habitat improvement would be expected to increase the amount of available spawning habitat, thereby contributing to higher overall spawning and incubation success, and therefore chinook salmon production, annually. This action would off-set, in part, flow-related impacts to juvenile chinook salmon. Performance Criteria: a) Dry Year Flow Augmentation. Increase flows particularly during the period during dry and critically dry years to the maximum extent feasible, relative to non-augmented conditions. To assess whether flow augmentation is reducing flow-related impacts, flows would be monitored in the Lower American River. b) Flow Fluctuation Criteria. Reduce the frequency of large, rapid flow-reduction events throughout the year, particularly during the fall spawning and incubation period. c) Wetland/Slough Complex Restoration/Maintenance. Increase the amount of wetland/slough complex habitat in the Lower American River that is used by early life stages of chinook salmon for rearing prior to emigration. d) Instream Cover (woody debris). Increase the amount of woody debris within areas of the Lower American River channel that is used by early life stages of chinook salmon for rearing prior to emigration.	

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
	e) Shaded Riverine Aquatic Habitat Protection/Management. Protect existing, and increase to the extent feasible, the amount of shaded riverine aquatic habitat within the Lower American River. f) Spawning Habitat Management. Restore armored gravels to conditions that will encourage chinook salmon to use restored areas for spawning. Timing: a) Dry Year Flow Augmentation. Flow augmentation would occur during the spawning period October through December, during dry and critically dry years. This measure would be implemented, as necessary, throughout the effective period of the Water Forum Agreement. b) Flow Fluctuation Criteria. Flow fluctuation criteria would be developed and implemented for the effective period of the Water Forum Agreement. c) Wetland/Slough Complex Restoration/Maintenance. Wetland/Slough complex restoration/management would be conducted throughout the effective period of the Water Forum Agreement, as warranted by the success of initial projects to be initiated during the first two years of the Agreement. d) Instream Cover (woody debris). Instream cover (woody debris) would be allowed to accumulate in the Lower American River throughout the effective period of the Water Forum Agreement. e) Shaded Riverine Aquatic Habitat Protection/Management. Shaded riverine aquatic habitat protection/management	

Table 2-3
SUMMARY OF CUMULATIVE IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
	would be conducted throughout the effective period of the Water Forum Agreement, as warranted by the success of initial projects to be implemented within the first two years of the Agreement. f) Spawning Habitat Management. Spawning habitat management would be conducted throughout the effective period of the Water Forum Agreement.	
6.5-6: Lower American River Steelhead. Under the cumulative analysis set of assumptions, flow reductions anticipated to occur during the April through September period would reduce the amount of juvenile rearing habitat in most years. The analysis also indicates that the 69-year average temperature at Nimbus Dam and Watt Avenue for the May through September period would decrease up to about 1°F. Although measurable temperature increases could occur in up to 10% of the years during this period, measurable temperature decreases could occur from over 30% to 95% of the time during some months of this period. Because steelhead in the Lower American River are believed to be more limited by summer rearing temperatures than flows, the frequent and substantial temperature reductions would be expected to offset the flow reductions. Consequently, the combined temperature and flow changes under the 2030 w/ WFP would not be expected to adversely affect the long-term population trends of steelhead in the Lower American River. This would be a less-than-significant future cumulative impact.	No mitigation measures are required.	**less-than-significant**
6.5-7: Flow- and Temperature-Related Impacts to Splittail (February through May). Under the cumulative analysis assumptions, the 2030 w/ WFP would typically reduce, to some degree, the amount of riparian vegetation inundated between RM 8 and 9 (which serves as an index for the lower portion of the river) under the Base Condition. However, with few exceptions,	The following actions would be implemented as part of the HME, which will be adopted as an integral component of the Water Forum Agreement. a) Wetland/Slough Complex Restoration/Maintenance. Restore wetland/slough complexes occurring within habitat	**potentially significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
substantial amounts of inundated riparian vegetation would remain under the 2030 w/WFP in years when such habitat would occur under the Base Condition. In addition, flow changes under the 2030 w/WFP would have little effect on the availability of in-channel spawning habitat availability, or the amount of potential spawning habitat available from the mouth up to RM 5 – the reach of the river influenced by Sacramento River stage. The analysis also indicates that the frequency with which suitable temperatures for splittail spawning below Watt Avenue would not change substantially under the 2030 w/WFP, relative to the Base Condition. Given the uncertainty as to the magnitude and extent of splittail spawning in the Lower American River, and the actual amount of potential spawning habitat at specific flow rates throughout the river, the effects of flow reductions from the February through May period also are uncertain and, therefore, represent a potentially significant impact. This would be a potentially significant future cumulative impact.	transitional zones between river channels, shoreline, and upland habitats. Restoration would involve grading areas for the appropriate elevations and hydrology, as well as planting appropriate vegetation, to achieve desired habitat characteristics. Because wetland/slough complexes are used by splittail for spawning, restoration and maintenance of these complexes would increase the quantity, and possibly the quality, of spawning habitat available to splittail. Wetland/slough complex restoration/maintenance would reduce flow-related impacts to splittail spawning. b) Shaded Riverine Aquatic Habitat Protection/Management. SRA habitat can be restored along the Lower American River by constructing terraces along shorelines and planting terraces with appropriate herbaceous and woody vegetation. SRA habitat provides spawning and rearing areas for splittail. Development and implementation of a shaded riverine aquatic habitat protection/management program would facilitate increasing splittail spawning and rearing habitat availability within the Lower American River. Thus, protecting and restoring SRA habitat could improve splittail spawning and juvenile rearing success, thereby contributing to an overall increase in annual production of splittail. This action would off-set, in part, potential flow-related impacts to splittail. c) Flow Fluctuation Criteria. Develop and implement flow fluctuation (i.e., ramping) criteria for the operation of Folsom and Nimbus dams that would reduce the frequency with which rapid flow fluctuations occur in the river. Reducing the occurrence of large, rapid flow reductions would help to minimize losses of splittail due to fry and juvenile stranding during the February through May period. Flow fluctuation criteria would contribute to improving early life-stage rearing	

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
	success, thereby contributing to an overall increase in annual production of splittail. This action would off-set, in part, potential flow-related impacts to splittail. Performance Criteria: a) Wetland/Slough Complex Restoration/Maintenance. Increase the amount of wetland/slough complex habitat in the Lower American River that is used by splittail for spawning and rearing. b) Shaded Riverine Aquatic Habitat Protection/Management. Protect existing, and increase to the extent feasible, the amount of shaded riverine aquatic habitat within the Lower American River. c) Flow Fluctuation Criteria. Develop and implement flow fluctuation (i.e., ramping) criteria for the operation of Folsom and Nimbus dams that would reduce the frequency with which rapid flow fluctuations occur in the river. Reducing the occurrence of large, rapid flow reductions would help to minimize losses of splittail due to fry and juvenile stranding during the February through May period. Flow fluctuation criteria would contribute to improving early life-stage rearing success, thereby contributing to an overall increase in annual production of splittail. This action would off-set, in part, potential flow-related impacts to splittail.	
6.5-8: Flow- and Temperature-Related Impacts to American Shad (May and June). Under the cumulative analysis assumptions, flow reductions anticipated to occur during the May through June period would increase the frequency with which mean monthly flows at the mouth would be below the target attraction flow of 3,000 cfs by about 3 to 4%. Flow reductions under the 2030 w/WFP in May and June could reduce the number of adult shad	No mitigation measures are required.	**less-than-significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
attracted into the river during a few years. However, because American shad spawn opportunistically where suitable conditions are found, potentially attracting fewer adults spawners into the Lower American River in some years would not be expected to adversely impact annual American shad production within the Sacramento River system. Furthermore, direct impacts to the Lower American River sport fishery would be less than substantial in most years. In addition, the frequency with which suitable temperatures for American shad spawning would exist would not differ substantially between the 2030 w/WFP and the Base Condition. Consequently, the combined flow and temperature changes under 2030 w/WFP would not be expected to adversely affect the long-term population trends of American shad in the Lower American River. This would be a less-than-significant future cumulative impact.		
6.5-9: Flow- and Temperature-Related Impacts to the Striped Bass Sport Fishery (May and June). Under the cumulative analysis assumptions, flow reductions anticipated to occur during the May through June period would increase the frequency with which mean monthly flows at the mouth would be below the target attraction flow of 1,500 cfs by about 1 to 10%. However, flows at the mouth that are believed to be sufficient to maintain the striped bass fishery would be met or exceeded in most years during this period. The frequency with which suitable temperatures for juvenile striped bass rearing in the Lower American River would differ little between the 2030 w/ WFP and the Base Condition during May and June. Consequently, the combined temperature and flow changes under the 2030 w/ WFP would not be expected to adversely affect the long-term of the striped bass fishery in the lower American River. This would be a less-than-significant future cumulative impact.	No mitigation measures are required.	**less-than-significant**

Table 2-3
SUMMARY OF CUMULATIVE IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
6.5-10: Impacts to Shasta Reservoir ' s Coldwater Fisheries. Under the cumulative analysis assumptions, substantial reductions in reservoir storage would occur occasionally throughout the April through November period of the year. However, because physical habitat availability is not believed to be among the primary factors limiting coldwater fish populations within the reservoir, and because anticipated changes in seasonal storage would not be expected to result in substantial adverse effects on the primary prey base utilized by the reservoir's coldwater fish populations, seasonal reductions in storage expected to occur under 2030 w/ WFP would not significantly affect Shasta Reservoir's coldwater fisheries. This would represent a less-than-significant future cumulative impact.	No mitigation measures are required.	**less-than-significant**
6.5-11: Impacts to Trinity Reservoir ' s Coldwater Fisheries. Under the cumulative analysis assumptions, substantial reductions in reservoir storage would occur occasionally throughout the April through November period of the year. However, because physical habitat availability is not believed to be among the primary factors limiting coldwater fish populations within the reservoir, and because anticipated changes in seasonal storage would not be expected to result in substantial adverse effects on the primary prey base utilized by the reservoir's coldwater fish populations, seasonal reductions in storage expected to occur under 2030 w/ WFP would not substantially affect Trinity Reservoir's coldwater fisheries. This would represent a less-than-significant future cumulative impact.	No mitigation measures are required.	**less-than-significant**
6.5-12: Impacts to Shasta Reservoir ' s Warmwater Fisheries Under the cumulative analysis assumptions, the 70-year average amount of littoral habitat available to warmwater fishes would be reduced by about 11 to 36% during the July through September period (which are the initial rearing months for the reservoir's warmwater fishes of management concern), with even more substantial reductions in reservoir littoral habitat availability in some years during these months. Rates of elevation fluctuation	No feasible measures are available. It is beyond the purview of the Water Forum to independently mitigate this impact. The degree of impact will largely depend on future CVP operations. As such, the ability to mitigate lies with the USBR and will depend on those future operations.	**potentially significant**

Table 2-3
SUMMARY OF CUMULATIVE IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
would not change substantially under the 2030 w/ WFP, relative to the Base Condition. However, seasonal changes in 70-year average reservoir littoral habitat under the 2030 w/ WFP would be of sufficient magnitude to potentially affect long-term, average initial year-class strength of the warmwater fish populations of management concern. Reduced littoral habitat availability would be a potentially significant future cumulative impact to Shasta Reservoir warmwater fisheries.		
6.5-13: Impacts to Trinity Reservoir ' s Warmwater Fisheries Under the cumulative analysis assumptions, littoral habitat availability would be reduced by about 10 to about 20% during the March through September period, with substantial reductions in littoral habitat availability occurring frequently throughout period. On the average, the 70-year average littoral habitat would be reduced by nearly 20% from July through September. The potential for nest dewatering events to occur in Trinity Reservoir would not change substantially under the 2030 w/ WFP during the March through July spawning period. However, changes in the availability of littoral habitat under the 2030 w/ WFP would potentially result in adverse affects to the initial establishment of warmwater fish year-classes. Reduced littoral habitat availability would be a potentially significant future cumulative impact to Trinity Reservoir warmwater fisheries.	No feasible measures are available. It is beyond the purview of the Water Forum to independently mitigate this impact. The degree of impact will largely depend on future CVP operations. As such, the ability to mitigate lies with the USBR and will depend on those future operations.	**potentially significant**
6.5-14: Impacts to Keswick Reservoir Fisheries. Under the cumulative impact assumptions, hydrologic conditions with the 2030 w/ WFP would have little, if any, effect on seasonal storage, elevation, and temperature of Keswick Reservoir. Any minor changes in storage, elevation, or temperature that could occur would not substantially affect the reservoir's fishery resources. This would constitute a less-than-significant future cumulative impact.	No mitigation measures are required.	**less-than-significant**

Table 2-3
SUMMARY OF CUMULATIVE IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
6.5-15: Flow-Related Impacts to Sacramento River Fisheries. Under the cumulative analysis assumptions, the 70-year average flows released from Keswick Dam would not be substantially reduced during any month of the year. The analysis indicates that flow reductions of more than 10% would occur occasionally during some months and infrequently during others under 2030 w/ WFP, relative to the Base Condition. The analysis also indicates that the 3, 250 cfs minimum flow objective for Keswick Reservoir stipulated in the NMFS Biological Opinion for the protection of winter-run chinook salmon rearing and downstream passage between 1 October and 31 March would not be violated in any month of this period under either the 2030 w/ WFP or the Base Condition. Flow changes below Keswick Dam that would occur under the 2030 w/ WFP would result in less-than-significant impacts to upper Sacramento River fisheries resources. The analysis for the lower Sacramento River indicates that the 70-year average flows under 2030 w/ WFP would not be substantially reduced relative to the Base Condition. The analysis also indicates that flow reductions of more than 20% would occur occasionally during August and infrequently during all other months of the year. Consequently, any flow-related impacts to lower Sacramento River fisheries or migrating anadromous fishes that could occur under 2030 w/ WFP are considered to be less than significant. Overall, this constitutes a less-than-significant future cumulative impact.	No mitigation measures are required.	**less-than-significant**
6.5-16: Temperature-Related Impacts to Sacramento River Fisheries Resources. Under the cumulative analysis assumptions, the 69-year average temperature at Keswick Dam would increase up to approximately one-half °F during the period August through November. Mean monthly temperatures at Keswick Dam would exceed the 56°F threshold stipulated in the NMFS Biological Opinion for winter-run chinook salmon about 1% more often in September, and would exceed the 60°F threshold stipulated for October in the NMFS Biological Opinion for winter-run chinook	No feasible measures are available. It is beyond the purview of the Water Forum to independently mitigate this impact. The degree of impact will largely depend on future CVP operations. As such, the ability to mitigate lies with the USBR and will depend on those future operations.	**significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
salmon 1% more often under the 2030 w/ WFP, relative to the Base Condition. Mean monthly temperatures at Bend Bridge would exceed the 56ºF threshold stipulated in the NMFS Biological Opinion for winter-run chinook salmon approximately 1% more often in April, and approximately 3% more often in May, June, and August. Although there would be no substantial change in the 69-year average early lifestage salmon survival for fall-, late fall-, winter-, and spring- run chinook salmon, substantial reductions in annual early-lifestage survival could be expected to occur under the 2030 w/ WFP, relative to annual survival estimates under the Base Condition, approximately 6% more often for winter-run and approximately 1 to 3% more often for spring-run. Substantial changes in average lower Sacramento River temperatures would not be expected over the 69-year period simulated, although individual months could exhibit substantial temperature increases.. Overall changes in water temperatures represent a significant future cumulative impact.		
6.5-17: Delta Fish Populations. Under the cumulative analysis assumptions, reductions in Delta outflow of more than 10% would occur occasionally during some months of the February through June period considered important for Delta fisheries resources. The analysis also indicates that upstream shifts of the position of X2 of 1 km or more would also occur occasionally during some months. Finally, the analysis indicates that Delta export to inflow ratios under the 2030 w/ WFP would not exceed the maximum export limits for either the February through June (35% of Delta inflow) or the July through January periods (65% of Delta inflow). Although the project would not cause X2 or Delta outflow standards to be violated, the project could result in reductions in outflow and upstream shifts in the position of X2, which could be considered a potentially significant impact to Delta fisheries resources.	No feasible measures are available. It is beyond the purview of the Water Forum to independently mitigate this impact. The degree of impact will largely depend on future CVP operations. As such, the ability to mitigate lies with the USBR and will depend on those future operations.	**potentially significant**

Table 2-3
SUMMARY OF CUMULATIVE IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
FLOOD CONTROL (Section 6.6)		
6.6-1: Ability to Meet Flood Control Diagrams of CVP/SWP Reservoir. Increased diversions from CVP/SWP reservoirs under the future cumulative condition would result in reduced storage during the flood control season, increasing the ability to meet flood control needs. This would be a less-than-significant future cumulative impact.	No mitigation measures are required.	**less-than-significant**
POWER SUPPLY (Section 6.7)		
6.7-1: Reduced CVP Hydropower Capacity and Generation - Under the set of assumptions for future conditions used in the EIR, the cumulative impact analysis indicates that no substantial reduction in average annual surplus capacity or capacity for use by WAPA ' s preference customers would occur. Under the future cumulative condition, WAPA ' s capacity peak maximum of 1,152 megawatts would not be met in about 47 of the 828 months studied, as compared to 42 months for the Base Condition. However, under the future cumulative condition average annual CVP energy production would be reduced. by about 225 Gwh compared to the Base Condition. This change in annual average CVP energy production which is roughly equivalent to a 5% percent reduction, is considered a significant cumulative impact.	No feasible mitigation measures are available.	**significant**
6.7-2: Changes in Pumping Requirements for Diverters at Folsom Reservoir - Under the set of assumptions for future conditions used in the EIR, the cumulative impact analysis indicates that energy requirements for those who pump water from Folsom Reservoir would increase by about 140% over existing conditions. Although not a significant environmental effect, this represents a significant cumulative economic impact.	No mitigation measures are required.	**less-than-significant (economically significant)**

Table 2-3
SUMMARY OF CUMULATIVE IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
VEGETATION AND WILDLIFE (Section 6.8)		
6.8-1: Special Status Species, Riparian Vegetation, and Backwater Ponds Associated with the Lower American River - Under the set of assumptions for future conditions used in the EIR, the cumulative impact analysis indicates that the range of flows within the minimum/optimal range of 1,300 to 4,000 cfs would vary by 3 or fewer years during the 70-year period of record, in comparison to base conditions. As a result, reduced flows under future cumulative conditions would not result in an adverse effect to the special-status species (including the Valley Elderberry Longhorn Beetle) that are dependent on riparian vegetation and backwater ponds associated with Lower American River. This would be a less-than-significant future cumulative impact.	No mitigation measures are required.	**less-than-significant**
6.8-2: Special Status Species and Riparian Vegetation Associated with the Sacramento River and Sacramento-San Joaquin Delta - Under the set of assumptions for future conditions used in the EIR, the cumulative impact analysis indicates that flows in the lower American River would be further reduced. However, during the critical growing season months of April through July, the number of occurrences in which mean monthly flows of the lower American River would be within the minimum/optimal flow range of 1,300 to 4,000 cfs would vary by 3 or fewer years during the 70-year period of record, in comparison to base conditions. As a result, reduced flows under future cumulative conditions would not result in an adverse effect to the special-status species (including the Valley Elderberry Longhorn Beetle) that are dependent on riparian vegetation and backwater ponds associated with Lower American River. This would be a less-than-significant future cumulative impact.	No mitigation measures are required.	**less-than-significant**
6.8-3: Vegetation Associated with Reservoirs - Under the set of assumptions for future conditions used in the EIR, the cumulative	No mitigation measures are required.	**less-than-significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
impact analysis indicates that, in comparison to base conditions, mean monthly surface water elevations at Folsom, Shasta, and Trinity reservoirs would be reduced by less than 1% during the months of the growing season (March-October). Because the draw down zones at these reservoirs are vegetated with non-native plants that do not form a contiguous riparian community, minor fluctuations in surface water elevations would not adversely affect important habitat values at these reservoirs. Consequently, this would be a less-than-significant cumulative impact.		
RECREATION (Section 6.9)		
6.9-1: Cumulative Impacts on the Lower American River Recreation Opportunities - Under the set of assumptions for future conditions used in the EIR, the cumulative impact analysis indicates that flows in the lower American River would be even further reduced. For example, during the months of May through September, the number of occurrences in which mean monthly flows of the lower American River would be reduced below the minimum threshold of 1,750 cfs would increase by as much as 40%, in comparison to base conditions. The WFP would contribute to this cumulative impact. This would be a significant cumulative impact.	The WFP includes features intended to lessen potential environmental impacts to the American River, consistent with the coequal objective to protect its natural values. These mitigating features include water conservation, dry-year diversion restrictions, and conjunctive use of ground water and surface water. Adoption of the WFP with these features would reduce flow effects on Lower American River recreation opportunities. In addition, improvements to recreation facilities in the American River Parkway are identified to compensate for the reduction in quality of and opportunity for rafting/boating on the Lower American River. Actions would occur in cooperation with the Sacramento County Department of Parks and Recreation and could include one or both of the following: (A) contributing to the purchase and development of the Uruttia property to provide water-dependent recreation opportunities and (B) developing recreation facilities to improve water-dependent and water-enhanced recreation opportunities in the American River Parkway. The improvements would involve projects that are consistent with the American River Parkway Plan, or that would be implemented subject to an amendment to the parkway plan by Sacramento County.	**significant**

The measures described below could be implemented in cooperation with the Sacramento County Department of Parks and Recreation, the agency responsible for implementing the American River Parkway Plan. The measures could be part of the Habitat Management Plan adopted by the Water Forum participants as an implementation tool for the Habitat Management Element of the Water Forum Proposal. Funding for the recreation measures may include money from within or outside the Water Forum Successor Effort. Because activities by a number of agencies are underway to restore and enhance the Lower American River, this recreation mitigation should be coordinated with the broader ecosystem partnership efforts. Other agencies involved in the Lower American River may participate in funding and/or implementation of recreation mitigation, as appropriate, to promote a well-coordinated program of restoration and enhancement of the river.

a) Uruttia Property. The Uruttia Property, located on the north side of the Lower American River near CalExpo, could be acquired and/or developed to provide public access, opportunities for water-dependent recreation activity related to the river (such as canoe and kayak use and instruction), and enhanced environmental values which can provide opportunities for water-enhanced recreation, such as sightseeing and nature study. The property and facilities would be incorporated into the American River Parkway and reflected by amendment in the American River Parkway Plan.

b) Recreation Facility Improvements to the American River Parkway. The American River Parkway Plan describes in several Area Plans the resources and facilities intended to provide for water-dependent and water-enhanced

recreation, including river access, trails, parking, swimming areas, and other facilities. The facilities could include improvement of river access for rafting/boating in the less intensively used sections of the river, such as downstream of Goethe Park; trail improvements to increase the opportunity for water-enhanced recreation, such as a linkage between the Fairbairn plant and the Sutter ' s Landing Park site; or interpretive resources to improve water-enhanced nature study and appreciation of the Parkway.

c) Update of the American River Parkway Plan. The update could consider the flow regime resulting from the WFP and appropriate actions to take in the Parkway to support improvement of both recreation opportunities and riparian habitat.

d) Enhancement of the Condition and Quality of Existing Recreation Facilities. Past and current budget constraints have limited the County ' s ability to maintain some existing recreation facilities. Enhancement of the condition and quality of existing facilities could improve the attraction of the Parkway for both water-dependent and water-enhanced recreation activity.

The improvements to recreation facilities in the American River Parkway would accomplish the following criteria:

- Facilities would improve opportunities for water-dependent recreation, particularly rafting/boating, such that the river is made more accessible when flows are appropriate and/or the quality of rafting/boating is improved; or facilities would improve opportunities for water-enhanced recreation, such that the quality and

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
	visitation associated with recreation activity in the Parkway is increased. • Improvements would be consistent with the American River Parkway Plan. The final selection of facilities for improvement would occur during the 18-month preparation period of the Habitat Management Plan. Facilities would be developed as soon as feasible after completion of that plan, recognizing the need to assemble funding, secure facility approvals, and prepare designs.	
6.9-2: Cumulative Impacts to Folsom Reservoir Recreation Opportunities - Under the set of assumptions for future conditions used in the EIR, the cumulative impact analysis indicates that, in comparison to base conditions, surface water elevations at Folsom Reservoir would be further reduced. For example, during the recreational use period of the year (primarily May-September), the number of occurrences in which lake levels would decline below the minimum 412-foot elevation for use of marina wet slips would increase by more than 10%, in comparison to base conditions. Reduced lake levels under the cumulative condition would also adversely affect swimming beaches. The WFP would contribute to this cumulative condition and it would be a significant cumulative impact.	The WFP includes features intended to lessen potential environmental impacts on the Lower American River, which would also serve to decrease environmental effects to other resources. These mitigating features include water conservation, dry-year diversion restrictions, and conjunctive use of ground water and surface water. Adoption of the WFP with these features would reduce water surface elevation effects on Folsom Reservoir recreation. In addition, boating facility improvements would enhance boating access during periods of higher water to compensate for reduced availability of boat ramp and marina facilities from Water Forum Proposal diversions. Actions would occur in cooperation with the California Department of Parks and Recreation (CDPR) and would be consistent with the General Plan for Folsom Lake State Recreation Area (CDPR, 1978). Mitigation should also be consistent with the objectives of CDPR proposals for measures to mitigate lower lake levels from flood storage reoperation (Kranz, 1997). The actions could be added into the recreation section of the Habitat Management Plan as a means to implement them.	**significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
	One or more of the following recreation measures described below could be implemented in cooperation with the CDPR. Funding for the recreation measures may include money from within or outside the Water Forum Successor Effort. A number of agencies are involved in water resources and recreation facility decisions affecting Folsom Reservoir, so this recreation mitigation should be coordinated with other actions, as appropriate. Consequently, other agencies involved in Folsom Reservoir may participate in funding and/or implementation of recreation mitigation. e) Boating Facilities to Increase Access and Use During Higher Water Periods. Construction of boating facilities, consistent with the General Plan for Folsom Lake State Recreation Area would increase boating access and use of the reservoir during higher water periods. To compensate for reduced availability of boating facilities during lower water periods, this measure would improve boating facilities for use when higher water conditions allow for high-quality water recreation and the greater reservoir surface area availability; at higher water levels, visitation can be increased when the larger reservoir surface area can support more intensive use. Examples of potential boating facility improvements suggested by CDPR staff include boat parking and shore facilities at Dyke 8 or a launch ramp and dock at New York Cove (on the east side of the reservoir, north of Brown ' s Ravine). The final selection of facilities would occur in cooperation between the Water Forum Successor Effort and the CDPR. f) Improvement to the Marina Area. Construction of facility improvements in the Brown ' s Ravine area would enhance the operation of the marina. Improvements would be consistent with the Folsom Lake State	

Table 2-3
SUMMARY OF CUMULATIVE IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
	Recreation Area General Plan. The intent of these improvements would be to help enhance marina operations during periods of sufficiently high water to offset the reduced availability of wet slips. The final selection of facilities would occur in cooperation between the Water Forum Successor Effort, the operator of the marina, and the CDPR. The improvements to recreation facilities on Folsom Reservoir will accomplish the following criteria: • Facilities serving higher water conditions will increase boating visitation to Folsom Reservoir when the surface area is large enough to support the increased use. • Marina facility improvements will help enhance operation of the marina when water level is high enough to support the wet slips. • Improvements are consistent with the General Plan for Folsom Lake State Recreation Area. The final selection of facilities for improvement would occur during an period following adoption of the Water Forum Proposal. Facilities would be developed as soon as feasible after completion of that plan, recognizing the need to assemble funding, secure facility approvals, and prepare designs.	
6.9-3: Sacramento River and Sacramento-San Joaquin Delta Recreation Opportunities Under Future Cumulative Conditions - Under the set of assumptions for future conditions used in the EIR, the cumulative impact analysis indicates that during the critical growing season months of April through July mean monthly flows in the Sacramento River would be reduced by approximately 3%, in comparison to base conditions. Flows would not be reduced with sufficient magnitude and frequency to adversely affect recreational opportunities associated with the Sacramento River	No mitigation measures are required.	**less-than-significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
and Sacramento-San Joaquin Delta. This would be a less-than-significant cumulative impact.		
6.9-4: Lake Natoma, Whiskeytown, Keswick, Shasta, and Trinity Reservoirs Recreation Opportunities Under Future Cumulative Conditions - Under the set of assumptions for future conditions used in the EIR, the cumulative impact analysis indicates that, in comparison to base conditions, mean monthly surface water elevations at Shasta and Trinity reservoirs would be reduced by less than 1% during the recreational use period of the year (primarily May-September), which would not substantially diminish recreation opportunities. Because Lake Natoma, Whiskeytown, and Keswick reservoirs serve as regulating reservoirs, the pattern of surface water elevations changes at these reservoirs is not expected to change substantially under cumulative conditions. This would be a less-than-significant cumulative impact.	No mitigation measures are required.	**less-than-significant**
LAND USE AND GROWTH-INDUCING (Section 6.10)		
Land use designations established in the most recent general plans for the jurisdictions in the water service study area represent the maximum long-term level of growth approved by city and county decision-makers. Because the WFP addresses the region ' s water demands through the year 2030, and the buildout years of the general plans are not able to be precisely predicted, the reliable water supply provided by the WFP to each purveyor may fall short of, just meet, or exceed water demand at buildout. The diversions provided for in the WFP are intended to accommodate each agency ' s projected surface water need in 2030 considering such factors as projected growth rate, water rights, conservation levels, availability of alternative water supplies, environmental considerations, and other factors. As such, that analysis is inherently cumulative.	The water supply included in the WFP has been determined considering the planned growth for each jurisdiction within the water service study area; as such, the WFP is consistent with the growth parameters described each city and county General Plan. The General Plan of each jurisdiction includes policies and programs for the protection of the environment and, to the extent feasible, the avoidance or mitigation of significant effects on the environment from planned growth and development. During the normal course of each jurisdiction ' s implementation of its General Plan policies, feasible mitigation of significant impacts from planned growth and development would occur. Because mitigation of growth-related environmental impacts is in the purview of each city and county, through their existing land use authority, and because the Water Forum itself has no such authority, the	**significant**

Table 2-3
SUMMARY OF CUMULATIVE IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
	WFP cannot feasibly provide for additional mitigation of growth-related land use and development environmental impacts.	
AESTHETICS (Section 6.11)		
6.11-1: Aesthetic Value of the Lower American River - Under the set of assumptions for future conditions used in the EIR, the cumulative impact analysis indicates that flows in the lower American River would be further reduced. However, during the critical growing season months of April through July, the number of occurrences in which mean monthly flows of the lower American River would be within the minimum/optimal flow range of 1,300 to 4,000 cfs would vary by 3 or fewer years during the 70-year period of record, in comparison to base conditions. As a result, reduced flows under future cumulative conditions would not result in an adverse effect to riparian vegetation and habitat and, as such, would not result in an adverse affect to the aesthetic quality of the lower American River. This would be a less-than-significant future cumulative impact.	No mitigation measures are required.	**less-than-significant**
6.11-2: Aesthetic Value of the Sacramento River and Sacramento-San Joaquin Delta - Under the set of assumptions for future conditions used in the EIR, the cumulative impact analysis indicates that mean monthly flows in the Sacramento River would be reduced by approximately 3%, in comparison to base conditions, during the critical growing season months of April through July. Flows would not be reduced with sufficient magnitude and frequency to significantly alter existing riparian vegetation dependent on Sacramento River flows and Delta inflows. As a result, the aesthetic quality of the Sacramento River and Sacramento-San Joaquin Delta would not be adversely affected. This would be a less-than-significant future cumulative impact.	No mitigation measures are required.	**less-than-significant**

Table 2-3
SUMMARY OF CUMULATIVE IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
6.11-3: Aesthetic Value of Reservoirs - Under the set of assumptions for future conditions used in the EIR, the cumulative impact analysis indicates that mean monthly surface water elevations at Folsom, Shasta, and Trinity reservoirs would be reduced by less than 5 feet, in comparison to base conditions. In addition, because Lake Natoma, Whiskeytown, and Keswick Reservoir serve as regulating reservoirs, future surface water elevations at these reservoirs are not expected to change substantially. Consequently, this would be a less-than-significant future cumulative impact.	No mitigation measures are required.	**less-than-significant**
CULTURAL RESOURCES (Section 6.12)		
6.12-1: Physical Deterioration of Cultural Resource Sites in Folsom Reservoir - Under the set of assumptions for future conditions used in the EIR, the cumulative impact analysis indicates that Folsom Reservoir water surface elevations would be reduced more frequently and/or by greater magnitudes compared to that occurring solely as a result of the WFP. Future reductions in 70-year monthly average water surface elevation would approximate 2 to 4 ft, relative to existing elevations. Such reductions would result in a lowered zone where water-level fluctuations would be the most pronounced. The effect of this lowered fluctuation zone on cultural resources would be to expose sites that historically had experienced a higher degree of protection from erosion and other physical destructive forces. Under the future cumulative condition, this would be a significant cumulative impact.	The WFP hydrologic modeling data indicates that the project would have a significant impact on cultural sites and features within the reservoir pool, especially those located between the 360 ft msl and 395 ft msl elevations. Significant impacts would include the potential exposure of previously submerged sites to increased vandalism, recreation use, wave action, and the effects of repeated inundation and drawdown. Many prehistoric and historic sites have been recorded within the reservoir basin, most of which remain unevaluated. Only about half of the reservoir has been surveyed, and many other sites undoubtedly exist in the unsurveyed areas. In 1994, Far Western and JRP Historical Consultants prepared a Research Design as part of SAFCA ' s Folsom Re-operation Study. That document included all of the reservoir basin between the 390-foot and the 466-foot contours. The Research Design provides, among other components, summaries of the known cultural resources within the study area; research issues applicable to those resources; and recommendations for evaluating the sites, protecting them from further damage, and mitigating unavoidable impacts.	**potentially significant**

Table 2-3
SUMMARY OF CUMULATIVE IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
	Checklists are included for evaluation of various types of sites. All unevaluated sites within the reservoir that fall within the direct impact zone of the WFP could be given additional study, using this Research Design as a guideline. Also, unsurveyed portions of the direct impact zone could be surveyed for cultural resources, as water levels permit; any additional sites and features also may require evaluation and mitigation. The appropriate agencies (i.e., Bureau of Reclamation, US Army Corp of Engineers, and the State Office of Historic Preservation) could decide that evaluation and mitigation of a *representative sample* of the sites is sufficient, although this cannot be determined without comprehensive consultation with those agencies. Recent conversations with archaeologists at the Bureau of Reclamation's Sacramento office suggest that such sampling would be acceptable to that agency.	
6.12-2: Inundation or Exposure of Cultural Resource Sites in the Lower American River - Under the set of assumptions for future conditions used in the EIR, the cumulative impact analysis indicates that river flows in the Lower American River would be reduced more frequently and/or by greater magnitudes compared to the WFP alone. With overall reductions in 70-year monthly average river flows (up to 11 percent, but generally about 5 percent), the potential for inundation of cultural resource sites along the Lower American River would be less than that existing today. Such reductions, however, would also not exceed those historically recorded, thereby avoiding further exposure of any cultural remains which are presently submerged. This would represent a less-than-significant cumulative impact.	No mitigation measures are required.	**less-than-significant**
6.12-3: Inundation or Exposure of Cultural Resource Sites in the Lower Sacramento River - Under the set of assumptions for future conditions used in the EIR, the cumulative impact analysis	No mitigation measures are required.	**less-than-significant**

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
indicates that flows in the Lower Sacramento River could be reduced more frequently and/or by greater magnitudes compared to that occurring solely as a result of the WFP. Such reductions on a 70-year monthly average, however, are anticipated to be generally less than 4 percent, relative to existing flow conditions. These reductions would be small enough that exposure of submerged cultural resources would be highly unlikely. Moreover, any cultural resources within the river banks and floodplain would not be affected since flows would, on average, be lower and it is assumed that the existing levee system would continue to provide channelized protection of the floodplain areas. This would be considered to represent a less-than-significant cumulative impact.		
SOILS AND GEOLOGY (Section 6.13)		
6.13-1: Changes in Geologic Substructures – In the future, it is anticipated that development will continue throughout the region. Associated with this anticipated development, ground disturbing activities of new construction efforts have potential to substantially change geologic substructures. With major construction projects, potential changes to subsurface geology could affect human safety. However, development and planning of future projects would consider geotechnical studies and implement design recommendations, as appropriate, in order to minimize any hazardous geologic changes to the underlying substrata. Therefore, cumulative changes in geologic substructures are considered less than significant cumulative impact.	No mitigation measures are required.	**less-than-significant**
6.13-2: Exposure to Major Geologic Hazards – In the future, it is recognized that major capital improvement and construction projects will occur with the potential to expose people or property to major geologic hazards. Given the relative stability of the geologic subsurface environment in the greater Sacramento area, exposure to geologic hazards is considered to be a less-than-significant impact.	No mitigation measures are required.	**less-than-significant**

Table 2-3
SUMMARY OF CUMULATIVE IMPACTS

Impact Before Mitigation	Potential Mitigation Measures	Significance After Mitigation
6.13-3: Increased Soil Erosion by Wind or Water – Future development activities could disturb surface soils and thereby induce either wind or water erosion. This, however, would be highly localized and temporary, potentially occurring only during construction periods. Future compliance and adherence to project-specific siting investigations, soils/geotechnical studies and the implementation of any necessary project-specific mitigation measures, would avoid long-term soil erosion. This is considered to represent a less-than-significant cumulative impact.	No mitigation measures are required.	**less-than-significant**
6.13-4: Loss of Soil Cover – In the future, increasing development across the region will undoubtedly result in a loss of soil cover. Certain projects, depending on their scale and location, may result in permanent loss of some soil cover. Protection against loss of valuable soils (for farmland purposes) is provided through the State mapping and identification system and avoided and/or mitigated through CEQA mitigation of project-specific actions. Future soil loss represents a less-than-significant cumulative impact.		**less-than-significant**

2.6 SUMMARY OF ALTERNATIVES TO THE WATER FORUM PROPOSAL

Pursuant to §15126(d) of the State CEQA Guidelines, the environmental impact report includes an analysis of a range of alternatives that could feasibly attain its basic objectives (i.e., the coequal objectives), plus three "no project" alternatives. Seven alternatives to the WFP are considered: 1) Increased Sacramento River Diversions; 2) Increased Groundwater Pumping; 3) Increased Water Reclamation; 4) More Frequent Reductions in Surface Water Diversions; 5) No Project Alternative—Independent Actions; 6) No Project Alternative—Constrained Surface Water and Groundwater; and 7) No Project Alternative—Constrained Surface Water, Unconstrained Groundwater.

2.6.1 Alternative 1 - Increased Sacramento River Diversions

Alternative 1, Increased Sacramento River Diversions, would involve transferring up to 78,000 AF of surface water diversions considered in the WFP from the Lower American River to the Sacramento River with the aim of reducing impacts on the American River. In order to reach end users, water diversion, pumping, treatment and transmission facilities would be required.

This alternative assumes water diversions from two locations on the Sacramento River: a new surface water diversion at Freeport, approximately 10 miles downstream of the confluence of the Sacramento and American rivers and a new diversion near Elkhorn, approximately 10 miles north of the confluence. New facilities would include but not be limited to water diversions and treatment plants at Freeport and Elkhorn, treated water pipelines to Folsom and Northridge Water District, a canal from Freeport to the South County area, and to the Folsom South Canal.

This alternative would result in reduced impacts on American River fisheries and recreation opportunities. Impacts related to power supply would be increased due to the cost of pumping water diverted from the Sacramento River to the service areas. Impacts of Alternative 1 on Sacramento River fisheries, water quality, flood control, vegetation and wildlife, aesthetics, cultural resources, and soils and geology would be the same, or not substantially different from impacts of the proposed WFP.

2.6.2 Alternative 2 - Increased Groundwater Pumping

Alternative 2 would involve meeting a larger portion of future demands through additional groundwater pumping. This alternative assumes that local groundwater from three subareas of the groundwater basin in the County would be extracted to meet projected growth in Sacramento County through the year 2030. An Integrated Groundwater - Surface Water Model (IGSM) was used to assess groundwater use in 2030 (assuming buildout of the County's Urban Policy Area) with the provision that a larger portion of water demand would be met from groundwater (Sacramento County Water Agency 1997).

Under this analysis, groundwater use is projected to increase from approximately 497,000 AF/Yr in the base condition, to approximately 612,000 AF/Yr in 2030. Most of the increase would occur in the South Sacramento area where substantial urban growth is planned. This alternative would reduce somewhat adverse impacts to fisheries, recreation, and other flow-related impacts

including water supply, power supply, vegetation and wildlife, and aesthetics. Groundwater, however, would be maintained at lower levels. This would increase the yield of the aquifer system, but could result in land subsidence, increased pumping costs, in-migration of poorer-quality water from the deep aquifer system or adjacent areas, decline in well productivity, and increased rate of movement of groundwater contamination.

2.6.3 Alternative 3 - Increased Water Reclamation

Alternative 3 would involve increased use of reclaimed water to offset new surface water diversions and groundwater pumping for non-potable consumptive uses such as irrigation, industrial use, and wetlands management. Specifically, reclamation studies for the County of Sacramento, the City of Roseville, and the El Dorado Irrigation District (EID), are considered in the definition of Alternative 3.

Results of the Sacramento County reclamation study concluded that the potential demand for agricultural use of reclaimed water could increase over time from approximately 150,000 AF in 1993 to approximately 263,000 AF in the year 2010, with out-of-county export of approximately 14,600 AF after 2005 due to insufficient in-County demand south of the American River (Sacramento County Regional Sanitation District 1994). Non-agricultural reclaimed water users in the County (primarily irrigators of parks, schools, roadway rights-of-way and medians, cemeteries, and golf courses) would generate a demand for 33,000 AF of reclaimed water per year, approximately 15,400 AF of which would be south of the American River. Under this alternative, reclaimed water use in Sacramento County would total approximately 263,000 AF. Conveyance, storage, and distribution facilities for reclaimed water would include pump stations, storage tanks, reservoirs, pipelines and canals. The Clay Station Reservoir site on Laguna Creek would need to be developed as the site for a 170,000 AF reclaimed water reservoir. This alternative also assumes increased reclamation in the City of Roseville and in the El Dorado Irrigation District (EID).

With these three sources of reclaimed water totaling approximately 300,000 AF/Yr by 2010, Alternative 3 considers substantially reduced groundwater pumping with some reductions in surface water diversions on the American and Sacramento rivers. Use of reclaimed water after 2010 would be expected to increase, but estimation of volume would be speculative.

Use of reclaimed water to meet some of Sacramento County's non-potable water demand would reduce groundwater pumping and some diversions from the Lower American and Sacramento River. Impacts to fisheries and recreation on the Lower American River would be somewhat reduced under Alternative 3. Impacts with regard to water quality and flood control would be the same or slightly reduced than under the WFP. Impacts with regard to water quality would be substantially reduced. This alternative would reduce return flows below the Sacramento River wastewater treatment plant. Treated effluent diverted for reclaimed water use (and thus not discharged to the Sacramento River) would decrease Delta outflows by a like amount. Therefore out-of-area water supply impacts could be substantially greater than those of the WFP.

Implementation of Alternative 3 would reduce demands on surface and groundwater resources in the project area. However, constraints to reclamation on the scale contemplated in Alternative 3 are many, and lend uncertainty to its ultimate implementation. Such constraints include regulatory permits and approvals, institutional agreements between producers of reclaimed water and other agencies; identification of markets for the resource; public health questions; and construction of treatment, storage, and conveyance facilities. Alternative 3 could not entirely substitute for any element of the WFP in any case, however, due to the limited uses of reclaimed water. Provision for additional surface water supplies to meet growing demands for potable water would still be required.

2.6.4 Alternative 4 - More Frequent Reductions in Surface Water Diversion

Under the WFP most purveyors that divert upstream of Nimbus Dam would limit their increased diversions or take other measures to reduce the impacts of diversions in about 18% of the years (i.e., years in which the projected March through November unimpaired inflow to Folsom Reservoir is less than 950,000 AF.)

Under Alternative 4, those purveyors would limit their increased diversions or take other measures to reduce the impacts of diversions in about 43% of the years (i.e., years in which March through November unimpaired inflow to Folsom Reservoir is below 1,600,000 AF). It would allow diversions similar to those described in the WFP in the remaining years.

Requiring drier year cutbacks in a greater percentage of years would result in reduced diversions from the Lower American River. Alternative 4 would result in somewhat reduced impacts to fisheries resources. Other flow-related impacts would be the same or slightly reduced, including recreation opportunities, vegetation and wildlife, water quality, power supply, visual resources, and flood control. Impacts on groundwater could be substantial as purveyors turn to groundwater in a greater number of years to make up for the shortfall in surface water supplies. This could result in impacts similar to those described under Alternative 2, Increased Groundwater Pumping, including land subsidence, increased pumping costs, in-migration of poor quality water, decline in well productivity, and increased rate of movement of groundwater contamination. Some purveyors without access to alternative sources would not have sufficient water supply to meet projected demand.

2.6.5 Alternative 5 - No Project Alternative—Independent Actions

Under Alternative 5, No Project Alternative—Independent Actions, it is assumed that purveyors would continue to pursue water supply projects. This alternative represents a condition that could occur in the year 2030 if the WFP is not implemented, and purveyors develop their own projects to meet their anticipated demands, without dry year delivery reductions, water conservation programs or Lower American River Habitat Management Element negotiated as part of the WFP. All other assumptions (e.g., 2030 out-of-basin CVP/SWP demands and increased Sacramento Valley demands, and increased Trinity River flows) will be used for comparative purposes for the Future Cumulative Condition simulation.

Implementation of Alternative 5 would result in more surface water diversions from the Lower American River, with no Water Forum-negotiated dry year restrictions, although there would be other external limitations on water availability (e.g., CVP-imposed deficiencies). On the Lower American River, impacts on fall-run chinook salmon and steelhead would be somewhat worse. Other flow related impacts would also be somewhat worse than under the WFP, including Lower American River and Folsom Reservoir recreation opportunities, water quality, flood control, CVP and SWP deliveries, visual resources, and Sacramento River fisheries.

2.6.6 Alternative 6 - No Project Alternative—Constrained Surface Water and Groundwater

Under Alternative 6, No Project Alternative—Constrained Surface Water and Groundwater, represents a condition at 2030 that could occur if diversions and groundwater pumping by Water Forum purveyors were constrained to the lesser of future demands, existing capacity, or existing water entitlements. All other assumptions (e.g., 2030 out-of-basin CVP/SWP demands and increased Sacramento Valley demands, and increased Trinity River flows) will be set at the same levels established for the Future Cumulative Condition simulation.

This alternative would not have sufficient water supply to provide for projected demand in the water service study area. Because a lower volume of water would be diverted from Folsom Reservoir, the Lower American River, and the Sacramento River as compared to the WFP, impacts on fisheries, recreation, vegetation and wildlife, CVP and SWP water deliveries, water quality, visual resources, and power supply would be reduced.

2.6.7 Alternative 7 - No Project Alternative—Constrained Surface Water, Unconstrained Groundwater

Under Alternative 7, No Project Alternative—Constrained Surface Water, Unconstrained Groundwater, represents a condition at 2030 that could occur if diversions by Water Forum purveyors were constrained to the lesser of future demands, existing capacity, or existing water entitlements. All other assumptions (e.g., 2030 out-of-basin CVP/SWP demands and increased Sacramento Valley demands, and increased Trinity River flows) will be used for comparative purposes for the Future Cumulative Condition simulation. This alternative assumes that future demands would be met through groundwater pumping where groundwater is available. As such, the impacts of this alternative are similar to Alternative 2, Increased Groundwater Pumping. The reader is referred to Section 2.6.2 for a summary of impacts of Alternative 2.

2.6.8 Alternatives Eliminated from Detailed Consideration

Several additional alternatives were considered during the planning process, but were eliminated from detailed consideration in the EIR, because they cannot feasibly attain the objectives of the proposed WFP for financial, legal, technological, and/or environmental reasons. These alternatives include Auburn Dam, Feather River diversions, and additional conservation beyond Best Management Practices.

Auburn Dam

Auburn Dam would require federal authorization and appropriation. As detailed in the American River Water Resources Investigation (ARWRI), USBR studied Auburn Dam as an alternative for meeting the region's water supply needs (SMWA/USBR, 1996; SMWA/USBR, 1997), and for regional flood control (USACE/DWR, 1991). In May 1998, USBR issued its Record of Decision regarding the proposed action for the ARWRI. The ARWRI is the subject of the Final Environmental Impact Statement (FEIS), ARWRI, California (FES 97-36, dated November 27, 1997), developed in compliance with the National Environmental Policy Act (NEPA). The adopted decision is as follows:

"Reclamation has not identified a Federal role for meeting the future water needs of the ARWRI study area; therefore, a Federal program is not being selected.

While no Federal action will be initiated to meet the water needs of the local area, USBR will, as appropriate, cooperate with local agencies as specific water management activities are proposed and implemented. USBR would exercise its statutory authorities, such as that afforded by the Central Valley Project Improvement Act, to provide assistance in implementation and cooperate in the process with local lead officials. Such cooperation may involve individual actions on the part of USBR that constitute "major Federal actions", and as such would require that USBR comply with the NEPA and other Federal statutes. Under those circumstances, USBR would prepare the required additional documentation."

Feather River Diversions

Diversions from the Feather River were considered for Placer County and parts of Sacramento County to reduce the need for American River diversions. A fatal flaw analysis was prepared to examine the feasibility of diverting water at a rate of 200 mgd (310 cfs) from the Feather River to help meet the 2030 demands of South Placer and north Sacramento counties. Based on this analysis, it was determined that several fish species would be exposed to the diversion at their most sensitive life stages (i.e., eggs, larvae, and juveniles) during downstream migration. Because this level of diversion from the Feather River would likely have significant impacts to fisheries, and a new diversion could involve a lengthy and uncertain permit process, this alternative was eliminated from detailed consideration in the EIR.

Additional Conservation Beyond Best Management Practices

The WFP includes a Water Conservation Element which sets forth the water purveyors' programs for implementing water conservation measures, or best management practices (BMPs), including residential water meter retrofit. The majority of these BMPs are similar to those identified in the Memorandum of Understanding Regarding Urban Water Conservation in California (Urban Water Conservation Council, 1994). It is assumed that by the year 2030 all water purveyors will have fully implemented all BMPs. The WFP Water Conservation Element is expected to achieve an overall conservation level of approximately 25%. Although additional conservation measures were considered, they would not be able to feasibly meet the WFP's

objectives by themselves at this time due to cost or health-related reasons. The WFP does not preclude the opportunity to implement other, more aggressive conservation approaches as they become feasible and available in the future. As a result, it is possible that enhanced conservation could occur. For instance, the California Urban Water Conservation Council continues to explore more BMPs. Although this was eliminated from detailed consideration in the EIR as an alternative to the WFP, the potential for enhanced conservation is understood by the Water Forum stakeholders.

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CONCEPTUAL MITIGATION PLAN

Westbrook Project

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CONCEPTUAL MITIGATION PLAN

Westbrook Project

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Chapter 1
Summary

The purpose of this document is to conceptually describe the mitigation measures proposed as compensation for the potential impacts to wetlands and other waters of the U.S. that would result from construction of the proposed Westbrook Project (the "Project"). The mitigation proposed herein is also intended to provide mitigation to assure that the project does not jeopardize the continued existence of any federally-listed threatened and endangered species, however, the specifics of impacts to federally-listed species is being specifically discussed in a separate Biological Assessment and is not addressed in this plan.

This plan was prepared consistent with the Corps of Engineers' ("Corps") and Environmental Protection Agency's ("EPA") regulations (the "Mitigation Guidelines") regarding compensatory mitigation for losses of aquatic resources (Corps of Engineers and Environmental Protection Agency 2008). The format of this document follows the Sacramento District Corps of Engineers' Habitat Mitigation and Monitoring Proposal Guidelines (Corps of Engineers 2004).

This plan is intended to be conceptual. It identifies the impacts of the proposed project and conceptually describes the mitigation measures proposed by the applicants. It does not provide a detailed description of the proposed mitigation measures. It is recognized that, in accordance with the Mitigation Guidelines, a detailed mitigation plan must be prepared, submitted to, and approved by the Corps prior to issuance of the Department of the Army permit.

The proposed mitigation provides for a combination of on-site and off-site wetlands preservation and on-site and off-site wetlands creation and restoration. A total of 2.9830 acres of wetlands would be preserved on-site. A total of 5.9436 acres of vernal pool preservation credits would be purchased from an approved mitigation bank within its approved service area. A total of 3.88 acres of seasonal wetlands would be created on-site. A total of 2.3979 acres of vernal pool creation and/or restoration credits would be acquired from approved mitigation banks within their approved service area. A total of 7.00 acres of seasonal wetland creation credits would be acquired from an approved mitigation bank within its approved service area.

Although, at the current time, the Applicant proposes to accomplish all off-site mitigation through the purchase of credits, the Applicant wishes to maintain the option to develop a permittee-sponsored mitigation plan to provide the proposed preservation and/or creation/ restoration mitigation measures. Where such measures are adopted, it is understood that the permittee will be required to prepare site-specific mitigation and monitoring and long-term maintenance plans and that these plans must be approved by the Corps and U.S. Fish and Wildlife Service (the "Service").

Chapter 2

Project Description

Responsible Parties

This mitigation plan is being proposed by Westpark S.V. 400, LLC ("Applicant") for Department of the Army Section 404 Permit to authorize fill in waters of the United States (U.S.) associated with the Project.

Location of Project

The ± 400-acre project area is located in the northwestern portion of the City of Roseville, Placer County, California. It is situated approximately 1.2 miles north of Baseline Road and one mile west of Fiddyment Road. Sheet 1 of 5 of the application drawings (Appendix A) is a vicinity map showing the location of the project area.

Description of the Proposed Project

The Project is a 400-acre mixed-use residential development. Sheet 3 of 5 of the application drawings (Appendix A) depicts the land plan for the Project. A mixture of land uses are planned, providing opportunities for development of new residential neighborhoods, an elementary school, parks, and several retail centers. The Project includes approximately 146 acres of low-density residential and 84 acres of medium-density residential, providing for approximately

1,340 single-family detached homes. In addition, approximately 28 acres is planned as high-density residential providing for 689 multi-family units. Of the Project's 2,029 total residential units, 10% (203 units) are set aside as affordable to very-low, low-, and moderate-income households.

Approximately 43 acres of commercial land uses are proposed, providing for development of approximately 565,000 sq. ft. of retail/office uses at several locations along Santucci Boulevard and Pleasant Grove Boulevard. Other proposed uses include a 10-acre elementary school site, approximately 16 acres for three neighborhood parks, and nearly 37 acres of open space for the preservation of natural resource areas. In addition to these uses, Westbrook provides for development of several paseos and Class I bike paths, providing an interconnected system of multi-use trails for pedestrians and cyclists to move through the plan area. Table 1 summarizes the proposed land uses comprising the Project and their respective areas.

Table 1. Summary of Proposed Land Uses and Their Areas

Land Use	***Gross Area (ac)***	***Net Area (ac)***	***Dwelling Units***
Low Density Residential	145.7	140.9	705
Medium Density Residential	83.6	79.4	635
High Density Residential	27.6	25.2	689
Commercial	43.3		
School	10.0		
Well Site	0.3		
Parks	15.5		
Open Space	36.6		
Major Roads	34.8		
Totals	**397.4**		**2,029**

Chapter 3

Description of Impacts to Aquatic Resources

Existing Resources

General Site Characteristics

The project site is characterized by gently rolling topography and large, open annual grassland areas. All of the project area has been disked, plowed and dry-farmed. The project area has been dry-farmed in at least two of the past six years. These agricultural activities have significantly affected both the upland and wetland plant communities.

The dominant plant community within the project area is ruderal non-native annual grassland. Dominant species comprising the non-native annual grassland include a variety of naturalized Mediterranean grasses including soft chess (*Bromus hordeaceus*), ripgut brome (*B. diandrus*), medusa head (*Taeniatherum caput-medusae*), wild oats (*Avena fatua*). Common herbaceous species include filarees (*Erodium spp*.), yellow star-thistle (*Centaurea solstitialis*), rose clover (*Trifolium hirtum*), cut-leaf geranium (*Geranium dissectum*), tarweed (*Holocarpha virgata*), Fitch's spikeweed (*Hemizonia fitchii*), common vetch (*Vicia sativa*), and hairy hawkbit (*Leontodon taraxacoides*).

The surface runoff within the project area flows to the north and west with the majority of the site draining to the north. The surface runoff on the eastern three-quarters of the project area flows

through a series of swales to the north. At the northern border of the study area, these swales flow into culverts that are part of the West Roseville Specific Plan developments storm drainage system. The surface runoff on the western one-quarter of the property flows through a series of swales and an intermittent stream to the west. West of the project area, surface flow drains through agricultural ditches in lands managed for rice cultivation, eventually flowing into Curry Creek.

The soil mapping units within the project area include: Cometa-Fiddyment Complex 1-5% slopes; Fiddyment-Kaseberg loams 2-9% slopes; and, San Joaquin-Cometa sandy loams 1-5% slopes. These soils occur on low terraces, are shallow to moderately deep, and underlain by hardpans except for Cometa which is underlain by a dense clay pan. The average depth to hard pan or clay pan in these soils ranges from 18" to 40". As stated previously, the project area has been historically and recently disked, plowed and dry-farmed. As a result, the soils are not compacted and are well-aerated. The disking and/or plowing has eliminated much of the natural micro-topography in many areas.

Aquatic Resources

A jurisdictional delineation of the project area was originally completed by ECORP Consulting, Inc. in 2006 and verified by the Corps of Engineers in November 2006. That verification expired November 8, 2011 and the Applicant has requested re-verification of the delineation from the Corps. Sheet 2 of 5 of the application drawings (Appendix A) is a copy of the delineation map. There is a total of 12.5470 acres of waters of the U.S. existing within the project area. This total is comprised 0.9462 acre of intermittent streams, 1.3498 acres of seasonal wetlands, 8.4368 acres of wetland swales and 1.8142 acres of vernal pools.

Two intermittent streams flow through the extreme northwest corner of the project area and converge near the western boundary of the project area. Streams are differentiated from linear wetlands (e.g. wetland swales) by the presence of defined beds and banks and

an identifiable ordinary high water line. Intermittent streams flow seasonally, but for a longer duration than ephemeral streams. Intermittent streams receive baseflow input from a seasonal perched groundwater table and, as a result, experience flow for weeks or months after rainfall events.

The seasonal wetlands are depressional wetlands that are inundated in the winter and early spring but are dry throughout the summer and fall. Depths of these seasonal wetlands range from a few inches up to 2 feet. These depressional seasonal wetlands are topographically and hydrologically similar to vernal pools (described below) but their plant communities are not dominated by species considered endemic to vernal pools. Common plant species include perennial rye (*Lolium perenne*), Mediterranean barley (*Hordeum marinum*), rabbit's-foot grass (*Polypogon monspeliensis*), mannagrass (*Glyceria declinata*), hyssop loosestrife (*Lythrum hyssopifolia*), toad rush (*Juncus bufonius*), and slender popcorn flower (*Plagiobothrys stipitatus micranthus*). These seasonal wetlands are essentially vernal pools that have been disturbed to the extent that they no longer support a vernal pool plant community.

Wetland swales are linear sloping seasonal wetlands that occur in topographic swales versus seasonal wetlands which occur in depressions. They are inundated in the winter and early spring during and for up to several weeks following rainfall events. They often have embedded depressions that pond water to a duration similar to depressional seasonal wetlands and vernal pools. The most common plants occurring within the wetland swales include perennial rye, Mediterranean barley, rabbit's-foot grass, and hyssop loosestrife.

Vernal pools are seasonally inundated wetlands occurring within topographic depression which occur both as isolated features in the landscape and in associated wetland and non-wetland swales. They typically flood to depths ranging from 2 inches to over 1 foot in the winter and early spring. The plant communities within vernal pools are typically dominated by vernal pool endemics, a majority of which are native annuals. These vernal pool endemics include

slender popcorn flower, Vasey's coyote thistle, Carters buttercup (*Ranunculus alveolatus*), double-horned downingia (*Downingia bicornuta*), and annual hairgrass (*Deschampsia danthonioides*). Depending on their depth and level of disturbance, other non-native species common to seasonal wetlands may also be present as dominants or associates.

Impacts

In calculating direct effects, it was assumed that if any portion of a non-linear, depressional wetland (i.e. seasonal wetlands and vernal pools) would be direct affected, all of it would be directly affected. For linear, sloping wetlands (i.e. wetland swales) the direct effects was calculated as that portion of the wetland within the footprint of development. Appendix B is an impact map.

For purposes of calculating impacts it was assumed that adjacent properties currently under application for a DA Permit (Conley and Federico properties) are not permitted and constructed at the time that the Westbrook project is constructed. Under this scenario, there would be fill slopes extending south onto both of these properties.

The Project would result in a total of 9.6108 acres of direct impacts to waters of the U.S. These direct impacts are comprised of 0.8730 acre vernal pools, 1.1137 acres swale depressional wetlands, 0.6244 acres seasonal wetlands and 6.9997 acres swale wetlands. Of these direct impacts, approximately 0.0292 acres (0.0008 acre swale depressional and 0.0284 wetland swale) are located on the Federico property and 0.0175 acre (0.0066 swale depressional and 0.0109 acre vernal pool) are located on the Conley property. If one or both of these properties are permitted and constructed prior to Westbrook, the impacts attributable to Westbrook would be reduced accordingly.

Chapter 4

Proposed Mitigation Measures

Goals and Objectives

The overall objective of this mitigation plan is to compensate for the loss of wetlands and other waters of the U.S. The proposed mitigation measures are intended to replace both loss of wetland area and wetland function. To the extent possible, the mitigation plan has been designed to replace lost wetlands in-kind and on-site. Where replacement of wetlands on-site is not environmentally preferable (i.e. vernal pools), the plan provides for mitigation off-site.

This plan is also intended to mitigate for potential impacts to federally-listed threatened and endangered species that have been documented as occurring within the project area or are considered likely to occur within the project area. As stated previously, a separate Biological Assessment is being prepared to more specifically address impacts to federally-listed species and to discuss the proposed mitigation measures relative to those species.

Description of Proposed Mitigation Measures

The Applicant proposes to compensate for impacts to waters of the U.S. through a combination of preservation and construction of wetlands on-site, purchase of vernal pool and seasonal wetland

restoration and creation credits (respectively) from an approved mitigation bank and purchase of vernal pool preservation credits from an approved mitigation bank.

The Applicant proposes establishment of 35.8-acre wetland preserve in the northwest corner of the project area. This wetland preserve is contiguous with much larger wetland preserves located to the north and east on the West Roseville Specific Plan development. Approximately 2.983 acres of wetlands will be preserved and managed. This total is comprised of .946 acres of intermittent channel, 0.952 acres of vernal pools, 0.725 acres of seasonal wetlands and 0.359 acres of wetland swales.

The Applicant proposes to construct approximately 3.88 acres of seasonal wetlands on-site within the wetland preserve. The wetlands will be constructed adjacent to the two intermittent channels.

The Applicant further proposes to provide 5.9436 acres of vernal pool preservation credits, 2.3979 acres of vernal pool creation/restoration credits and 7 acres of seasonal wetland creation credits from an approved mitigation bank.

On-site Preservation

The wetland preserve was sited at its proposed location because it would be situated adjacent to and contiguous with designated open space on the north and along a portion of its eastern boundary. It would be bordered by agricultural lands along its western boundary and developed lands to the south.

As stated previously, virtually all the project area has been disked and/or plowed in the past for agriculture. This has resulted in the general degradation of wetland function throughout the project area. The degradation is evident in terms of the muted micro-topography, aerated surface soils and ruderal plant communities. If the project area is not developed and wetlands not preserved and managed, it is very likely that this degradation would continue to occur in the

future. Therefore, the preservation and management of the wetlands within the proposed wetland preserve would eliminate this on-going degradation and restore (rehabilitate) wetland function in the preserved waters and wetlands.

On-site Creation

The on-site wetland creation will partially compensate for impacts to seasonal wetlands and swale wetlands. In addition to providing partial replacement of wetland losses, it is intended to restore, as much as possible, the function of the preserved streams which have been degraded by historic agricultural practices. The following objectives and/or criteria were considered in designing the proposed on-site wetland mitigation plan:

- Maximize the area of wetlands to be created after consideration of physical and logistical constraints;

- Design wetlands that maximize watershed support functions such as flood attenuation functions, surface water storage functions, water quality improvement functions and habitat connectivity;

- Design wetlands that will provide a diversity of habitats including short- and long-term inundation seasonal wetlands, emergent marshes, and riparian scrub;

- Design wetlands that are hydrologically interconnected to the existing watercourses;

- Design wetlands that promote the long-term stability of the existing watercourses in consideration of the geofluvial morphology of these watercourses;

- Design wetlands that minimize the potential to exacerbate vector breeding conditions;

- Site wetlands so that they have adequate upland buffers separating them from the proposed development; and

- Site wetlands so that they are down gradient of, and not within, the Project's water quality treatment features such as bioswales.

Using these design criteria, the location and extent of wetlands to be created on-site were conceptually mapped by Gibson & Skordal. The tentative wetland design was then reviewed by both MacKay & Somps and Civil Solutions. MacKay & Somps reviewed the plan with respect to its relation to the overall land plan. Civil Solutions reviewed the plan with respect to flood water attenuation, conveyance issues and quantified the hydrologic issues and benefits associated with the construction of the wetland features. Additionally, Civil Solutions evaluated preliminary stream stability guidance criteria to be used in their design. After incorporating the input provided by MacKay & Somps and Civil Solutions, the location and design of the proposed wetlands was revised.

Figure 1 is a conceptual plan drawing showing the proposed layout of the wetlands to be created.

A total of approximately 3.88 acres of wetlands will be constructed within the wetland preserve. The wetlands to be created will be located on low terraces excavated adjacent to two existing intermittent stream channels. The wetlands to be constructed will be located along the inside of existing stream meanders and along relatively straight reaches so as to avoid being intercepted by the natural meandering of the creek channel. The constructed wetlands will be shallow depressions located on low terraces designed to be inundated by overbank flooding during frequent storm events (less than the 2-year return interval). The connections between the stream channels and the constructed wetlands will be protected from erosion by the use of a vegetated geotextile fabric rather than structural armoring. The interior slopes adjacent to the wetlands will typically be graded to approximately 5:1 or greater except where limited by proximity to the adjacent watercourse.

The wetlands will be constructed during the dry season when surface water is not present. In constructing the wetlands, the first 4 to 6 inches of top soil from the impacted wetlands will be salvaged and stockpiled. The wetlands will then be excavated and

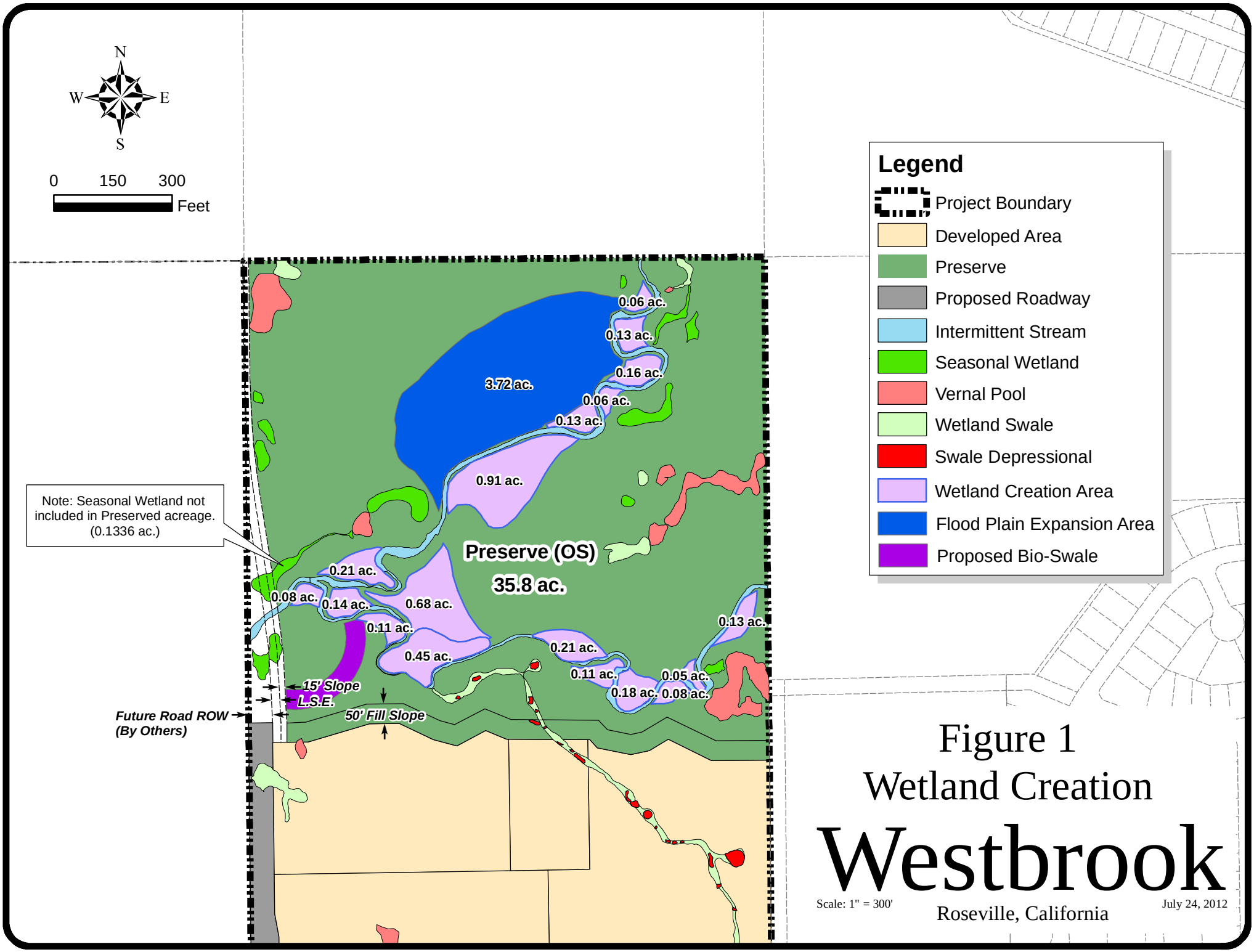


Figure 1
Wetland Creation

Westbrook

Scale: 1" = 300'

Roseville, California

July 24, 2012

graded to an elevation of approximately 4 to 6 inches below design depth. The salvaged topsoil will then be placed to final grade. Once grading is completed, the slopes of the wetland will be hydro-seeded with a mixture of upland and wetland grasses and forbs. To minimize erosion, it may also be desirable to sprinkler irrigate the constructed wetlands and side slopes to promote establishment of a vegetative cover prior to the on-set of the rainy season.

The wetlands will be designed to minimize adverse impacts to the existing low flow stream systems. Following completion of construction activities, sediment loading within the creek corridors would be expected to stabilize at current or lower rates than currently exist.

All stream low flow channels naturally migrate and evolve over time. It is likely that this will continue following construction of the Project and the on-site mitigation. The mitigation design is intended to accommodate this by locating the constructed wetlands away from the outside meander of the creeks. It is anticipated that these dynamic activities may, over time, pose a minor risk to the long-term viability of some of the created wetlands. However, this risk should be no greater than other natural locations where wetlands exist adjacent to streams.

In order to increase the volumetric flood detention capacity of the wetland preserve, the Applicant proposes to excavate an approximate 3.72-acre area of upland grassland located on the north side of the northernmost intermittent channel. The topsoil within this area will be salvaged and then the area will be excavated to an elevation slightly higher than the existing channel. Following completion of the excavation, the salvaged topsoil will be re-applied over the disturbed surface to restore the upland grassland.

Off-site Creation/Restoration

The applicants propose to secure 2.3796 acres of constructed vernal pool creation/restoration credits and 7 acres of constructed seasonal wetland creation credits from an approved mitigation bank in

western Placer County within the bank's approved service area. To date, the Applicant has secured vernal pool preservation credits from approved conservation banks in Western Placer County which total approximately 5.0 acres. Approximately 5.0 acres of preservation credits have been secured from Toad Hill Mitigation Bank by the Applicant, a portion of which are available for the Project. The Toad Hill Mitigation Bank is located within the Western Placer County Core Recovery Area.

Off-site Preservation

The applicants propose to secure 4.7021 acres of vernal pool preservation credits from an approved conservation bank in western Placer County within the bank's approved Service area. The Applicant proposes to provide these credits at the approved Toad Hill Mitigation Bank.

Implementation

Implementation Schedule

The Applicant proposes to implement the off-site mitigation measures in a phased manner commensurate with the phasing of construction. Prior to initiating construction of any phase of the project, the commensurate amount of off-site mitigation credits will be secured and proof of purchase will be provided to the Corps and the Service.

The construction of the on-site mitigation will be initiated prior to or concurrent with initiation of construction activities in waters of the U.S. Construction of the on-site mitigation will be completed no later than December 31 of that same year.

Responsibilities for Implementing Plan

The permittee will be responsible for securing the off-site preservation and creation credits in the amounts commensurate to the impacts associated with each respective permit. The permittee will also be responsible for constructing the on-site wetlands creation.

Chapter 5
Monitoring

Performance Standards

The following performance standards will be used to assess the relative success of the mitigation constructed on-site.

A minimum of 3.2 acres of the total 3.88 acres of wetlands constructed on-site must meet or exceed the following criteria for three consecutive years without human intervention.

- The constructed wetlands will exhibit a minimum of one primary or two secondary indicators of wetland hydrology (Corps of Engineers 2008).

- The plant communities in the constructed wetlands will be dominated by species with a wetland indicator status of facultative, facultative wetland, or obligate wetland (Reed 1988).

- The plant communities in the constructed wetlands will be dominated by species commonly found in the preserved wetlands within the project area.

Monitoring Protocol

The wetlands on-site will be monitored for a period of five years or until all performance criteria have been met for three successive years without human intervention, whichever is longer. The purpose of the monitoring is to assess the relative success of the mitigation as compared to performance criteria and to determine whether remedial actions are necessary to assure the performance criteria are met.

Monitoring of the constructed mitigation will include obtaining quantitative data on their hydrology and developing plant communities. Photo points will be established to qualitatively monitor trends in the developing plant communities. The areal extent of constructed wetlands will be surveyed annually using GPS technology and/or GIS technology with georeferenced aerial photography.

The monitoring of the hydrology of the constructed wetlands will be emphasized primarily in the first growing season following construction. Staff gauges will be installed at selected locations in the constructed wetlands. Sampling will be conducted at a frequency sufficient to document the depth and duration of inundation within the constructed wetlands. Once the hydrology of the constructed wetlands has been adequately characterized, additional detailed hydrology monitoring will not be conducted over subsequent growing seasons unless specific problems are identified that warrant further monitoring.

Vegetation monitoring will be conducted during each growing season throughout the monitoring period. The plant community in each of the constructed wetlands will be characterized. Each plant observed will be identified and its relative cover will be recorded. The total cover of all species will also be estimated.

Reporting

The results of each year's monitoring will be compiled into an annual monitoring report. The annual monitoring reports will present all monitoring data, assess the implications of that data, and make recommendations for remedial actions, where warranted. The annual reports will be submitted to the Corps not later than December 31st each year.

Where multiple segments of the on-site mitigation have been constructed to compensate for the impacts associated with any particular permit, the monitoring report must include all segments that have been constructed. Where a portion of those constructed wetlands are to be applied to future phases of that permit or to another permit, the monitoring report shall so note it.

Responsibilities

The permittee will be responsible for implementing all aspects of monitoring the wetlands constructed on-site. Each permittee will be responsible for submitting annual monitoring reports for the constructed wetlands, and for their success.

Chapter 6
Long-term Maintenance and Management

Prior to initiation of construction activities in wetlands and other waters of the U.S., a conservation easement will be established over the open space preserve, excluding the 50-foot wide fill slope. The conservation easement will be granted to the City of Roseville who will be responsible for the long term maintenance of the preserve. The long-term management of the preserve will be carried out under the City of Roseville's Open Space Preserve Overarching Management Plan (City of Roseville 2009) which has been previously approved by the Corps of Engineers and U.S. Fish and Wildlife Service. The conservation easement will limit activities within the open space preserves to those activities that are beneficial to the restoration, creation, and preservation of wetlands and their surrounding upland habitats and as specifically allowed for within the Final Mitigation Plan and the City of Roseville's Open Space Preserve Overarching Management Plan. Following completion of grading, a conservation easement over the 50-foot fill slope will be granted to the City of Roseville to for the long-term maintenance under the over-arching management plan. A funding mechanism, specifically a maintenance CFD as required by the City of Roseville, will be established to provide for the long-term maintenance of the preserves in perpetuity.

Once the constructed wetlands have been monitored for the required 5-year monitoring period and they have met or exceeded all performance criteria for a period of three consecutive years without human intervention, the permittee's responsibilities will have been satisfied. The open space preserves will then be dedicated to the City of Roseville.

Chapter 7
References

City of Roseville. 2009. City of Roseville Open Space Preserve Overarching Management Plan, Administrative Draft. March 10, 2010. Roseville, CA.

Corps of Engineers and Environmental Protection Agency. 2008. Compensatory Mitigation for Losses of Aquatic Resources, Final Rule. FR Vol. 73, No. 70. April 10, 2008.

Corps of Engineers. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0). ERCE/EL TR-08-28. September 2008. Vicksburg, MS.

Corps of Engineers. 2004. Habitat Mitigation and Monitoring Proposal Guidelines. Sacramento and San Francisco Districts Public Notice dated December 30, 2004. Sacramento, CA.

Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1. US Engineer Waterways Experiment Station. Vicksburg, MS.

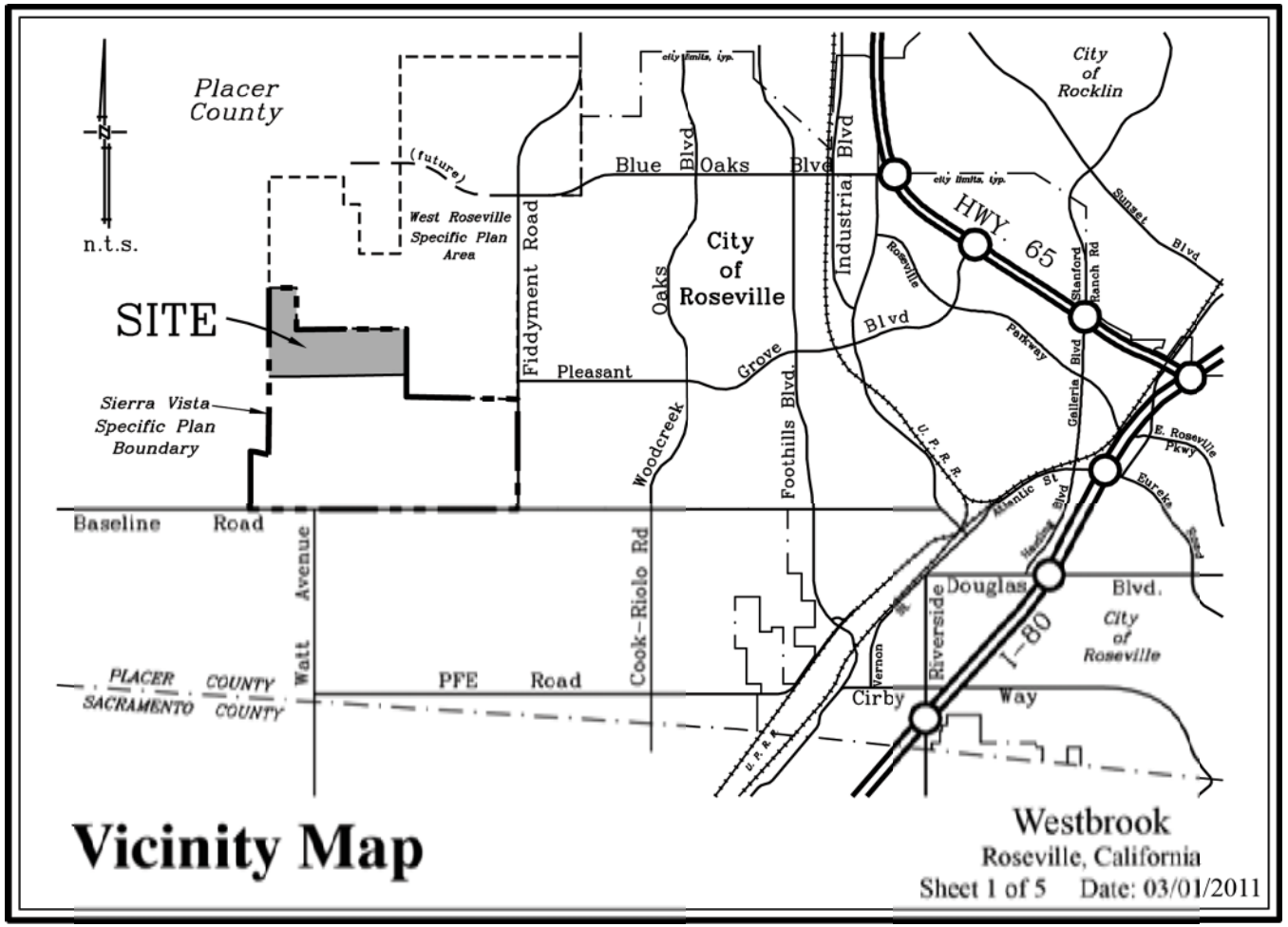
North Fork Associates. 2009. Biological Assessment for the Sierra Vista Specific Plan Project, Placer County, California. Revised June 9, 2009. Prepared for URS Corporation. San Francisco, CA.

Reed, P.B. 1988. National List of Plant Species that Occur in Wetlands: California (Region 0). Biological Report 88(26.10). May 1988. National Ecology Research Center, National Wetlands Inventory, U.S. Fish and Wildlife Service. St. Petersburg, FL.

U.S.D.A., Soil Conservation Service. 1980. Soil Survey of Placer County, Western Part. Sacramento, CA.

APPENDIX A

Application Drawings



Vicinity Map

Westbrook
Roseville, California
Sheet 1 of 5 Date: 03/01/2011

Area Summary	
Wetland Type	**Total**
Intermittent Stream	0.9462
Seasonal Wetland	1.3498
Vernal Pool	1.8142
Wetland Swale	8.4368
Grand Total	**12.5470**

Legend

- Project Boundary
- Ownership Line
- Intermittent Stream
- Seasonal Wetland
- Vernal Pool
- Wetland Swale

N
W E
S

0 300 600 1,200
Feet

Chan

Conley

Federico

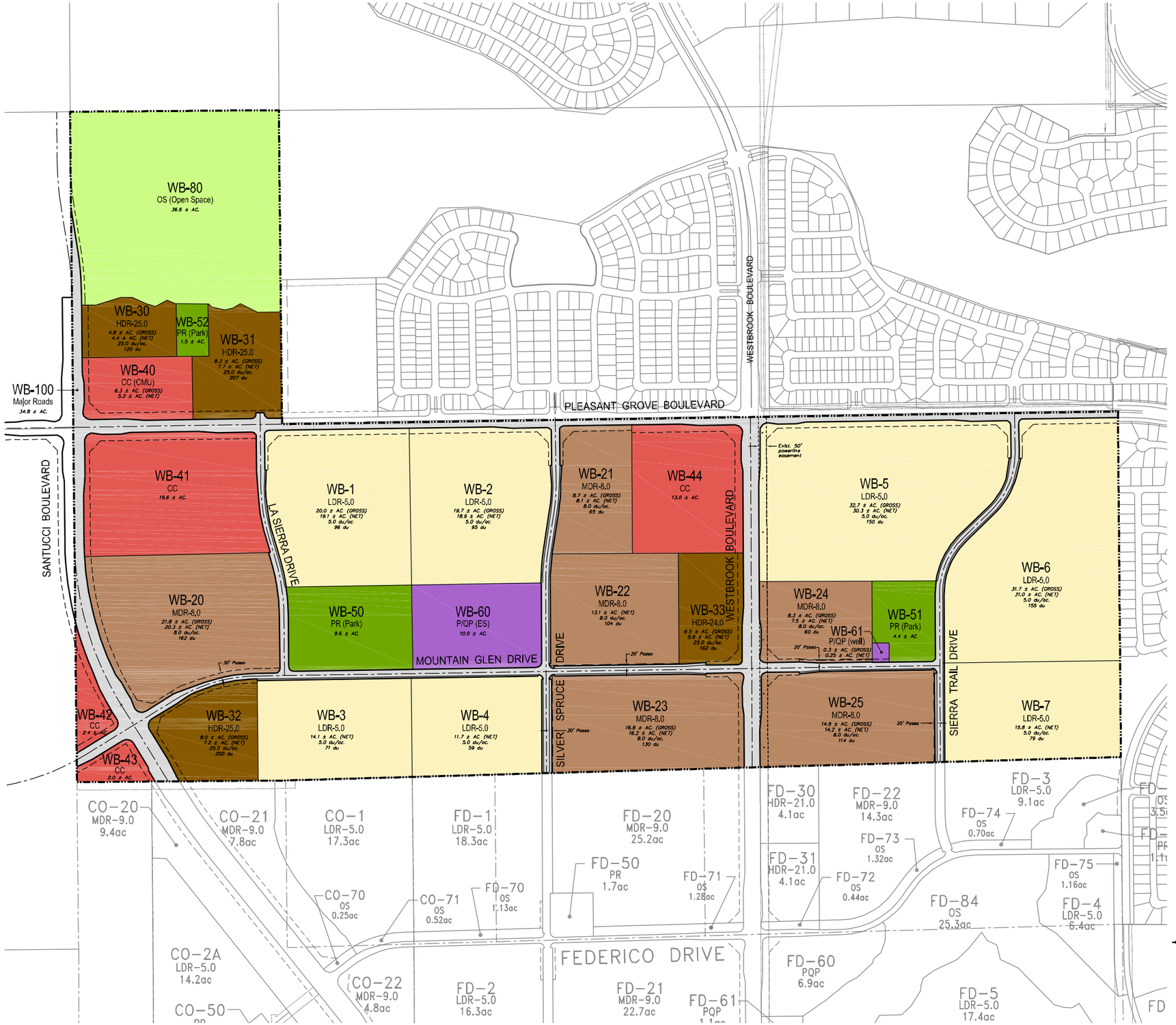
Existing Aquatic Resources

Westbrook

Scale: 1" = 600'

Roseville, California

March 8, 2011



PRELIMINARY STREET GEOMETRY, ACREAGE, and DWELLING UNIT COUNTS

WESTBROOK

Land Use	Acres (gr.)	Acres (net)	D.U.
LDR	145.7	140.9	705(1)
MDR	83.6	79.4	635(2)
HDR	27.6	25.2	689(3)
CC	37.0		
CC(CMU)	6.3		
P/QP (School)	10.0		
P/QP (well site)	0.3		
PARK	15.5		
OPEN SPACE	36.6		
MAJOR ROADS	34.8		
SITE TOTALS	397.4		2029

NOTES:
(1) LDR Dwelling Units based on net acres @ 5.0 d.u./ac.
(2) MDR Dwelling Units based on net acres @ 8.0 d.u./ac.
(3) HDR Dwelling Units based on gross acres @ 25.0 d.u./ac.

SIERRA VISTA LOT NUMBER KEY

LOT NUMBERS	LAND USE
1 - 19	Low Density Residential (LDR)
20 - 29	Medium Density Residential (MDR)
30 - 39	High Density Residential (HDR)
40 - 49	CC/CMU/BP
50 - 59	Park (PR)
60 - 69	Public / Quasi-Public (PQP)
70 - 79	Open Space (OS) - Paseos
80 - 89	Open Space (OS)
90 - 99	Urban Reserve (UR)
100	Major Roads

NORTH
0 300 600
SCALE:1"=300'

PROPOSED PROJECT LAND PLAN

Westbrook

Westpark Associates | MacKay & Somps Civil Engineers, Inc.
Not to Scale | *Roseville, California* | March 1, 2011
Sheet 3 of 5

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS

Wetland Impact Area Summary			
Wetland Type	**Avoided**	**Impacted**	**Grand Total**
Intermittent Stream	0.9462		**0.9462**
Seasonal Wetland	0.7253	0.6244	**1.3498**
Vernal Pool	0.9522	0.8620	**1.8142**
Wetland Swale	0.3593	8.0775	**8.4368**
Grand Total	**2.9830**	**9.5640**	**12.5470**

Future Santucci Blvd

See Cross Sections Sheet 5

A

B

B

A

Santucci Blvd.

Westbrook Blvd.

Legend

- Project Boundary
- Impact Area
- Preserve
- Proposed Roadway
- Intermittent Stream
- Seasonal Wetland
- Vernal Pool
- Wetland Swale

Note: Planned future alignment of Santucci Blvd. north of edge of development to be permitted and constructed by others.

N

W E

S

0 300 600 1,200

Feet

CO-20 9.4ac

CO-21 7.8ac

CO-1 17.3ac

FD-1 18.3ac

FD-20 25.2ac

FD-30 4.1ac

FD-22 14.3ac

FD-3 9.1ac

FD-74 OS 0.70ac

FD-83 OS 3.5ac

FD-51 PR 1.1ac

FD-73 OS

FD-31 4.1ac

FD-50 PR 1.7ac

FD-71 OS 1.28ac

FD-72 OS 0.44ac

FD-75 OS

CO-70 OS 0.25ac

CO-71 OS 0.52ac

FD-70 OS 1.13ac

FD-84 OS 25.3ac

FD-4 6.4ac

Chan

Conley

Federico

FEDERICO DRIVE

CO-2A 14.2ac

CO-50 PR

CO-22 4.8ac

FD-2 16.3ac

FD-21 22.7ac

FD-61 PQP

FD-60 PQP 6.9ac

FD-5 17.4ac

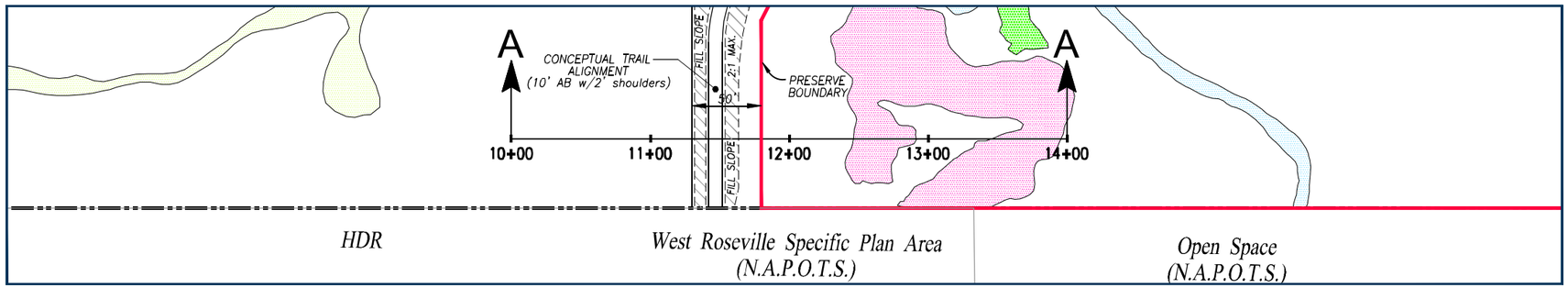
Impact Map

Westbrook

Roseville, California

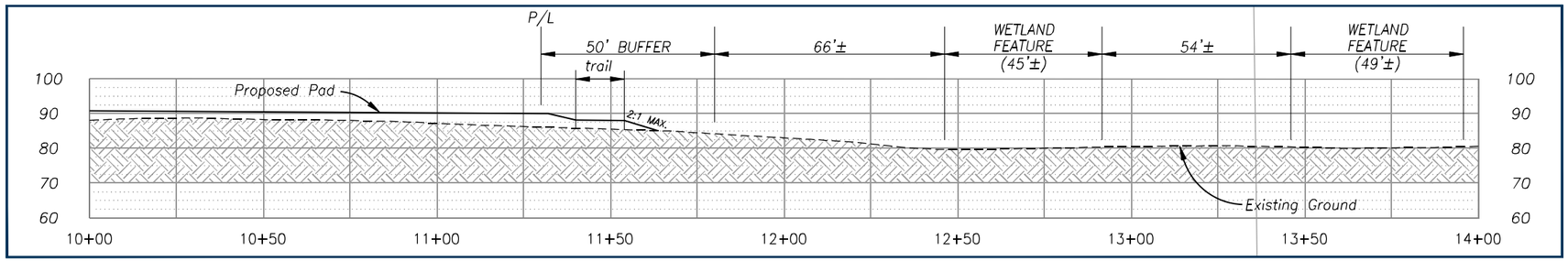
Scale: 1" = 600'

May 4, 2011



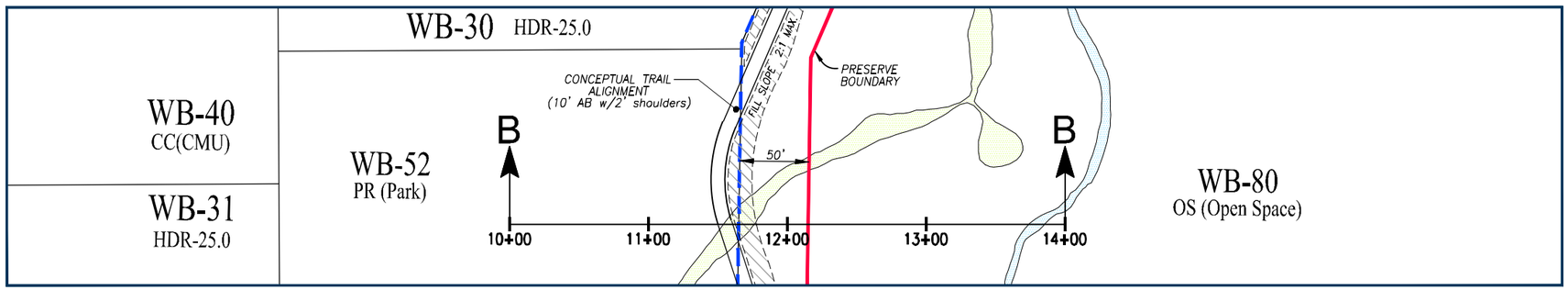
Plan View

1"=100'



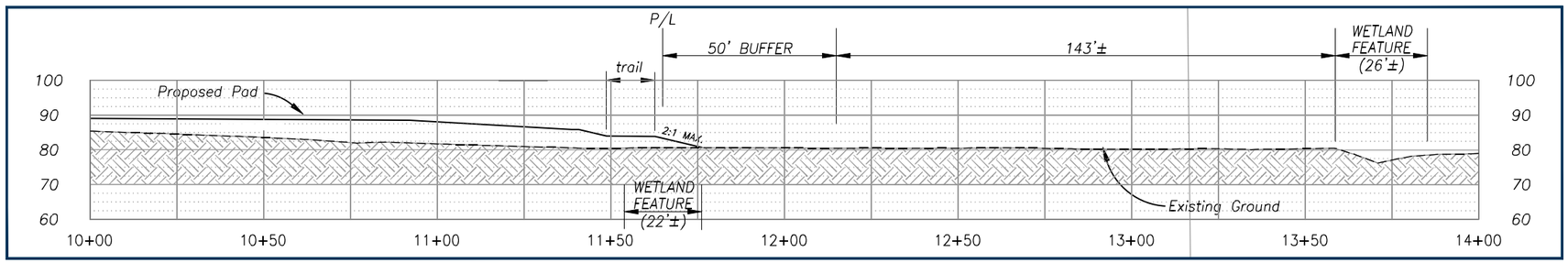
Section A-A

1"=40'



Plan View

1"=100'



Section B-B

1"=40'

N

Figure 5

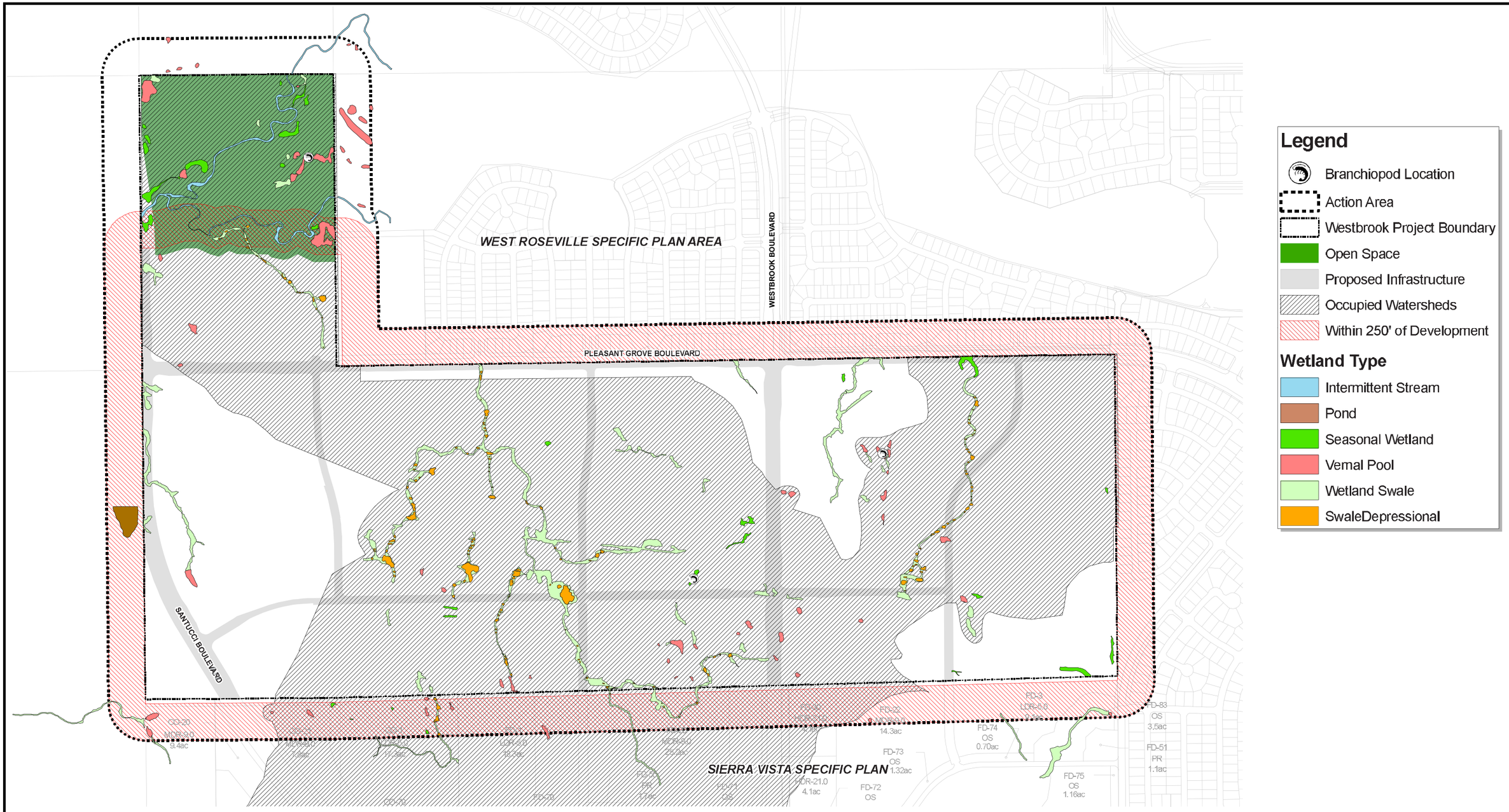
TYPICAL CROSS-SECTIONS

Westbrook Property

Scale: As Noted — *Roseville, California* — June 3, 2011

APPENDIX B

Impact Map



Impact Map

Westbrook

Scale: 1" = 300'

September 19, 2012

Roseville, California

Waters of the U.S. Impact and Mitigation Data for the Study Area (1990 through 2011) extracted from DA permit files (Prepared by the USACE, January 2012)

Waters of the U.S. Impact and Mitigation Data for the Study Area (1990 through 2011) extracted from DA permit files (Prepared by the USACE, January 2012)

Number	Status Notes	Acres Waters Delineated	VP Impacts (Acres Permanent)	VP Impacts (Acres Temporary)	OAR Impacts (Acres Permanent)	OAR Impacts (Acres Temporary)	Mitigation/Impact Notes	Planting Ratios/Measures Associated with Aquatic Resource (Enhancement ?)	NFW F for impacts to (acres) VP	NFW F for impacts to (acres) OAR	Bank / Preserve VP Creation IN	Bank / Preserve VP Preservation IN	Bank / Preserve VP Creation OUT	Bank / Preserve VP Preservation OUT	Bank / Preserve VP Creation Unknown Location	Bank / Preserve VP Preservation Unknown Location	Bank / Preserve OAR Creation IN	Bank / Preserve OAR Preservation IN	Bank / Preserve OAR Creation OUT	Bank / Preserve OAR Creation Unknown Location	ON-SITE OAR Creation	ON-SITE OAR Restored	ON-SITE OAR Preserved	ON-SITE OAR Enhanced	ON-SITE VP Creation	ON-SITE VP Preserved
1901-08768	Verified	6.198			6.198		RH Q-149. Approx 30,000 cy of fill (6.198 acres) auth in WOUS. All other data uk.																			
1901-09988	SP - Authorized	61.9	4.09		11.71		Restoration acreage was originally filled - should we count as impact? YES.										0.56				32.81	11.9			9	
					11.9																					
					0.26																					
					0.2												0.2									
					0.02																					
1989-00009	Verified	18.84			0.403		Info incomplete. Assumption of OAR impacts.																			
1989-00023	SP - Authorized, NWP - Verified	31.39	4.84		9.45		X														10.3		10.39		9.9	6.62
			0.02																							
1989-00038	Verified	4			0.8		Best Available Info																			
1989-00057	Verified	1.13			0.98		Best Available Info																			
1989-00059	Verified - Multiple	29.25	5.52		3.77		Addl 11.04 VP (P) for FWS (orchard Creek)				5.2552	11.04					3.4						18.98			0.25
1989-00063	Verified	8.18	2.83		3.195		X														2.52		2.155		11.567	
1989-00070	Verified	1			1		Delineated Assumed. Best Available Info. Verification states <1 acre.																			
1990-00035	Verified	6.685	0.682		3.609		RH 0954314, 0954341. Related to 1992-00159														3.929		1.714		4.772	0.68
1990-00109	SP - Authorized	13.7	0.05		13.65		VP mit (0.5) was for Laehr proj only - (can't find Laehr, probably out of study area, w/different name). Included impact for Laehr project.														21.1				0.5	
			0.5																							
1990-00144	Verified	3.421			0.856		Best Available Info																			

Number	Status Notes	Acres Waters Delineated	VP Impacts (Acres Permanent)	VP Impacts (Acres Temporary)	OAR Impacts (Acres Permanent)	OAR Impacts (Acres Temporary)	Mitigation/Impact Notes	Planting Ratios/Measures Associated with Aquatic Resource (Enhancement ?)	NFWF for impacts to (acres) VP	NFWF for impacts to (acres) OAR	Bank / Preserve VP Creation IN	Bank / Preserve VP Preservation IN	Bank / Preserve VP Creation OUT	Bank / Preserve VP Preservation OUT	Bank / Preserve VP Creation Unknown Location	Bank / Preserve VP Preservation Unknown Location	Bank / Preserve OAR Creation IN	Bank / Preserve OAR Preservation IN	Bank / Preserve OAR Creation OUT	Bank / Preserve OAR Creation Unknown Location	ON-SITE OAR Creation	ON-SITE OAR Restored	ON-SITE OAR Preserved	ON-SITE OAR Enhanced	ON-SITE VP Creation	ON-SITE VP Preserved
1990-00173	Verified	1.725	0.495		0.09		Best Available Info. 2002-00678 revises original VP estimate.																			0.12
1990-00412	Verified	0.83			0.83		Best Available Info. Delineated assumed.																			
1990-00622	Verified	0.94	0.31		0.63		Best Available Info, no info on mit.																			
1990-00650	Verified	3.33			0.8		X														1.78					
1990-00877	Verified	5.77	0.72		1.13		RH 0960537 - 0.21 VP (P) at Orchard Creek required by FWS, but included in Mit Plan specifically called out in Corps verification. Include?					0.21									1.7				0.88	0.88
1990-00946	Verified	0.93	0.24		0.69		Best Available Info, no info on mit.																			
1990-00966	Verified	0.74			0.74		Best Available Info																			
1990-01091	Verified	0.53	0.01		0.52		Best Available Info																			
1990-01158	Verified	0.83			0.83		Best Available Info																			
1990-01205	Verified	1			1		Best Available Info. Impact types uk…Assumed to be full amount possible (<1 acre)																			
1990-01206	Verified	1.42	0.14		1.28		Delineated Assumed														1.76				0.32	
1990-01257	SP - NWP -D/I Variable	6.55	0.08		0.04		Best Available Info. Indirect 0.22 types uk. Assumed OAR. NWP verification states that mit credits were required (first line), mentioned Sheridan. No amounts specified. Mitgation figures are assumptions based on impacts (1:1).				0.08						0.04									

Number	Status Notes	Acres Waters Delineated	VP Impacts (Acres Permanent)	VP Impacts (Acres Temporary)	OAR Impacts (Acres Permanent)	OAR Impacts (Acres Temporary)	Mitigation/Impact Notes	Planting Ratios/Measures Associated with Aquatic Resource (Enhancement ?)	NFW F for impacts to (acres) VP	NFW F for impacts to (acres) OAR	Bank / Preserve VP Creation IN	Bank / Preserve VP Preservation IN	Bank / Preserve VP Creation OUT	Bank / Preserve VP Preservation OUT	Bank / Preserve VP Creation Unknown Location	Bank / Preserve VP Preservation Unknown Location	Bank / Preserve OAR Creation IN	Bank / Preserve OAR Preservation IN	Bank / Preserve OAR Creation OUT	Bank / Preserve OAR Creation Unknown Location	ON-SITE OAR Creation	ON-SITE OAR Restored	ON-SITE OAR Preserved	ON-SITE OAR Enhanced	ON-SITE VP Creation	ON-SITE VP Preserved
			4.06		0.22						8.34															2.1
1990-01259	Verified	12.17			0.89		Best Available Info. MF Roll 194, Frame 2220. Previous impacts 0.89, types uk, assumed OAR. Addl impacts eveident via DFG record, but no Corps records to support.																				
1990-01311	Verified	2.16			0.79		Best Available Info. Same site as 1992-00123. MF Roll 156, Frame 592. Addl drainage swale" impact, amt uk																				
1991-00356	Verified	0.64			0.64		Best Available Info. MF Roll 158, Frame 23.																				
1991-00466	Verified - Assoc w Highlands Reserve	1.87	0.36		0.76		Delineated assumed. Mitigated in an extension of the 131 acres of wetland preserve located on the Highlands Reserve South Property. 0.75 acres of type uk was preserved.														1.94		0.75		0.36	
1991-00582	JD/Unauth	0.1			0.1		0.10 Unauth impacts, types uk, Assumed OAR. Delineated assumed.																				
1991-00770	NWP - LOP - Mods - Used to be 1990-01113	46.519	3.44		6.33		Just off-site, another 1.747 OAR perm impacts, creation of 2.35 OAR compensation. Not part of original project delineation/area!! But delineated under 2000-00386, which is still incomplete. Include?? Addl 1.03 acre VP created or used (unclear) on-site for remedial mit for unrelated project. Include?										6.33						33.76		4.69	2.68

Number	Status Notes	Acres Waters Delineated	VP Impacts (Acres Permanent)	VP Impacts (Acres Temporary)	OAR Impacts (Acres Permanent)	OAR Impacts (Acres Temporary)	Mitigation/Impact Notes	Planting Ratios/Measures Associated with Aquatic Resource (Enhancement ?)	NFW F for impacts to (acres) VP	NFW F for impacts to (acres) OAR	Bank / Preserve VP Creation IN	Bank / Preserve VP Preservation IN	Bank / Preserve VP Creation OUT	Bank / Preserve VP Preservation OUT	Bank / Preserve VP Creation Unknown Location	Bank / Preserve VP Preservation Unknown Location	Bank / Preserve OAR Creation IN	Bank / Preserve OAR Preservation IN	Bank / Preserve OAR Creation OUT	Bank / Preserve OAR Creation Unknown Location	ON-SITE OAR Creation	ON-SITE OAR Restored	ON-SITE OAR Preserved	ON-SITE OAR Enhanced	ON-SITE VP Creation	ON-SITE VP Preserved
					0.3		This impact acreage added to original delineation, because it was included under this project number although impacts were both adjacent AND within original project. Unclear how much of each, so it's hopefully a reasonable approach.										0.309										
					0.009		This impact acreage added to original delineation, because it was included under this project number although impacts were both adjacent AND within original project. Unclear how much of each, so it's hopefully a reasonable approach.																				
1991-01022	Verified - Highlands Reserve - D/I Variable - related, see 1997-00450	16.859	2.885		2.885		RH 0960480, 0960481. Both retrieved. Best Available Info. Delineated Assumed. 5.769 impacts include VP, acreage uk. Assumption - impacts split evenly across types. Indirect 0.303 VP.																	8.47	1.45	7.5	2.6
			0.02																							
1992-00098	Verified	1.2	0.2				FWS required significant preservation on-site (amt uk), + purchase of 0.4 created VP credits. RH 0960474, MF 200, 62. Delineated assumed.								0.4												0.8

Number	Status Notes	Acres Waters Delineated	VP Impacts (Acres Permanent)	VP Impacts (Acres Temporary)	OAR Impacts (Acres Permanent)	OAR Impacts (Acres Temporary)	Mitigation/Impact Notes	Planting Ratios/Measures Associated with Aquatic Resource (Enhancement ?)	NFWF for impacts to (acres) VP	NFWF for impacts to (acres) OAR	Bank / Preserve VP Creation IN	Bank / Preserve VP Preservation IN	Bank / Preserve VP Creation OUT	Bank / Preserve VP Preservation OUT	Bank / Preserve VP Creation Unknown Location	Bank / Preserve VP Preservation Unknown Location	Bank / Preserve OAR Creation IN	Bank / Preserve OAR Preservation IN	Bank / Preserve OAR Creation OUT	Bank / Preserve OAR Creation Unknown Location	ON-SITE OAR Creation	ON-SITE OAR Restored	ON-SITE OAR Preserved	ON-SITE OAR Enhanced	ON-SITE VP Creation	ON-SITE VP Preserved
1992-00123	Verified	0			0.52		Best Available Info. Same site as 1990-01311. MF Roll 181, Frame 845.														0.52		0.57			
1992-00159	Verified - Multiple	2.67	0.67		1.53		See 1990-00035. RH 0960473, no MF.														2.21		0.342		1.14	0.12
					0.008																					
1992-00174	Verified	0.98			0.65		X																			
1992-00667	Verified - NW26	0.09			0.09		Delineated Assumed. Best Available Info. MF roll 183, Frame 773. 0.09 acre impact types UK																			
1992-00792	Verified	0.09			0.09		Best Available Info. MF roll 183, Frame 1363																			
1993-00110	Verified	3.74			0.84		MF Roll 184, Frame 1543. No ORM/RAMS data														2.11					
1993-00274	Verified	14.81	0.021		1.829		RH 0960552. Associated with 1995-00589 (Twelve Bridges). Preservation from PDN - PDN was specified in verification, but acreage/operations plan was not. PDN included significant riparian enhancement/plantings - include? Preserved area supposedly under easement.				0.04										7.96		7.84			
1993-00362	Dev Bank - (Sheridan) + NWP + Mods	11.87			1.91		RH (0960547, 0960548, Robb has), 1006897. Impact types UK. Best Available Info.																			
1993-00388	Verified - Mods - See 1998-00286	14.45	3.39		4.78		X										0.34				5.88		6.21		4.28	0.07
1993-00514	Verified	11.21			0.1		Best Available Info																			
1993-00519	Verified - Multiple - See 1999-00350	22.05	4.04		2.16		RH 0960607 (Retrieved, with me), 0960608 (with me).					2.08					0.711				4.73		10.05		4.09	5.99

Number	Status Notes	Acres Waters Delineated	VP Impacts (Acres Permanent)	VP Impacts (Acres Temporary)	OAR Impacts (Acres Permanent)	OAR Impacts (Acres Temporary)	Mitigation/Impact Notes	Planting Ratios/Measures Associated with Aquatic Resource (Enhancement ?)	NFWF for impacts to (acres) VP	NFWF for impacts to (acres) OAR	Bank / Preserve VP Creation IN	Bank / Preserve VP Preservation IN	Bank / Preserve VP Creation OUT	Bank / Preserve VP Preservation OUT	Bank / Preserve VP Creation Unknown Location	Bank / Preserve VP Preservation Unknown Location	Bank / Preserve OAR Creation IN	Bank / Preserve OAR Preservation IN	Bank / Preserve OAR Creation OUT	Bank / Preserve OAR Creation Unknown Location	ON-SITE OAR Creation	ON-SITE OAR Restored	ON-SITE OAR Preserved	ON-SITE OAR Enhanced	ON-SITE VP Creation	ON-SITE VP Preserved
			0.01																							
1993-00626	Verified - Mod	8.93			1.04		Best Available Info. Addl fill (mod) of 1.04 acre type uk. Assumed OAR.Original fill uk. Known impacts incuded here (the mod), but this project is also included on unknown projects page.																			
1993-00732	Verified	0.6	0.3		0.3		Best Available Info. Impacts may include VP (Spread across both categories)																			
1994-00093	Verified	0.9	0.12		0.88		X				0.12					0.24	0.88									
1994-00181	Verified	0.3		0.25		0.026	Best Available Info																			
1994-00336	SP - Authorized - Mods	8.93	1.92		2.22		X								2.04	4	8.17						3.67			0.08
			0.12		0.92												1.96									
1994-00476	Verified	0.18		0.17		0.01	Best Available Info. Waters delineated was actually 1.45 (NWP 12). Impact acreage used instead.																			
1994-00506	Verified	0.55			0.02		Best Available Info																			
1994-00573	Verified	0.14	0.04		0.1		Best Available Info				0.04					0.08										
1994-00643	Verified - Grandfathered Aggregate Mining	40.5			40.5		Impacts UK, 40.5 WOUS delineated. Check location; 39.03271, -121.3479																			
1994-00836	Verified - CatX	0.03			0.03		Delineated Assumed. Best Available Info																			
1994-00999	Verified	0.068			0.029		Best Available Info																			
1994-01010	Verified	2.16	0.7		0.21		FWS mit, on-site preservation and bank credits purchased…Corps permit does not specify mit				0.7	1.4														

Number	Status Notes	Acres Waters Delineated	VP Impacts (Acres Permanent)	VP Impacts (Acres Temporary)	OAR Impacts (Acres Permanent)	OAR Impacts (Acres Temporary)	Mitigation/Impact Notes	Planting Ratios/Measures Associated with Aquatic Resource (Enhancement ?)	NFW F for impacts to (acres) VP	NFW F for impacts to (acres) OAR	Bank / Preserve VP Creation IN	Bank / Preserve VP Preservation IN	Bank / Preserve VP Creation OUT	Bank / Preserve VP Preservation OUT	Bank / Preserve VP Creation Unknown Location	Bank / Preserve VP Preservation Unknown Location	Bank / Preserve OAR Creation IN	Bank / Preserve OAR Preservation IN	Bank / Preserve OAR Creation OUT	Bank / Preserve OAR Creation Unknown Location	ON-SITE OAR Creation	ON-SITE OAR Restored	ON-SITE OAR Preserved	ON-SITE OAR Enhanced	ON-SITE VP Creation	ON-SITE VP Preserved
1994-01046	Verified	0.48	0.44		0.04		Best Available Info								0.44	0.88										
1995-00018	Verified - See 1996-00577 and 2005-00936	10.764	1.35		2.12		Same site as 2005-00936 and 1996-577. Delineated acreage only included here.														2.15		1.18		2.61	0.47
1995-00178	Verified - Loc UK - Owner Cav	2.96	0.86		0.85		On-site preserved was for both this project (Woodcreek North) AND 1995-00177 (Woodcreek West). Joint preserved acreage for both is included with THIS project (1995-00178).				1.201					2.702	0.51						1.1			1.24
1995-00332	Verified - addl Unauth Resolved in 1997-00605	0.61	0.32		0.29		FWS mitigation specifically called out in verification- "including, as req by FWS": 0.48 VP (Cr) and 0.96 VP (P) . Actual mit purchased 0.48 VP (Cr), 0.78 VP (P).								0.48	0.78	0.13									
1995-00337	Verified	0.02			0.02		Best Available Info																			
1995-00363	SP - Authorized - Unauth - D/I Variable	101.79	14.34		15.8	2.86	Indirect 31.10 VP and 0.45 OAR					14					7.53		10.85							
			31.1		0.45						10.72						4.95		1.43							
												11.06						1.8								
												31.15														
												0.57														
1995-00556	Verified	0.015				0.015	Delineated Assumed																			
1995-00569	Verified	1.5	0.045				X								0.045	0.09										
1995-00572	Verified	0.46			0.46		Delineated Assumed. Best Available Info. MF Roll 236, Frame 2188																			

Number	Status Notes	Acres Waters Delineated	VP Impacts (Acres Permanent)	VP Impacts (Acres Temporary)	OAR Impacts (Acres Permanent)	OAR Impacts (Acres Temporary)	Mitigation/Impact Notes	Planting Ratios/Measures Associated with Aquatic Resource (Enhancement ?)	NFWF for impacts to (acres) VP	NFWF for impacts to (acres) OAR	Bank / Preserve VP Creation IN	Bank / Preserve VP Preservation IN	Bank / Preserve VP Creation OUT	Bank / Preserve VP Preservation OUT	Bank / Preserve VP Creation Unknown Location	Bank / Preserve VP Preservation Unknown Location	Bank / Preserve OAR Creation IN	Bank / Preserve OAR Preservation IN	Bank / Preserve OAR Creation OUT	Bank / Preserve OAR Creation Unknown Location	ON-SITE OAR Creation	ON-SITE OAR Restored	ON-SITE OAR Preserved	ON-SITE OAR Enhanced	ON-SITE VP Creation	ON-SITE VP Preserved
1995-00589	SP - Authorized - Twelve Bridges - Ness	75.73	5.55		17.01		Originally 22.78 acre impacts (type?), 92.51 acres preserved on-site (type?), 34.17 created on-site (Types?). Changes from original are part of 1997-00375. Many modifications. 3.82 Impacts and credits data is poor. Assumption.															26.18		42.13		8.33	11.04
					0.226																0.34					
					0.02																0.02					
					3.82															3.82						
1996-00189	Verified	1			1		X																			
1996-00201	Verified	0.55	0.54		0.01		X				0.54					1.08	0.01									
1996-00328	Verified - Cat X	0.1			0.1		X										0.2									
1996-00329	Verified - Cat X	0.1			0.1		X										0.2									
1996-00495	SP - Authorized	0.413			0.413		Dredge 2000 cubic yards sediment from channel. Impacts assumed OAR. Delineated assumed.																			
1997-00315	Verified	2.56	0.04		2.52		About half of project is outside study area.								0.04	0.08	2.52									
1997-00375	SP - Auth	123.91	1.68		13.68		Includes portion of original 1995-00589, Incl all of 1992-00286, all but small parcel of 1990-00445					1.98				2	6.67				10.52		84.71	42	1.39	8.85
					14.99						0.29						23.9				21.1					
1997-00387	SP - Authorized	0.58	0.07		0.53		0.07 VP creation required by Corps was paid into FWS VP Conservation Fund…Where should we log data?								0.07	0.14			0.53							
1997-00391	Verified	3.81	0.69		1.91		X								0.69	1.38	1.91						1.21			

Number	Status Notes	Acres Waters Delineated	VP Impacts (Acres Permanent)	VP Impacts (Acres Temporary)	OAR Impacts (Acres Permanent)	OAR Impacts (Acres Temporary)	Mitigation/Impact Notes	Planting Ratios/Measures Associated with Aquatic Resource (Enhancement ?)	NFW F for impacts to (acres) VP	NFW F for impacts to (acres) OAR	Bank / Preserve VP Creation IN	Bank / Preserve VP Preservation IN	Bank / Preserve VP Creation OUT	Bank / Preserve VP Preservation OUT	Bank / Preserve VP Creation Unknown Location	Bank / Preserve VP Preservation Unknown Location	Bank / Preserve OAR Creation IN	Bank / Preserve OAR Preservation IN	Bank / Preserve OAR Creation OUT	Bank / Preserve OAR Creation Unknown Location	ON-SITE OAR Creation	ON-SITE OAR Restored	ON-SITE OAR Preserved	ON-SITE OAR Enhanced	ON-SITE VP Creation	ON-SITE VP Preserved
1997-00450	LOP - Authorized - Related to 1991-01022	0	0.02				0.303 Indirect VP via FWS. Supposedly, impacts were to be compensated for via off-site mit credits. No data on this. Comensation was recorded, but it is an assumption.								0.02											
1997-00508	RGP - Emergency	0			0		1.148 acre sediment removal from floods.																			
1997-00593	Verified	0.1	0.1				X								0.1	0.2										
1997-00605	Verified	0.82	0.29		0.23		FWS required on-site preserve, 0.25 OAR of which 0.22 is considered species habitat. Include? 0.02 VP impact is from 1995-00332								0.29	0.58	0.23									
			0.02								0.06					0.12										
1997-00632	SP - Authorized - D/I variable	20.61	4.98		0.688		Indirect VP 2.18, OAR 0.402.				4.98						0.697						9.487			5.52
			2.18		0.402							7.71														
												1.81														
1997-00695	LOP - Authorized - Cav - Loc UK	0.54	0.04		0.5		File loc UK. Realigned stream corridor is preserved (acres?) - Decision to place realignment in on-site OAR (C).								0.04	0.08					0.5					
1997-00767	Verified	0.49			0.49		X										0.49									
1998-00067	Verified	0.02			0.02		X										0.02									
1998-00081	Verified	5.99	0.53		1.04		Road Widening. NOTE: Entire linear projects line falls within study area.				0.53					0.53	0.4									
												1.06														
1998-00088	Verified	0.42			0.42												0.42									
1998-00117	Verified	0.29			0.29		X										0.29									

Number	Status Notes	Acres Waters Delineated	VP Impacts (Acres Permanent)	VP Impacts (Acres Temporary)	OAR Impacts (Acres Permanent)	OAR Impacts (Acres Temporary)	Mitigation/Impact Notes	Planting Ratios/Measures Associated with Aquatic Resource (Enhancement ?)	NFWF for impacts to (acres) VP	NFWF for impacts to (acres) OAR	Bank / Preserve VP Creation IN	Bank / Preserve VP Preservation IN	Bank / Preserve VP Creation OUT	Bank / Preserve VP Preservation OUT	Bank / Preserve VP Creation Unknown Location	Bank / Preserve VP Preservation Unknown Location	Bank / Preserve OAR Creation IN	Bank / Preserve OAR Preservation IN	Bank / Preserve OAR Creation OUT	Bank / Preserve OAR Creation Unknown Location	ON-SITE OAR Creation	ON-SITE OAR Restored	ON-SITE OAR Preserved	ON-SITE OAR Enhanced	ON-SITE VP Creation	ON-SITE VP Preserved
1998-00118	LOP - Authorized	0.56			0.56		X										0.49									
1998-00166	Verified	2.94	0.36		0.13		X				0.36						0.13						1.42			1.03
1998-00171	Verified	0.247			0.247		X																			
1998-00172	Verified	1.018	0.219		0.799		Delineated Assumed				0.219					0.438	0.799									
1998-00175	Verified	0			0		No Impacts. Where to put this one? Delineated assumed, no data.																			
1998-00184	Verified	0.09				0.06	X																			
1998-00208	Verified	1.77	1.42		0.1		1.436 VP C and 5.678 VP P required by FWS and referenced by Corps. Was to be purchased at Orchard Creek (in). Nancy feels Corps relied upon FWS mit to satisfy requirements - decision is to include those figures as Corps mitigation.				1.436	5.678					0.1									
1998-00263	Verified	0.28			0.28		X										0.28									
1998-00265	Verified	1.39	0.38		1.01		FWS mitigation (P) required by Corps				0.38					0.76	1.01									
1998-00371	Verified	0.004				0.004	Delineated Assumed																			
1998-00373	Verified	0.018			0.011	0.007	Delineated Assumed																			
1998-00377	Verified	0.03			0.03		X																			
1998-00379	Verified	0.14			0.14		X										0.14									
1998-00400	Verified	0.06			0.06		Delineated Assumed																			

Number	Status Notes	Acres Waters Delineated	VP Impacts (Acres Permanent)	VP Impacts (Acres Temporary)	OAR Impacts (Acres Permanent)	OAR Impacts (Acres Temporary)	Mitigation/Impact Notes	Planting Ratios/Measures Associated with Aquatic Resource (Enhancement ?)	NFWF for impacts to (acres) VP	NFWF for impacts to (acres) OAR	Bank / Preserve VP Creation IN	Bank / Preserve VP Preservation IN	Bank / Preserve VP Creation OUT	Bank / Preserve VP Preservation OUT	Bank / Preserve VP Creation Unknown Location	Bank / Preserve VP Preservation Unknown Location	Bank / Preserve OAR Creation IN	Bank / Preserve OAR Preservation IN	Bank / Preserve OAR Creation OUT	Bank / Preserve OAR Creation Unknown Location	ON-SITE OAR Creation	ON-SITE OAR Restored	ON-SITE OAR Preserved	ON-SITE OAR Enhanced	ON-SITE VP Creation	ON-SITE VP Preserved
1998-00481	Verified	2.08	1.04		0.56		Mitigation addressed Corps impacts, but was also used for FWS required mit. Sec 7 letter appended project to programmatic BO, this means we can assume 1:1C, 2:1 P						1.04			2.08			0.56							
1998-00538	Verified	6.45	0.31		2.69		X				2.51					5.02	0.49						3.45			
1998-00626	Verified	11.39	0.72		2.26		Best Available Info. This project is NWP 14 + NWP 26, so original delineated waters figure has not been modified.				2.14					4.28					2.87		8.36			
					0.05																					
1998-00668	Verified - SP - LOP - Modifications - Owner Grudzinski	9.6	0.41		2.09		Project has these authorizations and impacts, as well as a currently open incomplete SP.				0.41					0.82					2.72		7			
1998-00669	Verified	7.19	0.92		0.91		X			0.207					0.92	0.64					0.653		4.16			1.2
1998-00682	Verified	0.108	0.108				Delineated Assumed. FWS approved 0.108 constructed VP and FWS approved 0.216 preserved VP.								0.108	0.216										
1999-00051	LOP - Authorized - Permit Mod - Loc UK - Cav	0.25			0.25		Associated with 1992-00159. File loc UK.													0.25				0.6		
1999-00129	Verified	0.04			0.04		Small amt of fill from grading before delineation. Amt unknown. Assumed OAR.																			
1999-00252	Verified	1.39	0.05		1.34		Addl 0.34 VP (P) Purchased at Laguna Creek for FWS						0.17	0.34					1.22							
1999-00310	Verified	0.22			0.15		X												0.1		0.114					

Number	Status Notes	Acres Waters Delineated	VP Impacts (Acres Permanent)	VP Impacts (Acres Temporary)	OAR Impacts (Acres Permanent)	OAR Impacts (Acres Temporary)	Mitigation/Impact Notes	Planting Ratios/Measures Associated with Aquatic Resource (Enhancement ?)	NFWF for impacts to (acres) VP	NFWF for impacts to (acres) OAR	Bank / Preserve VP Creation IN	Bank / Preserve VP Preservation IN	Bank / Preserve VP Creation OUT	Bank / Preserve VP Preservation OUT	Bank / Preserve VP Creation Unknown Location	Bank / Preserve VP Preservation Unknown Location	Bank / Preserve OAR Creation IN	Bank / Preserve OAR Preservation IN	Bank / Preserve OAR Creation OUT	Bank / Preserve OAR Creation Unknown Location	ON-SITE OAR Creation	ON-SITE OAR Restored	ON-SITE OAR Preserved	ON-SITE OAR Enhanced	ON-SITE VP Creation	ON-SITE VP Preserved
1999-00322	LOP - Authorized - Part of Highland Reserve	0.44	0.29		0.15		RH 1037128. Impacts were previously authorized under 1989 Highland Reserve permit, but waters re-established. Mitigation for those impacts was also handled under original permit. Include any of this??																				
1999-00370	Verified	0.026				0.026	Delineated Assumed																				
1999-00383	Verified	0.25				0.25	Delineated Assumed																				
1999-00401	Verified	0.06				0.06	Delineated Assumed																				
1999-00662	Verified	0.01			0.01		Riparian replanting - not in Corps letter. NOTE: Entire utility line falls within study area. Waters delineated was actually 2.1 (NWP 12). Impact acreage used instead.																				
1999-00673	Verified	1.83	0.13		1.55		X								0.13	0.26			1.33								
1999-00680	Verified	0.577			0.577		X										0.577										
1999-00727	Verified - Addl Mod	2.629	0.357		0.126		Best Available Info, file incomplete. Preserve contains 2.146 acres, types uk. NOTE: Entire utility line falls within study area.								0.357	0.714				0.126			2.146			
1999-00728	Verified - D/I Variable	1.17	0.022		0.466		0.005 Indirect VP. 0.032 Indirect OAR.		0.022	0.466						0.044							0.711			
			0.005		0.032	0.005			0.005	0.032																
2000-00007	SP - Authorized - D/I Variable	2.89	0.2		1.98		0.15 Indirect VP.						0.7		1.4				2				0.56			
			0.15																							
2000-00054	Verified	1.03			0.289		X										0.29						0.75			
2000-00077	SP - Authorized	1.25	0.41		0.48		X								0.41	0.82	0.96									

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2000-00120	Verified	0.06			0.06		X													0.06						
2000-00127	Verified	1.12			0.13		X																			
2000-00140	Verified	0.03			0.03		Delineation Assumed.																			
2000-00300	Verified - Multiple	0.241	0.012				X		0.012							0.024										
2000-00330	Verified	0.32	0.21		0.11		X		0.21	0.11						0.42										
2000-00455	Verified	0.0112				0.0112	X																			
2000-00456	Verified	0.21		0.21			Impact greater than delineated acreage (0.1832). Impact used instead. FWS required mitigation.																			
2000-00513	Verified - Reverification	0.27	0.2		0.07		X				0.27					0.54										
2000-00668	Verified	0.0036			0.0036		Delineation Assumed.													0.0036						
2000-00671	Verified	0.07	0.04		0.03		Verification required 0.08 VP (P) at FWS bank. Corps required 0.04 VP C and 0.03 OAR C. Actual mitigation was 0.11 VP C In and 0.22 VP P In.				0.11	0.14														
												0.08														
2000-00702	Verified - D/I Variable	0.15			0.15		Delineation Assumed. Assoc w Highland Reserve. Indirect impacts (unspecified).										0.15									
2000-00730	Verified	0.01			0.01		Delineation Assumed.																			
2001-00011	Verified	0.05			0.05		X										0.05									
2001-00016	Verified - Multiple - Restoration	7.47			4.5	6.17	139.7 acres WOUS created via restoration (conservation area). NOTE: Be aware of any mitigation using Natomas HCP!!										139.7									
2001-00024	LOP and NWP - Verified/Authorized - D/I Variable	1			0.01		Indirect 0.176 (type uk, assumed OAR				0.379	0.758											0.58			0.02

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			0.379		0.031															0.21						
					0.176																					
2001-00050	Verified - D/I variable	0.17	0.06				0.11 Indirect OAR. FWS mit, 0.06 VP create, 0.120 vp preserve								0.06	0.12	0.06									
					0.11																					
2001-00096	Verified and/or SP - Originally Unauth	0.04	0.02		0.02		Impacts include VP, amt not specified in documents. (0.04 total) Assumption - impacts split evenly across types. FWS impacts much more. Significant FWS mitigation. Waters delineated was actually 1.441 (NWP 12). Impact acreage used instead.																			
2001-00136	Verified - D/I variable	0.64	0.003		0.24		X				0.003	0.67					0.24									
2001-00139	Verified	0.08				0.08	Credits required "riparian habitat" at Wildlands. Waters delineated was actually 0.29 (NWP 12). Impact acreage used instead.										0.08									
2001-00199	Verified	0.12			0.12		X										0.12									
2001-00216	Verified - utility line Orchard Creek	0.001				0.001	Waters delineated was actually 91.1 (NWP 12). Impact acreage used instead.	Plantings 3:1 (NMFS)																		
2001-00283	LOP - Authorized	0.7	0.08		0.61		X				0.18					0.36	1.68									
2001-00318	Verified	0.151	0.064		0.086		Applicant purchased 0.453 VP C (Sheridan) and 0.906 VP P (Orchard Creek) for FWS requirements.				0.453	0.906														
2001-00338	Verified	0.07			0.07		Delineation assumed. Expansion of 1901-08768.																			

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2001-00451	Verified	0.03				0.03	Waters delineated was actually 0.95 (NWP 12). Impact acreage used instead.												0.03							
2001-00536	Verified - D/I Variable	0.62	0.3		0.14		0.18 Indirect OAR.								0.3	0.6	0.23						0.18			
					0.18																					
2001-00568	Verified	0.006			0.006		Delineation assumed																			
2001-00569	Verified	0.06	0.06				X								0.06	0.12										
2001-00716	Verified	0.63	0.18		0.05		X								0.18	0.36				0.05						
2002-00017	SP - Authorized	4.072	0.617		2.639		X				2.849	5.69							0.581				0.59			
2002-00090	Verified	0.3			0.06	0.01	X										0.1									
2002-00101	Verified	0.43	0.12		0.31		X		0.12	0.31						0.24										
2002-00140	Verified	0.14			0.14		X										0.14									
2002-00183	Verified	0.006				0.006	X																			
2002-00357	Verified	0.089	0.045		0.04		X		0.045	0.04						0.09										
2002-00377	Verified	0.1			0.06		X																			
2002-00387	SP - Authorized	1.601	0.349		0.723		Review on-site preserve req - use this as acreage. on-site preserve acreage differs from permit requirement (more)				0.503					1.006			0.685				0.038			
2002-00396	SP - D/I variable - Authorized	2.155	0.623		0.25		1.102 Indirect types uk, ASSUMED OAR. 3.388 VP (P) at FWS bank (Mariner)				1.184	3.388					0.202						0.998			0.243
					1.102																					
2002-00442	Unauthorized	0.03	0.02				X																			
2002-00558	SP - Authorized - Ness - Loc UK	1.36	0.45		0.714		Loc UK, Best available info.		0.45							0.9				0.714			0.196			

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2002-00629	Verified	0.0003	0.0003				FWS mitigation: record of 0.0003 creation credits purchased (Sheridan)				0.0003					0.0006										
2002-00648	Verified - Multiple - D/I Variable - Unauth - Ness has	1.2532	0.001		0.063		Indirect 0.030 VP, 0.803 OAR. Significant mitigation req by other agencies.				0.03					0.06	0.97									
			0.03																							
			0.03		0.803																					
2002-00666	SP - Authorized - D/I variable	59.95	13.34		8.42		9.5 Indirect VP, 0.74 Indirect Vernal Swale. Preserve 210 acre portion of Reason Farms (wetland and waters acreage unknown). Irrevocable letters of credit $20m to secure 1000 acres of VP critical habitat ?? (Placer Land Trust).				43						8				7.07		13.35			24.84
					0.004						25.48							24			0.004					
					0.009	0.006						1.2						5.14								
					0.116							3														
					0.032	0.362						18.89														
2002-00752	SP - Authorized	5.326	0.177		2.351	0.096	FWS Mitigation	Shade Affected Reach 2:1							0.177	0.354					3.411		1.205			
2003-00040	Verified - D/I variable	0.556	0.094		0.277		0.185 Indirect Other WOUS. Delineated waters were unclear, multiple portions of multiple jds. Delineation assumed.		0.094							0.188	0.462									
					0.185																					
2003-00071	Verified - with Ness	0.654	0.37		0.094		X		0.37							0.74	0.094						0.19			
2003-00096	Verified	0.054	0.021		0.033		FWS mitigation								0.021	0.042										
2003-00127	Verified	0.32			0.32		X														1.3					
2003-00167	Verified	0.157			0.16		X										0.16									

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2003-00240	SP - Authorized - D/I variable	2.373	1.917		0.456		Indirect 0.038 impacts (type uk) ASSUMED OAR				2.128	4.256					0.283									
					0.038																					
2003-00297	Verified - restoration	0.76				0.76	X																			
2003-00496	Verified	0.133			0.133		X			0.133																
2003-00637	SP - Authorized - D/I variable - See 2005-00262	7.533	0.552		0.58		2.504 VP Indirect. 6.112 (P) and 1.298 (C) (types unspecified- assumed OAR) at Reason Farms. FWS (1.104) is an assumption based on known VP creation. 1.104 was subtracted from 6.112 (P) to generate assumed 5.008 OAR figure.				0.552	1.104					0.185	5.008								
			2.504														0.746									
2003-00650	Verified	2.931	0.251		0.226		0.702 VP Preservation at FWS approved bank was a condition		0.251							0.702	0.217						2.439			0.015
2003-00661	Verified	6.56			0.06		X																			
2003-00762	Verified	0.71			0.42	0.11	X													0.67						
					0.18																					
2003-00773	Verified	0.18			0.18		X			0.04							0.14									
2003-00797	Verified	0.24			0.24		X			0.13							0.21									
2004-00021	Verified	0.05			0.05		X										0.05									
2004-00136	Verified - D/I variable	0.05			0.03		Indirect 0.02 (types uk) ASSUMED OAR. Delineated was assumed.	Shade Affected Reach 3:1												0.1						
					0.02																					
2004-00213	SP - D/I variable - Authorized	2.015	1.036		0.546		Indirect 0.058 (types uk) ASSUMED OAR				1.347					2.694	0.575						0.433			
					0.058																					

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2004-00214	Verified	0.013			0.013		Waters delineated was actually 0.059 (NWP 14). Impact acreage used instead.													0.013							
2004-00394	Preserve (NWP) - Verified - Orchard Creek	3.18				0.01	VP creation required by permit, not included.																				
2004-00424	Preserve (NWP) - Verified - John D Vincent	54.85			0.003	0.02	13.469 created since initial permit. Creation and Restoration required by permit, not included.	Plantings: 1540 linear feet of ag ditch.																			
2004-00426	Verified	0.089			0.089		X			0.089																	
2004-00447	Verified - see 2005-00349	0.152			0.15		X			0.15																	
2004-00513	Verified	0.03				0.03	X	Plantings - Inch for inch (from PCN - incorporated by reference, not Corps letter)																			
2004-00770	Verified	0.98	0.2		0.15		X		0.2	0.15						0.4							0.63			
2004-00812	Verified - See 2000-00679	0.19	0.09		0.1		X		0.09	0.03						0.18			0.07							
2004-00843	Verified	0.38	0.27		0.11		X		0.27	0.11						0.54										
2004-00845	Verified - After the Fact and addl NWP	0.26			0.026		Waters delineated was actually 1.26 (NWP 14). Impact acreage used instead.	Shade Affected Reach 2:1		0.023																	
2004-00867	Verified	2.156			0.352		X			0.352													1.793			
2004-00910	Verified	0.2			0.068		X			0.068																	
2005-00017	Verified	0.05	0.028		0.015		X		0.028	0.015						0.056										
2005-00133	Unauth - Withdrawn for lack of staff resources	0.33			0.33		Delineated was assumed																			
2005-00254	Verified	0.392	0.063		0.192		X		0.063	0.192						0.126										

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2005-00259	SP - Verified - Outcard Channa - D/I variable	2.26	0.93		0.18		2.79 VP Indirect. (Total impact exceeds delineated, is this ok?) Mitigation an addl 1.42 on-site preserved (Resource Types unknown) - Assumed OAR. 1.86 VP (P) Service Approved bank.								0.93	1.86				0.18			1.42			
			2.79																							
2005-00307	SP - Authorized	2.038	0.708		1.33		X				0.708					1.416	1.33									
2005-00473	Verified	0.399			0.399		X			0.399																
2005-00493	Verified	0.98			0.07		X			0.07																
2005-00590	Verified - D/I variable	1.395	0.157		0.227		0.643 Indirect VP + 0.368 Indirect OAR. Off-site preservation was pulled from BO as a condition. NOTE: Entire Utility line falls within study area. Waters delineated was actually 21.197 (NWP 12). Impact acreage used instead.				0.868	4.74														
			0.643		0.368																					
2005-00595	Verified	0.11			0.11		X			0.11																
2005-00741	Verified - with Ness	0.806	0.38		0.06		Bank credits not yet purchased. 0.88 VP C IN, OR 1.32 VP C OUT. (ASSUMED 0.88 IN). Request by applicant to mitigate by resource at 1.5:1 instead of 2:1 all VP.				0.88					1.57								0.14			0.19
2005-00842	Verified	0.284	0.272		0.012		X		0.272	0.012						0.544										

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2005-00936	SP - Authorized - outcard - Robb - Supposedly with Office of Council. See 1995-00018	0			0.432		Same site as 1995-00018. The required on-site preserve (6.862 OAR) is already included under 1995-00018, as is the delineated acreage.																			
2005-00955	LOP Authorized	0.53			0.53		X													0.53						
2005-01087	SP - Authorized	4.29	1.25		3.04		X				1.34		3.9				2.15		0.2							
																	0.8									
2006-00248	Verified	0.84			0.086		EIS includes on-site preserve w/riparian, amt unknown. Not specified in Corps letter.																			
2006-00282	Verified	0.37	0.04		0.33		Off-Site Preservation was for FWS, as a condition.		0.04	0.33	0.31	0.93														
2006-00327	Verified	0.08	0.005		0.075		Addl FWS VP Creation Credits 0.064		0.005	0.075					0.064	0.128										
2006-00509	Verified	0.15				0.15	X																			
2006-00536	Verified	0.01			0.003	0.007	Waters delineated was actually 0.055 (NWP 14). Impact acreage used instead.																			
2006-00791	Verified	0.046			0.046		Waters delineated was actually 0.425 (NWP 12). Impact acreage used instead.			0.046																

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2006-00871	Verified - Multiple permits - Benn owner	0.269			0.269		LOP (0.269 impacts) used previous mititgation for Regional 65 Center (includes project area) for compensation. How to log? R 65 Center has no modern file # (1989). This old verification also includes VP impacts, on-site preserve, creation, etc.																			
					0.01	0.146				0.156																
						0.17																				
2006-01002	Verified	0.065			0.003	0.027	X														0.023					
2007-00053	Verified	0.061	0.061				X						0.061	0.122												
2007-00081	Verified	0.2273			0.0823	0.145	Waters delineated was actually 21.05 (NWP 12). Impact acreage used instead.			0.0823																
2007-00855	Dev Bank Incomplete + NWP Complete - Locust Road - See RAMS 2005-00937	2.57			0.91	0.01	Plan was to create 12.3 VP and 4.5 OAR. Corps letter also mandated this. 0.91 of the created OAR was to be used as compensation for impact. Although bank is still in review, created wetlands were constructed. As built acreages differ:11.52 VP and 2.53 OAR.																			
2007-00857	Dev Bank + NWP - Toad Hill - See RAMS 2005-00937	43.66			1.1																					
2007-01175	Verified	1.91				1.91	Waters delineated was actually 750.15 (NWP 12). Impact acreage used instead.																			
2008-00345	Verified	1.05			0.2		X			0.2																

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2008-00762	Unauth - Complete. ATF NWP - Incomplete	0.013			0.013		Incomplete, but near final mitigation will make 0.013 impact temporary, and there will be 0.09 OAR on-site enhancement as well.																			
2008-01549	Verified - D/I variable	0.123			0.048		0.014 Indirect OAR. NFWF is 0.5:1 for indirect	Shade Affected Reach 1:1		0.055																
					0.014																					
2009-00424	Verified	0.015			0.015		X																			
2009-01096	Verified	0.2412	0.0004	0.2408			Waters delineated was actually 44.27 (NWP 12). Impact acreage used instead.								0.39	0.78										
2009-01537	Verified	0.0265			0.02	0.065	Delineated Assumed			0.2																
2010-00667	Verified	0.038			0.021	0.017	Waters delineated was actually 0.3 (NWP 14). Impact acreage used instead.														0.08					
2010-00735	SP - Authorized	1.5			0.437		X										0.48		0.14							
2010-01179	Verified	0.028			0.011	0.017	Waters delineated was actually 0.85 (NWP 14). Impact acreage used instead.																			
2011-00141	Verified	0.34			0.15	0.1	X																			
		1099.5133	147.5517	0.8708	291.3809	13.7892			2.547	4.3823	122.9255	135.5	5.871	0.462	10.162	48.2146	238.847	35.948	19.726	6.7266	180.304	11.9	297.457	44.05	71.329	77.648

TOTAL MIT 1314